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CLASS 12 APPLIED MATHEMATICS - PRACTICE QUESTIONS

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CLASS 12

Applied Mathematics

Sample Paper 2 - Questions

38 questions | 80 marks | 2026-27

Time: 3 hours. Answer all questions and subparts unless a choice is stated. Marks are shown on the right. Write answers on separate sheets. Independently prepared practice paper.

Section A - Objective questions

1. Calculate the determinant of [[3,1],[1,4]]. **1**
(A) 11 (B) 13 (C) 12 (D) 10

2. For $f(x) = 2x^3$, calculate $f'(2)$. **1**
(A) 24 (B) 23 (C) 25 (D) 26

3. Determine the value of the integral from 0 to 1 of $6x^2$ dx. **1**
(A) 1 (B) 3 (C) 2 (D) 4

4. For cost $C(x) = x^2 + 2x + 100$, find marginal cost $C'(5)$. **1**
(A) 12 (B) 14 (C) 13 (D) 11

5. A binomial random variable has n = 6 and p = 0.2. Calculate its mean. **1**
(A) 1/5 (B) 6/5 (C) 11/5 (D) 16/5

6. An observation is 52, the mean is 50 and standard deviation is 1. Calculate its standard score. **1**
(A) 3 (B) 2 (C) 1 (D) 4

7. Calculate the present value of Rs 2000 due in two years at a 10% annual discount rate. Round to two decimal places. **1**
(A) 1652.89 (B) 1654.89 (C) 1651.89 (D) 1653.89

8. Calculate the central three-period moving average for observations 11, 15, 19. 1

(A) 16 (B) 15 (C) 14 (D) 17

9. Maximise Z = x + y with x >= 0, y >= 0 and x + y <= 11. State the maximum value. 1

(A) 11 (B) 10 (C) 12 (D) 13

10. Calculate the determinant of [[4,1],[1,5]]. 1

(A) 19 (B) 21 (C) 18 (D) 20

11. For $f(x) = 3x^3$, calculate f'(2). 1

(A) 36 (B) 35 (C) 38 (D) 37

12. Determine the value of the integral from 0 to 1 of $9x^2$ dx. 1

(A) 4 (B) 5 (C) 3 (D) 2

13. For cost $C(x) = x^2 + 4x + 100$, find marginal cost C'(5). 1

(A) 13 (B) 15 (C) 14 (D) 16

14. A binomial random variable has n = 6 and p = 0.5. Calculate its variance. 1

(A) 3/2 (B) 1/2 (C) 7/2 (D) 5/2

15. An observation is 54, the mean is 50 and standard deviation is 2. Calculate its standard score. 1

(A) 4 (B) 1 (C) 2 (D) 3

16. Calculate the present value of Rs 3000 due in two years at a 10% annual discount rate. Round to two decimal places. 1

(A) 2481.34 (B) 2479.34 (C) 2480.34 (D) 2478.34

17. Calculate the central three-period moving average for observations 12, 16, 20. 1

(A) 16 (B) 18 (C) 17 (D) 15

18. Maximise Z = x + y with x >= 0, y >= 0 and x + y <= 12. State the maximum value. 1

(A) 12 (B) 11 (C) 13 (D) 14

19. Calculate the determinant of [[5,1],[1,6]]. 1

(A) 31 (B) 28 (C) 29 (D) 30

20. For $f(x) = 4x^3$, calculate f'(2). 1

(A) 49 (B) 47 (C) 48 (D) 50

Section B - Short responses

21. Determine the value of the integral from 0 to 1 of $12x^2$ dx. 2

22. For cost $C(x) = x^2 + 6x + 100$, find marginal cost C'(5). 2

23. A binomial random variable has n = 7 and p = 0.2. Calculate its mean. 2

24. An observation is 56, the mean is 50 and standard deviation is 3. Calculate its standard score. 2

25. Calculate the present value of Rs 4000 due in two years at a 10% annual discount rate. Round to two decimal places. 2

Section C - Short responses

26. Calculate the central three-period moving average for observations 13, 17, 21. 3

27. Maximise Z = x + y with x >= 0, y >= 0 and x + y <= 13. State the maximum value. 3

28. Calculate the determinant of [[6,1],[1,7]]. 3

29. For $f(x) = 5x^3$, calculate f'(2). 3

30. Determine the value of the integral from 0 to 1 of $15x^2$ dx. 3

31. For cost $C(x) = x^2 + 8x + 100$, find marginal cost C'(5). 3

Section D - Extended responses

32. Let X have binomial distribution with n = 5 and p = 0.2. Calculate its mean, variance, P(X = 0) and P(X >= 1). State the independence assumption. **5**

33. Calculate the present value of Rs 1,000 due after one year and Rs 1,000 due after two years, using annual discount rate 10%. Compare this with paying Rs 1,800 immediately. **5**

34. Annual sales for Years 1-5 are 10, 14, 18, 16 and 22 thousand units. Calculate three-year moving averages and identify the years at which they are centred. **5**

35. Maximise Z = 3x + 4y subject to 2x + y <= 8, x + 2y <= 8, x >= 0 and y >= 0. List the feasible corner points and the maximum value. **5**

Section E - Case and application questions

36. A workshop models cost by $C(x) = x^2 - 4x + 20$, for x >= 0 in suitable units.

(a) Find C(0). **1**

(b) Find marginal cost C'(x). **1**

(c) Determine the value of x giving the minimum cost and justify it. **2**

37. A unit makes two products. The resource-use matrix is A = [[2,1],[1,3]], and production is X = [[4],[2]].

(a) State the order of AX. **1**

(b) Find its first entry. **1**

(c) Find its second entry and interpret the two results as resource requirements. **2**

38. A factory gets 60 percent of items from A and 40 percent from B. Defect rates are 2 percent for A and 5 percent for B.

(a) Find P(A and defective). **1**

(b) Find the probability an item is defective. **1**

(c) Given an item is defective, find the probability it came from B. **2**

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