

Goa Vidyaprasarak Mandal's
GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND
ECONOMICS PONDA GOA
B.COM. (SEMESTER-I) SUPPLEMENTARY
EXAMINATION, (Old Course), MAY/JUNE 2018
MATHEMATICAL TECHNIQUES

Duration: 2 hours

Marks: 80

- Instructions:** 1. Attempt all questions.
2. Figures to the right indicate full marks.

Q.1 Attempt the following:

(5 x 4 = 20)

- Construct the truth table for $(p \wedge q) \wedge \sim (p \vee q)$.
- If ${}^n P_5 : {}^n P_6$, find n.
- Ashok keeps aside ₹ 500 in the first month and increases his savings by ₹ 50 in every subsequent month. What will be his total savings at the end of 2 years?
- If $A = \begin{bmatrix} 2 & 1 \\ 4 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 5 \\ 3 & 2 \end{bmatrix}$, find the matrix X such that $2A + 5B - X = 0$.
- A sum of ₹ 68244 was divided among A, B and C in the ratio 3:4:5. Find the share of each.

OR

Q.I Attempt the following:

(5 x 4 = 20)

- Using truth table verify that $\sim (p \vee q) = (\sim p) \wedge (\sim q)$.
- A 4 digit number is to be formed using the digits from from 0 to 5. How many such numbers can be formed if the repetition of digits in the number is allowed.
- If for an A.P. $t_{10}=16$, find S_{19} .
- If $A = \begin{bmatrix} 1 & -2 \\ 2 & 0 \end{bmatrix}$ and $N = \begin{bmatrix} 2 & 0 \\ 2 & 1 \end{bmatrix}$, find the matrix $3A + 5B$.
- Divide the amount of ₹ 29520 among A, B, C in the ratio 3:2:1.

Q.2 Attempt the following:

(5 x 4 = 20)

- a) The sets $A = \{2, 4, 7, 9\}$, $B = \{1, 3, 5, 7\}$ and $C = \{2, 3, 4, 5\}$.
Verify that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.
- b) If ${}^{18}C_r = {}^{18}C_{r+2}$, find the value of r .
- c) Using Cramer's Rule solve the following equations
 $3x - 5y = 4$ and $x + 4y = 2$.
- d) For an A.P. 100, 95, 90, ..., when will its term be equal to 10?
- e) 75 men can finish a piece of work in 48 days. How many more men should be engage to complete the work in 30 days.

OR

Q.II Attempt the following:

(5 x 4 = 20)

- p) Use Venn diagram to show that for any sets A and B, $A \cup B = A \cup (B - A)$.
- q) A committee of 4 members is to be formed out of 5 men and 3 women. In how many ways committee can be formed to have at least 2 men?
- r) Using Cramer's rule, solve the following equations.
 $2x + 3y = 10$, $4x - 5y = 12$.
- s) The third term of a G.P. is 12 and the sixth term is 96, find its first term and the common ratio.
- t) If the price of 10 pens is ₹ 800. How many pens can be bought for ₹ 2400.

Q 3. Attempt the following:

(5 x 4 = 20)

- a) Check whether the following statement is tautology or contradiction.
 $(p \wedge q) \rightarrow (p \vee q)$
- b) If ${}^nC_r = 120$ and ${}^nP_r = 720$, find the value of n .
- c) If $A = \begin{bmatrix} 4 & 1 \\ 3 & 2 \end{bmatrix}$. Find the matrix $A^2 + 2A$.
- d) Find the sum $5 + 55 + 555 + \dots$ upto n terms.

Pg 3 of 4

- e) Neema scores 432 marks and is failed by 23 marks. If 35% marks are required to qualify an examination, find the maximum marks in the examination.

OR

Q III. Attempt the following:

(5 x 4 = 20)

- p) Prove that $(p \wedge q) \wedge \sim (p \vee q)$ is a contradiction.
- q) A class have 7 boys and 8 girls. If 5 students out of these are to be selected, find the total number of choices if 1) there are 3 boys and 2 girls 2) 1 boy and 4 girls are to be selected.
- r) Find x if
$$\begin{vmatrix} x & 2 & 1 \\ 3 & 0 & 1 \\ 4 & -5 & 2 \end{vmatrix} = 0$$
- s) A sum of ₹ 72800 is to be paid in 6 monthly instalments, such that each instalment is three times the previous instalment. Find the first and the last instalment.
- t) A man donates 6% and spends 80% of his monthly income. If he saves ₹ 1750. Find his monthly income.

Q 4. Attempt the following:

(5 x 4 = 20)

- a) How many words can be formed from letters of the word COMMITTEE, so that it begins with a consonant and end with a vowel.
- b) Find the value of x and y satisfying the matrix equation:
$$\begin{bmatrix} x & 3 & 0 \\ 2 & y & 4 \end{bmatrix} + \begin{bmatrix} 3 & 1 & 2 \\ 4 & 3 & -2 \end{bmatrix} = \begin{bmatrix} 4 & 2 & 2 \\ 6 & 5 & 2 \end{bmatrix}$$
- c) Meena invests ₹ 5,000 in the first month and increases her investment by ₹ 500 in every subsequent month. Calculate her total investment at the end of 3 years.
- d) In a group of 20 adults, there are 8 males and 9 vegetarians. Find by using venn diagram, the number of female non vegetarians, if the group contains 5 male vegetarians.
- e) A candidate get 65% votes in an election and wins by 2745 votes. Find the total number of votes cast.

OR

Q IV Attempt the following:

(5 x 4 = 20)

- p) A committee of 4 is to be formed from 5 professors and 4 students. In how many ways this can be done, if the committee contains
- i) Exactly 4 professors
 - ii) At least 3 professors.
- q) If $A = \begin{bmatrix} 3 & 2 \\ 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 3 & 2 \end{bmatrix}$ find AB and BA .
- r) Find the sum of all the numbers between 100 and 300, which are exactly divisible by 5.
- s) A and B are two subsets such that $n(A \cup B) = 75$, $n(A) = 45$ and $n(A \cap B) = 5$, find $n(B)$.
- t) A person bought a watch for ₹2400 and sold it for ₹ 2760. Calculate the profit and profit percentage.

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