



**Bal Bharati**  
**PUBLIC SCHOOL**  
Sector -21, Noida

## **SUMMER HOLIDAY HOME WORK**

### **CLASS XII**

**Dear Students and Parents,**

**As the summer holidays approach, we encourage students to make the most of this valuable time. Here are some suggestions to help students stay productive, engaged, and refreshed during the break:**

- 1. Reading: Cultivate a reading habit by exploring a variety of books and newspapers. Whether it's fiction, non-fiction, or educational material, reading enhances vocabulary, knowledge, and imagination.**
- 2. Skill Development: Use this time to learn a new skill or hobby. This could include playing a musical instrument, cooking, painting, or learning a new language. Online courses , internships and workshops are excellent resources for this purpose.**
- 3. Physical Activity: Stay active by engaging in sports, yoga, or simple exercises. Physical activity is crucial for maintaining health and can be a fun way to spend time with family and friends.**
- 4. Volunteering: Consider volunteering for community service. This not only helps others but also provides a sense of fulfillment and teaches valuable life skills.**
- 5. Educational Trips: Plan educational trips to museums, historical sites, or natural parks. These outings can be both enjoyable and informative.**
- 6. Time Management: Balance leisure with productive activities. Creating a daily schedule can help manage time effectively and ensure that each day is spent meaningfully.**
- 7. Project Work: Start working on school projects or personal projects that interest you. This could be a science experiment, a writing project, or a DIY craft.**
- 8. Family Time: Spend quality time with family. Engage in activities like board games, cooking together, or having meaningful conversations.**

**We hope these suggestions will help students utilize their summer holidays effectively, ensuring a balance of rest, learning, and fun.**

**Wishing everyone a safe, enjoyable, and productive summer break!**

## ACCOUNTANCY

1. A and B are equal partners with capitals of ₹2,00,000 and ₹1,00,000 respectively. As per deed, they are allowed an interest @ 8% on capital. During the year, the firm earned a profit of ₹12,000. Interest on capital allowed to A and B will be: 1  
(a) ₹16,000 and ₹8,000 respectively  
(b) ₹8,000 and ₹4,000 respectively  
(c) Nil  
(d) ₹6,000 each
2. A partner, Gaurav, withdrew ₹12,000 in the beginning of the each quarter during the year. Interest on drawings @ 8% chargeable to him will be 1  
(a) ₹1,440 (b) ₹2,400  
(c) ₹2,080 (d) ₹1,760
3. On which side Partner's drawings out of Capital will be recorded, when their capitals are fixed? 1  
(a) Debit side of Capital A/c (b) Credit side of Capital A/c  
(c) Debit side of Current A/c (d) Credit side of Current A/c
4. Which of the following items is not recorded in Profit and Loss Appropriation A/c? 1  
(a) Interest on Partner's Capital  
(b) Amount of Partner's drawings  
(c) Profit as per Profit and Loss  
(d) Commission to a partner
5. Net profit before commission has been ₹1,20,000. Partner's commission is 20% of net profit before charging such commission. The amount of partner's commission is:  
(a) ₹25,000 (b) ₹24,000  
(c) ₹20,000 (d) ₹22,000
6. A, B and C are partners in a firm sharing profits in the ratio 2 : 2 : 1. C is guaranteed a minimum profit of ₹40,000 by A. Profit for the year amounted to ₹1,60,000. The profit credited to each partner will be: 1  
(a) ₹40,000, ₹80,000, ₹40,000 (b) ₹56,000, ₹64,000, ₹40,000  
(c) ₹ 64,000, ₹64,000, ₹32,000 (d) ₹60,000, ₹60,000, ₹40,000

7. P, Q and R are partners sharing profits in the ratio 3 : 2 : 1. Interest on capital of P, Q and R ₹1,800, ₹2,100 and ₹1,500 respectively is omitted to be provided. The adjustment entry will be: 1
- (c) Both (a) and (b)  
(d) Neither (a) nor (b)
8. The balances of partner's current account are: 1
- (a) Debit  
(b) Credit  
(c) always credit  
(d) either debit or credit
9. Nusrat and Sonu were partners in a firm sharing profits in the ratio of 3 : 2. During the year ended 31st March, 2023 Nusrat had withdrawn ₹15,000. Interest on her drawings amounted to ₹300. Pass necessary journal entry for charging interest on drawings assuming that the capitals of the partners were fixed. 1
10. A, B and C are partners in a firm. Their capital accounts showed the balance on 1st April 2022 as ₹20,000; ₹15,000 and ₹10,000 respectively. During the year A withdrew ₹400 at the beginning of the each month. B withdrew ₹500 at the end of the each month. C withdrew ₹800 at the middle of the each month for six month ending 30th September 2022. Interest on drawing is to be charged @ 12% p.a. Calculate interest on drawings of each partner. 3
11. Zee and Vee are partners in a firm. Their capital accounts showed the balance on 1st April, 2022 as ₹20,000 and ₹15,000 respectively. During the year 2022-23, Zee introduced additional capital of ₹10,000 on August 1, 2022 and Vee introduced ₹15,000 on 1st October, 2022. Interest on capital is allowed @ 6% p.a. on the capital. Calculate interest on capital of each partner. 3
12. A, B, C, D, X, Y and Z are partners in a firm. During the year A withdrew 300 at the beginning of the each month. B withdrew 600 at the end of the each month. C withdrew 500 at the middle of the each month. D withdrew 1,000 at the beginning of the each quarter. X withdrew 2,000 at the end of the each quarter. Y withdrew 5,000 during the year. Z withdrew the following:-

	(₹)
April 30, 2022	6,000
June 30, 2022	4,000
September 1, 2022	8,000
December 31, 2022	3,000
February 28, 2023	5,000

Interest on drawing is to be charged @ 12% p.a. Calculate interest on drawings for the year 31st March 2023.

13. The Partnership agreement between Maneesh and Girish provides that:
- Profits will be shared equally;
  - Maneesh will be allowed a salary of 400 p.m;
  - Girish who manages the sales department will be allowed a commission equal to 10% of the net profits, after allowing Maneesh's salary;
  - 7% p.a. interest will be allowed on partner's fixed capital;
  - 5% interest will be charged on partner's annual drawings;
  - The fixed capitals of Maneesh and Girish are ₹1,00,000 and ₹80,000 respectively. Their annual drawings are ₹16,000 and ₹14,000 respectively. The net profit for the year ending March 31, 2023 amounted to ₹40,000.

Prepare firm's Profit and Loss Appropriation Account. 3

14. A and B entered into partnership on 1st April, 2022 without any partnership deed. They introduced capitals of ₹5,00,000 and ₹3,00,000 respectively. On 31st October, 2022, A advanced ₹2,00,000 by way of loan to the firm without any agreement as to interest. The profit and loss account for the year ended 31.03.2023 showed a profit ₹4,30,000 but the partners could not agree upon the amount of interest on loan to be charged and the basis of division of profits. Pass a journal entry for the distribution of profit between the partners. 3

15. A and B are partners in a firm. A is to get a commission of 10% on net profit before charging any commission. B is to be get commission of 10% on net profit after charging all commission. Net profit before charging any commission was ₹2,20,000. Find out the commission of A and B and prepare Profit and Loss Appropriation A/c. 3

16. A, B, C and D are the four partners sharing profit as 4 : 3 : 2 : 1. They earned a profit of ₹,80,000 for the year ended 31.03.2023. As per the deed they are to charge a commission @ 20% of the profit after charging such commission which they will share as 2 : 3 : 2 : 3. Prepare Profit and Loss Appropriation Account showing the distribution of profits and the share of each partner assuming capital accounts are maintained on fixed capital system. 3

17. K and P were partners in a firm sharing profits in 4 : 3 ratio. Their capitals on 01.04.2022 were: K ₹80,000 and P 60,000. The partnership deed provided as follows:
- Interest on capital and drawings will be allowed and charged @ 12% p.a. and 10% p.a. respectively.
  - K and P will be entitled to a monthly salary of 2,000 and ₹3,000 respectively. The profits for the year ended 31.03.2023 were 1,00,300. The drawings of K and P were ₹40,000 and ₹0,000 respectively.

Prepare Profit and Loss Appropriation Account and Capital Account of K and P for the year ended 31.3.2023 assuming that the capitals of the partners were: (i) fluctuating. (ii) Fixed. (3+3)

18. Lokesh and Azad are partners sharing profits in the ratio 3 : 2, with capitals of ₹50,000 and ₹30,000, respectively. Interest on capital is agreed to be paid @ 6% p.a. Azad is allowed a salary of ₹2,500 p.a. During 2022-23, the profits prior to the calculation of interest on capital but after charging Azad's salary amounted to 12,500. A provision of 5% of profit is to be made in respect of manager's commission. Prepare accounts showing the allocation of profits and partner's capital accounts.

19. X and Y are partners in a firm sharing profits in the ratio of 3 : 2. On 1 April 2022 their fixed capitals were 3,00,000 and 2,50,000 respectively. On 1.7.2022 they decided that their total fixed capital should be 6,00,000. They further decided that this capital should be in their profit sharing ratio. Accordingly, they introduced extra capital or withdrew excess capital. The partnership deed provided for the following:
- Interest on capital @ 12% p.a.
  - Interest on drawings @ 18% p.a.
  - A monthly salary of ₹2,000 to X and a monthly salary of ₹1,500 to Y. The drawings of X and Y during the year as follows:

Year 2022-23	X (₹)	Y (₹)
June 30	20,000	15,000
September 30	20,000	25,000

During the year ended 31.03.2023, the firm earned a net profit of ₹1,50,000. 10% of this profit was to be transferred to general reserve. You are required to prepare:  
 (i) P & L Appropriation A/c (ii) Partner's Capital A/c (iii) Partner's Current A/c. (3+3)

20. Ram and Shyam were partners in a firm. After adjusting the profits of the year ₹2,00,000 and drawings in their Capital Accounts, the balances of their capital were Ram ₹4,00,000 and Shyam ₹3,00,000. During the year Ram withdrew ₹80,000 and Shyam ₹1,00,000. It was found that interest on Capital and Drawings @ 10% p.a. as provided in the partnership agreement had not been allowed and charged to the partners' capital accounts. Pass the necessary adjustment entry. 3
21. Radha, Mary and Fatima are partners sharing profits in the ratio of 5 : 4 : 1. Fatima is given a guarantee that her share of profit, in any year will not be less than ₹5,000. The profits for the year ending March 31, 2023 amounts to ₹35,000. Shortfall if any, in the profits guaranteed to Fatima is to be borne by Radha and Mary in the ratio of 3 : 2. Record necessary journal entry to show distribution of profit among partner. 3
22. Ankur and Bobby were into the business of providing software solutions in India. They were sharing profits and losses in the ratio 3 : 2. They admitted Rohit for a 1/5 share in the firm. Rohit, an alumni of IIT, Chennai would help them to expand their business to various South African countries where he had been working earlier. Rohit is guaranteed a minimum profit of ₹2,00,000 for the year. Any deficiency in Rohit's share is to be borne by Ankur and Bobby in the ratio 4 : 1. Losses for the year ₹10,00,000. Pass the necessary journal entries. 3
23. Deepti, Tanuja and Renu were partners in a firm trading in hand sanitizer. They were sharing profits in the ratio of 3 : 3 : 2. Their Fixed capitals on 1st April, 2022 were ₹ 2,00,000, ₹ 3,00,000 and ₹ 6,00,000 respectively.

During the COVID pandemic, all partners decided to help the poor daily workers personally. For this, Deepti withdrew ₹ 20,000 from the firm on 15th September, 2022. Tanuja instead of withdrawing cash from the firm took hand sanitizer amounting to ₹ 24,000 from the firm and distributed those to the worker's families. On the other hand, Renu withdrew ₹ 1,00,000 from her capital on 1st January, 2023 and provided a mobile medical van in the containment Zone.

The partnership deed provides for charging interest on drawings @ 6% p.a and allowing interest on capital @ 9% p.a. The net profit of the firm for the year ended on 31st March, 2023 before providing for any of the above adjustments was ₹ 1,57,500. Partners also decided to donate 10% of net profit to Chief Minister relief fund. Based on the above information you are required to answer the following question 3

I. Interest on Tanuja's Drawing will be:

- (a) ₹ 1,440 (b) ₹ 720  
(c) NIL (d) ₹ 240

II. Interest on Partners drawing will be debited to :

- (a) Profit and Loss A/c  
(b) Partners' Capital A/c  
(c) Profit and Loss Appropriation A/c  
(d) Partner's Current A/c

III. Interest on Renu's Capital will be \_\_\_\_\_.

24. Puneet and Raju are partners in a clay toys making firm. Their capitals were ₹ 5,00,000 and ₹10,00,000 respectively. The firm allowed Puneet to get a commission of 10% on the net profit before charging any commission and Raju to get a commission of 10% on the net profit after charging all commission. Following is the Profit and Loss Appropriation Account for the year ended 31st March 2023.

Dr. Profit and Loss Appropriation Account for the year ended 31st March 2023 Cr.

Particulars	Amount (₹)	Particulars	Amount (₹)
To Puneet's Capital A/c (Commission) (..... × 10/100)	44,000	By Profit and Loss A/c	.....
To Raju's Capital A/c (Commission)	.....		
To Profit share transferred to :			
Puneet's Capital A/c	.....		
Raju's Capital A/c	.....		
	.....		.....

I. Raju Commission will be:

- (a) ₹ 40,000 (b) ₹ 44,000  
(c) 36,000 (d) ₹ 36,440

II. Puneet's share of profit will be:

- (a) ₹ 1,80,000 (b) ₹ 1,44,000  
(c) ₹ 2,16,000 (d) ₹ 1,60,00

III. What Journal entries are passed for Commission payable to Raju.

1

1

1

**CBSE SAMPLE PAPER 1 (2023-4)**

1. Assertion: Batman, a partner in a firm with four partners has advanced a loan of ₹ 50,000 to the firm for last six months of the financial year without any agreement. He claims an interest on loan of ₹ 3,000 despite the firm being in loss for the year.

Reasoning: In the absence of any agreement / provision in the partnership deed, provisions of Indian Partnership Act, 1932 would apply. 1

- (a) Both A and R are correct, and R is the correct explanation of A.  
(b) Both A and R are correct, but R is not the correct explanation of A.  
(c) A is correct but R is incorrect.  
(d) A is incorrect but R is correct.
2. A, B and C are in partnership business. A used ₹ 2,00,000 belonging to the firm without the information to other partners and made a profit of ₹ 35,000 by using this amount. Which decision should be taken by the firm to rectify this situation?
- (a) A need to return only ₹ 2,00,000 to the firm.  
(b) A is required to return ₹ 35,000 to the firm.  
(c) A is required to pay back ₹ 35,000 only equally to B and C.  
(d) A need to return ₹ 2,35,000 to the firm.
3. Interest on Partner's loan is credited to: 1
- (a) Partner's Fixed capital account.  
(b) Partner's Current account.  
(c) Partner's Loan Account.  
(d) Partner's Drawings Account.
4. Annu, Banu and Chanu are partners, Chanu has been given a guarantee of minimum profit of ₹ 8,000 by the firm. Firm suffered a loss of ₹ 5,000 during the year. Capital account of Banu will be \_\_\_\_\_ by ₹ \_\_\_\_\_.
- (a) Credited, ₹ 6,500 (b) Debited, ₹ 6,500  
(c) Credited, ₹ 1,500 (d) Debited, ₹ 1,500

Read the following hypothetical situation, answer question no. 5 and 6.

Richa and Anmol are partners sharing profits in the ratio of 3 : 2 with capitals of ₹ 2,50,000 and ₹ 1,50,000 respectively. Interest on capital is agreed @ 6% p.a. Anmol is to be allowed an annual salary of ₹ 12,500. During the year ended 31st March 2023, the profits of the year prior to calculation of interest on capital but after charging Anmol's salary amounted to ₹ 62,000. A provision of 5% of this profit is to be made in respect of manager's commission. Following is their Profit & Loss Appropriation Account.

Particulars	Amount ₹	Particulars	Amount ₹
To Interest on Capital		By Profit and loss account	.....(2).....
Richa	.....	(After manager's commission)	
Anmol	.....		
To Anmol's Salary A/c	12,500		
To Profit transferred to:			
Richa's Capital A/c	.....(1).....		
Anmol's Capital A/c	.....		
	.....		.....

5. The amount to be reflected in blank (1) will be: 1
- (a) ₹ 37,200 (b) ₹ 44,700  
(c) ₹ 22,800 (d) ₹ 20,940
6. The amount to be reflected in blank (2) will be: 1
- (a) ₹ 62,000 (b) ₹ 74,500  
(c) ₹ 71,400 (d) ₹ 70,775
7. In the absence of an agreement, partners are entitled to: 1
- (i) Profit share in capital ratio.  
(ii) Commission for making additional sale.  
(iii) Interest on Loan & Advances by them to the firm.  
(iv) Salary for working extra hours.  
(v) Interest on Capital.
- Choose the correct option:
- (a) Only (i), (iv) and (v)  
(b) Only (ii) and (iii)  
(c) Only (iii)  
(d) Only (i) and (iii)
8. A and B are partners. B draws a fixed amount at the end of every quarter. Interest on drawings is charged @ 15% p.a. At the end of the year interest on B's drawings amounted to ₹ 9,000. Drawings of B were: 1
- (a) ₹ 24,000 per quarter.  
(b) ₹ 40,000 per quarter.  
(c) ₹ 30,000 per quarter.  
(d) ₹ 80,000 per quarter.
9. Shyam, Gopal & Arjun are partners carrying on garment business. Shyam withdrew ₹ 10,000 in the beginning of each quarter. Gopal, withdrew garments amounting to ₹ 15,000 to distribute it to flood



victims, and Arjun withdrew ₹ 20,000 from his capital account. The partnership deed provides for interest on drawings @ 10% p.a. The interest on drawing charged from Shyam, Gopal & Arjun at the end of the year will be

3

- (a) Shyam ₹ 4,800; Gopal ₹ 1,000; Arjun ₹ 2,000.
- (b) Shyam ₹ 4,800; Gopal ₹ 1,000; Arjun ₹ 2,000.
- (c) Shyam ₹ 2,500; Gopal ₹ 750; Arjun Nil.
- (d) Shyam ₹ 4,800; Gopal Nil; Arjun Nil.

10. P, Q and R were partners with fixed capital of ₹ 40,000, ₹ 32,000 and ₹ 24,000. After distributing the profit of ₹ 48,000 for the year ended 31st March 2022 in their agreed ratio of 3 : 1 : 1 it was observed that:

- (a) Interest on capital was provided at 10% p.a. instead of 8% p.a.
- (b) Salary of ₹ 12,000 was credited to P instead of Q.

You are required to pass a single journal entry in the beginning of the next year to rectify the above omissions.

3

11. Cheese and Slice are equal partners. Their capitals as on April 01, 2022 were ₹ 50,000 and ₹ 1,00,000 respectively. After the accounts for the financial year ending March 31, 2023 have been prepared, it is observed that interest on capital @ 6% per annum and salary to Cheese @ ₹ 5,000 per annum, as provided in the partnership deed has not been credited to the partners' capital accounts before distribution of profits.

You are required to give necessary rectifying entries using P & L adjustment account.

3

**CBSE SAMPLE PAPER 2 (2023-4)**

1. Read the following statements: Assertion (A) and Reason (R). Choose the correct alternative from those given below.

Assertion: Michael, Mike and Stephen were partners sharing profits and losses in the ratio 3:2:1. Stephen being a partner wants that he should be exempted from sharing the losses in the firm.

Reasoning: According to Partnership Act 1932, "It may be agreed between the partners that one or more of them shall not be liable for losses."

Alternatives:

1

- (a) Both A and R are correct, and R is the correct explanation of A.  
(b) Both A and R are correct, but R is not the correct explanation of A.  
(c) A is correct but R is incorrect.  
(d) A is incorrect but R is correct.
2. Mike and Ken were two partners sharing profits and losses in the ratio 4:3. Ken was in need of funds so he took a loan of ₹50,000 from the firm at an agreed rate of interest being 10% p.a. If Interest is charged on loan to the partner it will be:

1

- (a) Debited to Profit and Loss A/c  
(b) Credited to Profit and Loss A/c  
(c) Debited to Profit and Loss Appropriation A/c  
(d) Credited to Profit and Loss Appropriation A/c

3. Stella, Grace and Carol were partners in the firm sharing profits and losses in the ratio 3:2:1. Carol was guaranteed a profit of 15,000 after making all adjustments. Any deficiency is to be borne by Grace. The net profit for the year 31st March 2023 was ₹60,000. Grace will be

\_\_\_\_\_ by ₹\_\_\_\_\_.

1

- (a) Credited, ₹6,500.  
(b) Debited, ₹5,000.  
(c) Credited, ₹7,500.  
(d) Debited, ₹ 2,500.

Read the following hypothetical situation and answer question no. 4 and 5.

Ana and Anne started a partnership business on 1st April, 2022. Their capital contributions were ₹ 3,00,000 and ₹ 1,00,000 respectively. Ana rented her property to carry on business for ₹2,500 p.m. Interest on capitals @12% p.a. Ana, to get a salary of ₹ 4,000 p.m. Anne to get a commission of 2% of the net profit. Profits are to be shared in the ratio of 3:2. The profits for the year ended 31st March, 2023 before providing for rent was ₹ 2,00,000.

Dr.

Profit and Loss Appropriation Account

Cr.

for the year ended 31st March, 2023

Particulars	₹	Particulars	₹
To Interest on capital: Ana	_____	By Profit and Loss A/c	_____ (2)
Anne	_____		
To Partner's Salary: Ana	_____		
To Anne's commission	48,000		
To Profit transferred to	_____ (1)		
Ana's Capital A/c	_____		
Anne's Capital A/c	_____		
	_____		

4. The amount to be reflected in blank (1) will be: 1
- (a) ₹3,720 (b) ₹3,400
- (c) ₹ 2,800 (d) ₹2,940
5. The amount to be reflected in blank (2) will be:(a) 1
- ₹1,62,000 (b) ₹ 1,74,500
- (c) ₹ 1,71,400 (d) ₹1,70,000
6. Which of the following is a right of a partner? 1
- (a) sharing profits and losses with other partners in the agreed ratio
- (b) inspecting and having a copy of the books of accounts
- (c) retiring from the firm without giving proper notice
- (d) taking part in the misconduct of the business
- Choose the correct option:
- (i) Only (b) and (c)
- (ii) Only (c)
- (iii) Only (a) and (b)
- (iv) Only (a) and (d)
7. Edward and Hayward are partner Edward draws a fixed amount at the beginning of every quarter. Interest on drawings is charged @10% p.a. At the end of the year, interest on Edward's drawings amounted to ₹7,500. Drawings of Edward were: 1
- (a) ₹ 34,000 per quarter.
- (b) ₹ 44,000 per quarter
- (c) ₹ 30,000 per quarter
- (d) ₹ 60,000 per quarter

8. Ayan, Azan and Aqib are partners carrying on furniture business. Ayan withdrew ₹ 5,000 at the end of each month. Azan withdrew ₹10,000 at end of each quarter. Aqib withdrew ₹40,000 at the end of each month for six months. The partnership deed provides for interest on drawings @ 12% p.a. The interest on drawing charged from Ayan, Azan and Aqib at the end of the year will be: 1

(a) Ayan- ₹ 1,800, Azan- ₹3,300, Aqib- ₹ 6,000 (b) Ayan- ₹ 2,400, Azan- ₹ 1,200, Aqib- ₹ 5,000 (c) Ayan- ₹ 1,400, Azan- ₹ 3,200, Aqib- ₹ 2,000 (d) Ayan- ₹ 3,200, Azan- ₹ 2,300, Aqib- ₹ 8,000

9. Viraf, Virat and Vaibhav were partners with capitals of ₹2,30,000, ₹1,20,000 and ₹2,40,000. After distributing the profit of ₹5,20,000 for the year ended 31st March 2023 in their agreed ratio of 3:2:1 it was observed that: Interest on capital was provided at 14% p.a. instead of 10% p.a. You are required to pass adjustment entry. 3

10. Eden and Ivon were partners in a firm sharing profits and losses in the ratio of 5:4. Their capitals were ₹75,000 and ₹ 90,000 respectively. After the accounts for the financial year ending March 31, 2023 have been prepared, it is observed that interest on capital @ 10% per annum and salary to Eden @ ₹9,000 per annum, as provided in the partnership deed has not been credited to the partners' capital accounts before distribution of profits. You are required to give necessary rectifying entries using Profit and Loss Adjustment Account

# ARTIFICIAL INTELLIGENCE

## PROJECT BASED ACTIVITY - 15 MARKS



### Project Document must comprise:

- Cover Page with the names of the group along with members and SDG theme.
- Basic Intro/ About the research topic
- 4W Problem Canvas along with the problem statement
- Empathy Map
- Solutions cited - Best possible solution selected
- Explanation of how the solution worked upon can achieve a specific SDG
- Screenshots/Pictures supporting the project

### Project Details:

- The project has to be made with collaborative effort of all team members. Each team/ group can have 3-4 members. The team shall submit the project document hardcopy in the first week of July,2023.

- The team shall present their project with the help of presentations and other support materials.

*Create a Portfolio with*  
**UNESCO MGIEP** Courses' Certificates  
Framer Space: Empowering Learners

**ADOBE BOOTCAMP** Certificates focused on 'Digital Creativity and AI Skills Accelerator' [https://bit.ly/Adobe\\_Express\\_Bootcamp\\_Group2](https://bit.ly/Adobe_Express_Bootcamp_Group2)

## BIOLOGY

### (I) WORKSHEET

**Objective: To develop Reasoning and Analytical Skills**

**Topics: Principles of Inheritance & Variations**

#### Molecular Basis of Inheritance

- Q1. A non-haemophilic couple was informed by their doctor that there is possibility of a haemophilic child being born to them. Draw a checker board and find out the percentage of possibility of such a child among the progeny.
- Q2. In a particular plant species, majority of the plants bear purple flowers. Very few plants bear white flowers. No intermediate colours are observed. If you are given a plant bearing purple flowers, how would you ascertain that it is a pure breed for that trait? Explain.
- Q3. Inheritance patterns of flower colour in garden pea plant and snap dragon differ. Why is the difference observed? Explain the difference with the help of crosses in their inheritance patterns.
- Q4. AaBb was crossed with aabb. What would be the phenotypic ratio of the progeny?
- Q5. A true breeding homozygous pea plant with green pods and axial flowers as dominant characters, is crossed with a recessive homozygous pea plant with yellow pods and terminal flowers. Work out the cross up to F<sub>2</sub> generation giving the phenotypic ratio of F<sub>1</sub> and F<sub>2</sub> generation respectively.
- Q6. Name one autosomal dominant and one autosomal recessive Mendelian disorder in humans.
- Q7. Why is Drosophila ideal for experiments in Genetics?
- Q8. The map distance between genes A and B is 3 units, between B and C 10 units and between C and A 7 units. What is the order of the genes on the linkage map?
- Q9. A man who is a PTC taster has a non-taster wife. They have a taster son and two non-taster daughters. Give the genotypes of the parents and children and represent them on a pedigree chart. Is this a sex linked character? Explain.
- Q10. Suppose you begin with one molecule of DNA, after 4 replications, how many daughter DNA molecules would have original parental strands?

(II) Prepare an Investigatory Project on the topics assigned to you in the class.

(III) Complete the Biology Practical File.

## **BUSINESS STUDIES**

### Case Studies –(Chapter -2)

#### Principles of Management

Q. 1. In your school, you observe that books are kept in office, chalks in the library and office records in the staff room.

1. Which principle of management is violated here and why?
2. How will that affect the achievement of school objectives?
3. As a manager, what steps will you take to rectify the shortcomings? (3 marks)

Q. 2. The production manager of an automobile company asked the foreman to achieve a target production of 200 scooters per day. But he did not give him the authority of requisition tools and materials from the stores department. Can the production manager blame the foreman if he is not able to achieve the desired target? Explain briefly the principle relating to the situation.

(3 marks)

Q. 3. Soniya Ltd. was engaged in the business of manufacturing auto components. Lately, its business was expanding due to increased demand for cars. The competition was also increasing. In order to keep its market share intact, the company directed its workforce to work overtime. But this resulted in many problems.

Due to increased pressure of work the efficiency of workers declined. Sometimes, the subordinates had to work for more than one superiors. The workers were becoming indisciplined. The spirit of teamwork, which had characterized the company previously, had begun to wane.

Identify any three principles of management (as given by Henry Fayol) which were being violated, quoting the lines from the above case. (3 marks)

Q. 4. The production manager of Harsh Ltd. instructs a salesman to go slow in selling the product, where the marketing manager is insisting on fast selling to achieve the target. Which principle of management is being violated in this case? (1 mark)

Q. 5. Kanika and Priyanka are typists in a company having same educational qualifications. Kanika is getting Rs. 16000 per month and Priyanka Rs. 10000 per month as salary for the same working hours. Which principle of management is violated in this case. (1 mark)



Q. 6. Rishabh, a manager, very often speaks to people at all levels, passing on instructions regarding his department and also the other departments. Which principle of management is being overlooked? (1 mark)

Q. 7. The management and workers have entered into an agreement that workers will do overtime to cover up losses of the company. In return, the manager will increase the wages. But management later refused to increase the wages. Name the principle violated in this situation. (1 mark)

Q. 8. In Simran Ltd., an employee has the objective of maximizing his salary, but the organizational objective is to maximize output at competitive cost. There was some dispute on this for a while. Eventually, the organization's interest was given priority over employees' interest. Name the principle related to this situation. (1 marks)

Q. 9. Radhika opens a jewelry showroom in Jaipur after completing a course in jewelry designing. She has employed eleven persons in her showroom. For greater productivity, she divides the work into small tasks and each employee is trained to perform his/her specialized job. The sales persons are allowed to close a deal with a buyer by giving a maximum of 10% discount, whereas the decision to give any further discount rests with Radhika as the final authority. In the earlier days of starting of the business, five of her employees were asked to put in extra hours of work. In return she had promised to give them a special incentive within a year. Therefore, after six months when the business was doing well, she awarded a cash bonus to each of these employees to honour her commitment. However, when it comes to settling the conflicts among her employees, she tends to be more biased towards her female employees.

In context of the above case:

1. Identify and explain the various principles of management that are being applied by Radhika by quoting lines from the paragraph.
2. Identify and explain the principle of management which is being violated by Radhika by quoting lines from the paragraph.
3. State any one effect of the violation of the principle of management by Radhika as identified in part (b) of the question.

Q. 10. Neeraj is selected for the post of software developer in an IT Company. On the first day of his joining Mehul, his project manager tells Neeraj that during the course of his work he will come across many such opportunities which may tempt him to misuse his powers for individual or family's benefit at the cost of larger general interest of the company. In such situations, he should rather exhibit exemplary behavior as it will raise his stature in the eyes of the company. Also, for interacting with anyone in the company on official matters, he should adopt the formal chain of authority and communication.

In context of the above case:

1. Identify and explain the various principles of management that Mehul is advising Neeraj to follow while doing his job.

2. List any two values that Mehul wants to communicate to Neraj.

Q. 11. Davinder is a class twelfth commerce student in a reputed school in Punjab. Satinder is his elder brother who is doing his Masters in Hospital administration from Delhi after completing his B. Sc course. During vacations when Satinder comes home, Davinder shows him the business studies project that he is preparing on the topic 'Principles of Management'. Satinder tells him that these principles are also a part of MBA course curriculum at the beginner's level as they form the core of management in practice. But he finds these principle different from those of pure science.

In context of the above case:

1. Outline the concept of principles of management.
2. Why does Satinder find the principle of management different from those of pure science?
3. Why do the principles of management form the core of management in practice?

Explain by giving any two points highlighting the importance of principles of management.

Q. 12. Nutan Tiffin Box service was started in Mumbai by Mumbai dabbawalas. The Dabbawalas who are the soul of entire Mumbai aim to provide prompt and efficient services by providing tasty homemade tiffin to all office goers at right time and place. The service is uninterrupted even on the days of bad weather, political unrest and social disturbances. Recently they have started online booking system through their website 'mydabbawalas.com'. owing to their tremendous popularity amongst the happy and satisfied customers and members, the dabbawalas were invited as guest lecturers by top business schools. The Dabbawalas operate in a group of 25-30 people along with a group pleader. Each group teams up with other groups in order to deliver the tiffin on time. They are not transferred on frequent basis as they have to remember the addresses of their customers. They follow certain rules while doing trade-No alcohol during working hours; No leave without permission; Wearing of white cap & carrying ID cards during business hours.

Recently on the suggestion of a few self motivated fellow men, the dabbawalas thought out and executed a plan of providing food left in tiffins by customers to slum children. They have instructed their customers to place red sticker if food is left in the tiffin, to be fed to poor children later.

1. State any one principle of management given by Fayol & one characteristic of management mentioned in the above case.
2. Given any two values which the Dabbawalas want to communicate to the society.(4 marks)

Q. 13. 'Aapka vidyalaya' believes in holistic development of students and encourages team building through a mix of curricular, co-curricular and sports activities. On its founders day a stage performance had to be put up. A committee of ten prefects was constituted to plan different aspect of the function. They all decided to use recycled paper for decoration. There was a spirit of unit and harmony and all members supported each other. With mutual trust and belongingness the programme was systematically planned and

executed. Kartik, one of the prefects realized that unknowingly the group had applied one of the principles of management while planning and executing the programme. He was so inspired by the success of the function that he asked his father to apply to same principle in his business. His father replied that he was already using this principle.

1. Identify the principle of management applied for the success of the programme.
2. State any two features of management highlighted in the above para.
3. Identify any two values which 'Aapka Vidyalaya' communicated to the society. (4 marks)

Q. 14. Nikita and Salman completed the MBA and started working in a multinational company at the same level. Both are working hard and are happy with their employer. Salman had the habit of backbiting and wrong reporting about his colleagues to impress his boss. All the employees in the organization knew about it. At the time of performance appraisal the performance of Nikita was judged better than Salman. Even then their boss, Mohammed Sharif decided to promote Salman stating that being a female Nikita will not be able to handle the complications of a higher post.

1. Identify and explain the principle of management which was not followed by this multinational company.
2. Identify the values which are being ignored quoting the lines the above para. (5 marks)

Q. 15. Sigma Ltd. is a large company manufacturing electric motors. The company has several departments – Production, Marketing, Finance and HR. Mr. Shashank, CEO of the company set the target sale of 10 crore in a month. To increase the sales, the marketing manager, Mr. Ishaan insists on offering 10% discount to customers. But the finance manager, Mr. Mohak does not approve such discount as it would mean loss of revenue. Because of dual subordination, the sales manager, Mr. Anshik could not achieve the sales target.

1. Which concept of management Sigma Ltd. is lacking? State it.
2. Which principle of management has been overlooked by this company? State it.
3. Which principle of management has been overlooked by this company? State it. (6 marks)

Q. 16. ABC Ltd. is engaged in producing electricity from domestic garbage. There is almost equal division of work and responsibility between workers and management. The management even takes workers into confidence before taking important decisions.

All the workers are satisfied as the behavior of the management is very good.

1. State the principle of management described in the above para.

2. Identify any two values which the company wants to communicate to the society. (3 marks)

Q. 17. Voltech India Ltd. is manufacturing LED bulbs to save electricity and running under heavy losses.

To revive from the losses, the management thought of shifting the unit to a backward area where labour is available at a low cost. The management also asked the workers to work overtime without any additional payment and promised to increase wages of the workers after achieving its mission. Within a short period the company started earning profits because both the management and the workers honoured their commitments.

1. State the principle of management described in the above para.
2. Identify any two values that the company wants to communicate to the society. (3 marks)

Q. 18. Kushal Ltd. is a leading automobile company in which the various departments are setting up their own objectives without paying any interest to the organizational objectives.

1. Which aspect of management the company is lacking? What will be its impact on the organization?
2. Identify the principle of management which has been overlooked by this organization.
3. State any two values neglected by the people of this organization. (5 marks)

Q. 19. Telco Ltd. is manufacturing files and folders from old clothes to discourage use of plastic fields and folders. For this, they employ people from nearby villages where very less job opportunities are available. An employee, Harish, designed a plan for cost reduction but it was not welcomed by the production manager. Another employee gave some suggestion for improvement in design, but it was also not appreciated by the production manager.

1. State the principle of management described in the above para.
2. Identify any two values that the company wants to communicate to the society. (3 marks)

Q. 20. Khandelwal Ltd., a tyre manufacturing concern has been established for more than ten years. Having made good profits in the past, company wanted to expand further and hence did not declare bonus for the previous year. The workers got agitated and trade union declared strike and demanded bonus and other facilities. The management decided not to give into their demands.

1. Which principle of scientific management is overlooked in the given case?
2. State any two values overlooked/ignored by the management in the above case. (3 marks)

Q. 21. Hritik is desirous of setting up a small factory to manufacture different kinds of eco-friendly packaging materials. He proposes to adopt a logical approach to his business rather than hit and trial method as he knows that this can result in tremendous saving of human energy as well as

wastage of time and materials. He plans to adopt paternalistic style of management in practice in order to avoid any kind of class-conflict that may emerge between him and the workers. Moreover, he plans to seek the opinion of his workers before taking any important decisions and also offers incentives to them for providing valuable suggestions for the business.

In context of the above case:

1. Identify and explain the various principle of scientific management that Hritik plans to apply in his business.
2. List any two values that he wants to communicate to the society by offering eco-friendly packaging material.

Q. 22. Gaurika has been appointed as the chief organizer of a weeklong cultural event. Being a staunch follower of scientific management, she decides to execute her work by putting into practice the various techniques of scientific management. On the basis of several observations, she is able to determine that the standard time taken by the security officer at the gat to check the credentials of each visitor is 30 seconds. So she decides to employ two persons on this job for every function along with the other necessary support staff. She considers the fact that every day, the functions will take place in three shifts of four hours each, therefore it is important to give breaks to the support staff even in a single shift to take her/his lunch etc. moreover, on introspection, she determines that the best way to distribute refreshment boxes to the visitors will be to hand it over to them at the exit gate as it would help to save time and eliminate any kind of confusion.

In the context of the above case:

1. Identify and explain the various techniques of work study which have been put into practice by Gaurika.
2. List any two values that Gaurika wants to communicate to the society.

Q. 23. 'Study Buddy Pvt.' Is company dealing in stationery items. In order to establish standards of excellence and quality in materials and in the performance of men and machines, the company adheres to benchmarks during production. Moreover, its products are available in limited varieties, sizes and dimensions thereby eliminating superfluous diversity of products.

Identify the technique of scientific management which has been adopted by 'Study Buddy Pvt. Ltd.'

Q. 24. Tina and Anshu completed their MBA and started working in a multinational company at the same level. Both are working hard. Anshu has the habit of backbiting and wrong reporting about his colleagues to impress the boss. All the employees in the organization know about it. At the time of performance appraisal also Tina's performance was rated better than Anshu. Even then their boss decided to promote Anshu stating that being a female, Tina will not be able to handle the complications of higher post.

1. Identify and explain the principle of management that was not followed by this company.

2. Identify the values being ignore.

Q. 25. In one of his principles, Taylor suggested that job performance should be based on scientific enquiry and not on will/wish or personal intuition of manager?

1. Name that principle.

2. What values can be followed by using this principle?

Q. 26. The production department of Alpha Ltd. was not performing well on detailed analysis, it was observed that the workers of that department were overburdened. They were forced to work for longer hours without any break. So the management planned to replace the production manager. They appointed Mr. Hari as the new Production Manager. He observed the average worker and note down their times. He noted down the time they worked and the time they required to be fresh to join back the work. Based on this observation, he set the break intervals for workers. He gave small breaks to workers to recharge their energy.

1. Name and explain the technique of scientific management used by Mr. Hari.

2. State the value which Mr. Hari wants to communicate to the society by allowing rest intervals to workers.

Q. 27. In the staff meeting the principal of the school raised objection that teachers start the teacher after 5 to 10 minutes in third floor classes. He warned them as students are complaining about this. The teachers explained the principal that when we climb steps from ground to third floor. We get some tiredness and need 5 to 10 minutes rest before starting the lecture. The principal planned to install a lift in school so that teachers do not waste their energy on wasteful activity of climbing steps.

1. State the techniques of scientific management used by principal.

2. State any other technique of scientific management.

Q. 28. In a factory the toolbox was kept under the table of every worker, whenever worker needs tools he had to bend tape out tool from tool box and keep it back after use. The newly appointed supervisor observed it and suggested to keep a stool near every worker's chain where toolbox can be placed so that workers do not waste their energy in bending again and again.

1. Which technique of scientific management is used by New Supervisor.

2. State the objective of motion study.

Q. 29. Mr. Mukesh used to manufacture shoes by employing labour who were easily available. When his son after completing his MBA joined the business, he analysed that if we use capital intensive method by using a machine it will reduce the cost and the quality of shoes will also improve.

1. Which technique of Scientific management is used by his son.
2. What is the objective of that technique.

Q. 30. Mr. Kapoor, Finance manager of ABC Ltd. applied for leave to attend a family function in Amritsar. The director of the company requested him to cancel his leave as there is an important meeting schedule on that date. Mr. Kapoor immediately agreed and cancelled his trip as he thought attending meeting is more important for company's benefit.

1. Which principle of Fayol is applied by Mr. Kapoor?
2. Explain that principle.

Q. 31. The manager of ABC Ltd. asked his workers to work overtime to increase the production and earn more but he did not paid extra wages to workers for extra time worked. The workers started feeling dissatisfied and stop contributing maximum.

1. Which principle of Fayol is violated in the above case.
2. Explain that principles.

Q. 32. Mr. Rajiv is the owner of 'Laxmi Dairy.' He is producing various milk products. He always tests various ways of producing different products and chooses the best and most economical way of production. He is also very particular about fixing a place for everything and he makes sure that all the employees are given a fixed place so that there is no wastage of time and delay in production.

1. Which technique of scientific management is applied by Mr. Rajiv?

2. Which principle of Henry Fayol is followed by him?Q. 33. Mr. Rajiv the senior manager of Unique enterprise considered himself very wise and used to take all the decisions himself without consulting the employees, he never used to help any one nor he used to take help of anyone. The employees of unique enterprise were not working efficiently and company's profit margin started declining to tackle the problem, the company appointed a new manager from IIM Bangalore. The new manager after joining made a policy that all the decisions will be taken after consulting employees in the meeting. All employees must give some suggestions and best suggestions will be rewarded with financial and nonfinancial incentives. This policy had a very positive effects on company.

1. State the principle of Hencry Fayol used by new manager.
2. State the technique of scientific management related to above case.

Q. 34. In a school principal makes sure that every instruction, order or information given by him must be passed to vice-principal then Head of the department and then to teachers and students must be informed by respective teachers only. He never allows teachers to directly communicate with him.

1. Stat the Principle of Henry Fayol followed by the school principal.
2. In case of emergency which concept of Scalar Chain can be used by teacher to pass urgent message directly to principal.

Q. 35. Pawan is working as a Production Manager in CFL Ltd. which manufactures CFL bulbs. There is no class-conflict between the management and workers. The working conditions are very good. The company is earning huge profits. As a policy, the management shares the profits earned with the workers because they believe in the prosperity of the employees.

1. State the principle of management described in the above paragraph.
2. Identify any two values which the company wants to communicate to society.

Q. 36. The principles of Taylor and Fayol are mutually complementary. On believed that management should share the gains with the workers while the other suggested that employees' compensation should depend on the earning capacity of the company and should give them a reasonable standard of living.

Identify and explain the principles of Fayol and Taylor referred to in the above paragraph.

Q. 37. The principles of Taylor and Fayol are mutually complementary. One believed that management should not close its ears to constructive suggestions made by the employees while the other suggested that a good company should have an employee suggestion system whereby suggestions which result in substantial time or cost reduction should be rewarded.

Identify and explain the principles of Taylor and Fayol referred to in the above paragraph.

Q. 38. Hina and Harish are typists in a company having the same educational qualifications. Hina gets Rs. 3,000 per month and Harish gets Rs. 4,000 per month as salaries for the same working hours. Which principle of management is being violated in this case? Name and explain the principle.

Q. 39. Rajveer works as a plant superintendent in a carpet making factory. In order to complete the export orders on time, the production manager asks him to make the workers work over time whereas the finance manager is strictly against this practice because it will increase the cost of production. Moreover, Rajveer feels that since the company is manufacturing handmade carpets as well as machine made carpets there is a lot of overlapping of activities. Therefore, there should be two separate divisions for both of them wherein each division should have its own in charge, plans and execution resources.

In context of the above case:

1. Identify and explain the principle of management which is being violated.
2. Also identify the principle of management that Rajveer feels should be implemented in the factory.



3. Give any two differences between the principle of management as identified in part (a) and part (b) respectively.

Q. 40. Gurpreet is running a retail mart in Varanasi to provide various types of products of daily use under one roof to the buyers. The employee turnover in his business is very high and he is perpetually on a look out for new staff. The fact of the matter is that he lacks managerial skills and assigns work to his employees on adhoc basis without letting them settle down in a specific work. This approach of his creates a sense of insecurity among the employees and they tend to leave the job very quickly. However, he is a very god fearing person and offers fair wages to his employees so they can afford a reasonable standard of living.

In context of the above case:

1. Identify and explain the principle of management which Gurpreet is unable to apply and is perpetually on a look out for new staff.

2. “He is a very god fearing person and offers fair wages to his employees so they can afford a reasonable standard of living.” Name and explain the relevant principle of management will have been brought into effect by Gurpreet.

Q. 41. After finishing her BBA degree course, Tanya gets a job of Assistant Manager in a retail company through the reference of her cousin Taruna who works in the same company as a Senior Manager. Taruna decides to guide Tanya through her experience by making her aware of the important facts about management in practice. She tells her that neither the principles of management provide any readymade, straitjacket solutions to all managerial problems nor they are not rigid prescriptions, which have to be followed absolutely.

In context of the above case:

1. Identify the two features of principles of management mentioned in the above paragraph by quoting lines from the paragraph.

2. Why do the principles of management not provide readymade, straitjacket solutions to all managerial problems?

Q. 42. Raj and Simran are both qualified eye surgeons and good friends. After obtaining a certificate of practice, they decide to persue a career of their own choice. Raj starts an eye care centre in the city whereas Simran joins a government hospital in a small village. They meet after a long time in a party. Raj invites Simran to visit his eye care centre and she accepts his invitation. She observes at his clinic that there is a fixed place for everything and everyone and it is present there so that there is no hinderance in the activities of the clinic. Also, Raj always tends to replace ‘I’ will ‘We’ in all his conversations with the staff members. Later on Raj shares with her that he always deals with lazy staff sternly to send the message that everyone is equal in his eyes.

In context of the above case:

1. Identify and explain the various principles of management that Raj is applying for the successful management of his eye care centre.

2. List any two values that Simran wants to communicate to the society by taking up a job in a village.

Q. 43. Anshul owns a small scale factory where utility items are prepared from waste material like paper mache items, paper and cloth bags, decorative material etc. over the past few weeks, he was observing that the productivity of one of his very efficient worker, Ramdas, is going down. So he decides to probe into the matter and confronts Ramdas one day. On being asked, Ramdas shares with Anshul that he has deliberately slowed down in his work as many of the less efficient workers often pull his leg saying that there is no need for him to be more efficient when everybody is being paid at the same rate. Taking a lesson from this insight, Anshul decides to implement an incentive bonus plan so as differentiate between efficient and inefficient workers.

In context of the above case:

1. Name and explain the incentive bonus plan that Anshul may implement so as differentiate between efficient and inefficient workers.

2. State any two values that Anshul wants to communicate to the society by setting up a special type of business.

Q. 44. Swaraj is running an office furniture showroom. Most of his clients are businessmen and they prefer to buy goods on credit. Keeping this in mind, he has given the power to the sales manager, Mr. Bhardwaj, to offer a credit period of only 20 days, while negotiating a deal with a buyer. On a specific day, Mr. Bhardwaj finds that if he can offer a credit period of 30 days as an exception to a prospective buyer, he is likely to finalize a highly profitable deal for the business. So Mr. Bhardwaj requests Swaraj to grant him additional authority for offering a credit period of 30 days in the interest of the business. But swaraj refuses to extend his authority and as a result, the deal is not finalized.

In context of the above case:

1. Can Mr. Bhardwaj be held responsible for loss of the deal? Why or why not? Give a suitable reason in support of your answer.

2. Also, explain the related principle.

## MATHEMATICS

### MCQ & Assertion Reason & Case Study (Matrices and Determinants)

#### MCQ (1 Marks)

- If a matrix has 6 elements, then number of possible orders of the matrix can be
  - 2
  - 4
  - 3
  - 6
- Total number of possible matrices of order  $2 \times 3$  with each entry 1 or 0 is
  - 6
  - 36
  - 32
  - 64
- If  $A$  is a square matrix such that  $A^2=A$ , then  $(I + A)^2 - 3A$  is
  - $I$
  - $2A$
  - $3I$
  - $A$
- If matrices  $A$  and  $B$  are inverse of each other then
  - $AB = BA$
  - $AB = BA = I$
  - $AB = BA = 0$
  - $AB = 0, BA = I$
- The diagonal elements of a skew symmetric matrix are
  - all zeroes
  - are all equal to some scalar  $k(\neq 0)$
  - can be any number
  - none of these
- If a matrix  $A$  is both symmetric and skew symmetric then matrix  $A$  is
  - a scalar matrix
  - a diagonal matrix
  - a zero matrix of order  $n \times n$
  - a rectangular matrix
- $A = [a_{ij}]_{m \times n}$  is a square matrix, if
  - $m < n$
  - $m > n$
  - $m = n$
  - None of these .
- The number of all possible matrices of order  $3 \times 3$  with each entry 0 or 1 is:

- (a) 27                      (b) 18                      (c) 81                      (d) 512

9. The restriction on  $n$ ,  $k$  and  $p$  so that  $PY + WY$  will be defined are:

- (A)  $k = 3, p = n$                       (B)  $k$  is arbitrary,  $p = 2$   
 (C)  $p$  is arbitrary,  $k = 3$                       (D)  $k = 2, p = 3$

10. If  $n = p$ , then the order of the matrix  $7X - 5Z$  is:

- (A)  $p \times 2$                       (B)  $2 \times n$   
 (C)  $n \times 3$                       (D)  $p \times n$

11. If  $A, B$  are symmetric matrices of same order, then  $AB - BA$  is a

- (A) Skew symmetric matrix    (B) Symmetric matrix  
 (C) Zero matrix                      (D) Identity matrix

12. If  $A = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$ , then  $A + A' = I$ , if the value of  $\theta$  is:

- (A)  $\frac{\pi}{6}$                       (B)  $\frac{\pi}{3}$   
 (C)  $\pi$                       (D)  $\frac{3\pi}{2}$

13. If the matrix  $A$  is both symmetric and skew symmetric, then

- (A)  $A$  is a diagonal matrix    (B)  $A$  is a zero matrix  
 (C)  $A$  is a square matrix    (D) None of these

14. If  $A$  is square matrix such that  $A^2 = A$ , then  $(I + A)^3 - 7A$  is equal to

- (A)  $A$                       (B)  $I - A$                       (C)  $I$                       (D)  $3A$

Question 15.

Assertion(A) : Only square Matrices can be multiplied

Reason(R) : Square matrices have the same order

- a) Assertion is true and Reason is true . Reason is correct explanation for Assertion.  
 b) Assertion is true and Reason is true . Reason is not the correct explanation for Assertion.  
 c) Assertion is true and Reason is false.  
 d) Assertion is false but Reason is true.

Question 16.

Assertion(A) : A Square matrix can be expressed as sum of two different Matrix

Reason(R) : These matrices essentially are symmetric and skew symmetric

- a) Assertion is true and Reason is true . Reason is correct explanation for Assertion.  
 b) Assertion is true and Reason is true . Reason is not the correct explanation for Assertion.  
 c) Assertion is true and Reason is false.

d) Assertion is false but Reason is true.

### Continuity & Differentiability

MCQ (12 x 1 = 12 )

1. The derivative of function  $f(x) = \sin^{-1}(\cos x)$  at  $x = 0$  is \_\_\_\_\_

- (a) 1 (b) 0 (c) -1 (d) not defined

2. The function  $f(x) = [x]$ , where  $[x]$  denotes the greatest integer function is

- (a) Continuous at integer points only  
(b) continuous at everywhere  
(c) continuous at non-integer points only  
(d) differentiable everywhere

3. The function  $f(x) = |\cos x|$  is

- (a) differentiable at  $x = (2n+1)\pi/2, n \in Z$   
(b) continuous but not differentiable at  $x = (2n+1)\pi/2, n \in Z$   
(c) differentiable for all  $x$  but not continuous at some  $x$   
(d) None of these

4. The function  $\frac{4-x^2}{4x-x^3}$

- (a) continuous at  $x=0$   
(b) discontinuous at two point  
(c) discontinuous at three points  
(d) none of the above

5. The set of points where the function  $f(x) = \sin(2x-1)$  is differentiable are

- (a)  $R = \{1/2\}$   
(b)  $R$   
(c)  $(0, \infty)$   
(d) None

6. The function  $f(x) = e^{\sin x}$  is

- (a) continuous everywhere but not differentiable at 0  
(b) continuous and differentiable everywhere

(c) not continuous at 0

(d) None

7.  $f(x) = \sin x$  is

(a) everywhere differentiable

(b) everywhere continuous but not differentiable  $x = n\pi$  where  $n \in \mathbb{Z}$

(c) not continuous at 0

(d) None

8. The function  $f(x) = x - [x]$ , where  $[x]$  denotes the greatest integer function is

(a) continuous at integer points only      (b) continuous at everywhere

(c) continuous at non integer points only      (d) differentiable at everywhere

9. The derivative of function  $f(x) = \sin^{-1}(\cos x)$  at  $x = 0$  is -----

(a) 1      (b) 0      (c) -1      (d) not defined

10.  $y = a \sin x + b \cos x$ , then prove that  $y'' + y =$

(a) 0      (b) 0      (c) -1      (d) not defined

Q11. Assertion(A) : A continuous function is differentiable at all points

Reason(R) :  $\lim_{x \rightarrow a^+} f(x) = f(a) = \lim_{x \rightarrow a^-} f(x)$        $x = a$

a) Assertion is true and Reason is true .

Reason is correct explanation for Assertion.

b) Assertion is true and Reason is true .

Reason is not the correct explanation for Assertion.

c) Assertion is true and Reason is false.

d) Assertion is false but Reason is true.

Q12. Assertion(A) : Limits and Continuity are same

Reason(R) : We check for limits for determining continuity

a) Assertion is true and Reason is true .

Reason is correct explanation for Assertion.

b) Assertion is true and Reason is true .

Reason is not the correct explanation for Assertion.

c) Assertion is true and Reason is false.

d) Assertion is false but Reason is true.

**CASE STUDY (4 marks)**

**Matrices and Determinants**

Q1. Two schools P and Q want to award their selected students on the values of Tolerance, Kindness, and Leadership. The school P wants to award Rs x each, Rs y each and Rs z each for the three respective values to 3, 2 and 1 students respectively with total award money of Rs. 2200.

School Q wants to spend Rs 3100 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as school P). If the total amount of award for one prize on each value is Rs 1200, using matrices, find the following:

1. What is award money for Tolerance?
  1. 350
  2. 300
  3. 500
  4. 400
2. What is the award money for Leadership?
  1. 300
  2. 280
  3. 450
  4. 500
3. What is the award money for Kindness?
  1. 500
  2. 400
  3. 300
  4. 550
4. If a matrix A is both symmetric and skew-symmetric, then
  1. A is a diagonal matrix
  2. A is a scalar matrix
  3. A is a zero matrix
  4. A is a square matrix
5. If A and B are two matrices such that  $AB = B$  and  $BA = A$ , then  $B^2$  is equal to
  1. B
  2. A
  3. 1
  4. 0

**Q2. Read the case study carefully and answer any four out of the following questions:**

Three friends Ravi, Raju and Rohit were buying and selling stationery items in a market. The price of per dozen of Pen, notebooks and toys are Rupees x, y and z respectively.

Ravi purchases 4 dozen of notebooks and sells 2 dozen pens and 5 dozen toys. Raju purchases 2 dozen toys and sells 3 dozen pens and 1 dozen of notebooks. Rohit purchases one dozen of pens and sells 3 dozen notebooks and one dozen toys.

In the process, Ravi, Raju and Rohit earn ₹ 1500, ₹ 100 and ₹400 respectively.



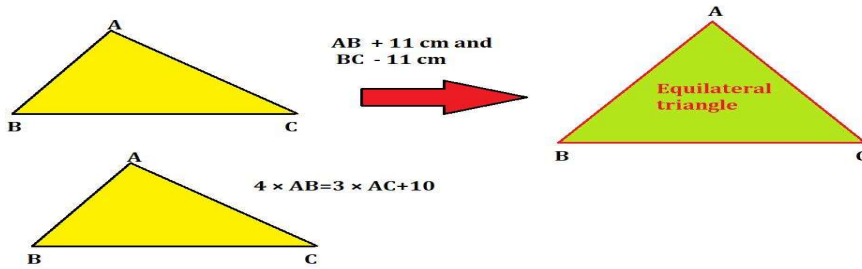
1. What is the price of one dozen of pens?
  1. ₹ 100
  2. ₹ 200
  3. ₹ 300
  4. ₹ 400
  
2. What is the total price of one dozen of pens and one dozen of notebooks?
  1. ₹ 100
  2. ₹ 200
  3. ₹ 300
  4. ₹ 400
  
3. What is the sale amount of Ravi?
  1. ₹ 1000
  2. ₹ 1100
  3. ₹ 1300
  4. ₹ 1200
  
4. What is the amount of purchases made by all three friends?
  1. ₹ 1200
  2. ₹ 1500
  3. ₹ 1300
  4. ₹ 1400
  
5. What is the price of sales made by all three friends?
  1. ₹ 3000
  2. ₹ 2500
  3. ₹ 2700
  4. ₹ 2400

**Q3. Read the case study carefully and answer any four out of the following questions:**

Once a mathematics teacher drew a triangle ABC on the blackboard. Now he asked Jose, "If I increase AB by 11 cm and decrease the side BC by 11 cm, then what type of triangle it would be?"

Jose said, "It will become an equilateral triangle."





Again teacher asked Suraj, "If I multiply the side AB by 4 then what will be the relation of this with side AC?"

Suraj said it will be 10 cm more than the three times AC.

**Find the sides of the triangle using the matrix method and answer the following questions**

1. What is the length of the smallest side?
  1. 54 cm
  2. 43 cm
  3. 30 cm
  4. 35 cm
2. What is the length of the largest side?
  1. 54 cm
  2. 43 cm
  3. 65 cm
  4. 35 cm
3. What is the perimeter of the triangle?
  1. 150 cm
  2. 160 cm
  3. 165 cm
  4. 162cm
4. What is the side of the equilateral triangle formed?
  1. 54 cm
  2. 43 cm
  3. 30 cm
  4. 35 cm
5. What is the order of the matrix formed?
  1.  $3 \times 3$
  2.  $2 \times 3$
  3.  $3 \times 2$
  4.  $2 \times 2$

## Continuity & Differentiability

A potter made a mud vessel, where the shape of the pot is based on  $f(x) = |x - 3| + |x - 2|$ , where  $f(x)$  represents the height of the pot.



1. When  $x > 4$  What will be the height in terms of  $x$  ?
  - a.  $x - 2$
  - b.  $x - 3$
  - c.  $2x - 5$
  - d.  $5 - 2x$
  
2. Will the slope vary with  $x$  value?
  - a. Yes
  - b. No
  
3. What is  $\frac{dy}{dx}$  at  $x = 3$ 
  - a. 2
  - b. -2
  - c. Function is not differentiable
  - d. 1
  
4. When the  $x$  value lies between (2,3) then the function is
  - a.  $2x - 5$
  - b.  $5 - 2x$
  - c. 1

d. 5

5. If the potter is trying to make a pot using the function  $f(x) = [x]$ , will he get a pot or not? Why?
- Yes, because it is a continuous function
  - Yes, because it is not continuous
  - No, because it is a continuous function
  - No, because it is not continuous

## Continuity & Differentiability

### Long Answer Type Questions

1. Find the value of  $k$ , so that the function  $f$  defined below, is continuous at  $x = 0$ , where

$$f(x) = \begin{cases} \left(\frac{1-\cos}{8x^2}\right), & \text{if } x \neq 0 \\ k, & \text{if } x = 0 \end{cases}$$

All India 2014C

2. If  $f(x) = \begin{cases} \frac{1-\cos 4x}{x^2}, & \text{when } x < 0 \\ a, & \text{when } x = 0 \\ \frac{\sqrt{x}}{\sqrt{16+\sqrt{x}-4}}, & \text{when } x > 0 \end{cases}$  and  $f$  is continuous at  $x = 0$ , then find the value of  $a$ .

Delhi 2013C

3. Find the value of  $k$ , for which  $f(x) = \begin{cases} \frac{\sqrt{1+kx}-\sqrt{1-kx}}{x}, & \text{if } -1 \leq x < 0 \\ \frac{2x+1}{x-1}, & \text{if } 0 \leq x < 1 \end{cases}$  is continuous at  $x = 0$ .

All India 2013

4. Find the value of  $k$ , so that the function  $f$  defined by

$$f(x) = \begin{cases} \frac{k \cos x}{\pi - 2x}, & \text{if } x \neq \frac{\pi}{2} \\ 3, & \text{if } x = \frac{\pi}{2} \end{cases}$$
 is continuous at  $x = \frac{\pi}{2}$

HOTS; Delhi 2012C; Foreign 2011

5. Find the value of  $a$  for which the functions  $f$  is defined as  $f(x) = \begin{cases} a \sin \frac{\pi}{2}(x+1), & x \leq 0 \\ \frac{\tan x - \sin x}{x^3}, & x > 0 \end{cases}$

Delhi 2011

6. If the function  $f(x)$  given by  $f(x) = \begin{cases} 3ax + b, & \text{if } x > 1 \\ 11 & \text{if } x = 1 \\ 5ax - 2b, & \text{if } x < 1 \end{cases}$  is continuous at  $x = 1$ , then

find the values of  $a$  and  $b$ .

**Delhi 2011; All India 2010**

7. Find the values of  $a$  and  $b$  such that the following function  $f(x)$  is a continuous functions.

$$f(x) = \begin{cases} 5, & x \leq 2 \\ ax + b, & 2 < x < 10 \\ 21 & x \geq 10 \end{cases}$$

**Delhi 2011**

8. Find the relationship between  $a$  and  $b$  so that the function  $f$  defined by

$$f(x) = \begin{cases} ax + 1, & \text{if } x \leq 3 \\ bx + 3, & \text{if } x > 3 \end{cases} \text{ is continuous at } x = 3.$$

**All India 2011**

9. Find the value of  $k$ , so that the function  $f$  defined by

$$f(x) = \begin{cases} kx + 1, & \text{if } x \leq \pi \\ \cos x, & \text{if } x > \pi \end{cases} \text{ is continuous at } x = \pi.$$

**Foreign 2011**

10. For what values of  $\lambda$ , is the function  $f(x) = \begin{cases} \lambda(x^2 - 2x), & \text{if } x \leq 0 \\ 4x + 1, & \text{if } x > 0 \end{cases}$  is continuous at  $x = 0$ ?

**Foreign 2011**

11. Discuss the continuity of the functions  $f(x)$  of  $x = \frac{1}{2}$ , when  $f(x)$  is defined as follows:

$$f(x) = \begin{cases} 1/2 + x, & 0 \leq x < 1/2 \\ 1, & x = 1/2 \\ 3/2 + x, & 1/2 < x \leq 1 \end{cases}$$

**Delhi 2011C**

12. Find the value of  $a$  if the functions  $f(x)$  defined by  $f(x) = \begin{cases} 2x - 1 & x < 2 \\ a, & x = 2 \\ x + 1, & x > 2 \end{cases}$  is continuous at  $x =$

2.

**All India 2011C; Delhi 2009C**

13. Find the values of  $a$  and  $b$  such that the functions defined as follows is continuous.

$$f(x) = \begin{cases} x + 2, & x \leq 2 \\ ax + b, & 2 < x < 5 \\ 3x - 2, & x \geq 5 \end{cases}$$

**Delhi 2010, 2010C**

14. For what of  $k$ , is the functions defined by  $f(x) = \begin{cases} k(x^2 + 2), & \text{if } x \leq 0 \\ 3x + 1, & \text{if } x > 0 \end{cases}$ , continuous at  $x = 0$ ?

Also, write whether the function is continuous at  $x = 1$ .

**All India 2010, 2010C**

15. Find all points of discontinuity of  $f$ , where  $f$  is defined as follows:

$$f(x) = \begin{cases} |x| + 3 & x \leq -3 \\ -2x, & -3 < x < 3 \\ 6x + 2, & x \geq 3 \end{cases}$$

**Delhi 20110**

16. Show that the function  $f(x)$  defined by  $f(x) = \begin{cases} \frac{\sin x}{x} + \cos x, & x > 0 \\ 2, & x = 0 \\ \frac{4(1-\sqrt{1-x})}{x}, & x < 0 \end{cases}$  is continuous

at  $x = 0$ .

**All India 2009C**

17. For what value of  $k$ , is the following function continuous at  $x = 2$ ?

$$f(x) = \begin{cases} 2x + 1, & x < 2 \\ k, & x = 2 \\ 3x - 1, & x > 2 \end{cases}$$

**Delhi 2008**

18. If  $f(x)$  defined by the following, is continuous at  $x = 0$ , then find the values of  $a$ ,  $b$  and  $c$

$$f(x) = \begin{cases} \frac{\sin(a+1)x + \sin x}{x}, & \text{if } x < 0 \\ c, & \text{if } x = 0 \\ \frac{\sqrt{x+bx^2} - \sqrt{x}}{bx^{3/2}}, & \text{if } x > 0 \end{cases}$$

**HOTS; All India 2008**

19. Show that  $f(x) = \begin{cases} 5x - 4, & \text{when } 0 < x \leq 1 \\ 4x^3 - 3x, & \text{when } 1 < x < 2 \end{cases}$  is continuous at  $x = 1$

**Delhi 2008C**

20. If the following function  $f(x)$  is continuous at  $x = 0$ , then the value of  $k$ .

$$f(x) = \begin{cases} \frac{1 - \cos 2x}{2x^2}, & x \neq 0 \\ k, & x = 0 \end{cases}$$

**All India 2008C**

### Short Answer Type Questions

1. Write the derivative of  $\sin x$  with respect to  $\cos x$ .

**2014C**

**Delhi**

2. If  $\cos y = x \cos(a + y)$ , where  $\cos a \neq \pm 1$ , prove that  $\frac{dy}{dx} = \frac{\cos^2(a+y)}{\sin a}$

**Foreign 2014**

3. If  $y = \sin^{-1} \{x\sqrt{1-x} - \sqrt{x}\sqrt{1-x^2}\}$  and  $0 < x < 1$ , then find  $\frac{dy}{dx}$ .

**All India**

**2014C; Delhi 2010**

4. If  $e^x + e^y = e^{x+y}$ , prove that  $\frac{dy}{dx} + e^{y-x} = 0$ .

**Foreign 2014**

5. Find the value of  $\frac{dy}{dx}$  at  $\theta = \frac{\pi}{4}$ , if  $x = ae^\theta (\sin\theta - \cos\theta)$  and  $y = ae^\theta (\sin\theta + \cos\theta)$ .

**All**

**India 2014**

6. If  $x = a \left( \cos t + \log \tan \frac{t}{2} \right)$ ,  $y = a \sin t$ , then evaluate  $\frac{d^2y}{dx^2}$  at  $t = \frac{\pi}{3}$ .

**Delhi 2014C**

7. If  $x^m y^n = (x + y)^{m+n}$ , prove that  $\frac{dy}{dx} = \frac{y}{x}$ .  
**Foreign 2014**
8. If  $x = a \cos\theta + b \sin\theta$  and  $y = a \sin\theta - b \cos\theta$ , show that  $y^2 \frac{d^2 y}{dx^2} - x \frac{dy}{dx} + y = 0$ .  
**Foreign 2014**
9. Differentiate  $\tan^{-1} \left( \frac{\sqrt{1-x^2}}{x} \right)$  w.r.t  $\cos^{-1} (2x\sqrt{1-x^2})$ , when  $x \neq 0$ .  
**Delhi 2014**
10. If  $y = x^x$ , then prove that  $\frac{d^2 y}{dx^2} - \frac{1}{y} \left( \frac{dy}{dx} \right)^2 - \frac{y}{x} = 0$ .  
**Delhi 2014**
11. Differentiate  $\tan^{-1} \left( \frac{x}{\sqrt{1-x^2}} \right)$  w.r.t  $\sin^{-1} (2x \sqrt{1-x^2})$ .  
**Delhi 2014**
12. Differentiate  $\tan^{-1} \left( \frac{\sqrt{1+x^2}-1}{x} \right)$  w.r.t.  $\sin^{-1} \left( \frac{2x}{1+x^2} \right)$ , when  $x \neq 0$ .  
**Delhi 2014**
13. If  $y = Pe^{ax} + Qe^{bx}$ , then show that  $\frac{d^2 y}{dx^2} - (a + b) \frac{dy}{dx} + aby = 0$ .  
**All India 2014, 2009C**
14. If  $x = \cos t (3 - 2 \cos^2 t)$  and  $y = \sin t (3 - 2 \sin^2 t)$ , then find the value of  $\frac{dy}{dx}$  at  $t = \frac{\pi}{4}$ .  
**All India 2014**
15. If  $(x - y)e^{\frac{x}{x-y}} = a$ . Prove that  $y \frac{dy}{dx} + x = 2y$ .  
**Delhi 2014C**
16. If  $x = a(\cos t + t \sin t)$  and  $y = a(\sin t - t \cos t)$ , then find the value of  $\frac{d^2 y}{dx^2}$  at  $t = \frac{\pi}{4}$ .  
**Delhi 2014C**
17. If  $y = \tan^{-1} \left( \frac{a}{x} \right) + \log \sqrt{\frac{x-a}{x+a}}$ , prove that  $\frac{dy}{dx} = \frac{2a^3}{x^4 - a^4}$ .  
**All India 2014C**
18. If  $x = a \sin 2t (1 + \cos 2t)$  and  $y = b \cos 2t (1 - \cos 2t)$ , then show that at  $t = \frac{\pi}{4}$ ,  $\left( \frac{dy}{dx} \right) = \frac{b}{a}$ .  
**All India 2014**
19. If  $(\tan^{-1} x)^y + y^{\cot x} = 1$ , then find  $dy/dx$ .  
**All India 2014C**

### Long Answer Type Questions

20. If  $x = 2\cos\theta - \cos 2\theta$  and  $y = 2\sin\theta - \sin 2\theta$ , then prove that  $\frac{dy}{dx} = \tan \left( \frac{3\theta}{2} \right)$ .  
**Delhi 2013C**
21. If  $y = (\sin x)^x + \sin^{-1} \sqrt{x}$ , then find  $\frac{dy}{dx}$ .  
**Delhi 2013C 2009; All India 2009C**

22. If  $y = x \log \left( \frac{x}{a+bx} \right)$ , then prove that  $x^3 \frac{d^2y}{dx^2} = \left( x \frac{dy}{dx} - y \right)^2$ .  
**Delhi 2013C**
23. Differentiate the following function with respect to x.  $(\log x)^x + x^{\log x}$   
**Delhi 2013**
24. If  $y = \log [x + \sqrt{x^2 + a^2}]$  then show that  $(x^2 + a^2) \frac{d^2y}{dx^2} + x \frac{dy}{dx} = 0$ .  
**Delhi 2013**
25. Show that the function  $f(x) = |x - 3|$ ,  $x \in \mathbb{R}$ , is continuous but not differentiable at  $x = 3$ .  
**Delhi 2013**
26. If  $x = a \sin t$  and  $y = a(\cos t + \log \tan (t/2))$ , then find  $\frac{d^2y}{dx^2}$ .  
**Delhi 2013**
27. Differentiate  $\sin^{-1} \left[ \frac{2^{x+1} 3^x}{1+(36)^x} \right]$  with respect to x  
**HOTS; All India 2013**
28. If  $x = a \cos^3 \theta$  and  $y = a \sin^3 \theta$ , then find the value of  $\frac{d^2y}{dx^2}$  at  $\theta = \frac{\pi}{6}$   
**All India 2013**
29. If  $x \sin(a+y) + \sin a \cos(a+y) = 0$ , then prove that  $\frac{dy}{dx} = \frac{\sin^2(a+y)}{\sin a}$   
**All India 2013, 2011, 2010**
30. If  $x^y = e^{x-y}$ , then prove that  $\frac{dy}{dx} = \frac{\log x}{(1+\log x)^2}$  or  $\frac{dy}{dx} = \frac{\log x}{\{\log(xe)\}^2}$   
**All India 2013, 2011, 2010**
31. If  $y^x = e^{y-x}$ , then prove that  $\frac{dy}{dx} = \frac{(1+\log y)^2}{\log y}$   
**All India 2013**
32. If  $(\cos x)^y = (\cos y)^x$ , then find  $\frac{dy}{dx}$ .  
**HOTS; Delhi 2012**
33. If  $\sin y = x \sin(a+y)$ , then prove that  $\frac{dy}{dx} = \frac{\sin^2(a+y)}{\sin a}$   
**HOTS; Delhi 2012**
34. If  $x = \sqrt{a^{\sin^{-1} t}}$  and  $y = \sqrt{a^{\cos^{-1} t}}$ , then show that  $\frac{dy}{dx} = \frac{-y}{x}$ .  
**All India 2012**
35. Differentiate  $\tan^{-1} \left[ \frac{\sqrt{1+x^2}-1}{x} \right]$  w.r.t.x.  
**HOTS; All India 2012**
36. If  $y = (\tan^{-1} x)^2$ , then show that  $(x^2 + 1)^2 \frac{d^2y}{dx^2} + 2x(x^2 + 1) \frac{dy}{dx} = 2$   
**Delhi 2012**
37. if  $y = x^{\sin x - \cos x} + \frac{x^2-1}{x^2+1}$ , then find  $\frac{dy}{dx}$   
**Delhi 2012C**
38. If  $x = a(\cos t + t \sin t)$  and  $y = a(\sin t - t \cos t)$ , then find  $\frac{d^2y}{dx^2}$  and  $\frac{d^2y}{dt^2}$   
**Delhi 2012C**
39. Find  $\frac{dy}{dx}$ , when  $y = x^{\cot x} + \frac{2x^2-3}{x^2+x+2}$   
**All India 2012C**

40. If  $x = \cos t + \log \tan \frac{t}{2}$  and  $y = \sin t$ , then find the values of  $\frac{d^2y}{dt^2}$  and  $\frac{d^2y}{dx^2}$  at  $t = \frac{\pi}{4}$ .

**All India 2012C**

41. If  $x\sqrt{1+y} + y\sqrt{1+x} = 0$ , ( $x \neq y$ ), then prove that  $\frac{dy}{dx} = -\frac{1}{(1+x)^2}$ .

**HOTS; Foreign 2012; Delhi 2011C**

42. If  $x = \tan\left(\frac{1}{a} \log y\right)$ , then show that  $(1+x^2)\frac{d^2y}{dx^2} + (2x-a)\frac{dy}{dx} = 0$ .

**All India 2011**

43. Differentiate  $x^x \cos x + \frac{x^2+1}{x^2-1}$  w.r.t.x.

**Delhi 2011**

44. If  $x = a(\theta - \sin\theta)$ ,  $y = a(1 + \cos\theta)$ , then find  $\frac{d^2y}{dx^2}$ .

**Delhi 2011**

45. Prove that  $\frac{d}{dx} \left[ \frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1} \left( \frac{x}{a} \right) \right] = \sqrt{a^2 - x^2}$ .

**Foreign 2011**

46. If  $y = \log [x + \sqrt{x^2 + 1}]$ , then prove that  $(x^2 + 1)\frac{d^2y}{dx^2} + x\frac{dy}{dx} = 0$ .

**Foreign 2011**

47. If  $\log(\sqrt{1+x^2} - x) = y\sqrt{1+x^2}$ , then show that  $(1+x^2)\frac{dy}{dx} + xy + 1 = 0$ .

**All India 2011C**

48. If  $x = a(\theta + \sin\theta)$  and  $y = a(1 - \cos\theta)$ , then find  $\frac{d^2y}{dx^2}$ .

**All India 2011C**

49. If  $y = a \sin x + b \cos x$ , then prove that  $y^2 + \left(\frac{dy}{dx}\right)^2 = a^2 + b^2$ .

**All India 2011C; HOTS**

50. If  $x = a(\cos\theta + \theta \sin\theta)$  and  $y = a(\sin\theta - \theta \cos\theta)$ , then find  $\frac{d^2y}{dx^2}$ .

**All India 2011C, 2008**

51. If  $x = a(\theta - \sin\theta)$  and  $y = a(1 + \cos\theta)$ , then find  $\frac{dy}{dx}$  at  $\theta = \frac{\pi}{3}$ .

**Delhi 2011C**

52. If  $y = (\sin x - \cos x)^{(\sin x - \cos x)}$ ,  $\frac{\pi}{4} < x < \frac{3\pi}{4}$ , then find  $\frac{dy}{dx}$ .

**All India 2010C**

53. If  $y = \cos^{-1} \left[ \frac{2x - 3\sqrt{1-x^2}}{\sqrt{13}} \right]$ , then find  $\frac{dy}{dx}$ .

**All India 2010C**

54. If  $y = (\cot^{-1} x)^2$ , then show that  $(x^2 + 1)^2 \frac{d^2y}{dx^2} + 2x(x^2 + 1) \frac{dy}{dx} = 2$ .

**Delhi 2010C**

55. If  $y = \operatorname{cosec}^{-1} x$ ,  $x > 1$ , then show that  $x(x^2 - 1) \frac{d^2y}{dx^2} + (2x^2 - 1) \frac{dy}{dx} = 0$ .

**All India 2010**

56. If  $y = \cos^{-1} \left( \frac{3x+4\sqrt{1-x^2}}{5} \right)$ , then find  $\frac{dy}{dx}$ .

**All India 2010**



57. Show that the function defined as follows, is continuous at  $x = 1$ ,  $x = 2$  but not differentiable

$$\text{at } x = 2 \quad f(x) = \begin{cases} 3x - 2, & 0 < x \leq 1 \\ 2x^2 - 2, & 1 < x \leq 2. \\ 5x - 4, & x > 2 \end{cases}$$

**Delhi 2010**

58. If  $y = e^{a \cos^{-1} x}$ ,  $-1 \leq x \leq 1$ , then show that  $(1 - x^2) \frac{d^2 y}{dx^2} - x \frac{dy}{dx} - a^2 y = 0$ .

**All India 2010**

59. Find  $\frac{dy}{dx}$ , if  $y = (\cos x)^x + (\sin x)^{1/x}$ .

**Delhi 2010**

60. If  $y = e^x \sin x$ , then prove that  $\frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} + 2y = 0$ .

**All India 2010C**

61. If  $y = (x)^x + (\sin x)^x$ , then find  $\frac{dy}{dx}$ .

**All India 2010C**

62. If  $y = 3 \cos(\log x) + 4 \sin(\log x)$ , then show that  $x^2 \frac{d^2 y}{dx^2} + x \frac{dy}{dx} + y = 0$ .

**All India 2009, 2009C**

63. If  $y = (x)^{\sin x} + (\log x)^x$ , then find  $\frac{dy}{dx}$ .

**Delhi 2009**

64. If  $x = a \left( \cos \theta + \log \tan \frac{\theta}{2} \right)$  and  $y = a \sin \theta$ , then find the value of  $\frac{d^2 y}{dx^2}$  at  $\theta = \frac{\pi}{4}$ .

**Delhi 2009C**

65. If  $y = (\log x)^x + (x)^{\cos x}$ , then find  $\frac{dy}{dx}$ .

**Delhi 2009C**

66. If  $y = e^x (\sin x + \cos x)$ , then show that  $\frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} + 2y = 0$ .

**Delhi 2009**

67. If  $y = \frac{\sin^{-1} x}{\sqrt{1-x^2}}$ , then show that  $(1 - x^2) \frac{d^2 y}{dx^2} - 3x \frac{dy}{dx} - y = 0$ .

**All India 2009**

68. Differentiate the following function w.r.t.x.  $(x)^{\cos x} + (\sin x)^{\tan x}$

**Delhi 2009**

69. Differentiate the following functions w.r.t.x.  $x^{\sin x} + (\sin x)^{\cos x}$

**Delhi 2009**

70. If  $y = x^{\cot x} + (\sin x)^x$ , then find  $\frac{dy}{dx}$ .

**All India 2008C**

71. If  $xy + y^2 = \tan x + y$ , then find  $\frac{dy}{dx}$

**All India 2008C**

72. If  $y = (\log x)^{\cos x} + \frac{x^2+1}{x^2-1}$ , then find  $\frac{dy}{dx}$

**Delhi 2008C**

73. If  $y = \sin^{-1} \left[ \frac{5x+12\sqrt{1-x^2}}{13} \right]$ , then find  $\frac{dy}{dx}$ .

**HOTS; All India 2008C**

74. If  $y = \cot^{-1} \left[ \frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}} \right]$   $0 < x < \frac{\pi}{2}$ , then find  $\frac{dy}{dx}$ .  
**HOTS; Delhi 2008**

75. If  $y = \sqrt{x^2 + 1} - \log \left( \frac{1}{x} + \sqrt{1 + \frac{1}{x^2}} \right)$ , then find  $\frac{dy}{dx}$ .  
**Delhi 2008**

76. Differentiate  $\tan^{-1} \left( \frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}} \right)$  w.r.t.x.  
**Delhi 2008**

**ANSWERS (Continuity)**

1.  $k=1$     2.  $a=8$     3.  $k=-1$     4.  $k=6$     5.  $a=1/2$     6.  $a=3$   
 and  $b=2$
7.  $a=2$  and  $b=1$     8.  $3a-3b=2$     9.  $k=\frac{-2}{\pi}$     10. No real value of  $x$
11.  $f(x)$  is discontinuous at  $x=1/2$     12.  $a=3$     13.  $a=3$  and  $b=-2$
14.  $k=\frac{1}{2}$ ,  $f(x)$  is continuous at  $x=1$ .    15.  $x=3$  is the point of discontinuity of  $f(x)$ .    17.  $k=5$
18.  $a=-3/2$ ,  $c=1/2$  and  $b$  may take any real value.    20.  $k=1$

**ANSWERS (Differentiability)**

1.  $-\cot x$     3.  $\frac{dy}{dx} = \frac{1}{\sqrt{1-x^2}} - \frac{1}{2\sqrt{(x-x^2)}}$     5.  $\frac{dy}{dx} = 1$     6.  $\frac{d^2y}{dx^2} = \frac{8\sqrt{3}}{a}$
9.  $-\frac{1}{2}$     11.  $\frac{1}{2}$     12.  $\frac{1}{4}$     14. 0    16.  $\left(\frac{d^2y}{dx^2}\right) = \frac{8\sqrt{2}}{\pi}$
19.  $\frac{dy}{dx} = \frac{-\left[\frac{y}{1+x^2}(\tan^{-1}x)^{y-1} - y^{\cot x} \operatorname{cosec}^2 x \log y\right]}{[(\tan^{-1}x)^y \log(\tan^{-1}x) + \cot x \cdot y^{\cot x - 1}]}$
21.  $\frac{dy}{dx} = (\sin x)[x \cot x + \log \sin x]$     23.  $(\log x)^x \left\{ \frac{1}{\log x} + \log(\log x) \right\} + 2 \left( \frac{\log x}{x} \right) x^{\log x}$
26.  $-\frac{\operatorname{cosec}^2 t}{a \cos t}$     27.  $\left[ \frac{2^{x+1} \cdot 3^x}{1+(36)^x} \right] \log 6$     28.  $\frac{32}{27a}$     32.  $\frac{dy}{dx} = \frac{\log(\cos y) + y \tan x}{x \tan y + \log(\cos x)}$     35.  $\frac{dy}{dx} =$
- $\frac{1}{2(1+x^2)}$     37.  $x^{\sin x - \cos x} \left[ \frac{\sin x - \cos x}{x} + \log x (\cos x + \sin x) + \frac{4x}{(x^2+1)^2} \right]$
38.  $\frac{\sec^3 t}{a}$ ,  $a(\sin t + t \cos t)$     39.  $x^{\cot x} \left( \frac{\cot x}{x} - \operatorname{cosec}^2 x \cdot \log x \right) + \frac{2x^2+14x+3}{(x^2+x+2)^2}$     40.  $\frac{-1}{\sqrt{2}}, 2\sqrt{2}$
43.  $\frac{dy}{dx} = x^{\cos x} [\cos x - x \log x \sin x + \log x \cos x] - \frac{4x}{(x^2-1)^2}$     44.  $\frac{1}{4a} \operatorname{cosec}^4 \frac{\theta}{2}$
48.  $\frac{1}{4a} \sec^4 \frac{\theta}{2}$     50.  $7 \frac{\sec^3 \theta}{a\theta}$     51.  $-\sqrt{3}$ .
52.  $\frac{dy}{dx} = (\sin x - \cos x)^{(\sin x - \cos x)} (\cos x + \sin x) [1 + \log(\sin x - \cos x)]$

$$53. \frac{dy}{dx} = \frac{-1}{\sqrt{1-x^2}} \quad 56. \frac{dy}{dx} = \frac{1}{\sqrt{1-x^2}}$$

$$59. \frac{dy}{dx} = (\cos x)^x [-x \tan x + \log \cos x] + (\sin x)^{1/x} \left[ \frac{\cot x}{x} - \frac{\log(\sin x)}{x^2} \right]$$

$$61. \frac{dy}{dx} = x^x(1 + \log x) + (\sin x)^x(x \cot x + \log \sin x)$$

$$63. \frac{dy}{dx} = x^{\sin x-1}[\sin x + x \log x \cos x] + (\log x)^{x-1}[1 + \log x - \log(\log x)]$$

$$65. (\log x)^{x-1}[1 + \log x \cdot \log(\log x)] + x \cos^{x-1}[\cos x - x \log x \sin x]$$

$$68. x^{\cos x-1}[\cos x - x \log \sin x] + (\sin x)^{\tan x}[1 + \sec^2 x \log \sin x]$$

$$69. x^{\sin x-1}[\sin x + x \log x \cos x] + \sin x^{\cos x} [\cos x \cot x - \sin x \log(\sin x)]$$

$$70. x^{\cot x-1}[\cot x - x \log x \operatorname{cosec}^2 x] + (\sin x)^x [x \cot x + \log x \sin x] \quad 71. \frac{dy}{dx} = \frac{\sec^2 x - y}{x + 2y - 1}$$

$$72. (\log x)^{\cos x} \left[ \frac{\cos x}{x \log x} - \sin x \log(\log x) - \frac{4x}{(x^2-1)^2} \right] \quad 73. \frac{1}{\sqrt{1-x^2}} \quad 74. \frac{1}{2} \quad 75. \frac{dy}{dx} = \frac{\sqrt{(1+x^2)}}{x}$$

$$76. \frac{dy}{dx} = \frac{1}{2\sqrt{(1-x^2)}}$$

## Matrices

### Short Answer Type Questions

1. If  $2 \begin{bmatrix} 3 & 4 \\ 5 & x \end{bmatrix} + \begin{bmatrix} 1 & y \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$ , then find  $(x - y)$ .

**Delhi 2014**

2. Solve the following matrix equation for  $x$ .  $\begin{bmatrix} x & 1 \\ -2 & 0 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ -2 & 0 \end{bmatrix} = 0$  **Delhi 2014**

3. If  $A$  is a square matrix such that  $A^2 = A$ , then write the value of  $7A - (I + A)^3$ , where  $I$  is an identity matrix.

**All India 2014**

4. If  $\begin{bmatrix} x - y & z \\ 2x - y & w \end{bmatrix} = \begin{bmatrix} -1 & 4 \\ 0 & 5 \end{bmatrix}$ , then find the value of  $x + y$ .

**All India 2014**

5. If  $\begin{bmatrix} a + 4 & 3b \\ 8 & -6 \end{bmatrix} = \begin{bmatrix} 2a + 2 & b + 2 \\ 8 & a - 8b \end{bmatrix}$ , write the value of  $a - 2b$ .

**Foreign 2014**

6. If  $\begin{bmatrix} x \cdot y & 4 \\ z + 6 & x + y \end{bmatrix} = \begin{bmatrix} 8 & w \\ 0 & 6 \end{bmatrix}$ , write the value of  $(x + y + z)$ .

**Delhi 2014C**

7. The elements of  $a_{ij}$  of a  $3 \times 3$  matrix are given by  $a_{ij} = \frac{1}{2}[-3i + j]$ . Write the value of element  $a_{32}$ .

**All India 2014C**

8. If  $[2x \ 4] \begin{bmatrix} x \\ -8 \end{bmatrix} = 0$ , find the positive value x.

**All India 2014**

9. If  $2 \begin{bmatrix} 1 & 3 \\ 0 & x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$ , then find the value of  $(x + y)$ .

**Delhi 2013C; All India 2012**

10. Find the value of a, if  $\begin{bmatrix} a - b & 2a + c \\ 2a - b & 3c + d \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$

**Delhi 2013**

11. If  $\begin{bmatrix} 9 & -1 & 4 \\ -2 & 1 & 3 \end{bmatrix} = A + \begin{bmatrix} 1 & 2 & -1 \\ 0 & 4 & 9 \end{bmatrix}$ , then find the matrix A.

**Delhi 2013**

12. If matrix  $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$  and  $A^2 = kA$ , then write the value of k.

**All India 2013**

13. If matrix  $A = \begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$  and  $A^2 = pA$ , then write the value of p.

**All India 2013**

14. If matrix  $A = \begin{bmatrix} 3 & -3 \\ -3 & 3 \end{bmatrix}$  and  $A^2 = \lambda A$ , then write the value of  $\lambda$ .

**All India 2013**

15. Simply  $\cos\theta \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix} + \sin\theta \begin{bmatrix} \sin\theta & -\cos\theta \\ \cos\theta & \sin\theta \end{bmatrix}$ .

**Delhi 2012; HOTS**

16. Find the value of  $y - x$  from following equation

$$2 \begin{bmatrix} x & 5 \\ 7 & y - 3 \end{bmatrix} + \begin{bmatrix} 3 & -4 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 7 & 6 \\ 15 & 14 \end{bmatrix}.$$

**All India 2012**

17. If  $x \begin{bmatrix} 2 \\ 3 \end{bmatrix} + y \begin{bmatrix} -1 \\ 1 \end{bmatrix} = \begin{bmatrix} 10 \\ 5 \end{bmatrix}$ , then write the value of x.

**Foreign 2012**

18. If  $3A - B = \begin{bmatrix} 5 & 0 \\ 1 & 1 \end{bmatrix}$  and  $B = \begin{bmatrix} 4 & 3 \\ 2 & 5 \end{bmatrix}$ , then find the matrix A.

**Delhi 2012C**

19. Write the value of  $x - y + z$  from following equation  $\begin{bmatrix} x + y + z \\ x + z \\ y + z \end{bmatrix} = \begin{bmatrix} 9 \\ 5 \\ 7 \end{bmatrix}$

**Foreign 2011**

20. Write the order of product matrix  $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} [2 \ 3 \ 4]$

**Foreign 2011; HOTS**

21. If a matrix has 5 elements, then write all possible orders it can have.

**All India 2011**

22. For a  $2 \times 2$  matrix,  $A = [a_{ij}]$  whose elements are given by  $a_{ij} = i/j$ , write the value of  $a_{12}$ .

**Delhi 2011**

23. If  $\begin{bmatrix} x & x - y \\ 2x + y & 7 \end{bmatrix} = \begin{bmatrix} 3 & 1 \\ 8 & 7 \end{bmatrix}$ , then find the value of y.

**Delhi 2011C**

24. From the following matrix equation, find the value of x.  $\begin{bmatrix} x + y & 4 \\ -5 & 3y \end{bmatrix} = \begin{bmatrix} 3 & 4 \\ -5 & 6 \end{bmatrix}$

**Foreign 2010**

25. Find x from the matrix equation  $\begin{bmatrix} 1 & 3 \\ 4 & 5 \end{bmatrix} \begin{bmatrix} x \\ 2 \end{bmatrix} = \begin{bmatrix} 5 \\ 6 \end{bmatrix}$ .

**Foreign 2010; HOTS**

26. If  $\begin{bmatrix} 3 & 4 \\ 2 & x \end{bmatrix} \begin{bmatrix} x \\ 1 \end{bmatrix} = \begin{bmatrix} 19 \\ 15 \end{bmatrix}$ , then find the value of x.

**Foreign 2010; HOTS**

27. If  $A = \begin{bmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix}$ , then for what value of  $\alpha$ , A is an identity matrix?

**Delhi 2010; HOTS**

28. If  $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 3 & 1 \\ 2 & 5 \end{bmatrix} = \begin{bmatrix} 7 & 11 \\ k & 23 \end{bmatrix}$ , then write the value of k.

**Delhi 2010**

29. If A is a matrix of order  $3 \times 4$  and B is a matrix of order  $4 \times 3$ , then find order of matrix (AB).

**Delhi 2010C**

30. If  $\begin{bmatrix} x + y & 1 \\ 2y & 5 \end{bmatrix} = \begin{bmatrix} 7 & 1 \\ 4 & 5 \end{bmatrix}$ , then find the value of x.

**Delhi 2010C**

31. If  $\begin{bmatrix} 2x + y & 3y \\ 0 & 4 \end{bmatrix} = \begin{bmatrix} 6 & 0 \\ 0 & 4 \end{bmatrix}$ , then find the value of x.

**All India 2010C**

32. If  $\begin{bmatrix} 3y - x & -2x \\ 3 & 7 \end{bmatrix} = \begin{bmatrix} 5 & -2 \\ 3 & 7 \end{bmatrix}$ , then find the value of y.

**All India 2010C**

33. If  $\begin{bmatrix} 2x & 1 \\ 5 & x + 2y \end{bmatrix} = \begin{bmatrix} 4 & 1 \\ 5 & 0 \end{bmatrix}$ , then find the value of y.

**All India 2009C**

34. If  $\begin{bmatrix} y + 2x & 5 \\ -x & 3 \end{bmatrix} = \begin{bmatrix} 7 & 5 \\ -2 & 3 \end{bmatrix}$ , then find the value of y.

**Foreign 2009**

35. Find the value of x, if  $\begin{bmatrix} 3x + y & -y \\ 2y - x & 3 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ -5 & 3 \end{bmatrix}$ .

**All India 2009**

36. Find the value of y, if  $\begin{bmatrix} x - y & 2 \\ x & 5 \end{bmatrix} = \begin{bmatrix} 2 & 2 \\ 3 & 5 \end{bmatrix}$

**All India 2009**

37. Find the value of x, if  $\begin{bmatrix} 2x - y & 5 \\ 3 & y \end{bmatrix} = \begin{bmatrix} 6 & 5 \\ 3 & -2 \end{bmatrix}$ .

**All India 2009**

38. If  $\begin{bmatrix} 15 & x + y \\ 2 & y \end{bmatrix} = \begin{bmatrix} 15 & 8 \\ x - y & 3 \end{bmatrix}$ , then find the value of x.

**Delhi 2009C**

39. If  $A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}$ , then find  $A - B$ .

**All India 2009C**

40. If  $\begin{bmatrix} x + 2y & 3y \\ 4x & 2 \end{bmatrix} = \begin{bmatrix} 0 & -3 \\ 8 & 2 \end{bmatrix}$ , then find x and y.

**All India 2008C**

41. Find x and y, if  $2\begin{bmatrix} 1 & 3 \\ 0 & x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$ .

**Delhi 2008; HOTS**

**Long Answer Types Questions**

42. If  $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$ ; then find value of  $A^2 - 3A + 2I$ .

**All India 2010**

43. If  $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ , then prove that  $A^2 - 4A - 5I = 0$ .

**Delhi 2008**

**Short Answer Type Questions**

1. Write  $2 \times 2$  matrix which is both symmetric and skew-symmetric matrices.

**Delhi 2014C**

2. For what value of x, is the matrix  $A = \begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & 3 \\ x & -3 & 0 \end{bmatrix}$  a skew –symmetric matrix?

**All India 2013; HOTS**

3. If  $A^T = \begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{bmatrix}$  and  $B = \begin{bmatrix} -1 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$ , then find  $A^T - B^T$ .

**All India 2012**

4. If  $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ , then find  $A + A'$ .

**All India 2010C**

5. If  $A = \begin{bmatrix} 3 & 4 \\ 2 & 3 \end{bmatrix}$ , then find  $A + A'$ , where  $A'$  is transpose of  $A$ .

**All India 2009C**

6. If matrix  $A = [1 \ 2 \ 3]$ , then write  $AA'$ .

**Delhi 2009; HOTS**

**Long Answer Type Questions**

7. For the following matrices A and B, verify that  $[AB]' = B'A'$ ;  $A = \begin{bmatrix} 1 \\ -4 \\ 3 \end{bmatrix}$ ,  $B = [-1 \ 2 \ 1]$ .

**All India 2010**

8. Express the following matrix as a sum of a symmetric and a skew-symmetric matrices and verify your result.

$$\begin{bmatrix} 3 & -2 & -4 \\ 3 & -2 & -5 \\ -1 & 1 & 2 \end{bmatrix}$$

All India 2010; HOTs

### ANSWERS

1. 10

2.  $x = 2$

3.  $-I$

4. 3

5. 0

6. 0

7.  $x = \frac{7}{2}$

8. 4

9. 6

10.  $a = 1$

11.  $\begin{bmatrix} 8 & -3 & 5 \\ -2 & -3 & -6 \end{bmatrix}$

12.  $k = 2$

13.  $p = 4$

14. 6

15. 1

16. 7

17.  $x = 3$

18.  $\begin{bmatrix} 3 & 1 \\ 1 & 2 \end{bmatrix}$

19. 1

20.  $3 \times 3$

21.  $1 \times 5, 5 \times 1$

22.  $\frac{1}{2}$

23.  $y = 2$

24.  $x = 1$

25.  $x = -1$

26.  $x = 5$

27.  $0^0$

28.  $k = 17$

29.  $3 \times 3$

30.  $x = 5$

31.  $x = 3$

32.  $y = 2$

33.  $y = -1$

34.  $y = 3$

35.  $x = 1$

36.  $y = 1$

37.  $x = 2$

38.  $x = 5$

39.  $\begin{bmatrix} 1 & 1 \\ 5 & -3 \end{bmatrix}$

40.  $x = 2, y = -1$

41.  $x = 3, y = 3$

42.

$$\begin{bmatrix} 1 & -1 & -1 \\ 3 & -3 & -4 \\ -3 & 2 & 0 \end{bmatrix}$$

### ANSWERS

1.  $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

2.  $x = 2$

3.  $\begin{bmatrix} 4 & 3 \\ -3 & 0 \\ -1 & -2 \end{bmatrix}$

4.  $\begin{bmatrix} 2 & 5 \\ 5 & 8 \end{bmatrix}$

5.  $\begin{bmatrix} 6 & 6 \\ 6 & 6 \end{bmatrix}$

6. [14]

8.  $\frac{1}{2} \begin{bmatrix} 6 & 1 & -5 \\ 1 & -4 & -4 \\ -5 & -4 & 4 \end{bmatrix} + \frac{1}{2} \begin{bmatrix} 0 & -5 & -3 \\ 5 & 0 & -6 \\ 3 & 6 & 0 \end{bmatrix}$

## Determinants

### Short Answer Type Questions

1. If  $\begin{vmatrix} 2x & 5 \\ 8 & x \end{vmatrix} = \begin{vmatrix} 6 & -2 \\ 7 & 3 \end{vmatrix}$ , then write the value of x.

**Delhi 2014**

2. If  $\begin{vmatrix} 3x & 7 \\ -2 & 4 \end{vmatrix} = \begin{vmatrix} 8 & 7 \\ 6 & 4 \end{vmatrix}$ , then find the value of x.

**All India 2014**

3. If A is a  $3 \times 3$  matrix,  $|A| \neq 0$  and  $|3A| = k|A|$ . Then write the value of K.

**Foreign 2014**

4. Find (adj A), if  $A = \begin{bmatrix} 5 & 2 \\ 7 & 3 \end{bmatrix}$ .

**Delhi 2014C**

5. Write the value of the determinant  $\begin{vmatrix} p & p+1 \\ p-1 & p \end{vmatrix}$ .

**Delhi 2014C**

6. If A is a square matrix of order 3 such that  $|\text{adj}(A)| = 64$ , then find  $|A|$ .

**Delhi 2013C**

7. If  $\begin{vmatrix} 2x & x+3 \\ 2(x+1) & x+1 \end{vmatrix} = \begin{vmatrix} 1 & 5 \\ 3 & 3 \end{vmatrix}$ , then find the value of x.

**Delhi 2013C**

8. If  $\begin{vmatrix} x+1 & x-1 \\ x-3 & x+2 \end{vmatrix} = \begin{vmatrix} 4 & -1 \\ 1 & 3 \end{vmatrix}$ , then write the value of x.

**Delhi 2013**

9. If  $A_{ij}$  is the cofactor of the element  $a_{ij}$  of the determinant  $\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$ , then write the value of

$a_{32} \cdot A_{32}$ .

**All India 2013; HOTS**

10. Let A be a square matrix of order  $3 \times 3$ . Write the value of  $|2A|$ , where  $|A| = 4$ .

**All India 2012**

11. If  $\Delta = \begin{bmatrix} 5 & 3 & 8 \\ 2 & 0 & 1 \\ 1 & 2 & 3 \end{bmatrix}$ , then write the minor of the of element  $a_{23}$ .

**Delhi 2012**

12. If the determinant of matrix A of order  $3 \times 3$  is of value 4, then write the value of  $|3A|$ .

**All India 2012C**



13. For what value of  $x$ ,  $A = \begin{bmatrix} 2(x+1) & 2x \\ x & x-2 \end{bmatrix}$  is a singular matrix?

**All India 2011C**

14. For what value of  $x$ , the matrix  $\begin{bmatrix} 2x+4 & 4 \\ x+5 & 3 \end{bmatrix}$  is a singular matrix?

**All India 2011C**

15. For what value of  $x$ , the matrix  $\begin{bmatrix} 2x & 4 \\ x+2 & 3 \end{bmatrix}$  is a singular matrix?

**Delhi 2011C**

16. For what value of  $x$ , matrix  $\begin{bmatrix} 6-x & 4 \\ 3-x & 1 \end{bmatrix}$  is a singular matrix?

**Delhi 2011C**

17. For what value of  $x$ , the matrix  $\begin{bmatrix} 5-x & x+1 \\ 2 & 4 \end{bmatrix}$  is a singular?

**Delhi 2011**

18. Evaluate  $\begin{vmatrix} \cos 15^\circ & \sin 15^\circ \\ \sin 75^\circ & \cos 75^\circ \end{vmatrix}$

**All India 2011; HOTS**

19. If  $\begin{vmatrix} x & x \\ 1 & x \end{vmatrix} = \begin{vmatrix} 3 & 4 \\ 1 & 2 \end{vmatrix}$ , then write the positive value of  $x$ .

**Foreign 2011; All India 2008C**

20. What is the value of determinant  $\begin{vmatrix} 0 & 2 & 0 \\ 2 & 3 & 4 \\ 4 & 5 & 6 \end{vmatrix}$ ?

**Delhi 2010**

21. Find the minor of the element of second row and third column in the determinant

$$\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$$

**Delhi 2010**

22. If  $A = \begin{bmatrix} 3 & 1 \\ 2 & -3 \end{bmatrix}$ , then find  $|\text{adj } A|$ .

**Delhi 2011C; HOTS**

23. If  $|A|=2$ , where  $A$  is a  $2 \times 2$  matrix, then find  $|\text{adj } A|$ .

**All India 2010C**

24. What positive value of  $x$  makes following pair of determinants equal?

$$\begin{vmatrix} 2x & 3 \\ 5 & x \end{vmatrix} = \begin{vmatrix} 16 & 3 \\ 5 & 2 \end{vmatrix}$$

**All India 20110**

25. If  $A$  is a non-singular matrix of order 3 and  $|\text{adj } A|=|A|^k$ , then what is the value of  $K$ ?

**All India 2009C; HOTS**

26. Evaluate  $2 \begin{vmatrix} 7 & -2 \\ -10 & 5 \end{vmatrix}$

**Delhi 2009C**

27. Find x from equation  $\begin{vmatrix} x & 4 \\ 2 & 2x \end{vmatrix} = 0$ .

**All India 2009**

28. If  $A = \begin{bmatrix} 1 & 2 \\ 4 & 2 \end{bmatrix}$ , then find the value of k, if  $|2A| = k|A|$ .

**Foreign 2009**

29. Evaluate  $\begin{vmatrix} 2 \cos \theta & -2 \sin \theta \\ \sin \theta & \cos \theta \end{vmatrix}$ .

**Delhi 2008C**

30. Evaluate  $\begin{vmatrix} a + ib & c + id \\ -c + id & a - ib \end{vmatrix}$

**Delhi 2008; HOTS**

31. For what value of x, is the following matrix singular?  $\begin{vmatrix} 3 - 2x & x + 1 \\ 2 & 4 \end{vmatrix}$

**Delhi 2008**

32. If  $\begin{vmatrix} 2x + 5 & 3 \\ 5x + 2 & 9 \end{vmatrix} = 0$ , then find the value of x

**Foreign 2008**

### Long Answer Type Questions

1. Two schools P and Q want to award their selected students on the values of discipline, politeness and punctuality. The school P wants to award Rs. x each, Rs. y each Rs. z each for the three respective values to 3, 2 and 1 students respectively with a total award money of Rs. 1000. School Q wants to spend Rs. 1500 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as before). If the total amount of award for one prize on each value is Rs. 600, using matrices, find the award money for each value. Apart from the above three values, suggest one more value for awards.

**Value Based Question; Delhi 2014**

2. Two schools A and B want to award their selected students on the values of sincerity, truthfulness and helpfulness. The school A wants to award Rs. x each, Rs. y each and Rs. z each for the three respective values of 3, 2 and 1 students, respectively with a total award money of Rs. 1600. School B wants to spend Rs. 2300 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as before). If the total amount of award for one prize on each value is Rs. 900, using matrices, find the award money for each value. Apart for these three values, suggest one more value which should be considered for award.

**All India 2014; Value Based Question**

3. Two schools P and Q want to award their selected students on the values of tolerance, kindness and leadership. The school P wants to award Rs. x each, Rs. y each and Rs. z each for the three respective values to 3, 2 and 1 students respectively with a total award money of Rs. 2200.

School Q wants to spend Rs. 3100 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as school P). If the total amount of award for one prize on each value is Rs. 1200, using matrices, find the award money for each value. Apart from these three values, suggest one more value which should be considered for the award.

**Foreign 2014; Value Based Question**

4. A total amount of Rs. 7000 is deposited in three different saving bank accounts with annual interest rates of 5%, 8% and  $8\frac{1}{2}\%$  respectively. The total annual interest from these three accounts is Rs. 550. Equal amounts have been deposited in the 5% and 8% savings accounts. Find the amount deposited in each of the three accounts, with the help of matrices.

**Delhi 2014C**

5. Two schools, P and Q want to award their selected students for the values of sincerity, truthfulness and hard work at the rate of Rs.  $x$ , Rs.  $y$  and Rs.  $z$  for each respective value per student. School P awards its 2, 3 and 4 students on the above respective values with a total prize money of Rs. 4600. School Q wants to award its 3, 2 and 3 students on the respective values with a total award money of Rs. 4100. If the total amount of award money for one prize on each value is Rs. 1500, using matrices, find the award money for each value. Suggest one other value which the school can consider for awarding the students.

**All India 2014C; Value Based Question**

6. Two institutions decided to award their employees for the three values of resourcefulness, competence and determination in the form of prizes at the rate of Rs.  $x$ , Rs.  $y$  and Rs.  $z$  respectively per person. The first institution decided to award respectively 4, 3 and 2 employees with a total prize money of Rs. 37000 and the second institution decided to award respectively 5, 3 and 4 employees with a total prize money of Rs. 47000. If all three prizes per person together amount to Rs. 12000, then using matrix method, find the values of  $x$ ,  $y$  and  $z$ . What values are described in this question?

**Delhi 2014C; Value Based Question**

7. A school wants to award its students for the values of honesty, regularity and hard work with a total cash award of Rs. 6000. Three times the award money for hard work added to that given for honesty, amounts to Rs. 11000. The award money given for honesty and hard work together is double the one given for regularity. Represent the above situation algebraically and find the award money for each value, using matrix method. Apart from these values, namely, honesty, regularity and hard work, suggest one more value which the school must include for award.

**Value Based Question; Delhi 2013**

8. The management committee of a residential colony decided to award some of its members (say  $x$ ) for honesty, some (say  $y$ ) for helping others and some others (say  $z$ ) for supervising the workers to keep the colony neat and clean. The sum of all the awardees is 12. Three times the

sum of awardees for cooperation and supervision added to two times the number of awardees for honesty is 33. If the sum of the number of awardees for honesty and supervision is twice the number of awardees for helping others, using matrix method, find the number of awardees of each category. Apart from these values, namely, honesty, cooperation and supervision, suggest one more value which the management of the colony must include for awards.

**Value Based Question; All India 2013**

9. Using matrices, solve the following system of equations.

$$x - y + 2z = 7 \qquad 3x + 4y - 5z = -5 \qquad \text{and} \qquad 2x - y + 3z = 12$$

**Delhi 2012**

10. Using matrices, solve the following system of linear equations.

$$x + y - z = 3 \qquad 2x + 3y + z = 10 \qquad \text{and} \qquad 3x - y - 7z = 1$$

**All India 2012**

11. If  $A = \begin{bmatrix} 1 & 2 & 1 \\ -1 & 1 & 1 \\ 1 & -3 & 1 \end{bmatrix}$ , then find  $A^{-1}$  and hence solve the system of equations

$$x + 2y + z = 4 \qquad -x + y + z = 0 \qquad \text{and} \qquad x - 3y + z = 4.$$

**Delhi 2012C**

12. Determine the product of  $\begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix} \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$  and then use to solve the system of equations

$$x - y + z = 4 \qquad x - 2y - 2z = 9 \qquad \text{and} \qquad 2x + y + 3z = 1$$

**Delhi 2012C; HOTS**

13. Find  $A^{-1}$ , where  $A = \begin{bmatrix} 1 & 2 & -3 \\ 2 & 3 & 2 \\ 3 & -3 & -4 \end{bmatrix}$ . Hence, solve the system of equations,

$$x + 2y - 3z = -4 \qquad 2x + 3y + 2z = 2 \qquad \text{and} \qquad 3x - 3y - 4z = 11.$$

**All India 2012C, 2010, 2008**

14. Using matrix method, solve the following system of equations.

$$\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4 \qquad \frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1 \qquad \text{and} \qquad \frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2, \quad x, y, z \neq 0$$

**Delhi 2011**

15. Using matrices, solve the following system of equations.

$$3y + 2z = 60 \qquad x + 2y + 3z = 45 \qquad \text{and} \qquad 6x + 2y + 3z = 70$$

4x +

**All India 2011**

16. Using matrices, solve the following system of equations.

$$x + 2y + z = 7$$

$$x + 3z = 11$$

$$\text{and } 2x - 3y = 1$$

**All India 2011; Delhi 2008C**

17. Using matrices, solve the following system of equations.

$$x + 2y - 3z = -4$$

$$2x + 3y + 2z = 2$$

$$\text{and } 3x - 3y - 4z = 11$$

**All India 2011, 2008**

18. Use product  $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix} \begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix}$  to solve the system of equations

$$x - y + 2z = 1$$

$$2y - 3z = 1$$

$$\text{and } 3x - 2y + 4z = 2$$

**HOTS; Foreign 2011**

19. If  $A = \begin{bmatrix} 2 & -1 & 1 \\ 3 & 0 & -1 \\ 2 & 6 & 0 \end{bmatrix}$ , then find  $A^{-1}$ .

Using  $A^{-1}$ , solve the following system of equations

$$2x - y + z = -3$$

$$3x - z = 0$$

$$\text{and } 2x + 6y - z = 2$$

**All India 2011C**

20. If  $A = \begin{bmatrix} 1 & -2 & 1 \\ 0 & -1 & 1 \\ 2 & 0 & -3 \end{bmatrix}$ , then find  $A^{-1}$  and hence solve the following system of equations

$$x - 2y + z = 0$$

$$-y + z = -2 \quad \text{and} \quad 2x - 3z = 10$$

**All India 2011C**

21. If  $A = \begin{bmatrix} 1 & -2 & 0 \\ 2 & 1 & 3 \\ 0 & -2 & 1 \end{bmatrix}$  and  $B = \begin{bmatrix} 7 & 2 & -6 \\ -2 & 1 & -3 \\ -4 & 2 & 5 \end{bmatrix}$ , then find  $AB$  and hence solve system of equations

$$x - 2y = 10$$

$$2x + y + 3z = 8$$

$$-2y + z = 7$$

**Delhi 2011C**

22. If  $A = \begin{bmatrix} 3 & -4 & 2 \\ 2 & 3 & 5 \\ 1 & 0 & 1 \end{bmatrix}$ , then find  $A^{-1}$  and hence solve the following system of equations

$$3x - 4y + 2z = -1$$

$$2x + 3y + 5z = 7$$

and

$$x + z = 2$$

**Delhi 2011C**

23. If  $A = \begin{bmatrix} 8 & -4 & 1 \\ 10 & 0 & 6 \\ 8 & 1 & 6 \end{bmatrix}$ , then find  $A^{-1}$  and hence solve the following system of equations

$$8x - 4y + z = 5 \qquad 10x + 6z = 4 \qquad \text{and} \qquad 8x + y + 6z = \frac{5}{2}$$

**All India 2010C**

24. If  $A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$ , then find  $AB$ . Use this to solve the system of equations

$$x - y = 3 \qquad 2x + 3y + 4z = 17 \qquad \text{and} \qquad y + 2z = 7$$

**All India 2010C**

25. If  $A = \begin{bmatrix} 3 & 2 & 1 \\ 4 & -1 & 2 \\ 7 & 3 & -3 \end{bmatrix}$ , then find  $A^{-1}$ . Hence, solve the following system of equations

$$3x + 2y + z = 6 \qquad 4x - y + 2z = 5 \qquad \text{and} \qquad 7x + 3y - 3z = 7$$

**Delhi 2010C**

26. Using matrices, solve system of linear equations

$$x + y + z = 6 \qquad x + 2z = 7 \qquad \text{and} \qquad 3x + y + z = 12$$

**All India 2009**

27. Solve the following system of equations, by using matrix method.

$$3x - 2y + 3z = 8 \qquad 2x + y - z = 1 \qquad \text{and} \qquad 4x - 3y + 2z = 4$$

**Foreign 2009**

28. Using matrices, solve the following system of equations

$$x + y + z = 1 \qquad x - 2y + 3z = 2 \qquad \text{and} \qquad x - 3y + 5z = 3$$

**All India 2009C**

29. Using matrices, solve the following system of equations

$$8x + 4y + 3z = 18 \qquad 2x + y + z = 5 \qquad \text{and} \qquad x + 2y + z = 5$$

**All India 2009C**

30. Using matrices, solve the following system of equations

$$x + y - z = 3 \qquad 2x + 3y + z = 10 \qquad \text{and} \qquad 3x - y - 7z = 1$$

**Delhi 2009C**

31. Using matrices, solve the following system of equations

$$2x + 8y + 5z = 5 \qquad x + y + z = -2 \qquad \text{and} \qquad x + 2y - z = 2$$

**Delhi 2009C**

32. Using matrices, solve the following system of equations

$$x - y + 2z = 1 \qquad 2y - 3z = 1 \qquad \text{and} \qquad 3x - 2y + 4z = 2$$

**All India 2008C**

33. Using matrices, solve the following system of equations

$$2x + y + z = 7 \qquad x - y - z = -4 \qquad \text{and} \qquad 3x + 2y + z = 10$$

**All India 2008C**

## ANSWERS

### Short Answer Type Questions

- |                |                 |              |             |                             |
|----------------|-----------------|--------------|-------------|-----------------------------|
| 1. $x = \pm 6$ | 2. $x = -2$     | 3. $k = 27$  | 4. 1        | 5. 1                        |
| 6. $\pm 8$     | 7. $x = 1$      | 8. $x = 2$   | 9. 110      | 10. 32                      |
| 11. 7          | 12. 108         | 13. $x = -2$ | 14. $x = 4$ | 15. $x = 4$                 |
| 16. $x = 2$    | 17. $x = 3$     | 18. 0        | 19. 2       | 20. 8                       |
| 21. 13         | 22. -11         | 23. 2        | 24. 4       | 25. $k = 2$                 |
| 26. 30         | 27. $x = \pm 2$ | 28. $k = 4$  | 29. 2       | 30. $a^2 + b^2 + c^2 + d^2$ |
| 31. $x = 1$    | 32. $x = -13$   |              |             |                             |

### Long Answer Type Questions

- |  |   |   |
|--|---|---|
| 1. $x = 100, y = 200, z = 300$   | 2. $x = 200, y = 300, z = 400$  | 3. $x = 300, y = 400, z = 500$              |
| 4. Rs. 1125, Rs. 1125, Rs. 4750  | 5. $x = 500, y = 400, z = 600$  | 6. 4000, 5000, 3000                         |
| 7. Rs. 500, 2000, 3500   | 8. $x = 3, y = 4, z = 5$  | 9. $x = 2, y = 1, z = 3$                    |
| 10. $x = 3, y = 1, z = 1$  | 11. $\frac{1}{10} \begin{bmatrix} 4 & -5 & 1 \\ 2 & 0 & -2 \\ 2 & 5 & 3 \end{bmatrix}$ and<br>$x = 2, y = 0, z = 2$ | 12. product = 8I<br>$x = 3, y = -2, z = -1$ |
| 13. $\frac{1}{67} \begin{bmatrix} -6 & 17 & 13 \\ 14 & 5 & -8 \\ -15 & 9 & -1 \end{bmatrix}$<br>and $x = 3, y = -2, z = 1$ | 14. $x = 2, y = 3, z = 5$   | 15. $x = 5, y = 8, z = 8$                   |
| 16. $x = 2, y = 1, z = 3$  | 17. $x = 3, y = -2, z = 1$  | 18. product = I<br>$x = 0, y = 5, z = 3$    |
| 19. $\frac{1}{32} \begin{bmatrix} 6 & 6 & 1 \\ -2 & -2 & 5 \\ 18 & -14 & 3 \end{bmatrix}$                                  | 20. $\begin{bmatrix} 3 & -6 & -1 \\ 2 & -5 & -1 \\ 2 & -4 & -1 \end{bmatrix}$<br>$x = 2, y = 0, z = -2$             | 21. $AB = III$<br>$x = 4, y = -3, z = 1$    |

$$x = \frac{-1}{2}, y = \frac{1}{2}, z = \frac{-3}{2}$$

$$22. \frac{-1}{9} \begin{bmatrix} 3 & 4 & -26 \\ 3 & 1 & -11 \\ -3 & -4 & 17 \end{bmatrix}$$
$$x = 3, y = 2, z = -1$$

$$25. \frac{1}{62} \begin{bmatrix} -3 & 9 & 5 \\ 26 & -16 & -2 \\ 5 & 5 & -11 \end{bmatrix}$$

and  $x = 1, y = 1, z = 1$

$$28. x = \frac{1}{2}, y = 0, z = \frac{1}{2}$$

$$31. x = -3, y = 2, z = -1$$

$$23. \frac{1}{10} \begin{bmatrix} -6 & 25 & -24 \\ -12 & 40 & -38 \\ 10 & -40 & 40 \end{bmatrix}$$
$$x = 1, y = 1/2, z = -1$$

$$26. x = 3, y = 1, z = 2$$

$$29. x = 1, y = 1, z = 2$$

$$32. x = 0, y = 5, z = 3$$

$$24. AB = 6I$$

$$x = 2, y = -1, z = 4$$

$$27. x = 1, y = 2, z = 3$$

$$30. x = 3, y = 1, z = 1$$

$$33. x = 1, y = 2, z = 3$$



## CHEMISTRY

<b>S.No.</b>	<b>PROJECT TOPICS ALLOTTED ROLL NO. WISE</b>	<b>Roll No. XII A &amp; B</b>
1	Preparation of soya bean milk and its comparison with the natural milk with respect to curd.	1 & 23
2	Comparative study of the rate of fermentation of the following materials wheat flour, gram flour, potato juice ,carrot juice etc.	2 &24
3	Study of common food adulterants in fat, oil butter,sugar ,turmeric powder ,chilli powder and pepper.	3 &25
4	Sterilization of water by using bleaching powder	4 & 26
5	Determination of contents of toothpaste tooth powder.	5 & 27
6	Analysis of honey	6 &28
7	Analysis of vegetable and fruit juices	7 &29
8	Content of cold drinks available in the market.	8 & 30
9	Analysis of coin	9 &31
10	To study the effect of repeated heating on the property of oil	10 & 32
11	To prepare natural dyes at home	11 & 33
12	To study the chemistry involved in removing different types of stains from clothes	12 & 34
13	To compare the quality of tap water before and after using potash alum.	13&35
14	To study the different types of oils used in kitchen and compare their effect on the body	14 & 36
15	Investigation of foaming capacity of different soaps	15 & 37
16	Preparation of toilet soap	16 &38
17	Preparation of invisible ink	17 & 39

18	To study the use of different spices in strengthening immunity of body	18 & 40
19	To study the effect of heat on vitamin C in tomatoes	19 & 41
20	To study the effect of temperature on solubility of a non volatile solute	20 & 42
21	To study the change in boiling point of a liquid on adding a solute.	21 & 43
22	Preparation of poster colours	22 & 44

### **General Guidelines**

1. Project should be neat and well-presented and must be hand- written on interleaf sheets.
2. Sample project is shared in the chemistry group . Same pattern is to be followed.
3. If students want to perform experiments in the laboratory, they need to complete the entire work except the completion of the observation table.
4. Relevant pics are to be pasted.
5. Project is to be done on interleaf sheets
6. No whitener to be used, in case of any mistake redo the sheet.
7. All are supposed to adhere to the topic allotted though any other topic related to chemistry can be taken with prior permission of the teacher.

## COMPUTER SCIENCE

### Very Short Answer Type Questions (1-Mark)

- 1a) What are default parameters?  
b) Can a function return multiple values in python?

### 2 a) Give an example of a positional parameter.

- b) Carefully observe the code and give the output:

```
def example(a):  
    a = a + '2'  
    a = a*2  
    return a  
example("hello")
```

- 3 a) What is the output of the following program:

```
def myfunc(a):  
    a = a + 2  
    a = a * 2  
    return a  
print(myfunc(2))
```

- b) Find and write the output of the following python code:

```
x = "abcdef"  
i = "a"  
while i in x:  
    print(i, end = " ")
```

**the output is aaaaaa OR infinite loop. Give reason, why and how ?**

- 4 a) Find and write the output of the following python code:

```
a=10  
def call():  
    global a  
    a=15  
    b=20  
    print(a)  
call()
```

- b) From the program code given below, identify the parts mentioned below:

```
def num(x):  
    x=50  
    return x+3  
y=55  
res=num(y)
```

Identify these parts: function header, function call, arguments, parameters, function body, main program .

c) Trace the flow of execution for the following program:

```
def increment(x):  
    x=x+1 #main  
x=3  
print(x)  
increment(x)  
print(x)
```

d) What is the difference between the formal parameters and actual parameters ?

e) Predict the output of the following code

```
def codo(n):  
    if n == 0:  
        print("Finally")  
    else :  
        print(n)  
codo(n-3)  
codo(15)
```

### Short Answer Type Questions (2-Mark)

1.a) What possible outputs are expected to be displayed on the screen at the time of execution of the program from the following code? Also specify the minimum and maximum values that can be assigned to the variable c.

```
import random  
temp=[10,20,30,40,50,60]  
c=random.randint(0,4)  
for i in range(0, c):  
    print(temp[i],"#")
```

(i)10#20#

(ii) 10#20#30#40#50#

(iii) 10#20#30#

(iv) 50#60#

b) Find and write the output of the following python code:

```
def Alter(x,y=20):  
    x=x*y  
    y=x%y  
    print (x,'*',y)  
    return (x)
```

a=200

b=30

a=Alter(a,b)

print (a,'\$',b)

b=Alter(b)

print (a,'\$', b)

a=Alter(a)

```
print (a,'$',b)
```

2a) Rewrite the correct code after removing the errors: -

```
def SI(p,t=2,r):  
    return (p*r*t)/100
```

b) What are the possible outcome(s) executed from the following code? Also specify the maximum and minimum values that can be assigned to variable N.

```
import random  
NAV = ["LEFT","FRONT","RIGHT","BACK"]  
NUM = random.randint(1,3)  
NAVG = ""  
    for C in range(NUM,1,-1):  
        NAVG = NAVG + NAV[C]  
print(NAVG)
```

3 a) What output will be generated when the following Python code is executed?

b) Rewrite the following Python program after removing all the syntactical errors (if any), underlining each correction.:

```
def checkval:  
x = input("Enter a number")  
if x % 2 = 0:  
    print x,"is even"  
else if x<0:  
    print x,"should be positive"  
else;  
    print x,"is odd"
```

4a) Observe the following Python code very carefully and rewrite it after removing all syntactical errors with each correction underlined.

```
DEF execmain ():  
x=input ("Enter a number :")  
if (abs(x)=x):  
    print ("You entered a positive number")  
else:  
x=-1  
print "Number made positive:" xexecmain()
```

b) Find the output of the following Python program:

```
def makenew(mystr):  
    newstr = ""  
    count = 0  
    for i in mystr:  
        if count%2 != 0:  
            newstr = newstr + str(count)  
        else:  
            if i.islower():  
                newstr = newstr + i.upper()  
            else:
```

```

        newstr = newstr + i
    count += 1
    newstr = newstr + mystr[:1]
print("The new string is:", newstr)
makenew("sTUdeNT")

```

5 a) Consider the following function headers. Identify the correct statement: -

- 1) def correct(a=1,b=2,c):                      2) def correct(a=1,b,c=3):  
 3) def correct(a=1,b=2,c=3):                4) def correct(a=1,b,c):

b) What will be the output of the following code?

```

a=1
def f():
    a=10
    print(a)

```

c) Carefully observe the following Python code and answer the questions that follow:

```

global x
x=5
def fun2():
    x=3
    print(x)
x=x+1u
print(x)
fun2()

```

On execution, the above code produces the following output:

```

6
3

```

Explain the output with respect to the scope of the variables.

6 a) Write a program using user defined function to :

- i) Calculate and display average of all the elements in a user defined list containing numbers.
- ii) Write a python function that takes two numbers and print the smaller number. Also write how to call this function.

b) Explain two types of variable scope with example.

c) Write a note on Non- Void Function and Void Function.

### Application Based Questions/Programs(3 marks each)

1a ) Write a function mul ( ) which accepts list L, odd\_L, even\_L as its parameters. Transfer all even values of list L to even\_L and all odd values of L to odd\_L.

eg. If L = [10, 22, 24, 36, 37, 43, 51]

odd\_L = [ 37, 43,51]

and even\_L = [ 10, 22, 24, 26 ]

b) Write a definition of a method EvenSum(NUMBERS) to add those values in the list of NUMBERS, which are odd.

2 a) Write a python program to sum the sequence given below. Take the input *n* from the user.

b) Write a program to compute GCD and LCM of two numbers

3a) How many values can a python function return? Explain how?

b) Find the output of the following code: -

c) **Predict the output of the following code fragment:**

```
def check(n1=1, n2=2):
```

```
    n1=n1+n2
```

```
    n2+=1
```

```
    print(n1,n2)
```

```
check()
```

```
check(2,1)
```

```
check(3)
```

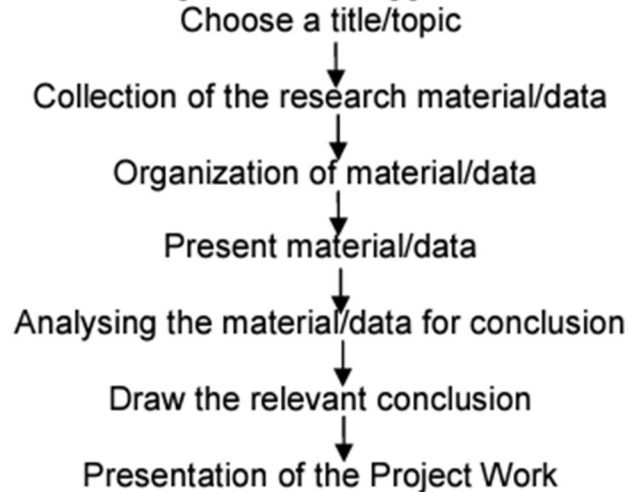
## ECONOMICS

### PROJECT WORK:

As per the suggestive list of topics given in the CBSE curriculum, each student has to complete the Economics Project file on any one of the chosen topics.

#### Scope of the project:

Learners may work upon the following lines as a suggested flow chart:



#### Marking Scheme :

Marks are suggested to be given as –

S. No.	Heading	Marks Allotted
1.	Relevance of the topic	3
2.	Knowledge Content/Research Work	6
3.	Presentation Technique	3
4.	Viva-voce	8
	Total	20 Marks

Answer the following questions as per weightage provided in Economics register:

**Q1. Giving reasons, classify the following into intermediate and final products:** 2

- i) Furniture purchased by a school.
- ii) Chalks and dusters purchased by a school.

**Q2. Distinguish between real and nominal gross domestic product.** 3

**Q3. Explain how externalities are a limitation in taking Gross Domestic Product as an index of welfare.**



**Q4. India can add value to its growth by resorting to a circular economy emphasizing maximum utility of products, components and materials, a study by a United Nations body said. - The Economic Times, 5 December, 2016**

**In light of the above statement, what is the significance of the circular flow of income? 3**

**Q5. The Government of India has recently launched ‘ Jan - Dhan Yojana’ aimed at every household in the country to have at least one bank account. Explain how deposits made under the plan are going to affect the national income of the country.**

**3**

**Q6. Explain the components of Legal Reserve Ratio.**

**3**

**Q7. Distinguish between Repo Rate and Reverse Repo Rate.**

**3**

**Q8. Critically evaluate Industrial and Trade policies implemented in India between 1950 - 1990.**

**3**

**Q9. Give the advantages of privatization and disinvestment in India.**

**3**

**Q10. How is India performing in agriculture after the implementation of NEP 1991?**

**3**

## ENGLISH

### SECTION A

#### READING SKILLS

Q1. Read the passage given below:

1. When we think of the game of cricket, we come to the conclusion that it is primarily a game that depends on outstanding physical activities, good hand-eye co-ordination, speed, skill and strength. It provides entertainment and generates strong feelings of excitement. A good match of cricket or of any other game neither adds to the existing stock of human knowledge nor reveals any secret existence. It does not carry any deep meaning but most people, particularly the lover of sports attach deep emotions and numerous meanings to it. Games are thought of as a metaphor for life. They are supposed to teach many lessons. In fact, more is said and written about a cricket match than about scientific findings or great philosophy.
2. This is because games, like a morality play, in which settings and rules are made by us, can easily make people test their fair and foul conduct principles of reward and punishment, and emotions of joy and disappointment. They can make us experience the thrill of war without exposing us to its dangers. A man watching a cricket match on TV and munching popcorn is like a surrogate warrior. In fact, games provide us with a safe outlet for our aggressiveness. If games become aggressive, they lose the very purpose of providing entertainment and purging us of our aggressiveness. They can calm our impatience without creating any conflict.
3. Commentators, journalists, politicians and analysts can do a great favour to the competing teams by keeping the excitement within limits. The teams should play without being dominated by feelings of national honour and shame. Excellent performance of the players of both teams should be enjoyed and appreciated.

Winning or losing in a game should not be taken seriously. A game is fun if it is played with true spirit of sportsmanship.

On the basis of your understanding of the above passage, answer the given questions by choosing the most appropriate option:

a) Complete the sentence by choosing an appropriate option:

Most people conclude that cricket is primarily a game because \_\_\_\_\_

- |                                     |  |
|-------------------------------------|--|
| (i) it is played as a match         | (ii) it requires two teams                 |
| (iii) it includes physical activity | (iv) it depends only on skill and strength |

- b) Comment on the writer's reference to that cricket does not reveal any secret of existence.
- c) List any two responses which watching a game of cricket gives rise to.
- d) Select the option that conveys the opposite of 'destroy' from words used in the passage.  
 (i) reveals (ii) experience  
 (iii) generate (iv) purging
- e) The writer would not agree with the given statements based on paragraph 2, EXCEPT (i) Rules of any game are made by people . (ii) Watching a cricket match makes the viewer believe that he is fighting a battle. (iii) It is necessary for a game to be aggressive in order to build excitement. (iv) A game can test people's sense of fair judgement.
- f) With reference to the passage a spectator is compared to a surrogate warrior. Choose the option that best describes the phrase. (i) a spectator who is paid to watch. (ii) a spectator who is in pain while watching a match. (iii) a spectator who enjoys the match as an armchair soldier. (iv) a spectator who makes judgement about reward and punishment.
- g) Why does the writer compare games to a morality play?
- h) Complete the given sentence with an appropriate inference with respect to the following: The writer says that games can calm our impatience without creating any conflict by \_\_\_\_.
- i) The writer advises the players that games should not become aggressive because \_\_\_\_
- j) Select the most suitable title for the above passage. (i) Excellent Performance by cricketers (ii) The Benefits of Playing Cricket (iii) Cricket – The King of Games (iv) The True Spirit of Playing Games

Q2. Read the passage given below:-

(1) How bird hits happen, why they are a concern?

New Delhi June 20

At least two bird strike incidents happened on Sunday. Both aircrafts returned to their airports of origin and were grounded for maintenance. An ABC aircraft which took off from Guwahati towards Delhi, suffered damage to its left engine following a bird hit at 1600 feet. The pilots returned to Guwahati. The other strike happened on another flight from Patna to Delhi. The pilots of the aircraft suspected a bird strike during the take-off roll but continued to climb. Following the take off rotation, they were informed by the cabin crew of sparks emanating from the left engine. Subsequently, the pilots were also informed by air traffic control of smoke coming out of one of the engines. The pilots declared an emergency and returned to Patna.

(2) Why are bird strikes a concern?

Bird strikes are among the most common threats to aircraft safety and they typically occur during take-off or landing. Dozens of bird strikes happen each day but some can be more dangerous than others. Typically, when birds collide with an aircraft's airframe, it is unlikely to cause significant problems for the pilots flying. But there are instances when the aircraft engine ingests the birds. This can lead to a loss of thrust for the engine and cause manoeuvrability problems for the crew. In these cases, where a jet engine ingests a bird, procedures would generally call for pilots to land the plane at the closest airport. While most airframe bird strikes are not considered critical to air safety, if a collision cracks a window or a wind-screen pilots will look to land as early as possible.

(3) How critical are bird strikes to air safety?

Smaller planes would generally be more susceptible to the dangers of bird strikes than larger ones. However, given that bird strikes mostly happen during take-off and landing, these incidents could distract the pilots during what are highly critical phases of flights that demand the complete attention of the crew.

(4) What causes bird-strikes?

The presence of birds around an aircraft increases the chances of a bird-strike. In the monsoon, as water puddles emerge on open grounds attracting insects to breed, the presence of birds increases. In some cases bird hits also happen at higher altitudes when a plane is cruising. These are more dangerous than the low-altitude hits, given that they can cause rapid depressurisation of cabins. Other reasons for bird activity around the air field could be presence of landfills or waste disposal. Other reasons for bird activity around the air field could be presence of landfills or waste disposal sites that can attract a large number of birds.

On the basis of your understanding of the above passage, answer the questions by choosing the most appropriate option:

a) Does the following statement agree with the information given in paragraph 1?

When an airplane is hit by a bird or is suspected to have been hit, the passengers must be asked to get down at once.

Select from the following:

If the statement agrees with the information.  
statement contradicts the information.  
no information on this.

True:  
False: If the  
Not Given: If there is

b) Select the option that displays the most likely reason for Bird hits.

- (i) when the aircraft is overloaded.
- (ii) at the time of landing or taking off.
- (iii) when the crew becomes negligent.
- (iv) when the passengers become panicky.

c) Complete the sentence appropriately with one word.

Smaller planes are generally more \_\_\_\_\_ than the larger ones.

d) Complete the given sentence by selecting the most appropriate option: \_\_\_\_\_ When the window on the windscreen of the air plane is cracked due to a bird hit \_\_\_\_\_

- (i) the crew must rush to the cockpit.
- (ii) the pilot must land at the earliest airport.
- (iii) the pilot must inform the maintenance engineer.
- (iv) the pilot should ignore them.

e) Based on the reading of the text, state a point to further the statement.

Dozens of bird hits take place every day \_\_\_\_\_.

- (i) but only a few are dangerous.
- (ii) all of them are fatal.
- (iii) but after every bird hit it is imperative to land the aircraft.
- (iv) the pilot should ignore them.

f) Complete the sentence based on the following statement

Complete attention of the crew is demanded during take off and landing.

We can say this because \_\_\_\_\_.

g) Complete the sentence appropriately with one/two words.

In cases where the aircraft engine ingests the bird, it leads to the loss of thrust and causes problems in \_\_\_\_\_.

h) Which are the areas most prone to bird hits?

i) Based on the reading of the text, state a point to challenge the given statement.

The area around air fields should be clear of any waste disposal sites.

j) Look at the graph. It shows that between 2016 and 2021 whereas air flights have come down, the bird-hits have gone up. This implies that the incidence of bird hits has \_\_\_\_\_.

- (i) Decreased
- (ii) increased
- (iii) remained constant
- (iv) been alarming

SECTION B

ADVANCED WRITING SKILLS

Q5A. You have seen an advertisement in The Hindu for the post of P.G.T.(Psychology) for St. Mary's Convent, Feeder Road, Lucknow. Apply for the job with complete BIO-DATA. You are Sajeev Mathews, resident of 96 Shaheed Bagh, Lucknow.

OR

B. Public demonstrations cause lot of disturbance in the daily routine of citizens. As Moksha/Mohit write a LETTER to the Editor of a leading national daily highlighting the need to discourage such demonstrations and disturbance by the public on highways, which cause a great loss of time and opportunity for many.

Q6A. Use of computers by students in the elite schools has become a deterrent for good handwriting. But according to those, who advocate the cause this era is the transitional phase in the history of mankind the change is imminent and adapting to it is common sense. However, you are from the old school of thought and feel extensive use of computers is a compromise with creativity and results in the increase in the tendency of a copy paste, exposing children to objectionable sites and of course eyes are another casualty. Write a letter to the editor of a newspaper expressing your concern regarding the same.

OR

Bal Vidya Public School, Bhilai, urgently requires a post-graduate teacher to teach political science for which they have placed an advertisement in The Bhilai Express. You are Sanjay/Sanjana Sharma from 21, Vasant Marg, Bhilai. Draft a letter including a CV, applying for the advertised post (120-150 words).

PROJECT WORK  
Summer Holidays

For

Instructions:-

1. Students need to do ANY ONE presentation with reference to the Poem or Prose of their choice.
2. Prepare a PPT mentioning Names, Class and Topic.
3. Mention the Reference and Topic.
4. To submit a hard copy of the project mentioning the following:-
  - (a) Introduction
  - (b) Content (as per subject/topic chosen)
  - (c) Conclusion
  - (d) Mention the link the PPT prepared

5. Project work to be done in A4 sheets and to submit on 3 July 2024.

- a) My mother at sixty-six : old age homes
- b) Lost Spring - school on wheels
  - teaching the poor/under privileged
  - implementing digital skills/financial skills
  - book binding
- c) Deep Water - Refer to para Olympics
  - Gandhi chapter + Tagore's song and any two people who fought their fear

Students to take live interviews of people from different professions and prepare a PPT.

Students can take interviews of any astrologer and prepare a PPT (Ref. Tiger Kin

Please note:- Assignment work to be done in the Writing Skills Register

- Project work to be done on 4 sheets

## **ENTREPRENEURSHIP**

### **Chapter 1: Entrepreneurial Opportunity**

#### **2014 Sample Paper Questions**

1. Hina, was manufacturing beauty products and was always on the lookout to improvise her products. . She used social media and online surveys to understand the latest trend in customer needs and overall in the cosmetics industry. . Through the surveys, she understood that the customers prefer natural ingredients like multani mitti or neem in place of chemicals in the beauty products. Responding to the customers' needs, she developed a 'MultaniMitti cum neem face pack' in an attractive package. It was highly priced as she knew that the customers will be ready to pay the price for the quality. Her face pack was an instant success. **Identify the 'Way' in which Hina spotted this trend.**
2. Disha, a graduate of Horticulture from Kurushetra University came across a barren land near Solan when she visited this place. Disha was fond of strawberries and was inquisitive to understand the reason why strawberries could not be grown there. She was informed by the local authorities that the land was infertile for raising strawberries. She took this as a challenge and believed in its success. Best quality strawberries now mark the beauty of that barren piece of land. **(a) Identify and explain the 'idea field' from where the idea has been generated. (b) Also explain and give one example each for four other idea fields which may generate useful product ideas.**
3. List any two factors included in 'micro environment'?
4. State the steps in the 'Creative Process' after the 'stage of preparation'?
5. . State the elements of 'Innovation Process'?

#### **2015 Sample Paper Questions**

1. Since her college days Mehak, loved the thrill of adventure sports. She was an avid reader which helped her to keep track of various new adventure sports taken up all around the world. She had recently read an article on increasing trend towards 'space tourism and adventurous holidays'. Using her personal experiences and her passion for adventure sports she decided to start a company called 'YOLO'. For the same purpose she also decided to collect statistics to see how much of these sports were accepted in our country. **Identify the ways in which she was able to spot the trend.**
2. Why does an entrepreneur need to scan environment? Explain.
3. Explain any three sources which lead to the emergence of basic ideas.



4. Shahida, a student of School of Rug Weaving Institute, Turkey, visited her grandparents in Kashmir for the first time. Breathtaking mountain scenery, clear lakes, lush vegetation and magnificent forests mesmerized her. The valley is home to a rich biodiversity including a large number of bird species, many of which are unique to Kashmir. It is home to Yak and sheep that are taken care of by nomads. Kashmiri lifestyle is essentially slow paced and reflects religious diversity. Kashmiris are known to enjoy their music in its various local forms, and the traditional dress of both genders is often quite colorful. Tulip, Saffron, dry fruits and artistic woodwork are its hallmark. She also observed that the government was stable and all the tourist places were well guarded by the army. She found it to be an ideal place to start a unit for carpet weaving and employ local people to preserve the ethnic touch. After the devastating floods a considerable population was rendered jobless, her unit would help to revive their economic condition. She started scanning and screening the environment and collected the following information. **a. Help her categorize the information making use of PESTEL MODEL.(Any three) b. Also state a value communicated by Shahida.**

5. Explain the factors that help an entrepreneur to identify a product. (Any 4)

### 2016-17

1. Sheila has a degree in robotics and she loves to design products. She started her career in 'Robotech' which uses high end technology in all their products. Her job profile included travelling a lot also. Whenever she travelled she noticed that disabled people have difficulty in maneuvering their wheelchair from one place to another because in some places ramp is not provided and there is no way they can walk up the stairs. She came up with an idea of a wheelchair which can be used on stairs easily. She decided to quit her job and start her own company. She realized that her idea was the first stage in the process of innovation. Identify the concept and explain the steps in its process.

2. Explain the first two elements in the innovation process?

3. Ragini, a career oriented mother, hardly got time to cook for the family. She decided to hire a cook but was not able to find one who could cook according to the taste of the family. Her sister Abha sensed that this problem is not only faced by her sister but also by many working women. She launched a website namely 'Dial for food' where housewives who had culinary ability and were interested to cook could drop in their contact details and households where specific cuisine was required could leave in their requirements so that through the website home cooked food could be delivered. The website mainly helped in identifying the requirement and fulfilled it through providing delivery service. Identify any two uses of problem identification to Abha.

### 2017-18

1. Ritu has completed her B.tech in textile designing. She wants to start a ready made garments manufacturing unit. She wants to manufacture trendy garments for children below

the age of one year. She approached a popular trend spotter to help her with the same. The trend spotter demanded Rs. 2,00,000 from Ritu to help her. Looking at the high fee demanded, she decided to do the trend spotting by herself. She decided to identify the trend by talking to the parents of the newly born. Explain the method that Ritu adopted to spot the trend.

2. The first step in the creative process is 'Idea germination'. Explain the next step that follows.

3. Explain creative efforts as an idea field and also list the ways in which these ideas can be generated.

4. Kiano Mobile Solutions (KMS) has been a leader in the mobile handset industry for years. After technological advancement, many players entered the market and started to take up the sales share. KMS failed to understand the changing trends in the mobile phone and lost its market share majorly whereas Hanhung Mobitech could understand the sensitivity to the environment factors which is crucial for an entrepreneur. How has the understanding of environment helped Hanhung Mobitech? Explain.

## **2018-19**

1. Enlist the elements of Innovation process.

2. Amish has the habit of reading the newspaper on a daily basis. The latest headlines caught his attention. The headlines read as follows' "Government plans to offer subsidy to manufacturers of solar panels". He had also heard from his friend that individual house owners are preferring to install solar panels to save electricity. He started to make connections that led him to a business idea of establishing a small scale industry manufacturing solar panels. Identify and explain this way of identification by Amish which has helped him to understand the market and produce goods accordingly.

3. Dristi ltd. decided to manufacture mobile phones with a new feature. It will have an inbuilt button which when pressed will extend into a selfie stick enabling the customers to click selfies easily without the need to carry a separate selfie stick. Identify two PESTEL factors that enabled Dristi Ltd., to bring out this new feature.

4. "All ideas need not necessarily become sound business opportunities". In reference to this statement explain the first three steps in idea and opportunity assessment.

5. Shobha is a small scale entrepreneur manufacturing chocolates in the name 'Yummilicious'. She had started this venture in the year 2012. She attended various start-up meeting where several Angel Investors and Venture Capitalists shared their success story and mentored the new budding entrepreneurs. In one of these sessions she heard a mentor say that every entrepreneur should constantly and consistently aim to improve the products and services already existing in the market. Taking this cue, Shobha decided to introduce wafers,

lollipop and hard candy under the same brand name. Explain the benefits as to why Shobha is doing so?

6. Harish, after finishing his degree wanted to start his own business. He was confused as to the kind of business he should start. He attended a start-up session. One of the speakers stated that 'Creativity can be used to spot and harness opportunities, as well as be applied to develop new products and services'. State any three ways in which creative ideas can be generated.

7. Entrepreneurship does not emerge and grow spontaneously. Rather, it is dependent upon several economic, social, political, legal and other factors. An entrepreneur has to carefully monitor the organization's internal and external environment for detecting early signs of opportunities and threats that may influence its current and future plans. Identifying the concept, justify its importance for an entrepreneur.

8. An entrepreneur identifies problems as roadblocks. They understand that they need to bring creative solutions to it. For this he needs to completely understand the problem, identify the target group and find an acceptable solution. Justify as to how identifying a problem will help an entrepreneur.

### **2019-20**

1. North west Airlines started their operations from India to various parts of the country in the year 2015. The company had been successful in it's operations as more people preferred to travel by air due to change in the lifestyle and attitude towards work and leisure. It is \_\_\_\_\_ factor as per PESTEL model.

2. \_\_\_\_\_ is the first stage in the process of innovation.

3. State whether the following statements are 'true' or 'false': Environment scanning is required to convert an idea into an opportunity.

4. Innovation is an indication that will help the entrepreneur to understand the market and produce goods or provide services in sync with the market needs, demand and taste.

5. Exploring opportunities in the environment is a process involving various steps. Arrange the steps in correct order.

i) Evaluating the ideas received from different sources to find a creative solution

- ii) Identifying a product or service through innovation
- iii) Opportunity spotting by analysing the needs and problems that exist in the environment
- iv) Setting up a project and nurturing it to success

a. i-ii-iii-iv

b. iii-i-ii-iv

c. ii-iii-iv-i

d. i-iv-iii-ii

6. Priya joined a Publication Company that publishes a monthly magazine “Lifestlye”. It covers articles related to fitness, clothing, gadgets, cooking etc., Priya had joined the clothing division of the magazine. Her divisional head explained her nature of work of the division. She also informed Priya that in addition to visits to local mall she would have to attend ‘Power lunches’ on the first Monday of every month. Out of the following identify the way of spotting trend, the divisional head is talking about?

a. Talk trends

b. Read trends

c. Watch trends

d. Think trends

7. . Rani finished her graduation from Bangalore University. Along with her friends she decided to travel the European countries for 20 days. She faced a lot of problems before and during her visit. While applying for visa, she found the process to be too tedious so she approached a travel agent who helped her but still it turned out to be expensive. After that she visited various websites to book hotels and transportation. It was a long process.

After leaving India, she found that language in every European country was different even though English was spoken widely. She could not find a single app which would cover everything from obtaining a visa, places to stay, eat and visit in every city. This roadblock inspired her to come up with a solution. When she came back to India, she developed an app that can be downloaded on any phone. The app acts as a virtual guide for every traveller who wants to visit European countries. State the objectives of developing this app.

### **2020-21**

1. Anant and Anandi together took over their family business of furniture. They

understood that the present competitors were using online means to sell their products. They decided on a new idea of providing furniture on a rental basis to offices and households and to also start making furniture using the traditional method which caught the attention of the new generation. They opened stores in various cities and started selling through online mode also. They both are using the service-related idea field. Mention whether the idea field identified is true or false.

2. Vikrant was always interested in technology driven products. After finishing his engineering degree, he started working on a new walking stick which will help blind people. The stick will be Bluetooth and wi-fi enabled which will be connected through an app on the phone which will guide the blind persons about the objects in front of their walking path. He has started testing the walking stick and found that the stakeholders were satisfied and it had a great value to the customers. Vikrant is in ..... stage of innovation process.

3. Mallika was selling vegetables in her cart along with her mother. They were able to earn a profit of around Rs.200 every day. Even though the amount was not substantial it was sufficient for a decent living. Mallika often noticed that nuclear families where both husband and wife go to work find it difficult to cook as cleaning and cutting vegetables took a lot of time, so an entrepreneur she started gathering information regularly and developed a new product line of selling cut vegetables in hygienic packaging. Mallika used .....trend to spot this idea.

4. Arvind planned to start a small fast-food joint in his area after finishing his degree in hospitality management. His plan was to combine and use healthy ingredients like whole wheat flour to make the burger buns. He knew that he had to start collecting information from different sources which will help him to identify the right opportunity to start his business. From where will Arvind get the necessary information?

A. Magazines

B. Shows

C. Family Members

D. All of the above

5. Victor industries has been one of the leading companies in Mobile phone industry in India. The company decided to launch a new Model AI 1 which will have inbuilt latest software to encourage hands free use and enhance the customer experience through 3D photos. They are also looking into ideas to use ecofriendly recyclable materials for the body of the phone which will cause less environmental damage. Identify the two factors of PESTEL model from the above case study.

A. Economic, Social

B. Ecological, Technological

C. Legal, Economic

D. Social, Political

**2021-22**

**1.** An idea should eventually lead to success of the venture of an entrepreneur. Which among the following ideas will an entrepreneur have to select?

a. Basic idea

b. Any random idea

c. Idea developed before environmental scanning

d. Idea developed after environmental scanning

**2.** Nelson started an AC repair shop in his area after doing a diploma course. What idea field is it?

a. Market-driven

b. Trading related

c. Service-related

d. Creative efforts

**3.** Identify the third element in the innovation process from the given options.

a. Resource organization

b. Commercial application

c. Implementation

d. Analytical planning

**4.** Which is the first stage in the process of innovation?

a. Idea germination

- b. Creativity
- c. Preparation
- d. Incubation

**5.** What is the basic test of a successful entrepreneur?

- a. Identification of business opportunity
- b. Identification of a problem
- c. Identification of target market
- d. Identification of ways to earn profit

**6.** Ramesh starts his day by reading all newspapers and has a keen interest towards all business news and articles. He connects the articles with the observations he has made over the years which he knows will eventually lead to business-boosting insights. Identify the way of trend spotting at this level.

- a. Read Trend
- b. Think trend
- c. Watch trend
- d. Talk trend

**7.** Assertion (A): Needs and problems exists in the environment

Reason (R): Opportunity is spotted by analyzing the environment.

- a. A is true but R is false.
- b. Both A and R are true, but R is not the correct explanation of A
- c. A is true and R is the correct explanation of A
- d. Both A and R are false.

**8.** Can all ideas be converted into opportunities?

- a. Yes, as ideas lead to opportunity

- b. Yes, only if it has assured market scope
- c. Yes, only if there is a good market for the product and rate of return on the investment is attractive.
- d. Yes, if the entrepreneur has enough financial resources.

9. During the Pandemic, the worst hit were the families who were infected by the virus and had no source for home cooked nutritious food. 'Chilly Chillz' is a multi-cuisine chain of restaurants operating throughout Delhi by a well-established network of outlets. The owner of the chain understood the concern and started serving 3 course meal to such families on payment basis. The interested customers had to login the website, select their location and set their menu for the day. This service proved to be a great support for suffering families. What was the source of generation of basic idea?

- a. Innovation
- b. Invention
- c. Problem
- d. Competition

10. George Kutty has a coffee bean processing unit in Kerala. During the pandemic he has learnt different styles to make coffee. He started improvising his product and range to make coffee premixes in different varieties like Latte, Mocha, Dalgona which will eventually help him to establish a place for his brand in the beverage industry. Identify the Idea field used by him

- a. Market driven
- b. Trading related
- c. Creative efforts
- d. Service sector

11. WX ltd. is in the process of innovating a new pen drive especially for teachers which will have a built-in antivirus and which can be worn like a watch so it minimizes the problem of losing the pen drive. Which of the given statements aptly describes the situation?

- a. This is trend spotting
- b. This is product identification



c. This is problem solving

d. This is problem solving by introducing an innovative product.

**12.** 'Safe for Women'- SFW has been a known brand among working women as the company keeps introducing various new innovative products for the safety of women. Their latest product is a pen which can be used as a pocket knife. The product is in huge demand. Which point of importance of scanning the environment does this news indicate?

a. Formulation of strategies and policies

b. Tapping useful resources

c. Image building

d. Better performance

**13.** Which of the following factors are involved in sensing opportunities?

1. Ability to perceive and preserve basic ideas

2. Ability to read the environment

3. Ability to assess the environment

4. Ability to harness different sources of information

a. 1, 2 only

b. 1 only

c. 1,4 only

d. 1, 2, 3 only

**14.** . In a bid to send astronauts to Mars, US space agency Nasa has invited applications for four people to live in a simulated Martian exploration habitat in order to prepare them for the real- life challenges of future missions to the red planet. Nasa started taking applications for participants to live for a year in Mars Dune Alpha, a 1,700-square-foot Martian habitat created by a 3D-printer that is inside a building at Johnson Space Center in Houston. Identify the macro environment factor which has influenced Nasa to develop Mars Dune Alpha.

a. Political

- b. Social
- c. Legal
- d. Technological

**15.** . Lakshmi Menon was troubled to see the huge waste generated by the scrap material left behind after stitching Personal Protective Equipment (PPE) gowns. These scrap materials could not be recycled easily. When she saw this problem, she thought of a solution also. It was to make lightweight bedrolls made from the scraps of the material. The bedrolls were cheap and durable and within a short span of time, demand for these bed rolls increased tremendously. What concept is involved in the above case study?

- a. Environment Scanning
- b. Problem Identification
- c. Trend spotting
- d. Market assessment

**16.** Monik Ltd., was the market leader in the Mobile Phone industry in 2000. The company was well known for its affordable phones. In 2007, a new company launched new Mobile models with the latest technologies and captured the market. Monik Ltd. did not expect this and lost the entire market share and had to close its operations. Which of the following SWOT analysis framework does this case indicate that Monik Ltd. failed to do?

- a. Strengths
- b. Weakness
- c. Opportunities
- d. Threats

**17.** Hitesh, a fisherman, faced a lot of problems in selling the fish he caught. His entire community was facing this problem and most of the time they had to dump the fish they caught back into the sea. He read a newspaper article on how people have started ordering online for most of the essentials. He spoke to his fellow fishermen about selling their fish online and started their business with a small delivery truck and an app and slowly and steadily their business started to flourish. What trend has Hitesh spotted?

- a. Read trends

- b. Watch trends
- c. Talk trends
- d. Think trends

**18.** Suganya wanted the younger generation to understand the nutritional value of traditional food. Keeping this in mind, she started a 'Eat To Fit' - ETF restaurant and it was a successful venture. She opened many branches all over the state. Seeing her success, other restaurants followed the same model but 'ETF' always had the major market share. Which point of importance of the environment does this case imply?

- a. Tapping useful resources
- b. Better performance
- c. Sensitisation of entrepreneurs to cope up with rapid changes
- d. Identification of opportunities to get first mover advantage

**19.** Fit Ltd., has become a well-known brand name in the field of fitness. Their products range from exercise equipment to protein powders. The company decided to launch a new product in the market which they believed will be a game changer. The company did a market survey amongst people from various age groups to know the acceptability of the product. What step of the creativity process is the company right now in?

- a. Idea germination
- b. Preparation
- c. Incubation
- d. Illumination

**2022-23**

**1.** Given below are the factors necessary for developing a successful idea. Identify the correct combinations from the given options.

- a. Skills and Knowledge
- b. Trends and demand
- c. Skills, Knowledge, and Competencies

d. Trends, demand, and change

2. Assertion(A): Customers are part of the microenvironment.

Reason(R): Microenvironment does not operate in isolation and is one of the levels of the business environment.

a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A)

c. Assertion (A) is true but Reason (R) is false.

d. Assertion (A) is false but Reason (R) is true

Q Read the following article written on the basis of the reopening of the economy worldwide in various sectors and answer the from question 14- question 18

E-Commerce – The pandemic has given rise to a “homebody economy”, as households make more use of online orders to avoid crowds. Across Europe’s largest e-commerce markets - France, Germany, and the UK -

purchase behavior has evolved. According to a May study by Kantar, 9% of shoppers make more online purchases than before; 60% say they will continue to shop online after the outbreak; and 80% say they will shop online again for nonessential items. Gaming -

The pandemic has accelerated existing trends within the gaming industry, such as the way gamers purchase and consume, moving from packaged games to

downloadable content. Another indicator of this shift, is mobile apps, in general, have skyrocketed during the crisis and are expected to account for 48% of the global games market this year, according to Newzoo’s April study. Automotive industry - As consumers regain the ability to travel in a post-

lockdown world, they’ll also be more concerned with how to commute safely. Despite being caught in the grip of the Covid-19 pandemic, the automotive industry has been a surprising early riser post-

confinement. Marketers have quickly realized that more consumers are exploring car ownership now that they want to reduce their use of public transport. Blogging - Confined to their homes, most

people have resorted to creating their own blogging services related to every field. Home cooks have emerged successfully creating their own reels. Many ready-to-cook food companies have resorted

to advertising their products through these influential bloggers. Finance - In the early stages of Covid-19, finance, and especially insurance services, saw a huge spike in page views as consumers

wanted to ensure the safety and health of their families. Following the global financial uncertainty, consumer behavior has shifted from a “now” mindset to one that prioritizes the future - thinking

more about how to invest and protect savings. As this crisis continues to evolve, finance will likely continue to be a high priority, and brands have started to identify the current mood and concerns of

their customers through feedback, and observations and are deciding as to how best to address them.

Source: Trendspotting-exchange4media.com; June 2020.

3. 'Cook-it-fast' - a growing ready-to-cook product manufacturing company was looking into various means of advertising their products. The marketing team suggested approaching an influential food blogger who can use their products in their recipes. Which way of trend spotting does this indicate?

- a. Read Trends
- b. Talk Trends
- c. Watch Trends
- d. Think Trends

4. "Play your way" a leading game developer company realized that they have to redevelop and enhance their app experience after reading the above article and listening to customer reviews as well as observing the pattern of people downloading and using the "In Purchase Facilities" within the app. Which way of trend spotting does this indicate?

- a. Read Trends
- b. Talk Trends
- c. Watch Trends
- d. Think Trends

5. "According to a May study by Kantar, 9% of shoppers make more online purchases than before; 60% say they will continue to shop online after the outbreak; and 80% say they will shop online again for non-essential items." Which way of trend spotting does this indicate?

- a. Read Trends
- b. Talk Trends
- c. Watch Trends
- d. Think Trends

6. "Marketers have quickly realized that more consumers are exploring car ownership now that they want to reduce their use of public transport." Which way of trend spotting does this indicate?

- a. Read Trends
- b. Talk Trends
- c. Watch Trends

d. Think Trends

7. “As this crisis continues to evolve, finance will likely continue to be a high priority, and brands have started to identify the current mood and concerns of their customers through feedback, and observations and are deciding as to how best to address them.” Which way of trend spotting does this indicate?

a. Read Trends

b. Talk Trends

c. Watch Trends

d. Think Trends

**8. Read the following newspaper article and identify and explain the elements in the PESTEL model which is present in this article.**

India will ban the use of single-use plastics from July 1 in order to prevent its harmful effects on the environment and in pursuance of its global climate goals. The production, importation, stocking, distribution, sale, and use of certain single-use plastic items that have a low utility and a high potential for littering will henceforth be banned. The items that face ban are plastic stirrers, plastic plates, plastic cups, plastic glasses, plastic cutlery like forks, spoons, and knives, plastic trays, wrapping or packaging films around candy boxes, balloon sticks made of plastic, flags made of plastic, candy sticks, ice-cream sticks, and polystyrene (Thermocol) for decorations. The ministry announcement further stated that control rooms at the national and state levels must be established in order to monitor the unauthorized production, importation, stocking, distribution, sale, and use of items made of single-use plastic that is forbidden. Plastic carry bags with a thickness of less than 75 microns are currently illegal to manufacture, import, stock, distribute, sell, and use, according to the Plastic Waste Management Amendment Rules, 2021. Plastic carry bags with a thickness of less than 120 microns will be forbidden as of December 31, 2022. Source: Economic Times, June 28, 2022

9. Explain the steps of the creative process.

## **FMM**

### **1. Book Review:**

- Read a book related to financial markets management or investing (e.g., "The Intelligent Investor" by Benjamin Graham, "A Random Walk Down Wall Street" by Burton Malkiel) and write a detailed review discussing key concepts and takeaways.

### **2. Derivatives Trading Simulation:**

- Participate in a virtual derivatives trading simulation game or platform. Experiment with options, futures, and other derivative instruments to understand their mechanics, pricing models, and risk management strategies.

### **3. Regulatory Compliance Project:**

- Research recent regulatory changes or developments in the financial markets. Prepare a report outlining the implications for market participants, compliance requirements, and potential challenges.

### **4. Global Market Comparison:**

- Compare and contrast the structure, regulations, and dynamics of financial markets in different regions or countries. Analyze how geopolitical factors, economic indicators, and cultural differences impact market behavior.

### **5. Investment Thesis Presentation:**

- Choose a specific industry or emerging market trend and develop an investment thesis around it. Present your thesis, supported by thorough research, market analysis, and rationale for potential investment opportunities.

### **6. Financial Market Research Paper:**

Conduct in-depth research on a current topic or emerging trend in the financial markets (e.g., cryptocurrency regulation, sustainable investing, fintech innovation). Write a research paper presenting your analysis, insights, and recommendations.

# **HISTORY**

## **Project Work**

### **OBJECTIVES**

Project work will help students:

- To develop skill to gather data from a variety of sources, investigate diverse viewpoints and arrive at logical deductions.
- To develop skill to comprehend, analyze, interpret, evaluate historical evidence and understand the limitation of historical evidence.
- To develop 21st century managerial skills of coordination, self-direction and time management.
- To learn to work on diverse cultures, races, religions and lifestyles.
- To learn through constructivism-a theory based on observation and scientific study.
- To inculcate a spirit of inquiry and research.
- To communicate data in the most appropriate form using a variety of techniques.
- To provide greater opportunity for interaction and exploration.
- To understand contemporary issues in context to our past.
- To develop a global perspective and an international outlook.
- To grow into caring, sensitive individuals capable of making informed, intelligent and independent choices.
- To develop lasting interest in history discipline.

### **GUIDELINES:**

I. Students should prepare a project of about 45-50 pages for CBSE assessment. The project should be

prepared according to the guidelines already issued in class.

The project should include the following sections:

1. Cover page- Displaying the topic.
2. Acknowledgement – Thanking the people or institution that has helped you in completion of your project.
3. Certificate- Mentioning your name and the name of teacher under whose supervision you have completed your work.
4. Index- Giving the list of contents with page numbers.
5. Introduction- Giving the purpose and importance of a study.
6. Chapters- Give a title to each chapter along with details and pictures.
7. Conclusion- What do you learn from your study?
8. Bibliography- Showing the sources from where you have gathered information.

Present the following in your project report:

- a. Data/Statistical Analysis/Map work
- b. Analysis/Explanation and interpretation
- c. Bibliography

### **ASSESSMENT**

Allocation of Marks (20)

The marks will be allocated under the following heads:

Project Synopsis 2 Marks



Timeline/explanation and interpretation /Map work  
5 Marks

Visual/overall presentation 4 Marks

Analysis/ Data/Statistical analysis  
4 Marks

Bibliography 1 Mark

Viva 4 Marks

Total 20 Marks

Projects should be in groups only. Students can use primary as well as secondary sources for the research work.

**Choose any one of the following topics:**

- i. Harappa Civilization - Town planning and artifacts
- ii. Mahabharata through the eyes of a reader.
- iii. Buddhism – Path to enlightenment
- iv. Jainism.
- v. India -Through the Eyes of Travellers - Al-Biruni, Ibn Battuta and Bernier
- vi. Understanding the Bhakti and Sufi Movement in India
- vii. Life of Mughal through paintings
- viii. Glimpses inside Mughals Imperials Household
- ix. Divine Apostle of Guru Nanak Dev
- x. The ‘Brahm Nirupam’ of Kabir – A journey to Ultimate Reality
- xi. The Partition of India in 1947
- xii. Capital city – Hampi
- xiii. Revolt of 1857- Vision of unity behind the first war of Independence
- xiv. Colonial Cities-Bombay, Madras and Calcutta
- xv. Mahatma Gandhi and National movement.
- xvi. The process behind the framing of the Indian Constitution.

**General instructions:**

- (i) Attempt all questions.
- (ii) Worksheets must be done in your register copy.

**Worksheet – 1**

1. Explain the terms, 'Saddle querns'. 1
2. Write the raw materials required for craft production in the Harappan civilisation. 1
3. What were the differences in the techniques adopted by Marshall and Wheeler in studying Harappan civilization? 3
4. What were the differences in the techniques adopted by Marshall and Wheeler in studying Harappan civilization? 3
5. How do inscriptions help in reconstruction of history? 3
6. Explain main features of Ashoka's Dhamma? 3
7. Explain the role of the sub-committees for coordinating military activities. 3
8. How can you say that the Harappan culture was an urban one? Explain with examples. 8

## **Worksheet 2**

1. What are megaliths? 1
2. Who were Kushanas? 1
3. Why is Mahabharata considered a colossal epic? 3
4. What were three strategies adopted by the Brahmins for enforcing Social norms? 3
5. How new jatis were grouped? 3
6. What was the Budha Sangha? Discuss its characteristics. 3
7. How were Buddhist texts prepared and preserved? 3
8. How were the rules of marriage followed in early societies? 8

## **Worksheet – 3**

1. What do you mean by Tri -ratna? 1
2. What do you mean by “Dharma Chakra Pravartana”? 1
3. What was the more complex social reality which Bernier’s notice in the Mughal Empire? 3
4. Explain how the foot post worked according to Ibn- Battuta. 3.
5. Compare and contrast the perspectives from which Ibn Battuta and Bernier wrote their accounts of their travels in India. 3
6. Discuss the picture of urban centers that emerges from Bernier's account. 3
7. Describe the causes of the rise of the Bhakti movement? 3
8. Describe the social, religious, cultural influences & importance of Bhakti movement?

## **Worksheet 4**

1. The term great and little traditions were coined by which sociologist? 1
2. The Virashaivas Movement in Karnataka led by which person? 1
3. Describe the Social condition of India as described by Al-Biruni in the 12th Century
4. Describe the extent to which Bernier's account enables historians to reconstruct contemporary rural society. 3
5. Explain with examples what historians meant by the integration of cults? 3
6. Why did Bhakti and Sufi thinkers adopt a variety of languages to express their opinions?
7. Analyze the relations which existed between the Chisti Sufi Saints and the State. 3
8. Describe the main features of Life in Shaikh Nizamuddin's Khanqah. 8

## HOME SCIENCE

### Chapter 1: Work, Livelihood and Career

#### Fill in the blanks-1 Marker

1. Career is driven by \_\_\_\_\_.
2. Choice of career is generally affected by \_\_\_\_\_.
3. Rahul makes and sells beautiful paintings, he wants to excel and grow in this field of work. This work would be termed as-
  - a) Meaningful work
  - b) Job
  - c) Career
  - d) Livelihood
4. Your friend who is studying in Class XII is very good in designing clothes. She wants to pursue her career in fashion designing. Her family is very supportive in this decision. But which two other factors she should consider while opting fashion designing as her career-
  - a) Globalization and Financial returns
  - b) Own interest and family support
  - c) Individual preference and aptitude
  - d) Needs and aspiration

#### Short Question Answer – 2 Marker

1. What do you understand about meaningful work?
2. What is the difference between a job and Career?

#### TRADITIONAL OCCUPATIONS OF INDIA

1. In rural areas \_\_\_\_\_ is the main occupation in India.
2. Famous weave of Gujarat \_\_\_\_\_ & Uttar Pradesh \_\_\_\_\_
3. Which type of crops are produced by Indian farmers for sale in urban markets?

- a) Food crops
- b) Cash crops
- c) Horticulture crops
- d) Plantation crops

4. Fishing is very popular traditional occupation of India because of-

- a) Large population
- b) Diversity
- c) Forestation
- d) Long coastline

6. List any four traditional occupations of India.

7. Rupesh's grandfather and his father have been involved in embroidery on cotton fabric since the last 40 years. His brother has also joined the same work but Rupesh does not want to continue with it. What could be two possible reasons for his decision?

8. Anushka is a good handicraft entrepreneur and her friend Simran is also running a handicraft business, but she is not as successful as Anushka. How can Anushka give her suggestions to run a successful handicraft business?

### **Work, Age and Gender**

1. Define the term 'sex'.
2. \_\_\_\_\_ refers to the biological categorization based on genetics, reproductive organs.
3. \_\_\_\_\_ refers to social identity of a person.
4. India's Supreme Court on \_\_\_\_\_ gave its decision that Section 377 is unconstitutional'.
5. State the year in which the following acts were passed –
  - a) The Factories Act - \_\_\_\_\_
  - b) The Plantation Labour Act- \_\_\_\_\_

c) The Mines Act, which provides protection to women in various industrial sectors

\_\_\_\_\_

d) Employees State Insurance Act and Maternity benefit Act - \_\_\_\_\_

6. \_\_\_\_\_ article of the Constitution of India guarantees equality of opportunity for all citizens in matters relating to employment and appointment to any office under the state.

7. Which article states that crèches should be maintained if more than 30 women are employed in an industry or factory?

8. \_\_\_\_\_ act came into force for equal wages for the same work or similar kind of work.

9. Beti Bachao, Beti Padhao scheme was launched on \_\_\_\_\_ by \_\_\_\_\_

10. Which organization was responsible for implementation of Equal Remuneration Act?

11. Expand:

a) KGBV -

b) BBBP -

c) SSA -

d) NPA -

e) ESI -

f) RTE -

g) KVIC-

12. "Gender is socially constructed". Elaborate on this statement with the help of examples.

13. "Changes come with continuity in the society". Explain this statement with context to how home makers contribute in the economy of the family.

14. Constitution of India guarantees equal opportunity to men and women in all walks of life. What are the acts which safeguard Constitutional rights of women?

15. Write a short note on the following:

a) Kasturba Gandhi Balika Vidyalaya (KGBV)

b) Beti Bacho Beti Padhao Yojana

## **ERGONOMICS**

### **I. FILL IN THE BLANKS:-**

- i. \_\_\_\_\_ is the study of work with the primary goal being adapt the work environment to the worker.
- ii. Ergonomics is derived from two Greek words- \_\_\_\_\_ and \_\_\_\_\_.
- iii. The other name of ergonomics is \_\_\_\_\_.
- iv. Ergonomics is an adjustment of \_\_\_\_\_ and \_\_\_\_\_.
- v. The four pillars of ergonomics are \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
- vi. Creating a \_\_\_\_\_ and \_\_\_\_\_ work environment is critical for a work place.

### **II.TRUE OR FALSE:-**

- a) Ergonomics principles are intended to improve the fit between a worker and an activity.
- b) Ergonomics is a topic that's important only in the workplace.
- c) The focus of ergonomics intervention and the best ergonomics solution must be its effect on productivity.
- d) Ergonomics considerations influence employee productivity only.

### **III.MULTIPLE CHOICE QUESTION :-**

(i) Your body can be stressed by:

- a. Bad posture
- b. Inappropriate temperature
- c. Bad lighting
- d. All of the above

(ii) Anthropometry is the science that measures-

- a. Height, weight, and size

- b. Body fat percentage
- c. Grip strength, range of motion, and functional
- d. All of the above
- e. A & B only

(iii) The study of the mechanical laws relating to the movement or structure of living organisms.

- a. Anthropology
- b. Anthropometry
- c. Biomechanics
- d. Anthrology

(iv) 'Ergonomics' is related to human-

- a. Comfort
- b. Safety
- c. Both 'a' and 'b'
- d. None of the above

(v) The following subject(s) is (are) related to 'Ergonomics' -

- a. Anthropology
- b. Physiology
- c. Psychology
- d. All of the above

(vi) The height of the top of the work bench should be \_\_\_ the height of the elbow of the workmen.

- a. at
- b. Above

- c. Below
- d. Any of the above

### **III. QUESTIONS:-**

(i) Ramesh was designing a chair considering few ergonomics principle in which his main consideration for the design is chair height only as per the workplace. Comment in favour or against for this statement with valid reason.

(ii) The ergonomic design of workplaces is essential to enhance the labour productivity and ensure the health and safety of all workers/employees. In this respect, what are the major ergonomics suggestion you must give to an employer to maintain the positive working environment in his organization ?

### **ENTREPRENEURSHIP**

#### **I. FILL IN THE BLANKS:**

- i. \_\_\_\_\_ is the act of creating a new and innovative enterprise/product or services.
- ii. The function of \_\_\_\_\_ is to change the patterns of production or design of a product through innovation, invention, adopting new technologies or re-producing an old one in a new way.
- iii. \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ are excellent examples of entrepreneurs with great vision.
- iv. \_\_\_\_\_ focusses on doing social goods.
- v. \_\_\_\_\_ work for the benefit of underprivileged and disadvantaged group.
- vi. Social Entrepreneurs are also known as \_\_\_\_\_.

#### **II. MULTIPLE CHOICE QUESTION :-**

- i. Entrepreneurial behaviour includes:
  - (a) Solving problems
  - (b) Taking initiatives
  - (c) Taking responsibility
  - (d) All of above



ii. Which of these statements best describes the context for entrepreneurship?

- (a) Entrepreneurship takes place in small businesses.
- (b) Entrepreneurship takes place in large businesses.
- (c) Entrepreneurship takes place in a wide variety of contexts.
- (d) Entrepreneurship does not take place in social enterprises.

iii. Entrepreneurs attributes includes:

- (a) Preservence
- (b) Hard working
- (c) Determination
- (d) All of above

iv. To provide financial assistance to entrepreneurs the government has set up a number of \_\_\_\_\_.

- (a) financial advisors.
- (b) financial intermediaries.
- (c) Industrial estates.
- (d) financial institutions.

v. Entrepreneurship can best be described as \_\_\_\_\_.

- (a) a process that requires setting up a business.
- (b) taking a significant risk in a business context.
- (c) having a strong vision.
- (d) a process involving innovation, new products or services, and value creation.

vi. Entrepreneurs skills includes:

- (a) Creative problem solving
- (b) Persuading

(c) Negotiation

(d) All of above

### **III. QUESTIONS:**

(i) Laxmi is a challenging lady and wants to set up her new business of handicraft and indigenous art. What important personal attributes will help her to take on the challenges of an enterprise?

(ii) “Entrepreneurs think differently from non-entrepreneurs”. Justify the statement with an example.

### **Chapter 10**

### **DESIGN FOR FABRIC AND APPAREL**

Multiple choice questions

- a. Which is not an element of art
  1. Colour
  2. Texture
  3. Line
  4. Emphasis
  
- b. \_\_\_\_\_ lines add length or height to the body and make it appear more slender.
  1. Vertical lines
  2. Horizontal lines
  3. Diagonal lines
  4. Curved lines
  
- c. In broadest sense design can be described as \_\_\_\_\_ in form
  1. Emphasis
  2. Harmony
  3. Lines
  4. Proportion
  
- d. Sunlight is the radiant energy reaching from sun by \_\_\_\_\_
  1. Infra red rays
  2. Light waves
  3. Ultra violet rays
  4. None of the above
  
- e. Intensity describes the
  1. Brightness
  2. Lightness
  3. Darkness

#### 4. Hue

Q2. Fill in the blanks

- a. \_\_\_\_\_ is the basic element of art
- b. \_\_\_\_\_ lines are the most active lines
- c. \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ are the three primary colours
- d. \_\_\_\_\_ and \_\_\_\_\_ are the two forms of balance.
- e. Combination of \_\_\_\_\_ make shape or form
- f. There are three characteristics of colour \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_

Q3. How do straight lines in a dress affect the personality of any individual?

Q4. Discuss the emotional effect of any one colour

Q5. Name the primary and secondary colours.

Q6. What is the effect of cool and warm colours on our personality.

Q7. How can emphasis be created in any portion of a dress?

#### **2 marks questions**

Q8. Reema is designing a suit for her thin sister. What points should she keep in mind?

Q9. Tarun is wearing pants and a shirt. State two ways each by which you can check harmony and emphasis in this dress

Q10. Shalu is very tall and slim. She has to buy a sari for herself. How can she camouflage her figure flaws?

Q11. Mrs. Mehra is round from the waist. Keeping the elements of arts and principles of designs in mind, design a party dress for her.

#### **4 marks questions**

Q12. Swati wants to design a saree and blouse for a woman who has fat arms. Show her how she can use all the 4 elements of design in designing the dress

Q13. Ritu is designing a dress for a woman who has heavy hips. Suggest how she can use all the four elements of design while designing this dress.

Q14. State four suggestions, by which you can use various colours in clothing, to disguise figure flaws.

Q15. Upasana wants to wear skirt and top, illustrate two ways by which Rhythm, Harmony, Balance and Emphasis can be checked in this dress.

**5 marks questions**

Q16. You have to design a frock for a oneyear old girl. What two features would you consider while selecting fabric for the frock? Suggest four ways each you can ensure rhythm and satisfactory workmanship in this dress.

Q17. Suggest a suitable dress, keeping in mind elements of art and principles of design to suit your friend who is tall, heavy and fair.

**PROJECT**

1. Develop a **leaflet** for Consumer Education and Protection on any one of the following. Compile it according to the prescribed format

A.

- a. Consumer Protection Act (introduction)
- b. Consumer rights
- c. Consumer Responsibilities

B.

- a. Consumer Protection Act (introduction)
- b. Consumer Problems

**2. Project**

Any one of the following project:

- a. Visit to the neighbouring areas and interview two adolescents and two adults regarding their perception of persons with special needs.

(Cover page, Aim, Introduction to disability, types of disabilities, Rights of students with disability, Details of interviewee, Questionnaire, Observation, Bibliography)

**OR**

- b. Profile any two person (child/adult) with special needs to find out their diet, clothing, activities, physical and psychological needs.

(Cover page, Aim, Introduction to disability, types of disabilities, Rights of students with disability, Details of interviewee, Questionnaire, Observation,

Bibliography)

**OR**

- c. Market survey any five processed foods with their packaging and label information.

(Make a table comparing the types of packaging materials used for different types of foods.)

Sample table-

From the collected information point out the relative merits and demerits of the different packaging materials used.

- **Assessment Criterion- Content, Presentation,**
- ***Marks will be awarded in Annual Examination during practical Examination.***

## INFORMATICS PRACTICES

- Q1. Which command in SQL is used to add record?  
(a) add (b) append (c) insert (d) None of these
- Q2. Which command in SQL is used to add a new column/field in a Table?  
(a) Alter table (b) append table (c) insert table (d) None of these
- Q3. Commands allows to perform tasks related to data manipulation.  
(a) DDL (b) DML (c) TCL (d) None of these
- Q4. Table constraint to prevent duplicate entries of rows.  
(a) NOT NULL (b) NULL (c) Unique (d) All of these
- Q5. The ..... keyword eliminates duplicate rows from the results of a Select statement.  
(a) Different (b) Distinct (c) Unique (d) None of these
- Q6. A table student consists of 5 rows and 6 columns. Later on 1 column added and 2 rows removed. What will be the degree and cardinality of the table student?  
(a) Degree 6 Cardinality 5  
(b) Degree 7 Cardinality 5  
(c) Degree 7 Cardinality 7  
(d) Degree 7 Cardinality 3
- Q7. SQL command to open database employee.  
(a) use employee (b) open employee (c) create employee (d) None of these
- Q8. Student table consists of 4 columns Rollno, Name, Date\_of\_birth and Fee. What will be the SQL command to remove column Fee from the table?  
(a) Alter table student  
remove column Fee;  
(b) Modify table student  
remove column Fee;

(c) Alter table student

\_\_\_\_\_ drop Fee;

(d) Modify table student

drop Fee;

Q9. What will be the command to view all the records from the table client?

(a) select all from client;      (b) select \* from client;

(c) show all from client;      (d) None of these

Q10. SQL function to count the total number of records present in the table given table.

(a) count(Movie)      (b) count(\*)

(c) count(All)      (d) None of these

Q11. Consider a table Consumer with fields (ConsumerName, NoofUnits, Address, ConsumerNo.) Select the suitable primary key for the table consumer.

(a) ConsumerName    (b) NoofUnits    (c) Address    (d) ConsumerNo

Q12. What will be the SQL command to display all the records from Customer table as per customer name in ascending order?

(a) select \* from customer arrange customername;

(b) select \* from customer order by customername asc;

(c) select \* from customer order by customername;

(d) select \* from customer group by customername;

Q13. .... clause is used in combination with Group by clause in a Select statement to put condition on groups.

(a) order by    (b) where    (c) having    (d) None of these

Q14. \_\_\_\_\_ clause is used to filter the rows / records from the table.

(a) order by    (b) where    (c) having    (d) None of these

Q15. Drop table is a ..... command.

(a) DDL      (b) DML      (c) TCL      (d) None of these

Q16. What will be the SQL command to display the structure of the table emp\_details.

(a) show emp\_details; (b) desc emp\_details; (c) view emp\_details (d) Any of these

Table : PRODUCT

Prod_ID	Product_Name	Manufactures	Price
TP01	Pen	Cello	5.00
TP02	Gel Pen	Luxar	10.00
TP03	Pen	Luxar	20.00
TP04	Pencil	Natraj	4.00
TP05	Sketch	Camel	2.00

Table : CLIENT

Client_ID	C_NAME	CITY	Prod_ID
C101	Rakesh	Delhi	TP01
C102	Sunil	Mumbai	TP05
C103	Dinesh	Delhi	TP02



C104	Suresh	Kolkata	TP01
C105	Vimal	Bangalore	TP03

Q17 to Q22 are based on above tables PRODUCT and CLIENT

Q17. What will be the output of the SQL command: select count(\*) from client;

- (a) 4 (b) 5 (c) 6 (d) 8

Q18. What will be the output of the SQL command: select max(price), min(price) from Product;

- (a) 2.00 20.00 (b) 20.00 2.00 (c) 5.00 10.00 (d) No output

Q19. What will be the output of the SQL command?

select price + 10 from product where Product\_Name = "Pen";

Q20. What will be the output of the SQL command?

select C\_Name from Client where C\_Name like "S%";

Q21. What will be the SQL command to view Client\_ID and Client\_Name for all the clients living in City Delhi, Mumbai or Chennai?

Q22. What will be the output of the following SQL command?

select Product\_Name, Client\_Name from PRODUCT P, CLIENT C

where P.Prod\_ID = C.Prod\_ID and Price >=10;

Q23. What will be the SQL command to remove all the records from the table Movie?

- (a) drop table Movie; (b) delete from Movie;  
(c) drop \* from Movie; (d) delete \* from Movie;

Q24. Consider a table Player with fields (Player\_Name, Player\_No, NoofMatches)

What will be the SQL command to display the Player details of all the Players name ends with 'th'?

```
Select * from player where player_name like "%th";
```

Q25. Consider a table Book with fields (Book\_no, Title, Author, Price)

What will be the SQL command to add 100 in the price of all the books.

```
Update book
```

```
Set price = price + 100;
```

## LEGAL STUDIES

1. Every student has to undergo a compulsory project work on “Understanding Case Laws”.

### OBJECTIVES:

The project work aims to enable students to:

- Identify a legal problem and provide its remedy
- Select relevant legal sources and conduct research
- Analyze and distinguish between types of cases
- Apply case laws and relevant statutory laws

**METHODOLOGY-** The student is required to select any 3 decided cases related to the curriculum where one must be civil in nature, one criminal and one constitutional in character.

The research on the cases must include the following points:

- Name of the case
- Parties to the case
- Citation to the case
- Bench
- Nature of the case (Civil, Criminal or Constitutional)
- Facts of the case and issues involved
- Decision of the case including Ratio Decidendi and Obiter Dicta

2. The Union Government has passed the three **new criminal law bills** which will be replacing **The Indian Penal Code, 1860 ; The Code of Criminal Procedure, 1973 and The Indian Evidence Act, 1872**. Analyse the need and the key changes and write a report on it. The report should be of minimum 15 pages.

3. Complete the assignments given in the Google classroom in your register.

## **PAINTING**

**-Create captivating painting on an A2 sheet inspired by the enchanting world of Folk painting, focusing on Kalamkari and Pattachitra styles.**

**-Produce a captivating painting on an A2 sheet, depicting a harmonious blend of a "Village Corner" and a "Bus Stand" in your composition.**

**Show your artistic flair in capturing the essence of given topics. Use any medium you prefer. Deadline: 2 July 2024. Enjoy your artistic journey!**

## PHYSICAL EDUCATION

Prepare a detailed research paper, PPT and Spiral bound file from the topic of your choice.

### List of projects/ Games-

Basketball, Football, Kabaddi,

Kho-Kho, Volleyball,

Handball, Hockey, Cricket,

Bocce and Unified Basketball

Complete the Investigatory project on the choice of your game and Compile it according to the prescribed format.

- Cover page
- Certificate
- Acknowledgment
- Index
- Introduction
- Content (including pictures/graphs/tables/survey report etc.)
- Case Study
- Bibliography
- Assessment Criterion-

Content, Presentation, Research Work, Case study, Viva-voce and Confidence.

- It is an individual activity and marks will be awarded in Half Yearly Examination during practical Examination.

## PHYSICS

### MCQ's (1 Mark)

1) If the critical angle for total internal reflection from a medium to vacuum is  $30^\circ$ , the velocity of light in the medium is :

- (a)  $3 \times 10^8 \text{ ms}^{-1}$  (b)  $6 \times 10^8 \text{ ms}^{-1}$   
(c)  $1.5 \times 10^8 \text{ ms}^{-1}$  (d)  $15 \times 10^8 \text{ ms}^{-1}$

2) Which of the following phenomenon is used in optical fibres?

- (a) total internal reflection (b) scattering  
(c) reflection (d) interference

3) Two lenses of power  $-15\text{D}$  and  $+5\text{D}$  are placed in contact co-axially. The focal length of equivalent lens is

- a)  $-10 \text{ cm}$   
b)  $-20 \text{ cm}$   
c)  $+10 \text{ cm}$   
d)  $+40 \text{ cm}$

4). The focal length of an equi-convex lens is equal to the radius of curvature of either face. The value of refractive index of the material of the lens will be

- a)  $\frac{1}{2}$  b)  $\frac{3}{2}$   
c)  $\frac{5}{2}$  d)  $\frac{7}{2}$

5. A ray of light passes through an equilateral glass prism such that the angle of incidence is equal to the angle of emergence and each of these angles is equal to  $\frac{3}{4}$  of angle of prism. What is the value of angle of deviation?

- a) 30  
b) 45  
c) 60  
d) 90

### SHORT ANSWER QUESTIONS ( 2 Marks )

6. A compound microscope has an objective of focal length  $1.25 \text{ cm}$  and eyepiece of focal length  $5 \text{ cm}$ . A small object is kept at  $2.5 \text{ cm}$  from the objective. If the final image formed is at infinity, find the distance between the objective and the eyepiece.

7. Two lenses of powers  $10 \text{ D}$  and  $-5 \text{ D}$  are placed in contact.

a) Calculate the power of the new lens.

b) Where an object should be held from the lens, so as to obtain a virtual image of magnification 2?

8. Define critical angle for a given pair of media and TIR. Obtain the relation between the critical angle and refractive index of the medium.

9. Two wavelengths of sodium light 590 nm and 596 nm are used, in turn, to study the diffraction taking place at a single slit of aperture  $2 \times 10^{-4}$  m. The distance between the slit and the screen is 1.5 m. Calculate the separation between the positions of the first maxima of the diffraction pattern obtained in the two cases.

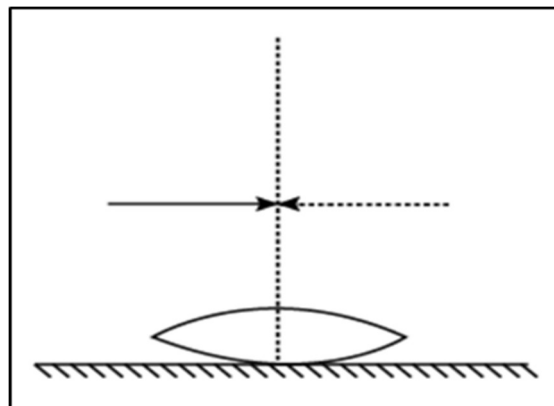
### **SHORT ANSWER QUESTIONS (3 Marks)**

10. A compound microscope an objective lens of focal length 4 cm and eyepiece lens of focal length 18 cm. placed at 6 cm from the objective lens. Calculate the magnifying power of the compound microscope. Also calculate the length of the microscope.

11. An astronomical telescope has a magnifying power of 10. In normal adjustment distance between objective and eye lens is 22 cm. Calculate the focal length of objective and eyepiece.

12. A symmetric biconvex lens of radius of curvature R and made of glass of refractive index 1.5, is placed on a layer of liquid placed on the top of a plane mirror as shown in the figure below.

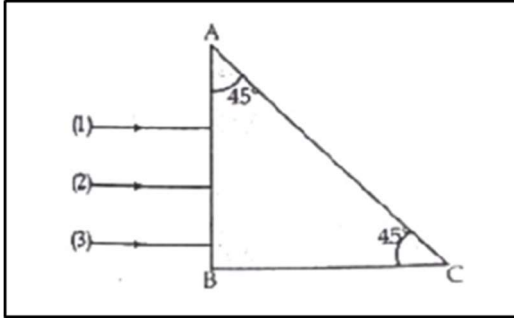
An optical needle with its tip on the principal axis of the lens is moved along the axis until its real and inverted image coincides with the needle itself. The distance of the needle from the lens



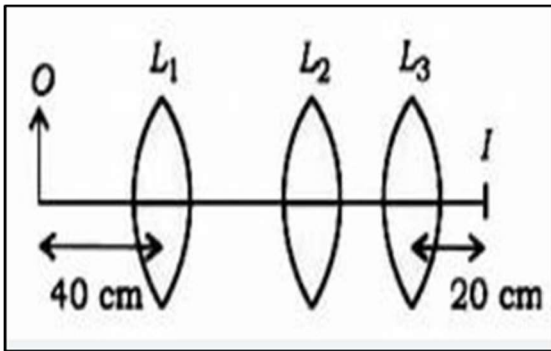
On removing the liquid layer and repeating the procedure, the distance is found to be y. Obtain the expression for the refractive index of the liquid in terms of x and y.

13. Three rays (1, 2, 3) of different colours fall normally on one of the sides of an isosceles right angled prism. The refractive index of prism for these rays is 1.39 , 1.47 ,1.38 Respectively Find

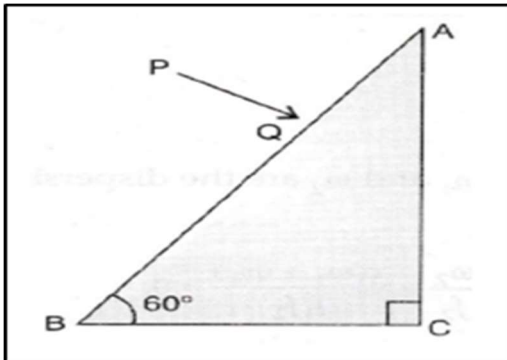
which of these rays get internally reflected and which get only refracted from AC. Trace the path of rays Justify your answer with the help of necessary calculation.



14. You are given three lenses  $L_1$ ,  $L_2$  and  $L_3$  each of focal length 20 cm. An object is kept at 40 cm in front of  $L_1$  as shown. The final real image is formed at the focus 'I' of  $L_3$ . Find the separation between  $L_1$ ,  $L_2$  and  $L_3$ .

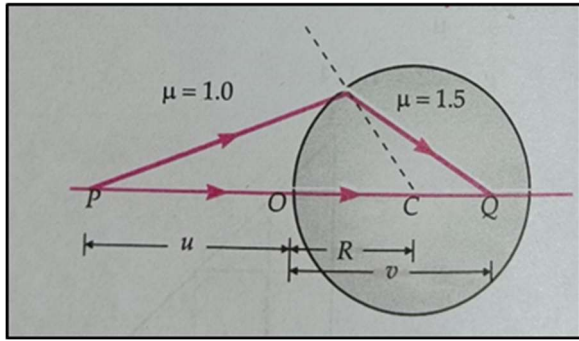


Q-15: (i) A ray PQ incident normally on the refracting face BA is refracted on the prism BAC made of material of refractive index 1.5. Complete the path of ray through the prism.

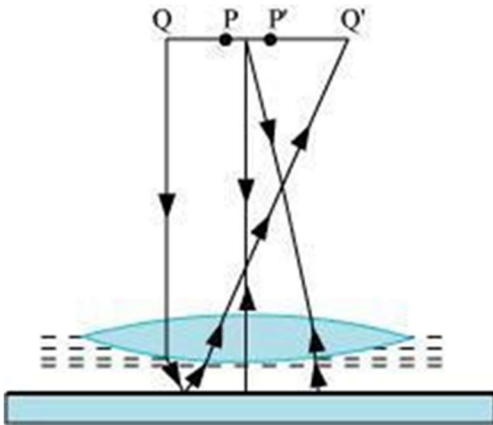


(ii) A spherical surface of radius of curvature  $R$  separates air ( $n=1$ ) from glass ( $n=1.5$ ). The centre of curvature is in the glass. A point object  $P$  placed in air is found to have a real image  $Q$  in the glass. The line  $PQ$  cuts the surface at a point  $O$  and  $PO = OQ$  as shown in the figure. Find the distance of object from the spherical surface.

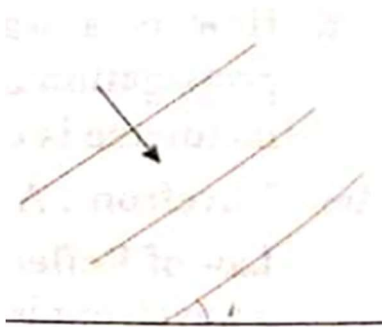




16. Figure shows an equiconvex lens (of refractive index 1.50) in contact with a liquid layer on top of a plane mirror. A small needle with its tip on the principal axis is moved along the axis until its inverted image is found at the position of the needle. The distance of the needle from the lens is measured to be 45.0 cm. The liquid is removed and the experiment is repeated. The new distance is measured to be 30.0 cm. What is the refractive index of the liquid?



17. A plane wave front propagating in a medium of refractive index ' $\mu_1$ ' is incident on a plane surface making the angle of incidence ' $i$ ' as shown in the figure. It enters into a medium of refractive index ' $\mu_2$ ', ( $\mu_1 < \mu_2$ ). Use Huygens' construction of secondary wavelets to trace the propagation of the refracted wave front. Hence verify Snell's law of refraction.



### **LONG ANSWER QUESTIONS ( 5 Marks )**

18. (a) Draw a labelled diagram showing the image formation by a refracting telescope. Define its magnifying power. Write two limitations of a refracting telescope over a refracting telescope.

(b) The focal lengths of the objective and the eyepiece of a compound microscope are 1 cm and 2.5 cm respectively. Find the tube length of the microscope for obtaining a magnification of 300.

19. a) Deduce the expression for the refractive index of glass prism in terms of angle of prism and angle of minimum deviation. Also plot a graph showing the variation of angle of incidence vs angle of deviation.

b) Explain briefly how the phenomenon of total internal reflection is used in fiber optics.

20. (a) Derive the mathematical relation between refractive indices  $n_1$  and  $n_2$  of two media and radius of curvature  $R$  for refraction at a convex spherical surface. Consider the object to be a point since lying on the principle axis in rarer medium of refractive index  $n_1$  and a real image formed in the denser medium of refractive index  $n_2$ . Hence, derive lens maker's formula.

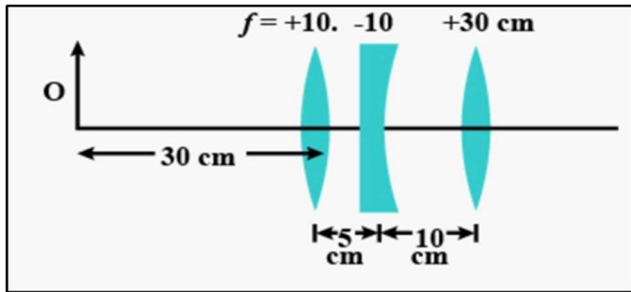
(b) Light from a point source in air falls on a convex spherical glass surface of refractive index 1.5 and radius of curvature 20 cm. The distance of light source from the glass surface is 100 cm. At what position is the image formed?

21. (a) Using the ray diagram for a system of two lenses of focal lengths  $f_1$  and  $f_2$  in contact with each other, show that the two lens system can be regarded as equivalent to a single lens of focal length  $f$  where ,

$$1/f = 1/f_1 + 1/f_2$$

Also write the relation for the equivalent power of the combination.

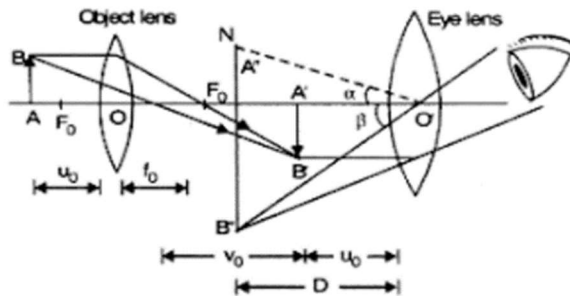
b) Determine the position of the image formed by the combination given in the figure



**Q-22: Case based question:**

**Read the case study given below carefully.**

A compound microscope consist of two lenses. A lens of short aperture and short focal length facing the object is called the object lens and another lens of short focal length but large aperture is called the eye lens. Magnifying power is defined as the ration of angle subtended by the final image at the eye to the angle subtended by the object is seen directly, when both are placed at least distance of distinct vision



**Q- (a)** an objective lens consist of

- (i) Short aperture and short focal length
- (ii) large aperture and large focal length
- (iii) Short aperture and large focal length

(iv) large aperture and short focal length

(b) The focal lengths of the objective and eye-piece of a compound microscope are 4 cm and 6 cm respectively. If any object is placed at a distance of 6 cm from the objective, the magnification produced by the microscope is

- (i) 2.5
- (ii) 5.8
- (iii) 10.3
- (iv) 15.4

(c) The magnifying power of a compound microscope is high if

- (i) Both the objective and eyepiece have short focal lengths
- (ii) Both the objective and eyepiece have long focal lengths
- (iii) The objective has a short focal length and the eyepiece has a long focal length
- (iv) The objective has a long focal length and the eyepiece has a short focal length

(d) The focal lengths of the objective and eye-piece of a microscope are 1.25 cm and 5 cm respectively. The position of the object relative to the objective in order to obtain an angular magnification of 30 in normal adjustment is

- (i) 1.2 cm
- (ii) 1.46 cm
- (iii) 2.25 cm
- (iv) 3.85 cm

OR

Magnification of a compound microscope is 30. Focal length of eyepiece is 5 cm and the image is formed at a distance of distinct vision of 25 cm. The magnification of the objective lens is

- (a) 6
- (ii) 5
- (iii) 7.5
- (iv) 10

**Q-23: Physics Investigatory project** : Students are required to research on a particular topic/concept and prepare a detailed hand written project report of the same, as per the instructions given in the class. Students will take their observations/readings in the Physics lab only.

## Q24. THE PHYSICS OF TOYS:

Only your imagination and ingenuity limit you in your application of the Fundamental laws of Physics to ordinary objects, even toys. The basic principles of Physics can often be demonstrated, as well as made fun, by using ordinary toys. The toy is an excellent means by which various concepts and principles in different branches of physics and engineering can be illustrated. By understanding how these toys work, the observers can better understand the world around them.

### General Instructions

1. Each student is required to prepare a toy to explain the various laws of Physics along with with a brief synopsis, explaining the Introduction, Construction, working and the various Physics principles involved in the toy.

2. Students will also prepare a video (max 2-3 mins) showcasing their toy and explaining the principles behind the working of the toy.

Last date for submission of video and toy is 5 July, 2024.

3. Suggested website/Links:

[https://instagram.com/physicsfun?utm\\_medium=copy\\_link](https://instagram.com/physicsfun?utm_medium=copy_link)

<https://www.arvindguptatoys.com/films.html>



## PSYCHOLOGY

- PROJECT FILE

### Cover Page

- Color: Choose either a black or white
- Design: reflect the theme of the project.
- Title: Centered on the page, write "THE TOPIC OF YOUR FILE" in a prominent, bold font. Below it, add "Name", "Class", and "Roll Number" in a smaller font.

### Inside the Project File

\*As shared in the class group\*

- PRACTICAL FILE

AIM :

BASIC CONCEPT :

DESCRIPTION OF TEST :

PRELIMINARIES:

Name:

Age:

Sex:

Mental Condition:

MATERIALS REQUIRED

PROCEDURE

INTROSPECTIVE REPORT (Written by subject - how was the test/their feeling/emotions)

BEHAVIOURAL REPORT

Written by you after observing the subject, just like rapport formation

PRECAUTIONS

INTERPRETATION

CONCLUSION

REFERENCE

- QUESTION AND ANSWER (In your notebooks)

- SELF AND PERSONALITY

1. A student who can manage his time well, organize and monitor his behavior is said to have

a) self regulation

b) self efficacy

c) self esteem.

d) self confidence

2. Identify the defense mechanism at work giving explanation for the same.
  - a) Sanjay is late to school almost everyday. When asked he says his mother doesn't wake him on time. Name the defense mechanism Sahil is using.
  - b) You get really mad at your sister but scream that she's the one mad at you.
  - c) You and your roommate have an argument so you stomp off into another room and pout
  - d) Jay has a lot of unconscious hostility toward his father but he acts very affectionate toward him and tells other people that he and his father have a wonderful relationship.
3. You just found a wallet in a dark theater. Which part of his personality according to Freud would urge you return the wallet?
4. Arvind's excessive concern with cleanliness and order could indicate a fixation at the stage of psychosexual development,
5. Carl Jung's theory of personality is also known as
6. How does self efficacy influence behavior?
7. Differentiate between the following
  - a) self esteem and self efficacy
  - b) type and trait approaches of personality.
  - c) regression and fixation
8. How does 'basic anxiety' lead to depression?
9. What is social learning?
10. Discuss the role of the unconscious in determining personality.
11. Compare Indian and western perspective of self.
12. Discuss the role of the pleasure principle, the reality principle, and internalizing in relation to Freud's three personality structure,
13. What are projective techniques? What are the advantages and limitations of projective techniques?
14. Discuss the advantages and limitations of self report measures”

15. What is self regulation? State the different techniques for self control.
16. How do the Neo-freudians differ from Freud? Explain how Karen Horney explains the development of psychological disorders.
17. " Personality is described as an adaptation of individuals or groups to the demands of culture" Discuss.
18. Explain the Humanistic approach to personality.

- PSYCHOLOGICAL DISORDERS

One Mark Questions

1. Frequent episodes of out of control eating is called
2. Schizophrenia is due to excess activity of
3. In psychoanalysis the technique whereby a patient reveals every thought, idea or image that comes to mind is called
4. Identify the disorder (specific subtype) (1x2)
  - (a) Sahil works in a call center. In Spite of knowing his odd hours of returning home, his mother continues to have prolonged, vague and intense fear accompanied by hyper vigilance, showing a kind of anxiety.
  - (b) Maya suddenly leaves her home and starts living In another city with a new identity and with no memory for her past.
5. Children who display age inappropriate stubbornness, are irritable, defiant and behave in a hostile manner may be suffering from?
6. Anxiety has been called the "butterflies in the stomach feeling". At what stage does anxiety become a disorder? मुच्य
7. How is ICD-10 different form DSM-IV?
8. How can Somatic Symptom Disorder be differentiated from Illness Anxiety Disorder?
9. A soldier is not able to walk after miraculous escaping in a terrorist attack in Mumbai. Physicians fail to find any medical cause for this inability to walk. Identify the disorder and give the other symptoms,
10. Elucidate the differences in various areas of functioning at different levels of mental retardation.



11. Why is 17th and 18th centuries known as "Age of Reason & Enlightenment"
12. What is the relation between depression and suicide? What are the major motives and risk factors for suicide? Describe any four symptoms that might be indicative of suicidal tendencies in a person.
13. What is the Diathesis Stress model? Explain with an appropriate example.
14. What are phobias? If someone had an intense fear of snakes, could this simple phobia be a result of faulty learning? Analyze how the phobia could be developed.
15. What are neuro developmental disorders? Describe the characteristics of Autism Spectrum Disorders.
16. How do the various psychological models explain the development of psychological disorders

#### SOCIAL INFLUENCE AND GROUP PROCESS

##### One mark Questions

1. A collection of people around a roadside performer is an example of  
(a) Group (b) crowd (c) mob (d) audience
2. Socially defined expectations that individuals in a given situation are expected to fulfill are called \_\_\_\_\_
5. Groups in which members are mutually accountable for their activities are called \_\_\_\_\_

##### Two Mark Questions

6. Distinguish between the following:  
(a) mob and crowd  
(b) Group and team  
(c) Primary and secondary group
8. Give one incident of social loafing in school. Why does it happen? Give any two ways of reducing social loafing.
9. Extreme cohesiveness within a group can become malfunctioning'. Explain

10. Differentiate between groupthink and group polarization. Suggest any four ways to prevent or counteract groupthink.

## **POLITICAL SCIENCE**

### **A. PROJECT WORK**

Objective: - To enable the students to know about the inventions of new concepts in world politics

and the constitution of India.

- To develop 21st century managerial skills of coordination, self-direction and time management.

- To understand contemporary political issues in context to our past.

To develop a global perspective and an international outlook.

Research Activity: - Research and collect the information on recent revolution of political ideas in the world and India, in the following areas.

- Comparison between NITI Aayog and Planning Commission and their contribution in India's Development.

Assignment: - Project Work

#### **Project Ideas**

. Partition of India-Theory behind it and its legacy

. Election 2019- Rise of BJP and Downfall of Congress (1989-2019).

. Emergency – A blot on Indian Democracy

. NDA III and NDA IV – Social and Economic welfare programmes

• Relevance of the United Nations in a Unipolar World.

• Understanding Resource Geopolitics and Environment degradation

• India's external relations -Critical analysis of the foreign policy of India especially with its immediate neighbors (Pakistan, China, Sri Lanka, Nepal, Myanmar)

• Project on the role played by the regional aspirations in backing the secessionist and insurgency (PUNJAB, J&K, MANIPUR, ASSAM, NAGALAND) movement in India

• India's response to ASEAN & EU as a dialogue partner.

(ANY TOPIC OF YOUR CHOICE RELATED TO CHAPTERS GIVEN BELOW)

### **GUIDELINES FOR THE PROJECTS:**

It must be emphasized that the process of doing the project is as important as the final project.

Once the project/projects are chosen, there should be a process of brainstorming to make out a draft/structure for the project before embarking on research.

Internet sites could be referred, but care must be taken in selecting, using and citing these sites.

Avoid plagiarism

### **Instructions:**

1. The holiday assignment should be handwritten.
2. Use of pictures, illustrations etc is essential.

The following aspects should be taken into account while preparing your project work:-

1. The project should not be for more than 25 to 30 A4 sized pages and should include the following:-

- Cover Page
- Certificate Page
- Acknowledgment
- Index/ Content
- Introduction
- Sub-Topics according to index
- Bibliography

2. The Project should be kept in a folder and brought to class after summer break for submission.

All the students should individually prepare this project for submission.

3. Also read the chapters of Political Science thoroughly and prepare at least 10 questions from each chapter in a holiday homework notebook. The projects must be neat and well-presented and must be completely hand-written.

4. No whiteners to be used or written matter to be crossed out. In case of any mistakes, redo the sheet.

5. Color illustrations, maps, charts may be hand drawn or printed (if it is relevant for any aspect of your project) are welcome to make them look attractive.

### **Presentation:**

1. In the form of art form like cartoons, caricatures, posters....digital prints or sheets
2. Spontaneous speeches can also be a part of presentation. Panel discussion by students can also be presented. Role play ,songs, enactment, PPT, video.....

### **Details of Project Work**

1. The project can be individual / pair / group of 4-5 each. The Project can be made on the topics given in the syllabus of a particular class.
2. The suggestive list of activities for project work is as follows: - Role Play, Skit, Presentation, Model, Field Survey, Mock Drills/Mock Event Mine craft etc. Steps involved in the conduct of the project: Students may work upon the following lines as a suggested flow chart:

### **Expected Checklist for the Project Work:**

- Introduction of topic/title
- Identifying the causes, events, consequences and/or remedies
- Various stakeholders and effect on each of them
- Advantages and disadvantages of situations or issues identified
- Short-term and long-term implications of strategies suggested during research
- Validity, reliability, appropriateness, and relevance of data used for research work and for presentation in the project file
- Presentation and writing that is succinct and coherent in project file

- A. Prepare a Worksheet with at least 10 questions from each topic from the chapters mentioned.
- B. The worksheet should include 5 question @ 1 marks, 5 questions @ 2 marks, 2 questions @ 5 marks. (ROLL. NO. wise)
- C. Please submit as a blank worksheet and also with answers.

### **(GROUP). (CHAPTERS FROM WHICH TOPIC CAN BE SELECTED)**

- |                         |                                       |
|-------------------------|---------------------------------------|
| · R.NO. 1-4 (Group 1)   | Challenges of nation building         |
| · R.NO. 5-8. (Group 2)  | Era of one-party dominance            |
| · R.NO. 9-12 (Group 3)  | Politics of planned development       |
| · R.NO. 13-16 (Group 4) | India's external relations            |
| · R.NO. 17-20 (Group 5) | The crisis of democratic order        |
| · R.NO. 21-24(Group 6)  | Recent Development in Indian politics |
| · R.NO. 24-29 (Group 7) | Regional aspirations                  |

New centers of power  
International organization

- C. Inculcate habit of reading newspaper and collect the relevant article associated with the content and place it alongside the chapter for reference while working on the chapter.
- D. Compile psephology reports with regard to general election 2024.