Seat No.	

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Kamala College, Kolhapur

(Autonomous)

B.C.A. (Part-I) (Semester-II) (CBCS)

Examination March/April, held in May, 2023.

AEC-312 -Mathematical Foundation for Computer Applications

Day and Date:Friday,02/06/2023 **Total Marks: 80**

Time: 08.00 a.m. to 11.00 a.m.

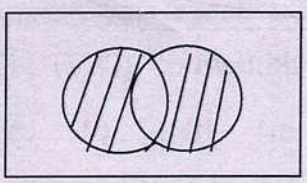
Instructions:

1. **Que 1 and Que 8 are compulsory.**
2. **Attempt any three questions from Que. 2 to Que. 7.**
3. **Figures to the right indicate full marks.**

Que-1) Select the correct alternative amd rewrite the statement **[12]**

1) The shaded region in the diagram is _____

a) (A – B) U (B – A)
b) (A – B) ∩ (B – A)
c) A U (B – A)
d) (A – B) U B



2) Which of the following is a statement in logic?

a) Where are you ? b) May god bless you

c) Mumbai is te capital of India d) I am lying

3) If A is a skew symmetric matrix of order 3 x3 then the diagonal element are

a) one b) equal c) zero d) none of these

1) The number of vertices in km,n is ____

a) m+n b) m^2+n^2 c) mn d) m-n

5) If A and B are two sets such that n (A) =70,n (B)=60,n (AUB)=110 Then n (A ∩ B) is equal to _____

a) 240 b) 50 c) 40 d) 20

6) The dual of " Jaipur is in Rajasthan or Surat is in Gujrat

a) Jaipur is not in Rajasthan or surat is not in Gujrat

b) Jaipur is not in Rajasthan and surat is not in Gujrat

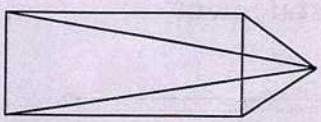
c) Jaipur is in Rajasthan and surat is in Gujrat

d) Jaipur is in Rajasthan or surat is in Gujrat

7) If $A=\begin{bmatrix} -1 & 2 \\ 3 & 1 \\ 0 & 4 \end{bmatrix}$ then A^T = -------

a) $\begin{bmatrix} 2 & -1 \\ 1 & 3 \\ 4 & 0 \end{bmatrix}$ b) $\begin{bmatrix} 3 & 1 \\ -1 & 2 \\ 0 & 4 \end{bmatrix}$ c) $\begin{bmatrix} 2 & 1 & 4 \\ -1 & 3 & 0 \end{bmatrix}$ d) $\begin{bmatrix} -1 & 3 & 0 \\ 2 & 1 & 4 \end{bmatrix}$

8) The number of edges in the following graph is,



a) 4 b) 5

c) 8 d) 10

9) The domain of {(1,7) , (2,6) } is _____

a) (1 , 6) b) (7 , 6) c) (1 , 2) d) (6 , 7)

10) Which of the following is not true ?

a) $P \vee F \equiv P$ b) $P \vee T \equiv P$

c) $P \wedge F \equiv F$ d) $P \wedge T \equiv P$

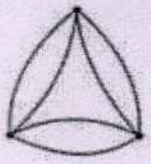
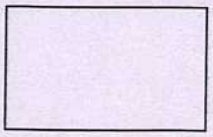
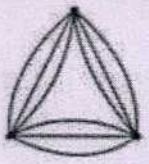
11) If $\begin{bmatrix} 2a & 6 \\ 3 & 8 \end{bmatrix} = \begin{bmatrix} 4 & 6 \\ 3 & a+2b \end{bmatrix}$

Then the values of a and b are_____

a) a = 2 b = 2 b) a = 2 b = 3

c) a = 4 b = 2 d) a = 3 b = 3

12) Which of the following is 4- regular graph on 3- vertices

a)  b)  c)  d) 

Q2) [8+8]

a) Define De – Morgans Laws. And Solve ,

From amongst 2000 literate individuals of a town 70% read Marathi newspaper ,50% read English newspaper and 32.5% read both Marathi and English newspaper .find the number of individuals who read

i) At least one of the newspaper
ii) Neither Marathi nor English newspaper
iii) only one of the newspapper

b) Let $A = \{1,2,3,4\}$ $B = \{4,5,6\}$ $C = \{5,6\}$
Find i) $A \times (B \cap C)$ ii) $(A \times B) \cap (A \times C)$
iii) $A \times (B \cup C)$ iv) $(A \times B) \cup (A \times C)$

Que-3) [8+8]

a) Define a statement and write Converse,Inverse,Contrapositive of the following-

" If you are good in logic ,then you are.good in Mathematics"

b) Define the term disjunction and using truth table
prove the following logical equivalence
$(P \leftrightarrow q) \equiv (P \wedge q) \vee (\sim P \wedge \sim q)$ Que-4) a) Define singular and non singular matrix with example
Also find x and y if

$$\{ 4 \times \begin{bmatrix} 2 & -1 & 3 \\ 1 & 0 & 2 \end{bmatrix} - \begin{bmatrix} 3 & -3 & 4 \\ 2 & 1 & 1 \end{bmatrix} \} \begin{bmatrix} 2 \\ -1 \\ 1 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$$

b) Define the term matrix with example

if $A = \begin{bmatrix} 7 & 3 & 0 \\ 0 & 4 & -2 \end{bmatrix}$, $B = \begin{bmatrix} 0 & -2 & 3 \\ 2 & 1 & -4 \end{bmatrix}$

Then find i) $A^T + 4B^T$ ii) $5A^T + 5B^T$

Que-5) [8+8]

a) Explain the degree of a vertex of undirected graph with example also explain Even ,Odd , Isolated and pendant vertices

b) Describe the terms walk , path and cycle with an example

also explain the union of two graphs [8 +8]

Que-6) a) What is a string

Let u = {1, 2 , 3 , 4 , 5 , 6 , 7 , 8 , 9 ,10 }

What bit string represents the subset

i) All odd integers in U ii) All even integers in U

iii) subset of U not exceeding 5

b) Define the terms - simple graph,Multigraph,complete graph and Bipartite graph with examples [8+8]

Que-7) a) Using truth table,examine whether the following statement patterns are tautology,contradication or contingency.

i) $(P \wedge q) \rightarrow (q \vee P)$, ii) $(P \wedge \sim q) \leftrightarrow (P \rightarrow q)$

b) Explain elementary raw transformation and hence find the Inverse of the matrix $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ by elementary row transformation [8+8]

Que-8) Write notes on any four of the following [20]

1) Define 'SET'. Write methods of describing a set

2) Valid and Invalid argument

3) Indentity matrix,skew-smmetric matrix,determinant of a matrix of order 2

4) Complement of a Graph

5) Conjuction,implication and negation.

6) Adjacency and Incidence matrix.

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