

HOLIDAY HOMEWORK



Roll No. : _____

GROW

GROW

Physical Education

Instructions for Students

- **Complete all questions in neat handwriting.**
- **Use separate notebook sheets for each chapter.**
- **Draw diagrams wherever required.**
- **Submit homework after summer vacation.**
- **Revise all chapters regularly.**

Chapter 1: Management of Sporting Events

MCQ (1 Mark Each)

1. Which committee manages the money of sports events?

- a) Technical Committee
b) Finance Committee
c) Transport Committee
d) Boarding Committee

2. Intramural tournaments are organized:

- a) Between schools
- b) Within the school
- c) At national level
- d) International level

3. The motto of Olympics is:

- a) **Faster, Higher, Stronger**
- b) **Unity in Diversity**
- c) **Play and Win**
- d) **Sports for All**

4. Which committee prepares the ground?

- a) Boarding Committee
b) Technical Committee
c) Ground & Equipment Committee
d) Medical Committee

5. League tournament is also known as:

- a) Knock-out tournament
b) Round Robin tournament
c) Combination tournament
d) Fixture tournament

6. In knockout tournament, the team losing once:

- a) Gets second chance**

- 1. Explain the importance of sports events.**
- 2. Differentiate between intramural and extramural activities.**

- 3. Explain any three functions of Finance Committee.**
- 4. Write three advantages of knockout tournament.**
- 5. Explain the role of Technical Committee.**
- 6. Write three disadvantages of league tournament.**
- 7. Explain the procedure to prepare fixtures in knockout tournament.**
- 8. Mention three objectives of intramural activities.**
- 9. Explain any three committees required for sports events.**
- 10. Write short notes on Sports Day celebration.**

5 Marks Questions

- 1. Explain knockout tournament with merits and demerits.**
- 2. Describe the importance of intramural activities in schools.**
- 3. Explain league tournament and its advantages.**
- 4. Discuss the role of different committees in sports management.**
- 5. Explain the objectives and significance of sports events.**
- 6. Draw and explain the fixture of 8 teams in knockout tournament.**
- 7. Explain the procedure for organizing sports events.**
- 8. Discuss the functions of Ground & Equipment Committee.**
- 9. Differentiate between knockout and league tournament.**
- 10. Explain the importance of extramural activities.**

Chapter 2: Children & Women in Sports

MCQ (1 Mark Each)

- 1. Female athlete triad is related to:**
 - a) Men**
 - b) Women athletes**
 - c) Children**
 - d) Coaches**
- 2. Motor development means development of:**
 - a) Intelligence**
 - b) Physical skills**
 - c) Emotions**
 - d) Personality**
- 3. Which hormone is important during adolescence?**
 - a) Thyroxine**
 - b) Estrogen**
 - c) Insulin**
 - d) Adrenaline**
- 4. Bullying in sports affects:**
 - a) Confidence**

5. Female athlete triad includes:

- a) Obesity**
b) Amenorrhea
c) Fever
d) Diabetes

6. Growth refers to increase in:

- a) Skill
- b) Size of body
- c) Thinking
- d) Behaviour

7. Which exercise is best for children?

- a) Heavy weight training
- b) Recreational activities
- c) No exercise
- d) Extreme exercise

8. Menarche is related to:

- a) Boys**
b) Girls
c) Coaches
d) Teachers

9. Women generally have more flexibility due to:

- a) Muscles
- b) Hormones
- c) Height
- d) Diet

10. Child abuse in sports can be:

- a) Physical
- b) Emotional
- c) Sexual
- d) All of these

2 Marks Questions

1. Define growth and development.
2. What is bullying?
3. Define female athlete triad.

- 1. Explain the importance of exercise for children.**
- 2. Describe the stages of growth and development.**
- 3. Explain the problems faced by women athletes.**
- 4. Write three causes of female athlete triad.**
- 5. Explain the effects of bullying on children.**
- 6. Describe motor development in children.**
- 7. Explain three benefits of participation of women in sports.**
- 8. Write a short note on menstruation and sports participation.**
- 9. Explain the role of physical activity in healthy growth.**
- 10. Discuss any three preventive measures for bullying.**

- 1. Explain female athlete triad in detail.**
- 2. Describe the importance of sports participation for women.**
- 3. Explain growth and development during childhood.**
- 4. Discuss the effects of bullying and its prevention.**
- 5. Explain the stages of motor development.**
- 6. Describe the benefits of physical activities for children.**
- 7. Explain the role of sports in empowerment of women.**
- 8. Discuss the precautions for women athletes during training.**
- 9. Explain the importance of balanced diet for children and women athletes.**
- 10. Write detailed notes on exercise guidelines for children.**

ACCOUNTANCY

- 1) A, B & C sharing profits and losses in the ratio of 5 : 3 : 2 decide to share profits and losses equally with effect from 1st April, 2019. Goodwill of the firm is valued at Rs. 90,000.

Pass journal entries under the following cases:

When goodwill does not appear in the books

When goodwill appears in the books at Rs. 60,000 and they agree on Existing goodwill is written off

Existing goodwill is not written off i.e. is carried in the books of the firm.

- 2) X, Y and Z are partners in a firm. The balances in their capital accounts as on 1-4-2014 were Rs. 2,00,000, Rs. 1,00,000 and 60,000 respectively. They share profits and losses equally. Interest on capital is allowed at 12% p.a. On 1-10-2011, the partners decided that their capital should be Rs. 1,00,000 each. The necessary adjustments in the capital are to be made by introducing or withdrawing cash. X was also entitled to salary of Rs. 5,000 per annum. Profit for the year ended on 31-03-2012 before charging interest on capital amounts to Rs. 1,00,000.

You are required to prepare a profit & loss appropriation account showing the distribution of profit among the partners.

- 3) A, B & C are partners in a firm sharing profits & losses in 11 : 5 : 4 ratios. Balance sheet of the firm as on 31st March was follows:

Liabilities	Amount	Assets	Amount
Capital		Building	
A 1,20,000		Machinery	1,35,000
B 90,000		Motor van	90,000
C 60,000		Furniture	60,000
Employee		Debtors	15,000
provident fund	2,70,000	Stock	1,20,000
Creditors	90,000	Cash	52,500
Bills payable	1,12,500	Profit and loss	15,000
Outstanding	30,000	account	30,000
expenses	15,000		
	5,17,500		5,17,500

On April 2014, A retired from the firm

- Goods to be valued at Rs. 67,500.
- Provision for doubtful debts to be made at 10%.
- Value of stock to be increased by 3,000.
- Fixed assets to be appreciated by 10%.
- A to be paid instantly and the required amount to be brought by B and C in such a way that their capital to be in proportion of 3 : 1.
- Unrecorded salary 3000 which is to be recorded. Prepare evaluation A/c partner's capital A/c & balance sheet.

- 4) X, Y and Z are partners in a firm sharing profits in the ratio 5 : 3 : 2. On 31st march 2011 balance sheet was

Balance Sheet

X died on 1st October 2011. It was agreed between his executor and the remaining partners that:

- Goodwill is to be valued at 2½ year's purchase of the average profit of the last four years, which

Balance Sheet

Liabilities	Amount	Asset	Amount
Creditors	1,04,000	Building	1,20,000
Reserve fund	30,000	Plant	1,00,000
Capitals:		Stock	54,000
X 1,20,000		Debtors	50,000
Y 90,000		Cash	20,000
Z 60,000	2,70,000	Bank	60,000
	4,04,000		4,04,000

were:

2007-08 = 50,000
 2008-09 = 40,000
 2009-10 = 80,000
 2010-11 = 70,000

- Building is valued at Rs. 1,40,000 plant at Rs. 92,000 and stock at 64,000.
- Profits of the year 2010-11 to be taken as having accrued at the same rate as that of the previous year.
- Interest on capital is provided at 9% p.a.
- On 1st October 2011 drawings account of X, Y & Z showed a balance of 40,000, 20,000 and 10,000 respectively.
- 51,900 is to be paid immediately to his executors and the balance is transferred to his executor's loan account.
- Y and Z decided to show their share of reserves in the balance sheet.

- 5) X, Y & Z are partners sharing profits and losses in the ratio of 1 : 2 : 3. Z retires and his capital after making adjustment for reserves and profits on revaluation stands at 2, 20,000. X and Y agreed to pay him Rs. 2,50,000 in full settlement of his claim. Record necessary entries for the treatment of goodwill if the new profit sharing ratio is decided 1 : 3.

- 6) Pass the journal entries for the following transactions in the books of A, B & C sharing profits in the ratio of 3 : 2 : 1 at the time of dissolution of the firm.

Realisation expenses of Rs. 3,500 were to be borne by and also to be paid by A partner.

B was given a loan of Rs. 30,000 by the firm.

C a partner took a machinery for 10,000. Loss on dissolution was Rs. 4,000.

Bank loan Rs. 50, 000 was paid.

- 7) Following is the Balance Sheet of Shashi and Ashu shari profit as 3 : 2.

Particulars	(Rs.)	Assets	(Rs.)
		Debtors	
		22,000 Less:	
Creditors	18,000	Provision for	21,000
General reserve	25,000	DD 1,000	18,000
Workmen's	15,000	Land and	12,000
compensation	15,000	Building	11,000
fund	10,000	Plant and	21,000
Capital : Shashi		machinery	
Ashu		Stock	
	83,000	Bank	83,000

On admission of Tanya for 1/6 th share in the profit it was decided that :

- Provision for doubtful debts to be increased by Rs. 1,500.
- Value of land and building to be increased to Rs. 21,000.
- Value of stock to be increased by Rs. 2,500.
- The liability of workmen's compensation fund was determined to be Rs. 12,000.
- Tanya brought in as her share of goodwill Rs. 10,000 in cash.
- Tanya was to bring further cash of Rs. 15,000 for her capital.

Prepare Revaluation A/c, Capital A/cs and the Balance Sheet of the new firm

8) X, Y & Z were partners sharing profits in the ratio of 2 : 1 : 1. Their balance sheet as on 31.3.2018

Liabilities	Amount	Asset	Amount
Capital A/c		Machinery	50,000
X	30,000	Joint life policy	4,000
Y	20,000	Stock	20,000
Z	20,000	Debtors	7,000
Reserves	4,000	Less : provision	(400)
Creditors	5,700	Bills receivable	400
Bills payable	2,300	Cash in hand	1,000
	82,000		82,000

The firm was dissolved on the above date:-

X took over the joint life policy at Rs. 5,000. Stock realised Rs. 22,000.

Debtors realised Rs. 4,000. Machinery was sold for Rs. 58,000.

Bill on hand realised in full. One bill for 500 under discount was dishonoured and had to be paid by the firm.

Prepare realisation account and capital accounts of partners.

9) Pass the journal entries for following transactions on the dissolution of a firm of partners A & B:

- Old furniture which had been written off in the books was sold for Rs. 40,000.
- There was old machinery which had been written off in the books. It was estimated to realise Rs. 5,000 which was taken by B at the estimated price less 30%.
- Investments book value Rs 50000 realised at 120%.
- Debtors Rs. 2,64,000. Provisions for doubtful debts Rs. 24,000, Rs. 48,000 of the books debts proved bad

10). Riddhi Ltd. was registered with a capital of ₹20,00,000 divided into 2,00,000 equity shares of ₹10 each. The company issued 1,00,000 shares to the public at a premium of ₹2 per share, payable as follows:

₹3 on application,

₹5 on allotment (including premium),

₹4 on first and final call.

Applications were received for 1,20,000 shares. Applications for 10,000 shares were rejected, and pro-rata allotment was made to the remaining applicants. All money was duly received except from Asha, who was allotted 2,000 shares and failed to pay allotment and call money. Her shares were forfeited after due notice and later reissued at ₹8 per share fully paid-up.

You are required to:

1. Pass journal entries in the books of Riddhi Ltd. for the above

CUET

Chapter 1: Fundamentals of Partnership

1. A partnership is formed by:
 - a) Operation of law
 - b) Mutual agreement
 - c) Court order
 - d) Government order
2. The maximum number of partners in a partnership firm is:
 - a) 10
 - b) 20
 - c) 50
 - d) No limit
3. In the absence of an agreement, partners share profits and losses:
 - a) In the ratio of capital
 - b) Equally
 - c) In the ratio of drawings
 - d) As decided by the senior partner
4. Interest on capital is allowed to partners if:
 - a) There is a provision in the Partnership Deed
 - b) Partner demands it
 - c) There is profit
 - d) Law mandates it
5. Interest on drawings is charged:
 - a) Always

- b) Only if there is profit
 - c) Only if stated in the partnership deed
 - d) When capital is more
6. Which document governs the relationship among partners?

a) Memorandum of Association

b) Articles of Association

c) Partnership Deed

d) Prospectus

7. What is the liability of partners in a partnership firm?

a) Limited

b) Unlimited

c) No liability

d) Limited to their share in profit

8. Which of the following is not a feature of partnership?

a) Sharing of profits

b) Separate legal entity

c) Mutual agency

d) Association of two or more persons

9. Profit and Loss Appropriation Account is prepared to:

a) Calculate net profit

b) Distribute profits among partners

c) Calculate revenue

d) Prepare balance sheet

10. When a partner is entitled to a salary, it is:

a) Charged to Profit and Loss Account

b) Credited to Capital Account

c) Credited to Profit and Loss Appropriation Account

d) Not recorded

11. A partner who contributes only capital is called:

a) Working partner

b) Sleeping partner

c) Nominal partner

d) Minor partner

12. A minor can be admitted to the benefits of partnership with:

a) Approval of court

b) Consent of all partners

c) Consent of guardian

d) Government order

13. In the absence of agreement, interest on partner's loan is paid at:

a) 6% p.a.

b) 12% p.a.

c) 10% p.a.

d) No interest is paid

14. Partnership comes to an end when:

- a) A partner resigns
 - b) The firm incurs losses
 - c) A partner dies
 - d) A new partner joins
15. The capital of partners can be:
- a) Fixed only
 - b) Fluctuating only
 - c) Either fixed or fluctuating
 - d) None of these

Chapter 2: Change in Profit Sharing Ratio among Existing Partners,

1. A change in profit sharing ratio amounts to:
 - a) Dissolution of partnership
 - b) Reconstitution of partnership
 - c) Admission of a new partner
 - d) Retirement of a partner
2. Sacrificing ratio is calculated at the time of:
 - a) Change in profit-sharing ratio
 - b) Admission of a partner
 - c) Retirement of a partner
 - d) Dissolution of the firm
3. Gaining Ratio =
 - a) Old Ratio – New Ratio
 - b) New Ratio – Old Ratio
 - c) Old Ratio + New Ratio
 - d) Sacrificing Ratio + New Ratio
4. The account opened to adjust the change in value of assets and liabilities is called:
 - a) Profit and Loss Account
 - b) Revaluation Account
 - c) Realisation Account
 - d) Capital Account
5. When goodwill is raised in the books, it is debited to:
 - a) All Partners' Capital Accounts
 - b) Goodwill Account
 - c) Gaining Partners' Capital Accounts
 - d) Sacrificing Partners' Capital Accounts
6. At the time of change in profit sharing ratio, goodwill is adjusted among:
 - a) All partners
 - b) Gaining partners and sacrificing partners
 - c) Only new partners
 - d) Sleeping partners only
7. If a partner gains in the new ratio, he should:
 - a) Be given cash
 - b) Compensate the sacrificing partner
 - c) Get goodwill from firm

d) Leave the partnership

8. Revaluation Account is prepared to:

- Calculate goodwill
- Record changes in assets and liabilities
- Prepare final accounts
- Determine sacrifice ratio

9. Profit or Loss on Revaluation is transferred to:

- a) Goodwill Account
- b) Capital Accounts of all partners
- c) Sacrificing partner only
- d) Cash Account

10. When the profit-sharing ratio among existing partners is changed, the goodwill adjustment is made through:

- a) Cash only
- b) Capital Accounts only
- c) Bank Account
- d) General Reserve

11. General Reserve at the time of change in profit sharing ratio is distributed among partners in:

- Gaining ratio
- New ratio
- Old ratio
- Sacrificing ratio

12. Revaluation Account shows:

- Market value of business
- Capital of partners
- Net gain or loss on revaluation of assets and liabilities
- Profit available for distribution

13. Which of the following is not an intangible asset?

- a) Trademark
- b) Goodwill
- c) Copyright
- d) Inventory

14. If a partner sacrifices his share, his capital account is:

- a) Debited
- b) Credited
- c) Not affected
- d) Closed

15. The change in profit sharing ratio may occur due to:

- a) Admission of a new partner
- b) Retirement or death of a partner
- c) Mutual agreement among partners
- d) All of the above

- b) Gaining partners' capital accounts
- c) Cash account
- d) Profit and Loss Account

4. Gaining Ratio is calculated as:

- Old Ratio – New Ratio
- New Ratio – Old Ratio
- Old Ratio + New Ratio
- Sacrificing Ratio + New Ratio

5. On retirement, the balance of the retiring partner's capital account is transferred to:

- a) Revaluation Account
- b) Goodwill Account
- c) His Loan Account or paid in cash
- d) Reserve Account

6. Revaluation Account is prepared at the time of:

- a) Retirement of a partner
- b) Admission of a partner
- c) Death of a partner
- d) All of the above

7. Profit on Revaluation is shared among:

- All partners in new ratio
- Remaining partners in gaining ratio
- All existing partners in old ratio
- Retiring partner only

8. The retiring partner is entitled to:

- a) Share of goodwill
- b) Share of profit till retirement
- c) Share in revaluation profit/loss
- d) All of the above

9. If the amount due to the retiring partner is not paid immediately, it is transferred to:

- a) Capital Account
- b) Current Account
- c) Loan Account
- d) Drawings Account

10. When goodwill is not shown in the books, it is adjusted through:

- a) Bank Account
- b) Revaluation Account
- c) Partners' Capital Accounts
- d) General Reserve

11. The balance of General Reserve at the time of retirement is transferred to:

- Retiring partner only
- Remaining partners
- All partners in old ratio
- All partners in new ratio

12. Unrecorded assets discovered at the time of retirement are:

d) Reserve

6. Dissolution of firm may be due to:

- a) Mutual agreement
- b) Insolvency of a partner
- c) Court order
- d) All of the above

7. Loan from a partner is paid:

- a) Before outside liabilities
- b) After partners' capital
- c) After outside liabilities
- d) Never repaid

8. The balance of Realisation Account shows:

- a) Capital balance
- b) Profit or loss on realisation
- c) Cash in hand
- d) Drawings

9. Unrecorded asset, when sold, is credited to:

- a) Capital Account
- b) Realisation Account
- c) Cash Account
- d) Reserve Account

10. Which of the following is not a mode of dissolution?

- a) Admission of a partner
- b) By mutual agreement
- c) By court order
- d) Compulsory dissolution

11. On dissolution, assets are transferred to:

- a) Cash Account
- b) Realisation Account
- c) Revaluation Account
- d) Capital Account

12. Partner's capital account will be debited for:

- a) Realisation profit
- b) Realisation loss
- c) Cash brought in
- d) Bank loan

13. Bank loan is treated as:

- a) Partner's loan
- b) Internal liability
- c) External liability
- d) Capital

14. When goodwill is not shown in the books at the time of dissolution, it is:

- a) Ignored
- b) Sold separately

- c) Debited to revaluation
d) Shown in balance sheet

15. In case of deficiency of cash, the loss is borne by:

- a) Creditors
- b) Government
- c) Partners in profit-sharing ratio

Chapter 6: Issue of Shares,

1. The capital raised by issue of shares is known as:

- a) Working Capital
- b) Loan Capital
- c) Share Capital
- d) Fixed Capital

2. The part of capital which a company is authorized to raise is called:

- a) Issued Capital
- b) Subscribed Capital
- c) Authorised Capital
- d) Called-up Capital

3. When shares are issued at a price higher than face value, the excess is called:

- a) Discount
- b) Premium
- c) Commission
- d) Profit

4. Securities Premium Account is shown under:

- a) Current Liabilities
- b) Reserve and Surplus
- c) Share Capital
- d) Fixed Assets

5. Application money should be at least:

- a) 5% of face value
- b) 10% of face value
- c) 15% of face value
- d) 25% of face value

6. The money payable on allotment is transferred from:

- Share Capital to Cash
- Share Application to Share Allotment
- Share Allotment to Share Capital
- Cash to Profit & Loss

7. Excess application money is:

- a) Refunded
- b) Transferred to allotment
- c) Adjusted in calls
- d) All of the above

8. Oversubscription of shares means:

- a) More applications received than shares issued

9. The unpaid amount on shares is shown as:

- a) Asset
- b) Liability
- c) Deduction from Share Capital
- d) Income

10. Forfeiture of shares means:

- a) Reissuing shares
- b) Cancelling shares for non-payment
- c) Issuing bonus shares
- d) Consolidating shares

11. Reissued shares cannot be issued at a discount more than:

- a) Face value
- b) ₹10
- c) Amount forfeited
- d) Market value

12. The journal entry for reissue of forfeited shares includes:

- a) Debit Share Capital
- b) Credit Forfeited Shares Account
- c) Debit Forfeited Shares Account
- d) Credit Share Allotment

13. Discount on issue of shares is:

- a) Capital loss
- b) Revenue loss
- c) Capital gain
- d) Revenue gain

14. The maximum discount allowed on reissue of forfeited shares is:

- a) 5%
- b) 10%
- c) Equal to amount forfeited
- d) 25%

15. After reissue of forfeited shares, balance in Forfeited Shares Account is transferred to:

- a) Capital Reserve
- b) Share Capital
- c) Profit & Loss
- d) Securities Premium

1. Management is
 - a) Science only
 - b) Art only
 - c) Both art and science
 - d) None
2. Which of the following is not a function of management?
 - a) Planning
 - b) Staffing
 - c) Sleeping
 - d) Controlling
3. Top-level management is responsible for:
 - a) Day-to-day work
 - b) Policy formulation
 - c) Supervision
4. Training Management is a:
 - a) Single activity
 - b) Group activity
 - c) Personal work
 - d) None
5. Which level focuses on implementation?
 - a) Top
 - b) Middle
 - c) Lower
6. None Coordination is:
 - a) Separate function
 - b) Essence of management
 - c) Optional activity
 - d) None
7. Management helps in:
 - a) Achieving goals
 - b) Increasing cost
 - c) Reducing work
8. None Efficiency means:
 - a) Doing work correctly
 - b) Doing work timely
 - c) Doing right work
9. None Effectiveness means:
 - a) Minimum cost
 - b) Achieving goals
 - c) Maximum effort
 - d) None

10. Who is known as father of scientific management?

- a) Fayol
- b) Taylor
- c) Drucker
- d) None

B. Assertion–Reason (10 Questions)

A: Management is universal.

R: It is required in all organizations. A: Coordination is not important.

R: It creates unity.

A: Management is dynamic.

R: It adapts to environment.

A: Planning is useless.

R: It helps in decision making.

A: Management is goal-oriented.

R: It aims to achieve objectives.

A: Middle management does supervision.

R: It links top and lower levels.

A: Management increases efficiency.

R: It reduces wastage.

A: Management is intangible.

R: It cannot be seen but felt.

A: Coordination is required at all levels.

R: Different departments work together.

A: Management is only for business.

R: It is used in all organizations.

C. Case Studies (5)

- A company achieves its targets using minimum resources. Identify the concept involved. A manager ensures all departments work together smoothly. Identify the function.
- Top managers decide future goals of the company. Identify the level of management. A supervisor guides workers in their daily tasks. Identify the level of management.
- A company changes its policies due to market changes. Identify the feature of management.

Chapter 2: Principles of Management

1. Who gave principles of management?

- a) Taylor
- b) Fayol
- c) Drucker
- d) None

2. Unity of command means:

- a) One boss
- b) Many bosses
- c) No boss
- d) None

3. Scalar chain refers to:

A: Principles are flexible.
R: They can be applied in all situations. A: Unity of direction is important.
R: It ensures same goal.

A: Discipline is not needed. R: It ensures obedience.
A: Fayol gave 14 principles.
R: He was a management thinker.
A: Scalar chain improves communication.
R: It defines authority line.
A: Equity means unfair treatment.
R: It ensures justice.
A: Taylor focused on efficiency.
R: He introduced scientific methods.
A: Initiative should be avoided.
R: It improves motivation.
A: Division of work increases efficiency.
R: Specialization improves skills.
A: Management principles are rigid.
R: They cannot be changed.

C. Case Studies (5)

- Employees receive orders from only one boss. Identify the principle.
- A company focuses on team spirit among workers. Identify the principle. Workers are treated fairly and equally. Identify the principle.
- A company follows proper chain of authority. Identify the principle. Workers are encouraged to give suggestions. Identify the principle.

Chapter 3: Business Environment

1. Business environment includes:
 - a) Internal factors only
 - b) External factors only
 - c) Both
 - d) None
2. Economic environment includes:
 - a) Culture
 - b) Inflation
 - c) Values
 - d) None
3. Political environment includes:
 - a) Government policies
 - b) Technology
 - c) Society
 - d) None
4. Social environment includes:
 - a) Traditions
 - b) Laws
 - c) Machines
 - d) None
5. Technological environment includes:

- A: Environment is dynamic.
R: It changes continuously.
A: Business environment affects firms.
R: It provides opportunities.
A: Social factors are not important.
R: They influence business.
A: Economic policies affect business.
R: They control resources.
A: Technology improves efficiency.
R: It brings innovation.
A: LPG reforms started in India.
R: To improve economy.
A: Globalisation increases competition.
R: Firms enter global markets.

A: Political stability is not important.

R: It affects business decisions.

A: Environment is uncertain.

R: Future cannot be predicted.

A: Business ignores environment.

R: It depends on environment.

C. Case Studies (5)

- A company adopts new technology to improve production. Identify environment type. Government changes tax policy affecting business. Identify environment type.
- Increase in inflation impacts company cost. Identify environment type.
- Changing customer preferences affect sales. Identify environment type.
- Company enters international market. Identify concept.

Chapter 4: Planning

1. Planning is:

- a) Future thinking
- b) Past thinking
- c) No thinking
- d) None

2. Planning focuses on:

- a) Present
- b) Future
- c) Past
- d) None

3. First step in planning:

- a) Objectives
- b) Budget
- c) Policy
- d) None

4. Planning reduces:

- a) Risk
- b) Profit
- c) Cost
- d) None

5. Strategy is:

- a) Plan
- b) Rule
- c) Budget
- d) None

6. Policy provides:

- a) Guidelines
- b) Orders
- c) Commands
- d) None

7. Budget is:

- a) Financial plan
- b) Rule
- c) Order
- d) None

8. Planning is:

- a) Continuous
- b) One-time
- c) Rare
- d) None

9. Planning improves:

- a) Efficiency
- b) Confusion
- c) Delay
- d) None

10. Which is not a type of plan?

- a) Objective
- b) Strategy
- c) Rule
- d) None

B. Assertion–Reason (10 Questions)

A: Planning is important.

R: It reduces uncertainty.

A: Planning is rigid.

R: It allows flexibility.

A: Objectives guide planning.

R: They define goals.

A: Planning reduces wastage.

R: It improves efficiency.

A: Policies guide decisions.

R: They provide framework.

A: Planning is future oriented.

R: It deals with upcoming events.

A: Planning is unnecessary.

R: It improves coordination.

A: Budget helps control.

R: It sets standards.

A: Planning is continuous.

R: It is done regularly.

A: Planning eliminates risk.

R: It reduces risk.

C. Case Studies (5)

- A company sets future goals. Identify step.
- Manager develops strategy to face competition. Identify plan type.
- Company prepares financial plan. Identify plan.

- Rules are followed strictly in company. Identify plan.
- Company reviews plans regularly. Identify feature.

Chapter 5: Organising

1. Organising involves:
 - a) Planning
 - b) Structuring
 - c) Controlling
 - d) None
2. Authority means:
 - a) Right to command
 - b) Duty
 - c) Responsibility
 - d) None
3. Responsibility means:
 - a) Right
 - b) Obligation
 - c) Power
 - d) None
4. Delegation means:
 - a) Assign work
 - b) Avoid work
 - c) Ignore work
 - d) None
5. Span of control means:
 - a) Number of employees
 - b) Number of subordinates
 - c) Number of managers
 - d) None
6. Centralisation means:
 - a) Top control
 - b) Lower control
 - c) No control
 - d) None
7. Decentralisation means:
 - a) Top control
 - b) Sharing authority
 - c) No authority
 - d) None
8. Organisational structure defines:
 - a) Roles
 - b) Duties
 - c) Authority
 - d) All
9. Functional structure is based on:

- a) Functions
- b) Products
- c) Regions
- d) None

10. Divisional structure is based on:

- a) Functions
- b) Products
- c) Roles
- d) None

B. Assertion–Reason (10 Questions)

A: Delegation improves efficiency.

R: It reduces workload.

A: Authority and responsibility go together.

R: Both are related.

A: Centralisation increases workload.

R: Decisions are taken at top.

A: Decentralisation improves motivation.

R: It gives power to lower levels.

A: Organising is important.

R: It defines roles.

A: Span of control should be wide.

R: It reduces supervision.

A: Authority is obligation.

R: Responsibility is duty.

A: Functional structure causes confusion.

R: It groups activities.

A: Delegation is not needed.

R: It improves efficiency.

A: Organising helps coordination.

R: It defines relationships.

C. Case Studies (5)

- Manager assigns tasks to employees. Identify concept. Company groups activities by functions. Identify structure.
 - Authority is shared at lower levels. Identify concept.
 - Top management takes all decisions. Identify concept.
 - Employees report to one manager. Identify principle.

Chapter 6: Staffing

1. Staffing means:

- a) Hiring
- b) Planning
- c) Controlling
- d) None

2. Recruitment means:

- a) Searching candidates

- b) Selecting candidates
- c) Training
- d) None

3. Selection means:

- a) Rejecting candidates
- b) Choosing candidates
- c) Training
- d) None

4. Training improves:

- a) Skills
- b) Cost
- c) Loss
- d) None

5. Internal recruitment means:

- a) Outside hiring
- b) Within organisation
- c) No hiring
- d) None

6. External recruitment means:

- a) Inside hiring
- b) Outside hiring
- c) No hiring
- d) None

7. Promotion means:

- a) Lower position
b) Higher position
c) Same position
d) None

8. Transfer means:

- a) Same level
- b) Higher level
- c) Lower level
- d) None

9. Training is:

- a) Short-term
- b) Long-term
- c) No term
- d) None

10. Staffing is related to:

- a) People
- b) Money
- c) Machines
- d) None

- What does the title, Lost Spring convey?
- What were the poets feelings at the airport? How did she hide them? Do you consider poets reaction appropriate?
- Justify the title Deep Water on the basis of the autobiographical excerpt by William Douglas.

Writing

- Sunrise Global School, Agra is going to organise a one act play competition in the school auditorium. You have decided to invite noted stage artist, **Nalini** to grace the occasion. Draft a formal invitation for her in about 50 words. You are Kiran cultural secretary.
- You are Neelam Gupta and have received an invitation card from Shr. AK Singh ,
principal of St Vincent Convent School, Agra to attend the schools annual function. Draft a formal reply of acceptance in about 50 words.

Grammar

1. Fill in the blanks in the following passages with the appropriate tense forms of the verbs given in brackets:

1. My younger brother, Tinu, (a) . (fall) off his bicycle yesterday. He (b) .. (hurt) his right ankle and (c) .. (be) in bed since then. The doctor (d) .. just (examine) him and (e) ..(advise) him complete rest for a week. He hopes that Tinu (f) .. (recover) soon.
2. The match (a) ..(begin) before we reached the stadium. There (b).. (be) a great rush at the gate. People (c) .. (argue) with the security guards. Entering the stadium (d).. (prove) a tedious job. I (e).. (be) able to forget this nasty experience in the years to come. I (f) ..(decide) never to watch an event in an overcrowded place.
3. When I (a).. (look) at the Palace in the morning sunlight, I was amazed. It (b) .. (seem) an architectural wonder. I (c) .. (watch) it from different angles and (d) .. (take) snaps. Perhaps my movements (e) .. (make) the guards suspicious. They at once (f) .. (catch) hold of my camera and spoke rudely to me.
4. It is estimated that India (a) .. (make) rapid strides in science in the coming years. For that we (b) .. (need) good science teachers, labs and equipment. Unfortunately, the existing scenario (c) .. (not present) an encouraging sight. The nation (d) .. (lack) administrators with a vision. Scientists (e) .. (be) more interested in foreign assignments than research at home. Students too (f) .. not (lag) behind.
5. Did you ever (a) . (hear) of paperless office? You (b) .. certainly (say), no. Well, very soon the old favourite of pen-pushers (c) .. (make) an unceremonious exit. You (d) .. already (see) it happening in the banks. Where (e) .. (be) those bulky ledgers? A smart computer (f) .. (replace) them quietly.

ECONOMICS & CUET PREPARATION

GENERAL INSTRUCTIONS

1. Complete ALL THREE sections.
2. Section 1: Submit in project file with proper binding.
3. Sections 2 & 3: Solve in separate ruled notebook.
4. Use blue/black pen. Draw diagrams/graphs with pencil on graph paper.
5. Submission: First week after vacation.
6. Total Marks: 75

INDEX

1. Internal Assessment Project – 20 Marks
2. CUET Economics Worksheet – 15 Marks
3. Macroeconomics Sample Paper – 40 Marks

SECTION 1 – ECONOMICS INTERNAL ASSESSMENT PROJECT

Choose ANY ONE topic. Follow CBSE Project Guidelines strictly.

A. Indian Economic Development Topics

1. Digital Payments in India
2. Unemployment among Youth
3. Impact of Inflation on Common People
4. Women Employment in India
5. Government Schemes for Employment
6. Green Revolution
7. Sustainable Development
8. Poverty in India
9. Role of MSMEs in Indian Economy
10. Consumer Awareness

B. Macroeconomics Topics

1. Study of Family Budget
2. Banking Services Used by People
3. Importance of RBI
4. Foreign Exchange Rate
5. GST and Its Impact

Mandatory Project File Format

1. Cover Page
2. Certificate
3. Acknowledgement
4. Index

4. Explain functions of money.

SECTION C – LONG ANSWER QUESTIONS

1. Calculate National Income.
2. Explain investment multiplier.
3. Explain credit creation by banks.

SECTION D – CASE STUDY QUESTIONS

1. Government expenditure and tax reduction during recession.
2. Balance of Payments and its components.

Music (Vocal)

1. 'आलाप' का संबंध किससे है?
 - a) स्वर विस्तार
 - b) ताल प्रदर्शन
 - c) नृत्य
 - d) वादन शैली
2. तान का मुख्य आधार क्या होता है?
 - a) द्रुत गति
 - b) ताल
 - c) लयकारी
 - d) अभिनय
3. अलंकार का प्रयोग क्यों किया जाता है?
 - a) स्वर साधना हेतु
 - b) ताल समाप्त करने हेतु
 - c) गीत लिखने हेतु
 - d) वाद्य निर्माण हेतु
4. भारतीय संगीत में मुख्यतः कितने ग्राम माने गए हैं?

- c) नीचे बिंदु
d) खड़ी रेखा
12. अलंकार के प्रकार है?

- a) 3
b) 4
c) 5
d) 2

13. राग का दर्पण किसे कहते हैं?

- a) आलाप
b) तान
c) लोकगीत
d) खटका

14. 'तिरप्' किसका प्रकार है ?

- a) आलाप
b) गमक
c) मीड
d) कण स्वर

15. तीन स्वरो का अर्ध गोलाई आकार में बोलना कहलाता है?

- a) मुर्की
b) खटका
c) कण
d) मात्रा

रचनात्मक प्रश्न

- 1) किन्हीं भी तीन तालों में 2-2 अलंकारों की रचना करके लिखो
- 2) रागों के स्वर विस्तार को तान कहते हैं और तान अनेक प्रकार की होती है किन्हीं भी 4 प्रकार की तानों की रचना करो
- 3) रागों के समय सिद्धांत का सम्पूर्ण वर्णन करो

Applied Mathematics

CBSE Board Examination 2026 answer sheets are being evaluated with the help of computer-assisted checking and strict marking schemes. Therefore, **writing proper steps in Mathematics plays a very important role in scoring good marks. Even if the final answer is correct, marks may be deducted for missing or improper steps.** To help you improve your presentation and answer-writing skills, some previous years CBSE questions along with marking-scheme-based solutions have been provided in this homework. Students are instructed to carefully observe and analyse each step of the solutions before writing them in their notebooks.

Important Instructions:

1. Write all questions neatly in your Mathematics holiday homework notebook.
2. Follow the CBSE marking scheme while solving every question.
3. Write complete steps clearly and systematically. Avoid skipping steps.
4. **Mention the marks allotted to each step on the right-hand margin of the notebook exactly according to the marking scheme given in the PDF.**
5. Proper presentation, correct mathematical notation, and neat diagrams (where required) should be maintained.
6. Use blue pen for writing and pencil for graphs, figures, and margin work.
7. **Highlight final answers properly by boxing them.**
8. Revise formulas and concepts before attempting the questions.
9. **Maintain cleanliness and discipline in your notebook work.**
10. **The test will be conducted from the Holiday Homework questions.**

Note: Students are advised to practice each question sincerely, as stepwise solving technique is extremely important for Board Examination preparation and helps in securing maximum marks.

Part -A

At least 10 Mathematics activity and 1 Project

Q2

31.	(a) Find a matrix A such that $A \begin{bmatrix} 4 & 0 \\ -1 & -2 \end{bmatrix} = \begin{bmatrix} 17 & 10 \\ 0 & -16 \end{bmatrix}.$ Also, find A^{-1}. OR (b) Given a square matrix A of order 3 such that $A^2 = \begin{bmatrix} 3 & -4 & 4 \\ 0 & -1 & 0 \\ -2 & 2 & -3 \end{bmatrix}$, show that $A^3 = A^{-1}$.	
Ans	(a) $A = \begin{bmatrix} 17 & 10 \\ 0 & -16 \end{bmatrix} \begin{bmatrix} 4 & 0 \\ -1 & -2 \end{bmatrix}^{-1}$ $= -\frac{1}{8} \begin{bmatrix} 17 & 10 \\ 0 & -16 \end{bmatrix} \begin{bmatrix} -2 & 0 \\ 1 & 4 \end{bmatrix}$ $= \begin{bmatrix} 3 & -5 \\ 2 & 8 \end{bmatrix}$ Also, $A^{-1} = \frac{1}{34} \begin{bmatrix} 8 & 5 \\ -2 & 3 \end{bmatrix}$ Or (b) $A^3 = A^{-1} \Leftrightarrow A^4 = I$ $A^4 = A^2 A^2 = \begin{bmatrix} 3 & -4 & 4 \\ 0 & -1 & 0 \\ -2 & 2 & -3 \end{bmatrix} \begin{bmatrix} 3 & -4 & 4 \\ 0 & -1 & 0 \\ -2 & 2 & -3 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} = I$	$\frac{1}{2}$ 1 $\frac{1}{2}$ 1 $1\frac{1}{2}$ $1\frac{1}{2}$

Q27(b)	Find the inverse of the matrix $\begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$.	
Ans	Here $A = 1(3-0) - 2(-1-0) - 2(2-0)$ $= 3 + 2 - 4 = 1$ $A_{11} = 3, A_{12} = 1, A_{13} = 2$ $A_{21} = 2, A_{22} = 1, A_{23} = 2$ $A_{31} = 6, A_{32} = 2, A_{33} = 5$ cofactor matrix = $\begin{bmatrix} 3 & 1 & 2 \\ 2 & 1 & 2 \\ 6 & 2 & 5 \end{bmatrix}$ $\Rightarrow adjA = \begin{bmatrix} 3 & 2 & 6 \\ 1 & 1 & 2 \\ 2 & 2 & 5 \end{bmatrix}$ $\therefore A^{-1} = \frac{1}{ A } adjA = \frac{1}{1} \begin{bmatrix} 3 & 2 & 6 \\ 1 & 1 & 2 \\ 2 & 2 & 5 \end{bmatrix} = \begin{bmatrix} 3 & 2 & 6 \\ 1 & 1 & 2 \\ 2 & 2 & 5 \end{bmatrix}$	1 1 1

Q4

Q36	Case Study – 1 Rohini wants to give a rectangular plot of land for a school in her village. When she was asked to mention the dimensions of the plot, she told that if its length is decreased by 50 m and breadth is increased by 50 m, then its area does not alter, but if its length is decreased by 10 m and breadth is decreased by 20 m, then its area will decrease by 5300 sq m. Based on the above information, answer the following questions : (i) Assuming x m and y m as the length and breadth of the plot respectively, write the system of linear equations in x and y. 1 (ii) Write the system of linear equations obtained in (i) in the matrix equation $AX = B$. 1 (iii) (a) Determine A^{-1}. 2 OR (b) Find the area of the plot. 2	
Ans(i)	$(x-50)(y+50) = xy \Rightarrow x - y = 50$ and $(x-10)(y-20) + 5300 = xy \Rightarrow 2x + y = 550$	$\frac{1}{2}$ $\frac{1}{2}$
Ans(ii)	$\begin{bmatrix} 1 & -1 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 50 \\ 550 \end{bmatrix}$	1

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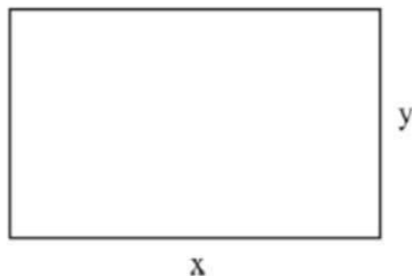
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	where, $A = \begin{bmatrix} 1 & -1 \\ 2 & 1 \end{bmatrix}$, $X = \begin{bmatrix} x \\ y \end{bmatrix}$, $B = \begin{bmatrix} 50 \\ 550 \end{bmatrix}$	
Ans (iii) (a)	$ A = 3$ and $adjA = \begin{bmatrix} 1 & 1 \\ -2 & 1 \end{bmatrix}$ $\therefore A^{-1} = \frac{1}{3} \begin{bmatrix} 1 & 1 \\ -2 & 1 \end{bmatrix}$	1 1
OR		
Ans (iii) (b)	$X = \begin{bmatrix} x \\ y \end{bmatrix} = A^{-1}B = \frac{1}{3} \begin{bmatrix} 1 & 1 \\ -2 & 1 \end{bmatrix} \begin{bmatrix} 50 \\ 550 \end{bmatrix} = \frac{1}{3} \begin{bmatrix} 600 \\ 450 \end{bmatrix} = \begin{bmatrix} 200 \\ 150 \end{bmatrix}$ $\therefore \text{Area} = xy = 200 \times 150 = 30,000 \text{ sq m}$	1½ ½

Q5

36.

An architect is developing a plot of land for a commercial complex. When asked about the dimensions of the plot, he said that if the length is decreased by 25 m and the breadth is increased by 25 m, then its area increases by 625 m^2 . If the length is decreased by 20 m and the breadth is increased by 10 m, then its area decreases by 200 m^2 .



On the basis of the above information, answer the following questions :

- Formulate the linear equations in x and y to represent the given information.
- Find the dimensions of the plot of land by matrix method.

65/S/3

Ans

$$\begin{aligned} \text{(i)} \quad (x-25)(y+25) &= xy + 625 \Rightarrow x - y = 50 \\ (x-20)(y+10) &= xy - 200 \Rightarrow x - 2y = 0 \end{aligned}$$

(ii) The system of linear equations can be written in matrix form as

$$\Rightarrow \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 & -1 \\ 1 & -2 \end{bmatrix}^{-1} \begin{bmatrix} 50 \\ 0 \end{bmatrix} = - \begin{bmatrix} -2 & 1 \\ -1 & 1 \end{bmatrix} \begin{bmatrix} 50 \\ 0 \end{bmatrix} = \begin{bmatrix} 100 \\ 50 \end{bmatrix}$$

x = 100m, y = 50m

1

1

 $\frac{1}{2}$

1

 $\frac{1}{2}$

Q6

26.	(a) Find a matrix A such that $A \begin{bmatrix} 4 & 0 \\ -1 & -2 \end{bmatrix} = \begin{bmatrix} 17 & 10 \\ 0 & -16 \end{bmatrix}.$ Also, find A^{-1}. OR (b) Given a square matrix A of order 3 such that $A^2 = \begin{bmatrix} 3 & -4 & 4 \\ 0 & -1 & 0 \\ -2 & 2 & -3 \end{bmatrix}$, show that $A^3 = A^{-1}$.	
Ans	(a) $A = \begin{bmatrix} 17 & 10 \\ 0 & -16 \end{bmatrix} \begin{bmatrix} 4 & 0 \\ -1 & -2 \end{bmatrix}^{-1}$ $= -\frac{1}{8} \begin{bmatrix} 17 & 10 \\ 0 & -16 \end{bmatrix} \begin{bmatrix} -2 & 0 \\ 1 & 4 \end{bmatrix}$ $= \begin{bmatrix} 3 & -5 \\ 2 & 8 \end{bmatrix}$ Also, $A^{-1} = \frac{1}{34} \begin{bmatrix} 8 & 5 \\ -2 & 3 \end{bmatrix}$	$\frac{1}{2}$ 1 $\frac{1}{2}$ 1

65/S/1

	Or (b) $A^3 = A^{-1} \Leftrightarrow A^4 = I$ $A^4 = A^2 A^2 = \begin{bmatrix} 3 & -4 & 4 \\ 0 & -1 & 0 \\ -2 & 2 & -3 \end{bmatrix} \begin{bmatrix} 3 & -4 & 4 \\ 0 & -1 & 0 \\ -2 & 2 & -3 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} = I$	$1\frac{1}{2}$ $1\frac{1}{2}$
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Q7

Q23(a)	If X is a normal variate with mean $(\mu) = 70$ and standard deviation $(\sigma) = 5$, then find $P(X > 75)$. (Given : $P(0 < Z < 1) = 0.3413$)	
Ans	For $X = 75$, $Z = \frac{75-70}{5} \Rightarrow Z = 1$ $P(X > 75) = P(Z > 1)$ $= 0.5 - P(0 < Z < 1)$ $= 0.5 - 0.3413$ $= 0.1587$	$\frac{1}{2}$ 1 $\frac{1}{2}$
OR		
Q23(b)	If X is a Poisson variate such that $P(X = 0) = P(X = 1) = \alpha$, then show that $\alpha = e^{-1}$.	
Ans	Let X be a poisson variate with parameter λ. Then $P(X = r) = \frac{e^{-\lambda} \lambda^r}{r!}$ Here $P(X = 0) = e^{-\lambda}$ and $P(X = 1) = \lambda e^{-\lambda}$ $\therefore P(X = 0) = P(X = 1) = \alpha \Rightarrow e^{-\lambda} = \lambda e^{-\lambda} = \alpha$ $\Rightarrow \lambda = 1$ $\Rightarrow \alpha = \frac{1}{e}$ i.e. $\alpha = e^{-1}$	1 $\frac{1}{2}$ $\frac{1}{2}$

Q11

Q36	Case Study – 1 Rohini wants to give a rectangular plot of land for a school in her village. When she was asked to mention the dimensions of the plot, she told that if its length is decreased by 50 m and breadth is increased by 50 m, then its area does not alter, but if its length is decreased by 10 m and breadth is decreased by 20 m, then its area will decrease by 5300 sq m. Based on the above information, answer the following questions : (i) Assuming x m and y m as the length and breadth of the plot respectively, write the system of linear equations in x and y. 1 (ii) Write the system of linear equations obtained in (i) in the matrix equation $AX = B$. 1 (iii) (a) Determine A^{-1}. 2 OR (b) Find the area of the plot. 2	
Ans(i)	$(x - 50)(y + 50) = xy \Rightarrow x - y = 50$ and $(x - 10)(y - 20) + 5300 = xy \Rightarrow 2x + y = 550$	1/2 1/2
Ans(ii)	$\begin{bmatrix} 1 & -1 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 50 \\ 550 \end{bmatrix}$	1

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	where, $A = \begin{bmatrix} 1 & -1 \\ 2 & 1 \end{bmatrix}$, $X = \begin{bmatrix} x \\ y \end{bmatrix}$, $B = \begin{bmatrix} 50 \\ 550 \end{bmatrix}$	
Ans (iii) (a)	$ A = 3$ and $\text{adj}A = \begin{bmatrix} 1 & 1 \\ -2 & 1 \end{bmatrix}$ $\therefore A^{-1} = \frac{1}{3} \begin{bmatrix} 1 & 1 \\ -2 & 1 \end{bmatrix}$	 1 1
OR		
Ans (iii)(b)	$X = \begin{bmatrix} x \\ y \end{bmatrix} = A^{-1}B = \frac{1}{3} \begin{bmatrix} 1 & 1 \\ -2 & 1 \end{bmatrix} \begin{bmatrix} 50 \\ 550 \end{bmatrix} = \frac{1}{3} \begin{bmatrix} 600 \\ 450 \end{bmatrix} = \begin{bmatrix} 200 \\ 150 \end{bmatrix}$ $\therefore \text{Area} = xy = 200 \times 150 = 30,000 \text{ sq m}$	 1½ ½

Q13

21(a).	Two pipes P and Q together can fill a tank in 10 minutes. If pipe P takes 15 minutes less than Q to fill the tank alone, then find the time taken by pipe Q to fill the tank alone.	
Sol.	Let pipe Q fills the tank in x minutes, then P will fill the tank in $x - 15$ minutes.	

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	$\frac{1}{x} + \frac{1}{x-15} = \frac{1}{10}$ $\Rightarrow x^2 - 35x + 150 = 0$ $\Rightarrow x = 30$ ($x = 5$ rejected) $\therefore$ Q can fill the tank alone in 30 minutes.	1 $\frac{1}{2}$ $\frac{1}{2}$
	OR	
21(b).	In a 200 m race, A beats B by 35 m or 7 seconds. Find the time taken by A to complete the race.	
Sol.	B covers a distance of 35 metres in 7 seconds. So, speed of B is 5 m/s So, B completes the race of 200 m in 40 seconds. Hence, A covers the race in $(40 - 7) = 33$ seconds.	$\frac{1}{2}$ 1 $\frac{1}{2}$

Q15

Q38	For providing water to the families of a colony, a large water tank with two inlet pipes A and B and an outlet pipe C, is installed. Pipes A and B can fill the tank in 10 hours and 12 hours respectively; whereas pipe C can empty the tank in 15 hours. Based on the above information, answer the following questions : (i) If both pipes A and B are opened together, then find the time in which the tank will be filled completely. 1 (ii) If both pipes A and C are opened together, then find the time in which the tank will be filled completely. 1 (iii) (a) If all the three pipes A, B and C are opened together, then find the time in which the tank will be filled completely. 2 OR (b) Pipes A and B are opened together for some time and then pipe B is turned off after some time. If the tank is completely filled in 6 hours, then after how many hours is pipe B turned off ? 2	
Ans(i)	Part of the tank filled by pipes A and B in one hour $= \frac{1}{10} + \frac{1}{12} = \frac{11}{60}$	$\frac{1}{2}$

	So, two pipes will fill the tank in $\frac{60}{11}$ hours.	$\frac{1}{2}$
Ans(ii)	Part of the tank filled by pipes A and C in one hour $= \frac{1}{10} - \frac{1}{15} = \frac{1}{30}$ So, two pipes will fill the tank in 30 hours.	$\frac{1}{2}$ $\frac{1}{2}$
Ans (iii)(a)	Part of the tank filled by three pipes A, B and C in one hour $= \frac{1}{10} + \frac{1}{12} - \frac{1}{15} = \frac{7}{60}$ So, these three pipes will fill the tank in $\frac{60}{7}$ hours.	$1\frac{1}{2}$ $\frac{1}{2}$
OR		
Ans (iii)(b)	Let the pipe B be turned off after 't' hours. Part of tank filled by A in 6 hours $= \frac{6}{10}$ Part of tank filled by B $= 1 - \frac{6}{10} = \frac{4}{10}$ $\Rightarrow \frac{t}{12} = \frac{4}{10}$ $\Rightarrow t = 4.8$ $\therefore$ Pipe B is turned off after 4.8 hours	1 $\frac{1}{2}$ $\frac{1}{2}$

1

Section B2: Applied Mathematics

Unit I: Numbers, Quantification and Numerical Applications

A. Modulo Arithmetic

- Define modulus of an integer
- Apply arithmetic operations using modular arithmetic rules

B. Congruence Modulo

- Define congruence modulo
- Apply the definition in various problems

C. Allegation and Mixture

- Understand the rule of allegation to produce a mixture at a given price
- Determine the mean price of a mixture
- Apply rule of allegation

D. Numerical Problems

- Solve real life problems mathematically

- Distinguish between upstream and downstream
- Express the problem in the form of an equation

F. Pipes and Cisterns

- Determine the time taken by two or more pipes to fill or empty the tank

G. Races and Games

- Compare the performance of two players w.r.t. time, distance

H. Numerical Inequalities

- Describe the basic concepts of numerical inequalities
- Understand and write numerical inequalities

UNIT II: ALGEBRA

A. Matrices and types of matrices

- Define matrix
- Identify different kinds of matrices

B. Equality of matrices, Transpose of a matrix, Symmetric and Skew symmetric matrix

- Determine equality of two matrices
- Write transpose of given matrix
- Define symmetric and skew symmetric matrix

C. Algebra of Matrices

- Perform operations like addition & subtraction on matrices of same order
- Perform multiplication of two matrices of appropriate order
- Perform multiplication of a scalar with matrix

D. Determinant of Matrices

- Determinant of a square matrix
- Use elementary properties of determinants
- Singular matrix, Non-singular matrix
- $|AB| = |A||B|$
- Simple problems to find determinant value

E. Inverse of a Matrix

- Define the inverse of a square matrix
- Apply properties of inverse of matrices
- Inverse of a matrix using: a) cofactors

If A and B are invertible square matrices of same size,

- $(AB)^{-1} = B^{-1} A^{-1}$
- $(A^{-1})^{-1} = A$
- $(A^T)^{-1} = (A^{-1})^T$

UNIT IV: PROBABILITY DISTRIBUTIONS

A. Probability Distribution

- Understand the concept of Random Variables and its Probability Distributions
- Find probability distribution of discrete random variable

B. Mathematical Expectation

- Apply arithmetic mean of frequency distribution to find the expected value of a random variable

C. Variance

- Calculate the Variance and S.D. of a random variable

D. Binomial Distribution

- Identify the Bernoulli Trials and apply Binomial Distribution
- Evaluate Mean, Variance and S.D. of a Binomial Distribution

E. Poisson Distribution

- Understand the conditions of Poisson Distribution
- Evaluate the Mean and Variance of Poisson distribution

F. Normal Distribution

- Understand normal distribution is a continuous distribution
- Evaluate value of Standard normal variate
- Area relationship between Mean and Standard Deviation

UNIT V: TIME BASED DATA

A. Time Series

- Identify time series as chronological data

B. Components of Time Series

- Distinguish between different components of time series

C. Time Series analysis for univariate data

- Solve practical problems based on statistical data and Interpret

D. Secular trend

- Understand the long term tendency

E. Methods of Measuring trend

- Demonstrate the techniques of finding trend by different methods

UNIT VI: INFERENCE STATISTICS

F. Valuation of Bonds:

- Concept of bond and related terms.
- Value of bond using present value approach

UNIT VIII: LINEAR PROGRAMMING

A. Introduction and related terminology

- Familiarize with terms related to Linear Programming Problem

B. Mathematical formulation of Linear Programming Problem

- Formulate Linear Programming Problem

C. Different types of Linear Programming Problems

- Identify and formulate different types of LPP

D. Graphical Method of Solution for problems in two Variables

- Draw the Graph for a system of linear inequalities involving two variables and to find its solution graphically

E. Feasible and Infeasible Regions

- Identify feasible, infeasible and bounded regions

F. Feasible and infeasible solutions, optimal feasible solution

- Understand feasible and infeasible solutions
- Find optimal feasible solution

Q1

If x, y and z are real number such that $x + y + z = 0$, then

value of $\begin{vmatrix} 3x & -x+y & -x+z \\ x-y & 3y & z-y \\ x-z & y-z & 3z \end{vmatrix}$ is

- (a) $3(xy + yz + zx)$ (b) $xy + yz + zx$
(c) 0 (d) 1

Q2

The matrix $A = \begin{bmatrix} 0 & 0 & 5 \\ 0 & 5 & 0 \\ 5 & 0 & 0 \end{bmatrix}$ is a

- A. Diagonal matrix B. Scalar matrix
C. Square matrix D. Symmetric matrix

Choose the **correct** answer from the options given below:

- (a) A, B and C only (b) B and C only
(c) C and D only (d) A and D only

If A is an invertible matrix of order 3, then
Match List-I with List-II.

Q10

If $P(A) = 0.4$, $P(B) = 0.8$ and $P(A|B) = 0.6$, then $P(A \cup B)$ is:

- (a) 0.96 (b) 0.72 (c) 0.36 (d) 0.42

Q11

If $A = \begin{bmatrix} 2 & 4 \\ x & -\frac{1}{2} \end{bmatrix}$ and A is singular, then x is equal to:

- (a) $\frac{1}{4}$ (b) $-\frac{1}{4}$ (c) -7 (d) 32

Q12

If $A = \begin{bmatrix} 1 & 0 \\ 3 & 1 \end{bmatrix}$ and $A^4 = \begin{bmatrix} 1 & 0 \\ k & 1 \end{bmatrix}$, then value of k is

- (a) 81 (b) 27 (c) 12 (d) 36

Q13

If $A = \begin{bmatrix} 2 & 3 \\ 1 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 \\ -1 & 3 \end{bmatrix}$, then $B^{-1}A^{-1}$ is equal to:

- (a) $-\frac{1}{11} \begin{bmatrix} 14 & 5 \\ 5 & 1 \end{bmatrix}$ (b) $\frac{1}{11} \begin{bmatrix} 15 & 11 \\ 1 & 0 \end{bmatrix}$
(c) $\frac{1}{11} \begin{bmatrix} 14 & 5 \\ 5 & 1 \end{bmatrix}$ (d) $-\frac{1}{11} \begin{bmatrix} 15 & 11 \\ 1 & 0 \end{bmatrix}$

Q14

For $a, b > 0$, if $P = \begin{bmatrix} 0 & -a \\ 2a & b \end{bmatrix}$ and $Q = \begin{bmatrix} b & a \\ -b & 0 \end{bmatrix}$ are two matrices such that $PQ = \begin{bmatrix} 2 & 0 \\ 3 & 8 \end{bmatrix}$, then the value of $(a + b)^{ab}$ is:

- (a) 8 (b) 9 (c) $\frac{1}{9}$ (d) $\frac{-1}{27}$

Q15

$$A = \begin{bmatrix} 0 & \alpha & \beta \\ -\alpha & 0 & \gamma \\ -\beta & -\gamma & 0 \end{bmatrix} \text{ is a}$$

- A. square matrix
- B. diagonal matrix
- C. symmetric matrix
- D. skew-symmetric matrix

Choose the correct answer from the options given below:

- (a) A and D only
- (b) A and C only
- (c) A, B and D only
- (d) A, B and C only

Q16

$$\text{If } P = \begin{bmatrix} 5 & 3 \\ -1 & -2 \end{bmatrix} \text{ satisfies the equation } P^2 - 3P - 7I = 0,$$

where I is an identity matrix of order 2, then P^{-1} is:

$$(a) \frac{1}{7} \begin{bmatrix} 2 & 3 \\ -1 & -5 \end{bmatrix}$$

$$(b) \begin{bmatrix} 2 & 3 \\ -1 & -5 \end{bmatrix}$$

$$(c) \frac{1}{7} \begin{bmatrix} 2 & 3 \\ -1 & -1 \end{bmatrix}$$

$$(d) \frac{1}{7} \begin{bmatrix} 2 & 5 \\ -1 & -1 \end{bmatrix}$$

Q17

A pair of dice is rolled. If the two numbers appearing on them are different, the probability that Match List-I with List-II.

	List-I (Event)		List-II (Probability)
A.	The sum of the numbers is greater than 11	I.	0
B.	The sum of the numbers is 4 or less	II.	$\frac{1}{15}$
C.	The sum of the numbers is 4	III.	$\frac{2}{15}$
D.	The sum of the numbers is 7	IV.	$\frac{3}{15}$

Choose the correct answer from the options given below:

- (a) A-I, B-II, C-III, D-IV
- (b) A-I, B-III, C-II, D-IV
- (c) A-I, B-II, C-IV, D-III
- (d) A-III, B-IV, C-I, D-II

$$(d) \quad x^2 = \frac{28}{3}$$

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