

Maximum Marks: 75.

Time: 2 Hrs. 30 Mins.

Note:

- 1) All questions are compulsory.
- 2) Use of non-programmable simple calculator is allowed.

Q-1) Attempt any two.

(15 marks)

- 1) Find the simple interest on Rs.1000/-for 8 years at 5% per annum. Also find the amount after 8 years.
- 2) How many ways 7 books A,B,C,D,E,F,G can be arranged on a shelf such that A and B are NOT together.
- 3) There are 4 boys and 5 girls. How many ways a committee of 5 can be formed if it should contain ATLEAST 1 boy?

Q-2) Attempt any two.

(15 marks)

1) What happens at Break-Even point? If the Total Cost function is $C=200+20x$ & Total Revenue function is $R=800+5x$. Find the point of no profit no loss.

2) Find inverse of matrix A by reduction method. $A = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{pmatrix}$

3) Find determinant of matrix $A = \begin{pmatrix} 2 & 3 & 4 \\ 1 & 3 & 2 \\ 3 & 5 & 4 \end{pmatrix}$
Is A invertible?

Q-3) Attempt any two.

(15 marks)

1) Find first and second order derivatives of following functions.

a) $f(x) = x^3 + e^x$ b) $f(x) = 5^x - 10$ c) $f(x) = \sqrt{x}$ d) $f(x) = 4 \log x$.

2) Show that $f(x) = 2x^3 - 6x^2 + 25x + 1$ is increasing for all x.

3) If $p = 4 + 3D - 5D^2$, Find Total Revenue, Average Revenue and Marginal Revenue at $D=2$.

Q-4) Attempt any two.

(15 marks)

1) Examine maxima and minima of function $f(x) = x^3 - 9x^2 + 24x + 7$.

2) Find missing entry of the table.

X	0	1	2	3	4
f(x)	-2	0	?	16	30

3) Find a polynomial $f(x)$ whose graph passes through given data using Newton's Backward difference interpolation formula. Further find $f(1.6)$. Where $f(0)=1$, $f(1)=2$, $f(2)=5$.

NO3AFP

Q-5) Attempt any three.

(15marks)

1) If $f(x) = \begin{cases} 2 + 3x & 1 \leq x < 4 \\ 3 + x & 4 \leq x < 7 \\ 7 + 2x & \text{otherwise} \end{cases}$ Find $f(0), f(1), f(5), f(6)$ and $f(-1)$.

2) Solve by Cramer's Rule.

$$5x + 2y = 7$$

$$6x - 5y = 38$$

3) Find a polynomial $f(x)$ whose graph passes through given points using Newton's Forward difference interpolation formula. $(0,0), (1,0), (2,-2)$.

4) Define price elasticity of demand. If $D = 100 - 2p^2$, find price elasticity of demand when $p = 10$.

4	3	2	1	0	2
30	10	20	0	-2	$f(x)$