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Tamilnadu Board

Mid-Term Exam Question Paper

2024



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First Mid-Term Test - 2024

Time : 1.30 Hrs. **MATHEMATICS** Marks : 50

PART - I

Answer all the question. Choose the correct one **4 x 1 = 4**

1. If the ordered pairs (a + 2, 4) and (5, 2a + b) are equal then (a, b) is
   a) (2, –2) b) (5, 1) c) (2, 3) d) (3, –2)
2. The range of the relation R = { (x, x2)}x is a prime number less than 13} is
   a) {2, 3, 5, 7} b) {2, 3, 5, 7, 11} c) {4, 9, 25, 49, 121}
   d) {1, 4, 9, 25, 49, 212}
3. The value of $(1^3 + 2^3 + 3^3 + ... + 15^3) - (1 + 2 + 3 + ... + 15)$ is
   a) 14400 b) 14200 c) 14280 d) 14520
4. $2\sqrt{2}, 4, 4\sqrt{2}$ .... 4th term in this geometric progression is
   a) 16 b) 8 c) $8\sqrt{2}$ d) $16\sqrt{2}$

PART - II

Answer any five of the following questions.
11th question is compulsory one **5 x 2 = 10**

5. A Relation R is given by the set { (x, y) / y = x + 3, x ∈ { 0, 1, 2, 3, 4, 5}. Determine its domain and range.
6. Let A = {1, 2, 3} and B = { x | x is a prime number less than 10}. Find A x B and B x A.
7. A man starts his journey from Chennai to Delhi by train. He starts at 22.30 hours on Wednesday. It it takes 32 hours of travelling time and assuming that the train is not late, when will he reach Delhi?
8. Find the 19th term of an A.P. –11, –15, –19, ...
9. Find the sum $3 + 1 + \frac{1}{3} + ...\infty$
10. If $1^3 + 2^3 + 3^3 + ... + k^3 = 44100$ then find 1 + 2 + 3 + ... + k.
11. If X = {–5, 1, 3, 4} and Y = {a, b, c}, then which of the following relations are functions from X to Y ?
    i) R_1 = { (–5, a), (1, a), (3, b)} ii) R_2 = { (–5, b), (1, b), (3, a), (4, c)}

PART - III

Answer any four of the following questions. 17th Question is compulsory one. **4 x 5 = 20**

12. Let A = {x ∈ N | 1 < x < 4), B = {x ∈ W | 0 ≤ x < 2} and C = {x ∈ N | x < 3}.

Then verify that A x (BUC) = (A x B) U (A x C)

13. If $f(x) = x^2$, $g(x) = 3x$ and $h(x) = x - 2$, Prove that (fog)oh = fo(goh)
14. The sum of three consecutive terms that are in A.P is 27 and their product is 288. Find the three terms.
15. Find the sum of $9^3 + 10^3 + ...+21^3$.
16. Find the HCF of 396, 504, 636.
17. A function f : {–5, 9} → R is defined as follows :

$$f(x) = \begin{cases} 6x+1 \; ; -5 \le x < 2 \\ 5x^2 - 1; \; 2 \le x < 6 \\ 3x - 4 \; ; \; 6 \le x \le 9 \end{cases} \quad \text{find} \quad \frac{2f(-2) - f(6)}{f(4) + f(-2)}$$

PART - IV

Answer all the question **2 x 8 = 16**

18. Construct a triangle similar to a given triangle LMN with its sides equal to $\frac{4}{5}$ of the corresponding sides of the triangle LMN (scale factor $\frac{4}{5} < 1$).

(OR)

Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{3}$ of the corresponding sides of the triangle PQR

(scale factor $\frac{7}{3} > 1$).

19. The following table shows the data about the number of pipes and the time taken to fill the same tank.

No. of pipes (x)	2	3	6	9
Time taken (in min) (y)	45	30	15	10

Draw the graph for the above data and hence
i) find the time taken to fill the tank when five pipes are used
ii) Find the number of pipes when the time is 9 minutes.

(OR)

Graph the following linear function $y = \frac{1}{2}x$. Identify the constant of variation and verify it with the graph. Also (i) find y when x = 9
(ii) find x when y = 7.5.

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