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Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (IT / Graphics & Web Designing) / BCA (Sem.-1)

MATHEMATICS

Subject Code : UGCA-1901

M.Code : 76961

Date of Examination : 10-01-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY** consisting of TEN questions carrying TWO marks each.
2. **SECTION-B contains SIX questions** carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Write briefly :

- a) Define Power Set with an illustration.
- b) What are tautologies, contradiction and contingent statements in algebra of logic?
- c) Define Conjunction, Disjunction, Conditional Operator and Bi-Conditional Operator.
- d) Define Addition and Multiplication of matrices with an example.
- e) Which term in the A.P. 5, 2, -1, is - 22?
- f) If $1/b+c$, $1/c+a$, $1/a+b$ are in A.P. then prove that a^2 , b^2 , c^2 are in A.P.
- g) In a G.P., the third term is 24 and sixth term is 192. Find the tenth term.
- h) If A, B are any sets, then $A \cap B = B$ if $B \subset A$.
- i) State De-Morgan's Law for difference of sets.
- j) Define tautology with an example.

SECTION-B

2. a) For given $A = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 4 \\ -1 & 1 \end{bmatrix}$. Is the following statement true or false $(A + B)^2 = A^2 + B^2 + 2AB$.
- b) Find the values of x, y, z and w for given $3 \begin{bmatrix} x & y \\ z & w \end{bmatrix} = \begin{bmatrix} x & 6 \\ -1 & 2w \end{bmatrix} + \begin{bmatrix} 4 & x+y \\ z+w & 3 \end{bmatrix}$.
3. a) Out of 400 boys of a school, 112 played cricket, 120 played hockey and 168 played football of these 32 played both football and hockey, 40 played cricket and football, 20 played cricket and hockey, 12 played all the three games. How many boys did not play any game and how many play only one game?
- b) State and Prove De-Morgan's law of sets.
4. a) Find the value of a_7 from the recurrence relation with $a_n = 2a_{(n-1)} + 3$ with $a_0 = 6$
- b) If a, b, c are in A.P. and b, c, d are in G.P. and $1/c, 1/d, 1/e$ are in A.P. Prove that a, c, e are in G.P.
5. a) If $A = \begin{pmatrix} 2 \\ -4 \\ 5 \end{pmatrix}$ and $B = (6 \ 3 \ -1)$ then verify that $(AB)' = B'A'$
- b) If $A = \begin{pmatrix} 3 & 2 & 5 \\ 4 & 1 & 3 \\ 0 & 6 & 7 \end{pmatrix}$ Express A as the sum of two matrices such that one is symmetric and other is skew – symmetric.
6. a) If $A = \begin{pmatrix} 1 & 3 & 2 \\ 0 & 5 & 7 \\ 6 & 4 & 8 \end{pmatrix}$ find the value of $A^2 + 7A + 3I$ here I denotes identity matrix.
- b) Prove that it is $A \subset B$ if and only if $B^c \subset A^c$ where c denotes complement of set.
7. a) Prove that $(p \wedge q) \wedge \sim (p \vee q)$ is a fallacy.
- b) Check the validity of the argument :

If I work, I cannot study. Either I work or pass mathematics. I passed mathematics. Therefore, I study.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.