(5) M2M522 Class : FYBMS
Sem 2 - Regular May 22
Date:- 07/05/22

Roll No:_____ Duration : 1 Hour Jr. Supervisor Sign._____ Sub : B. Mathematics

Q.1 Multiple Choice Question **Marks: 35**

1) The simple interest on Rs.15000 for 8 months at 10 % p.a. is _____.
a) Rs.1000
b) Rs.1500
c) Rs.1050
d) Rs.1005

Ans._____

2) The function f(x) = 4 - 11x is a _____ function.
a) Constant
b) Quadratic
c) Exponential
d) Linear

Ans._____

3) The product of first n natural numbers is denoted by _____.
a) n!
b) n?
c) n%
d) n$

Ans._____

4) If A is a matrix of order m × n , then it contains _____.
a) n rows
b) m rows
c) mn rows
d) m + n rows

Ans._____

5) A system of 3 linear equations in 3 unknowns can be solved using _____.
a) Newton's Rule
b) Cramer's Rule
c) Binomial Rule
d) Graham's Rule

Ans._____

6) A square matrix whose determinant value is zero, is called _____.
a) Non-Singular matrix
b) Null matrix
c) Singular matrix
d) identity matrix

Ans._____

7) The input required by each industry is _____.
a) Labour
b) Consumer
c) Transaction
d) profit

Ans._____

8) The derivative of 17 w.r.t. to x is _____.
a) 1
b) 0
c) 17
d) 17x

Ans._____

9) The differences of successive values of y where y is a function of equally spaced values of x are called _____.
a) Finite differences
b) Forward differences
c) Absolute differences
d) Positive differences

Ans._____

10) A sum of money amounts to Rs.11700 in 3 years and Rs.13500 in 5 years. Hence, simple interest on it for 1 year is _____.

a) Rs.1800
b) Rs.1500
c) Rs.900
d) Rs.1000

Ans._____

11) If f(x) = 74.9, then the value of f(2.7) is _____.

a) 74.9
b) 79.4
c) 74.5
d) 74.3

Ans._____

12) The value of ${}^{n}C_{r}$ is calculated by using the formula _____.

a) n!/(n - r)!
b) n!/(r!(n - r)!)
c) (n - r)!/r!
d) n!/r!(n + r)!

Ans._____

13) If 4, 2, 1, -3 are elements of third row of a matrix A, then matrix A has ____.

a) 4 columns
b) 4 rows
c) 3 rows and 4 columns
d) 4 rows and 4 columns

Ans._____

14) The value of D the determinants of coefficients of x and y in the following equations 4x - 3y = 20 and 2x - 4y = 7 is _____.

a) 5
b) 10
c) -10
d) -5

Ans._____

15) A square matrix whose determinant value is non-zero, is called _____.

a) Non-Singular matrix
b) Null matrix
c) Singular matrix
d) identity matrix

Ans._____

16) The transaction matrix is always a _____.

a) Diagonal matrix
b) Identity matrix
c) Square matrix
d) Null matrix

Ans._____

17) The derivative of $5x^2 + 10x + 7$ w.r.t. x is _____.

a) 5x + 10
b) 10x + 10
c) 5x+ 10x + 7
d) $5x^2 + 10x$

Ans._____

18) The forward differences of y are denoted by the operator _____.

a) Δ
b) δ
c) α
d) Σ

Ans._____

19) If the simple interest on Rs.30000 for 4 years is Rs.9600, the rate of interest p.a. is ____.

a) 0.06
b) 0.1
c) 0.08
d) 0.09

Ans._____

20) For the function f(x) = logx, the base of the logarithm is ____.

a) 10
b) e
c) a
d) 0

Ans._____

21) A Row matrix is of order _____.

a) $1 \times n$
b) $n \times 1$
c) $n \times n$
d) $n + 1$

Ans._____

22) If rows and columns of a determinant are interchanged its value _____.

a) increases
b) decreases
c) remains unchanged
d) changed

Ans._____

23) The inverse matrix of a matrix A can be obtained only when _____.

a) A is a square matrix
b) A is a singular matrix
c) A is non - singular matrix
d) A is zero matrix

Ans._____

24) The Demand matrix is always a _____.

a) Unit matrix
b) Column matrix
c) Square matrix
d) identity matrix

Ans._____

25) The derivative of a function y w.r.t. x measures _____.

a) rate of change of y w.r.t. x
b) change in y
c) change in x
d) rate of change of x w.r.t. y

Ans._____

26) For a function $y = 3x^2 + 7x + 4$, the third order differences are _____.

a) positive
b) negative
c) zero
d) 1

Ans._____

27) If amount of Rs. 50,000 becomes Rs. 65,000 in 3 years, the rate of simple interest must be ____.

a) 0.08
b) 0.1
c) 0.12
d) 0.15

Ans._____

28) For the function $f(x) = x - x^2$, the value of f(-1) is _____.

a) 5
b) 0
c) -2
d) 1

Ans._____

29) A matrix of order $m \times 1$ is called a _____.

a) Row matrix
b) Column matrix
c) Unit matrix
d) Zero matrix

Ans._____

30) If two rows of a determinant are interchanged, its value_____.

a) increases
b) decreases
c) does not change
d) changes its sign

Ans._____

31) Inverse of a square matrix is possible only if its determinant is _____.

a) zero
b) non-zero
c) almost zero
d) one

Ans._____

32) The Input - Output analysis was developed by _____.

a) Leontief
b) Bernouli
c) Newtin
d) Cramers

Ans._____

33) The derivative of 4^x w.r.t. x is _____.

a) 4^x
b) $4^x \log 4$
c) $4^x \log x$
d) $4^x + \log x$

Ans._____

34) While using Newton's Interpolation formula, the values of argument x are ____.

a) equidistant
b) at an interval of 1 unit only
c) not equally placed
d) at an interval of 2 units

Ans._____

35) If a sum of Rs.25,000, becomes Rs.31,000 at 8% simple interest p.a., the number of years is ____.

a) 3 years
b) 4 years
c) 5 years
d) 6 years

Ans._____

M2M522 Class : FYBMS
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Duration: 2 hour & 45 Minutes. **Marks: 75**

Sub : B. Mathematics

Q.1 Multiple Choice Question (Separate Sheet Attached) **35**

Q.2 Attempt any ONE of the following. **10**

A. A principal amounts to Rs.9,680 after 3 years and to Rs.10,800 after 5 years. Find the principal and the rate of simple interest.

B. A company manufactures notebooks. The weekly total cost function is given by $C = 15x + 3000$.

i) If each notebook is sold at Rs.25, what is the minimum quantity that needs to be produced to ensure no loss?

ii) If the selling price of a notebook is increased by 20%, what would be the minimum quantity that needs to be produced and sold to ensure no loss?

iii) If it is known in advance that at least 400 notebooks can be sold per week, find the selling price to ensure the company, no loss.

C. The staff of a department consists of a manager, an officer and 10 clerks. A committee of 4 is to be selected from the department. Find the number of ways in which this can be done so as to always include (i) the manager, (ii) the manager but not the officer (iii) neither the manager nor the officer

Q.3 Attempt any ONE of the following. **10**

A. If $A = \begin{bmatrix} 3 & 1 \\ 0 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & -3 \\ 1 & 2 \end{bmatrix}$ find the matrices

i) $A + 3B$,

ii) $4A - 7B$,

Also show that $(A + 3B)^T = A^T + 3B^T$

B. Solve the equations using Cramer's Rule.

$$\frac{7}{x+2} + \frac{3}{y+1} = 2 ; \frac{14}{x+2} + \frac{9}{y+1} = 5$$

C. If technology matrix $A = \begin{bmatrix} 0.2 & 0.4 \\ 0.3 & 0.7 \end{bmatrix}$ and final demand $D = \begin{bmatrix} 300 \\ 600 \end{bmatrix}$, find total output matrix.

Q.4 Attempt any ONE of the following. **10**

A. Differentiate w.r.t. x the following function

$$\frac{xe^x}{1 + x\,logx}$$

B. Find the values of x for which the function $f(x) = 4x + \frac{1}{4x}, x \neq 0$ is (i) increasing, (ii) decreasing.

C. The cost of manufacturing x items of a product is given by $C = 2x^2 + 3x + 10$. Find the total cost, average cost, marginal cost and the marginal average cost if 10 items are manufactured.

Q.5 Attempt any ONE of the following **10**

A. Construct a difference table for $f(x) = 5x^2$, $x = 0,1,2,3,4$. Hence find f(1.5), f(2.4) using Newton's Forward Difference Formula.

B. Find the fifth term of the sequence 2, 2, 4, 8.

C. Using Newton's backward difference interpolation formula, find the polynomial f(x) for y. hence obtain the value of y at x = 3.5, for the following data.

x	2	3	4
y	24	32	32