

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 ${}^nC_8 = {}^nC_2$, find nC_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%?
