

Goa Vidyaprasarak Mandal's
GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND
ECONOMICS, PONDA GOA
B.COM. (SEMESTER-I) EXAMINATION, OCTOBER 2016
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)

- a) Show that $(p \wedge q) \wedge \sim p$ is a contradiction.
- b) If ${}^n P_4 = 12 {}^n P_2$, find n.
- c) Snehal keeps aside ₹ 600 in the first month and increases her savings by ₹ 60 in every subsequent month. What will be her total savings at the end of 3 years?
- d) If $A = \begin{bmatrix} 2 & -1 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ and I is the unit matrix of order 2 find $A - 2B + I$.
- e) The ratio of the students in B.Com. M.Com. and B.C.A. are in the ratio of 7:5:2. If the numbers of students in M.Com is 280, find the number of students in B.Com and B.C.A.

OR

Q.I Attempt the following:

(5 x 4 = 20)

- p) Construct the truth table for $\sim [\sim p \vee \sim q]$.
- q) A 3 digit number is to be formed using the digits from 0 to 9. How many such numbers can be formed if the repetition of digits in the number is allowed.
- r) For the Arithmetic progression find
 $1 + 5 + 9 + \dots + 37$.
- s) If $M = \begin{bmatrix} 3 & 2 \\ 4 & 0 \end{bmatrix}$ and $N = \begin{bmatrix} 2 & 0 \\ 0 & -1 \end{bmatrix}$, find X such that $M - 2N + X = 0$.
- t) Amar, Akbar and Anthony invests ₹ 1,20,000, ₹ 88,000 and ₹ 72,000 respectively in a business. They earn a profit of ₹ 70,000. Find their share in profit.

Q.2 Attempt the following:

(5 x 4 = 20)

- a) If $A = \{1,2,3,4\}$ and $B = \{3,4,5,6\}$, $C = \{4,5,6,7\}$. Find $A - (B \cap C)$.
- b) If ${}^{18}C_r = {}^{18}C_{r+2}$, find ${}^r C_5$.
- c) Solve $\begin{vmatrix} x & 3 & 2 \\ 3 & 3 & 3 \\ 3 & x & 3 \end{vmatrix} = 0$.

- d) The n^{th} term of a G.P. with $a = 1$ and $r = 2$ is 128. Find n and the corresponding S_n .
- e) 75 men can finish a piece of work in 48 days. How many more men should be engaged 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 5 members is to be formed out of 6 men and 4 women. In how many ways committee can be formed to have at least 4 men?
- r) Using Cramer's rule, solve the following equations.
 $x + 3y = 13$, $4x - 5y = 1$.
- s) Find the 3 numbers in G.P. whose sum is $7/2$ and product is 1.
- t) If the cost of 8 Pen drives is ₹ 1800. How many Pen drives can be bought for ₹ 3825.

Q 3. Attempt the following:

(5 x 4 = 20)

- a) Prove that $(p \wedge q) \rightarrow (p \vee q)$ is a tautology.
- b) If ${}^n C_r = 120$ and ${}^n P_r = 720$, find the value of n and r .
- c) If $A = \begin{bmatrix} 1 & 0 \\ 2 & -3 \end{bmatrix}$. Show that $A^2 + 2A - 3I$ is zero matrix, where I is the identity matrix.
- d) Find the sum $9 + 99 + 999 + \dots$ upto n terms.
- e) 35% marks are required to qualify an examination. Ramesh gets 432 marks and is failed by 23 marks. 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) How many committees can be formed of 5 union members 4 non-union members selected from 10 union members and 8 non-union members?
- r) Find x if $[4 \quad x \quad 1] \begin{bmatrix} 3 \\ -2 \\ x \end{bmatrix} = [8]$
- s) Find three terms in G.P. such that, their product is 1000 and the sum of the second and third number is 30.
- t) A man donates 3% and spends 90% 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 COURTESY? How many of them will begin with C and end with Y?
- b) Find the value of x and y satisfying the matrix equation:
$$\begin{bmatrix} 1 & x & 0 \\ y & 2 & 4 \end{bmatrix} + \begin{bmatrix} 3 & 1 & 2 \\ 4 & 3 & -2 \end{bmatrix} = \begin{bmatrix} 4 & 2 & 2 \\ 6 & 5 & 2 \end{bmatrix}$$
- c) If for an A.P., the sum of first 31 terms is 186, find its T_{16} .
- d) If $A = \{x / x^2 - 5x + 6 = 0\}$,
 $B = \{x / x^2 - 3x + 2 = 0\}$,
 $C = \{x / x^2 - 4x + 3 = 0\}$.
Verify that $A \cap (B - C) = (A \cap B) - (A \cap C)$.

- 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) Out of the letters A,B,C,p,q,r how many arrangement can be made (i) beginning with a capital (ii) beginning and ending with a capital.

q) Find x if
$$\begin{vmatrix} x & 1 & 1 \\ 2 & 3 & 2 \\ -1 & -1 & -3 \end{vmatrix} = 0$$

- r) If the sum of first n terms of an Arithmetic progression with $a = 1$ and $d = 5$ is 286, find n.
- s) Of the total number of 200 students appearing in an examination, 140 passed in mathematics and 100 passed in Statistics. If 40 of them failed in both, find the percentage of students who have passed in both.
- t) Publisher fixes the price of a book 50% above its cost price and allows 15% trade discount and 4% cash discount. Calculate the profit percentage.

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