

Seat Number: - _____

Signature of Supervisor with Date:- _____

[Duration: - 2 ½ Hours]

BM105BM22

[Marks 75]

Note: -

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Students will be allowed 15 Minutes extra time per hour.

PART A

Q. 1 Multiple Choice Questions

(35 M)

1) In revenue function p is equal to _____

- A) AR B) MR C) MAC D) MAR

2) Derivatives of $100x$ will be _____.

- A) 1 B) 0 C) x D) 100

3) $6C5 =$ _____.

- A) 60 B) 620 C) 6 D) 30

4) $5!/2! =$ _____

- A) 10 B) 20 C) 30 D) 60

5) Harsha opened a recurring deposit in a bank for 4 years with payments of Rs. 5,000, paid at the end of each year. Find the money obtained at the end of the period with 6% p.a.

- A) Rs. 20,000 B) Rs. 21,873 C) Rs. 22,000 D) Rs. 21,200

6) If the payments are to be made as long as a person is alive, it is known as _____

- A) Immediate Annuity B) Life Annuity C) Annuity Certain D) Annuity Due

7) If the annuities are paid at the end of each period, it is known as an _____

- A) Immediate Annuity B) Life Annuity C) Annuity Certain D) Annuity Due

8) Keya Promised to give ketan Rs. 3,66,025 after 4 years. If the rate of interest is 10%, what is its present worth?

- A) Rs. 2,50,000 B) Rs. 3,66,000 C) Rs. 3,00,000 D) Rs. 2,19,600

9) Find the Present Value at 5% rate of interest of Rs. 7,408.80 payable 3 years from now.

- A) 7,400 B) 8,510 C) 6,400 D) 6,290

10) Find the future value of Rs. 30,000 kept in a fixed deposit account, after 6 years at 8% rate of compound interest p.a.

- A) 47,600 B) 30,000 C) 44,400 D) 35,000

11) A sum of Rs. 50,000 accumulated to Rs. 82,000 after 8 years, in a bank. Find the rate of simple interest p.a., which was charged by the bank.

- A) 10% B) 8% C) 5% D) 12%

12) Mr. Shah borrowed Rs. 20,000 from Mr. Patel. After 8 months, he returned the amount, with the simple interest. If the rate was 12% p.a., find the interest he has paid.

- A) 2400 B) 1920 C) 1800 D) 1600

13) In how many years a sum of Rs. 50,000 will amount to Rs. 60,000 at 10% simple interest?

- A) 4 years B) 1.5 years C) 2 years D) 1 year

14) Calculate simple interest on Rs. 20,000 for $3\frac{1}{2}$ years at 6% rate of interest per annum.

- A) Rs. 1200 B) Rs. 3600 C) Rs. 4800 D) Rs. 4200

15) If the elasticity of demand is between 0 and 1, the demand is said to be

- A) Constant B) inelastic C) elastic D) multiple

16) The derivatives of $y = 4x^2 + 4$ is always

- A) 16 B) 20 C) 0 D) $8x$

17) The product of price and demand is known as

- A) Total revenue B) marginal revenue C) average revenue D) marginal average revenue

18) The function $y = 4x + 3$ is always

- A) Increasing B) Decreasing C) constant D) Vertical

- 19) for an increasing function y of x its derivate w.r.t. x is
 A) positive B) negative C) zero D) Vertical
- 20) If elasticity of demand is zero, the demand is said to be
 A) elastic B) inelastic C) cannot say D) Vertical
- 21) The derivative of x^2 w.r.t. x is
 A) $2x$ B) $x^2 \cdot 2^x \log x$ C) $2^x \cdot x^2$ D) $2x \cdot 2^x$
- 22) The derivative of $7e^x$ w.r.t. x is
 A) 7 B) e^x C) $7e^x$ D) 0
- 23) Derivative of 17 w.r.t. x
 A) 1 B) 0 C) 17 D) 170
- 24) The derivative of function y w.r.t. x measures
 A) Rate of changes of y w.r.t. x B) Change in y C) Change in x D) Change in function
- 25) If the total cost is $C = 200 + 2x$ and revenue is $R = 800 + 5x$. Find the point of no profit, no loss.
 A) 10 units B) 20 units C) 40 units D) 15 units
- 26) The two related variables x and y are such that values of y depend on values of x , then x is called _____ variable and y is called _____ variables.
 A) Dependent, Independent B) Independent, Dependent
 C) Dependent, Dependent D) Independent, Independent.
- 27) If A is a matrix of order $m \times n$, then it contains
 (a) n rows (b) m rows (c) mn rows (d) q rows
- 28) A square matrix whose determinant value is zero, is called
 (a) Non-singular matrix (b) Singular matrix (c) Null matrix (d) Row matrix
- 29) A set of simultaneous equations can be solved using
 (a) Cramer's Rule (b) Cromton's Rule (c) Graham's Rule (d) Newton's
- 30) The value of a determinant with two identical rows is
 (a) one (b) zero (c) -1 (d) Two
- 31) If A is a matrix of order 2×3 then transpose matrix of (A) is of order
 (a) 2×3 (b) 3×3 (c) 2×2 (d) 1×1
- 32) A square matrix, having all non-diagonal elements zero and all diagonal elements with value 1 is called
 (a) Scaler matrix (b) Unit matrix (c) Diagonal matrix (d) Square matrix
- 33) A square matrix, having all non-diagonal elements zero and all diagonal elements equal is called
 (a) Scaler matrix (b) Diagonal matrix (c) Unit matrix (d) Square matrix
- 34) A ----- is an arrangement of all or part of a set objects in a definite order.
 (a) Permutation (b) Function (c) Combination (d) Factorial
- 35) The 2×2 matrix, $1, 0, 0, 1$ is called
 (a) Negative matrix (b) Transpose matrix (c) Unit matrix (d) Identity matrix

Answer Sheet for Multiple Choice Questions

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
1		8		15		22		29	
2		9		16		23		30	
3		10		17		24		31	
4		11		18		25		32	
5		12		19		26		33	
6		13		20		27		34	
7		14		21		28		35	

Marks Obtained: - _____

Signature of the Examiner: - _____

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Q.2 - Answer the Following - (Any One out of Three)

(10 M)

- A) What is Interest? Distinguish between simple interest and compound interest.
- B) If rs. 10000 is borrowed on compound interest of 10 % p.a.c.i. for 4 years. Find the amount after 4 years if interest is compounded (i) annually (ii) half yearly (iii) quarterly (iv) monthly.
- C) Mr. Rakesh, took a loan of rs. 2,00,000/- for 4 years at 12% p.a.c.i. compounded monthly. Find the emi using the reducing balance method and fixed interest method.

Q.3 - Answer the Following - (Any One out of Three)

(10 M)

A) IF $A = \begin{pmatrix} 1 & 3 & 7 \\ 4 & 6 & 2 \\ 5 & 4 & 3 \end{pmatrix}$ $B = \begin{pmatrix} 3 & 4 & 5 \\ 6 & 7 & 8 \\ 1 & 2 & 9 \end{pmatrix}$ find AxB .

- B) What are matrices and what are the types of matrices?
- C) Solve the following equations simultaneously using Cramer's rule.
 $3x + 2y + 4z = 2,$ $x - 2y - z = 6,$ $x + 2y - 6z = -2$

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P.T.O

Q.4 - Answer the Following - (Any One out of Three)

(10 M)

A) (i) Find dy/dx of $y = (2x^3 + 5)(x + 1)$

(ii) Find dy/dx of $y = (x^4 + 5) / (x+2)$

B) (i) Find d^2y/dx^2 of $y = (3x^4 + 8x + 5)(2x + 4)$

(ii) find dy/dx of $x^4 + e^x + 5^x - \log x + 7$

C) Total revenue function is given by $R = 4x^3 - 72X^2 + 420X + 5000$. Find x for which the total revenue is maximum.

Q.5 - Answer the Following - (Any One out of Three)

(10 M)

A) Estimate $f(22)$ using Newton's interpolation formula.

X	20	25	30	35	40
F(x)	11.4	10.9	10.2	9.1	7.8

B) Construct a difference table for $f(x) = 5x^2$, $x = 0$ (1) 4. Hence find (2.4) using Newton's forward difference formula.

C) B) Estimate $f(58)$ using Newton's interpolation formula.

X	45	50	55	60
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