MASTER OF COMPUTER APPLICATION
FIRST SEMESTER
FUNDAMENTAL CONCEPTS IN MATHEMATICS
MSM - 711

Duration : 3 hrs. **Full Marks : 70**

(PART-A : Objective)

Time : 20 min. **Marks : 20**

Choose the correct answer from the following: ***1×20=20***

1. The value of log 1 is equal to
   a. 1 b. 0
   c. 3 d. 2

2. The value of $\log_a a$ is equal to
   a. 0 b. 1
   c. -1 d. 2

3. $\log_a m + \log_a n$ is equal to
   a. $\log_a mn$ b. $\log_a m$
   c. $\log_a n$ d. 1

4. $\log_a m - \log_a n$ is equal to
   a. $\log_a mn$ b. $\log_a \frac{m}{n}$
   c. $\log_a n$ d. 1

5. $\log_a m^n$ is equal to
   a. $n \log_a m$ b. $\log_a \frac{m}{n}$
   c. $\log_a n$ d. 1

6. $\log_b m \times \log_a b$ is equal to
   a. $\log_b m$ b. $\log_a m$
   c. 1 d. 0

7. $\log_b a \times \log_a b$ is equal to
   a. 1 b. 0
   c. -1 d. 2

8. $\frac{\log_b m}{\log_b a}$ is equal to
   a. $\log_a m$ b. $\log_b m$
   c. 0 d. None of these.

9. The value of $\log_5 625$ is equal to
   a. 3 b. 4
   c. 2 d. 0

10. The value of $(\sqrt{3})^6$ is equal to
   a. 24 b. 36
   c. 27 d. 1

11. The value of $a^m \times a^n$ is equal to
   a. a^{m+n} b. a^{m-n}
   c. 1 d. 0

12. $a^m \div a^n$ is equal to
   a. a^{m+n} b. a^{m-n}
   c. 1 d. 0

13. $(a^m)^n$ is equal to
   a. a^{mn} b. a^{m-n}
   c. 1 d. 0

14. $(ab)^m$ is equal to
   a. $a^m . b^m$ b. ab
   c. 1 d. 0

15. $(\frac{a}{b})^m$ is equal to
   a. $a^m . b^m$ b. $\frac{a^m}{b^m}$
   c. 1 d. 0

16. A matrix whose each and every element is zero is known as
   a. Unit matrix b. Zero matrix
   c. 1 d. None of these.

17. A matrix whose diagonal elements is equal to 1 and non-diagonal elements is equal to zero is known as
   a. Unit matrix b. Zero matrix
   c. 1 d. None of these

18. A matrix whose rows and columns are equal is known as
   a. Unit matrix b. Zero matrix
   c. Square matrix d. None of these.

19. A matrix A_{ij} is known as symmetric matrix if
   a. $A_{ij} = -A_{ji}$ b. $A_{ij} = A_{ji}$
   c. 1 d. None of these.

20. A matrix A_{ij} is known as asymmetric matrix if
   a. $A_{ij} = -A_{ji}$ b. $A_{ij} = A_{ji}$
   c. 1 d. None of these

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Contd...

(PART-B : Descriptive)

Time : 2 hrs. 40 min. **Marks : 50**

[Answer question no.1 & any four (4) from the rest]

1. If $2^x = 3^y = 12^z$, show that xy = z(x+2y). Also, if $a^x = b^y = c^z$, abc =1, then prove that $\frac{1}{x}+\frac{1}{y}+\frac{1}{z} = 0$. 5+5=10

2. If $x = 3 - 3^{\frac{2}{3}} - 3^{\frac{1}{3}}$, then show that $x^3 - 9x^2 + 18x + 12 = 0$. 10

3. Show that $\frac{\left(x^2-\frac{1}{y^2}\right)^x.(x-\frac{1}{y})^{y-x}}{\left(y^2-\frac{1}{x^2}\right)^y(y+\frac{1}{x})^{x-y}} = (\frac{x}{y})^{x+y}$. 10

4. If $a = 10^x, b = 10^y, (a^y b^y) = 100$, prove that xyz=1. 10

5. Simplify $7log\frac{16}{15} + 5log\frac{25}{24} + 3log\frac{81}{80}$. 10

6. If $a^2 + b^2 = 14ab$, then prove that $\log\left\{\frac{1}{4}(a+b)\right\} = \frac{1}{2}(\log a + \log b)$ 10

7. Prove that $\frac{1}{\log_a abc} + \frac{1}{\log_b abc} + \frac{1}{\log_c abc} = 1$. 10

8. Show that the matrix $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ satisfies the following matrix equation $A^2 - 5A + 7I = 0$ 10

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