

MASTER OF COMPUTER APPLICATION  
FIRST SEMESTER (SPECIAL REPEAT)  
MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE  
MCA-103

SET  
A

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs.

Full Marks: 70

(Objective)

Time: 30 mins.

Marks: 20

Choose the correct answer from the following:

1 × 20 = 20

- The matrix  $A$  is singular if:
  - $|A| \neq 0$
  - $|A| > 0$
  - $|A| < 0$
  - $|A| = 0$
- If  $A = \{1,2,3\}$ ,  $B = \{1,2,3\}$  then  $A - B$  is:
  - 0
  - $\Phi$
  - Both a and b
  - None
- $A - B =$ 
  - $A \cap B^c$
  - $A^c \cap B$
  - Both a and b
  - None
- If  $A = \{1,2,3\}$  which of the following is not a subset of  $A$ ?
  - $\{1\}$
  - $\{\{1\}\}$
  - $\Phi$
  - $\{3,2\}$
- $f(x) = \frac{1}{x}$  then Range of the function is:
  - $\infty$
  - 0
  - Undefined
  - None
- $(A')$ 
  - $A$
  - $A''$
  - $\infty$
  - None
- Two sets are said to be equivalent if they contain:
  - Equal number of elements
  - Same elements
  - Both a and b
  - None
- If  ${}^n C_x = {}^n C_y$  then:
  - $x = y$
  - $x + y = n$
  - Both a and b
  - None

9. Tautology means:
- All the truth values are True
  - All the truth values are False
  - Both a and b
  - None
10. Which of the following is not an example of set?
- Set of vowels
  - Set of animals
  - Set of flowers
  - Set of beautiful girls
11. The product of two matrix A and B, AB exists:
- If the number of columns in A is equal to the number of rows in B
  - If the number of columns in B is equal to the number of rows in A
  - If the number of columns in A is not equal to the number of rows in B
  - If the number of columns in B is not equal to the number of rows in A
12.  ${}^{27}C_0 =$
- 1
  - 0
  - 27
  - None
13.  $A = \begin{bmatrix} 2 & 0 \\ 2 & 2 \end{bmatrix}$  is a:
- Scalar matrix
  - Diagonal matrix
  - Unit matrix
  - None
14. If  $A = \begin{bmatrix} 2 & -3 \\ 5 & 4 \end{bmatrix}$  and  $B = \begin{bmatrix} 7 & -3 \\ 9 & 1 \end{bmatrix}$ , then  $A + B = ?$
- $A + B = \begin{bmatrix} -9 & 0 \\ 14 & 5 \end{bmatrix}$
  - $A + B = \begin{bmatrix} 9 & 0 \\ 14 & 5 \end{bmatrix}$
  - $A + B = \begin{bmatrix} 9 & 0 \\ 1 & 5 \end{bmatrix}$
  - $A + B = \begin{bmatrix} 9 & 0 \\ 14 & -5 \end{bmatrix}$
15. Two statements are logically equivalent if their truth values are:
- True
  - False
  - Same
  - All of the above
16. If  $f(x) = \frac{\sqrt{x+1}}{\sqrt{x+2}}$  the domain is:
- 0
  - 1
  - Undefined
  - None
17. A matrix A is invertible if:
- $|A| = 0$
  - $|A| \neq 0$
  - A is singular
  - None



4. a) Show that  $(AB)^{-1} = B^{-1}A^{-1}$  if  $A = \begin{pmatrix} 3 & 6 \\ -2 & 5 \end{pmatrix}$  5+5=10

b) Test whether  $(p \rightarrow q) \vee (r \rightarrow \sim r)$  is a tautology or contradiction.

5. a) If  ${}^{18}C_r = {}^{18}C_{r+2}$  find the value of  ${}^rC_5$ . 5+5=10

b) Find range and domain of the function  $f(x) = \frac{x-3}{x+5}$

6. a. If  $f(x) = x^2 + 2x$ ,  $A = \begin{bmatrix} 1 & 2 \\ 4 & -3 \end{bmatrix}$ , find  $f(A)$  5+5=10

b. Show that  $\sim p \vee \sim q$  and  $\sim (p \wedge q)$  are logically equivalent.

7. a) Prove that, 5+5=10

(i)  $(A \cap B)^c = A^c \cup B^c$

(ii)  $(A \cup B)^c = A^c \cap B^c$

b) If  $A = \begin{bmatrix} -1 & 2 \\ 2 & 3 \end{bmatrix}$  find  $Adj A$  hence find  $A^{-1}$

8. a) What do you mean by Adjoint and inverse of a matrix? 5+5=10

b) If  $A = \begin{bmatrix} -1 & 2 \\ 2 & 3 \end{bmatrix}$  and  $B = \begin{bmatrix} 3 & 0 \\ 1 & 1 \end{bmatrix}$ , Show that:

$$(A+B)^2 \neq A^2 + 2AB + B^2$$

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