

Vidya Vikas Mandal's  
Shree Damodar College of Commerce & Economics  
FYBCOM, Semester I, Semester End Examination-October, 2018  
Mathematical Techniques-I(old course)

Time: 2 hours

Maximum Marks: 80

**INSTRUCTIONS:**

1. All questions are compulsory (internal choice is provided).
2. Figures to the right indicate full marks.
3. Non Programmable Calculator are allowed.

**Q.1 Attempt the following:**

[4X5]

- (a) Check whether the statement is contradiction :  $\sim p \vee (p \wedge q)$ .
- (b) In a class of 60 students. 25 students play cricket and 20 students plays tennis and 10 students play both the games. Find the number of students who play neither.
- (c) In how many ways can be letters of the word STATISTICS be arranged?
- (d) Find an A.P. whose  $10^{th}$  term is 5 and  $18^{th}$  term is 77.

OR

**Q.I Attempt the following:**

[4X5]

- (w) Construct the truth table for  $[p \wedge (p \implies q)] \implies q$ .
- (x) Write the power set of  $A = \{1,2,3\}$ .
- (y) In how many ways a committee of 5 members can be selected from 6 men and 5 women?
- (z) The third term of a geometric progression is 12 and the sixth term is 96. Find the first term and the common ratio of the progression.

**Q.2 Attempt the following:**

[4X5]

- (a) Test the validity of the following argument:  
The poem is readable if and only if the print is clear. The print is not clear therefore the poem is not readable.
- (b) If  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ ,  $A = \{2, 4, 6, 8\}$ ,  $B = \{2, 3, 5, 7\}$ . Find (i)  $A \cup B$ , (ii)  $A^c$ .
- (c) For a G.P. 3,6,12,24,... find  $S_8$ .
- (d) If  ${}^n C_8 = {}^n C_2$ , find  ${}^n C_5$ .

OR

Q.II Attempt the following:

[4X5]

- (w) Construct the truth table for the following statements:  $(p \wedge q) \implies p$ .
- (x) If  $U = \{1, 2, 3, 4, 5, 6\}$  be the universal set,  $A \cup B = \{2, 3, 4, 5, 6\}$ . Find  $A' \cap B'$ . Also if  $A - B = \{2, 3\}$ , find B.
- (y) How many four digit numbers can be formed with the digits 1, 2, 3, 4, 5?
- (z) Find the value of  ${}^{12}P_8$ .

Q.3 Attempt the following:

[4X5]

- (a) In how many different ways one can arrange the letters of the word "COMPUTE"?
- (b) Ashok invests ₹600 in the first month and increase his monthly investment by ₹50 in every succeeding month. What will be his total investment at the end of 1 year?
- (c) Find the inverse of the matrix  $A = \begin{bmatrix} 2 & 5 \\ 6 & 2 \end{bmatrix}$ .
- (d) Ajay purchased a book for ₹1250 and sold it for ₹1100. Find his loss percent.

OR

Q.III Attempt the following:

[4X5]

- (w) A man has 6 friends. In how many ways can he invite two of them at dinner?
- (x) Shyam invested ₹20 in the first month and then doubles, his investment every month for 11 months. Find his last investment and the total investment over 11 months.
- (y) Find the value of  $x$  if  $\begin{vmatrix} 2x & 5 \\ 7 & 3 \end{vmatrix} = 1$
- (z) The ages of A and B are in the ratio 9:4. Seven years hence, the ratio of their ages will be 5:3. Find their ages.

Q.4 Attempt the following:

[4X5]

- (a) If  $A = \begin{bmatrix} 5 & 2 \\ 3 & 4 \end{bmatrix}$  and  $B = \begin{bmatrix} 3 & 6 \\ 0 & 4 \end{bmatrix}$ , find  $3A + 3B$ , where I is identity matrix.
- (b) Solve using determinants  
 $4x - 3y = 17$ ;  $5x + y = 7$ .
- (c) The listed price of an article is ₹9600. If a discount of 8% is allowed to the buyer, how much will the buyer pay?
- (d) A man buys 11 apples for ₹10 each and sells 10 apples for ₹11 each. What is his gain percent?

OR

Q.IV Attempt the following:

[4X5]

(w) If  $A = \begin{bmatrix} 1 & -1 \\ a & b \end{bmatrix}$  and  $A^2 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ , find the value of  $a$  and  $b$ .

(x) If  $A = \begin{bmatrix} 1 & -1 \\ 2 & 1 \end{bmatrix}$ ,  $B = \begin{bmatrix} -1 & 6 \\ 2 & 3 \end{bmatrix}$ ,  $C = \begin{bmatrix} 1 & -1 \\ 5 & 2 \end{bmatrix}$ . Verify  $A(B + C) = AB + AC$ .

(y) If 32 is added to 80% of a number, the result is the number itself. Find the number.

(z) A person bought a book for ₹360. For what price should he sell it to gain 15%?

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