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Shree Damodar College of Commerce and Economics,Margao-Goa

F.Y.B.Com Semester-I, Semester End Examination, Oct 2017 (Old Course)

MATHEMATICAL TECHNIQUES( )

Duration: 2 hours **Max. Marks:80**

Instructions:

All questions are compulsory (choice is internal).

Start each question on fresh page.

Figures to the right indicate full marks.

Non programmable Calculators are allowed.

Q1 Attempt the following:

a) Prove that, the following pairs of statements are equivalent. 5

$p \rightarrow (q \rightarrow p)$ and $\sim p \rightarrow (p \rightarrow q)$

b) Concerning the first 41 presidents of the United States we know the following facts: 8 held cabinet posts, 14 served as vice-president, 15 served in the U.S. Senate, 2 served in cabinet posts and as vice-president, 4 served in cabinet posts and in the U.S. Senate, 6 served in the U.S. Senate and as vice-president, and 1 served in all three positions. How many presidents served in: 5

a. none of these 3 positions? b. only in the U.S. Senate?

c. at least one of the three position? d. exactly two positions?

c) In a group of 6 boys and 4 girls, four children are to be selected. In how many different ways can they be selected such that at least one boy should be there? 5

d) If the 5th term of an A.P. is 35 and its 9th term is 59.Find first term and common difference. 5

OR

Q1 Attempt the following

w) Find whether following statement is Tautology or Contradiction 5

$[((\sim p) \wedge q) \wedge (q \wedge r)] \wedge (\sim q)$

x) Given U = {1, 2, 3, 4, 5, 6, 7, 8, 9}, A = {2, 4, 6, 8}, B = {1, 3, 4, 5, 7} , 5

C = {7, 8} find:i) A ∩ B ii) B′ iii) A′ ∪ B′ iv) A – B v) (A ∩ C) ∩ (A ∪ B)

y) The Indian Cricket team consists of 16 players. It includes 2 wicket keepers and 5 bowlers. In how many ways can a cricket eleven be selected if we have to select 1 wicket keeper and atleast 4 bowlers? 5

z) Find three numbers in A.P whose sum is 15 and product is 45. 5

Q2 Attempt the following

a) Check the validity of the argument: 5

If it rains, Vivek carries Umbrella.

Vivek did not carry his Umbrella.

Therefore it did not rain.

b) Write all the subsets of set A={x/ x^2-4x+3 =0} 5

c) How many 3-digit numbers can be formed with the digits 1,4,7,8 and 9 if the digits are not repeated. 5

d) In a G.P., the 3rd term is 24 and the 6th term is 192.Find the 10th term. 5

OR

w) Construct the truth table for 5

$$[p \rightarrow (q \rightarrow r)] \leftrightarrow [(p \wedge q) \rightarrow r]$$

x) If A={x/ x^2-4x-5=0} and B={x/x^2 -8x-9=0}, find i) AUB ii) A-B. 5

y) In how many different ways can the letters of the word 'LEADING' be arranged in such a way that the vowels always come together?

z) The sum of first three terms of a G.P. is 13 /12 and their product is – 1. Find the common ratio and the terms. 5

Q3 Attempt the following

a) How many arrangements of the letters of the word 'BENGALI' can be made 5

(i) if the vowels are never together. (ii) if the vowels are to occupy only odd places

b) Find the sum of all natural numbers lying between 100 and 1000, which are multiples of 7. 5

c) If $A=\begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, show that $A^2 = 5A - 7I$, where I is identity matrix. 5

d) In a college, the ratio of the number of boys to girls is 8:5. If there are 200 girls, find the total number of students in the college. 5

OR

w) If C(18,r) = C(18,r+2) find C(r,5). 5

x) Find the sum of 5

$1 + 11 + 111 + 1111 + 11111\ldots$

y) Solve the equation $\begin{vmatrix} x & 2 & 3 \\ 3 & 5 & 8 \\ x+1 & 7 & 12 \end{vmatrix} = 0.$ 5

z) If 6 workers can build 4 cars in 2 days, then how many days would it take 8 workers to build 6 cars? 5

Q4 Attempt the following 5

a) If $A=\begin{bmatrix} 2 & -1 & 3 \\ 1 & 2 & 4 \end{bmatrix}$ and $B=\begin{bmatrix} 5 & 4 \\ 4 & 2 \\ -3 & 1 \end{bmatrix}$, find AB 5

b) A company produces plates and bowls which have to go through two machines.The schedule for the process of the goods in the two machine along with the utilizationof the company,is given in the following table. Also,if the profit on the sale of each plate is Rs. 20 and that on a bowl is Rs. 10,find the expected profit of the company per day. 5

	Plates	Bowls	Time Utilization by the company per day
Machine I	3	4	120
Machine II	1	2	48

5

c) A shopkeeper marks his goods 20% above cost price, but allows 30% discount for cash.Find his net loss.

d) A publisher sells 80 books of Business Mathematics for 6144.If the list price of the book is 96.Calculate the rate of trade discount. 5

OR

Q4 Attempt the following

w) Solve the following equations by using Cramer's rule. 5

$2x + 3y + z = 2\ ; -x + 2y + 3z = -1; -3x - 3y + z = 0$

x) If $A = \begin{bmatrix} 1 & -4 \\ -2 & 3 \end{bmatrix}$; $B = \begin{bmatrix} -1 & 6 \\ 3 & -2 \end{bmatrix}$ $C = \begin{bmatrix} 4 & -5 \\ 2 & 1 \end{bmatrix}$ 5

Verify $A\ (B + C) = AB + AC$.

y) In examination 53% students passed in English and 43% passed in Hindi. If 18% students pass in English and Hindi both, find the percentage of students failed in both the subjects. 5

z) A merchant who marked his goods up by 50% subsequently offered a discount of 20% on the marked price. What is the percentage profit that the merchant make after offering the discount? 5