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OEMT212

Reg. No.

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II Semester ALL UG Courses Degree Examination, September - 2023

MATHEMATICS
Commercial Mathematics
Paper : Open Elective
(NEP Scheme)



Time : 2½ Hours

Maximum Marks : 60

Instructions to Candidates:

Answer ALL questions.

I Answer any FIVE questions.

(5×3=15)

1. Define
 - i. Subset.
 - ii. Power set. Give an example for each.
2. If $A = \{3, 6, 9\}$ find $P(A)$.
3. If $A = \{a, b\}$, $B = \{b, c\}$, $C = \{c, d\}$, then find $(A \times B) \cup (A \times C)$.
4. Compute
 - i. $\frac{9!}{6!}$.
 - ii. $\frac{14!}{12! 2!}$.
5. Out of 12 boys and 6 girls, how many groups can be formed each containing 6 boys and 2 girls.
6. Define the occurrence of an event with example.
7. How to convert fraction into percentage? Solve (i) $\frac{3}{7}$ (ii) $\frac{6}{11}$.
8. If 'x' gets a salary of 15,000 rupees, 'y' gets a salary of 5000 rupees. Find the ratio of salaries.
9. Two numbers are in the ratio 3:5. If 5 is added to each, they are in the ratio 22:35 find the numbers.

[P.T.O.]

**II. Answer any THREE questions.**

1. In a class of 50 students, 15 do not participate in any games, 25 play cricket and 20 play foot ball. Find the number of students who play both. Show the results through Venn diagram.
2. If $A = \{x, y, z\}$, $B = \{w\}$, $C = \{u\}$, then verify $A \times (B - C) = (A \times B) - (A \times C)$.
3. A relation R is defined on the set of integers by $R = \{(x, y) / x - y \text{ is a multiple of a non-zero integer } 5\}$. Show that R is an equivalence relation on Z .
4. Find the range of the function
 - i. $f(x) = x^2 + 6, x > 0$
 - ii. $f(x) = 3x + 2, x > 0$.
5. If $f(x) = 2x + 1$ and $g(x) = x^2 + 2$. Find (i) $\text{fog}(x)$ (ii) $\text{gof}(x)$.

III. Answer any THREE questions.

(3×5=15)

1. A bag contains 3 white, 4 red and 2 green balls, one ball is selected at a random from a bag. Find the probability.
2. How many numbers lying between 100 and 1000 can be formed with the digits 0, 1, 2, 3, 4, 5, if the repetition of the digits is not allowed.
3. In a B.Com course there are 4 optional papers, out of which a student is entitled to opt for any number of papers not exceeding 3. Find the number of ways in which a student can choose his optional papers.
4. The probability that india wins a cricket match is 0.52. If India plays three matches, find the probability that it wins. (i) atleast one match (ii) all the three matches.
5. Let A and B be two events with respective probabilities $P(A)$ and $P(B)$. Then prove that the probability of occurrence of atleast one of these two events is $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

IV. Answer any THREE questions.

(3×5=15)

1. An articles is sold at a gain of 25% on cost price. Find the ratio of selling price to cost price.
 2. Define (i) duplicate ratio (ii) Triplicate ratio (iii) Find the duplicate and triplicate ratio of the following (i) 2:3.
 3. If $x : y = 2 : 3$ find $\frac{2x^2 + 5y^2}{x^2 + y^2}$.
 4. The ratio between two numbers is 3:5. If each number is increased by 4, the ratio becomes 2:3. Find the numbers.
 5. Three numbers are in the ratio 2:3:4. If the sum of the squares is 1856. Find the numbers.
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