

Internal Examination

Class:-11

F.M.:75

Subject: Business Mathematics

Time:3 hours

Attempt all the questions.

Group: A (1x11=11)

Rewrite the correct option in your answer sheet.

- 1) If the demand equation for a certain commodity is $Q = a - bp$, then the expression for elasticity of demand is

a) $\frac{Qd}{p} \times \frac{\Delta P}{\Delta Qd}$ b) $\frac{Qd}{p} \times \frac{\Delta Qd}{\Delta P}$
 c) $\frac{P}{Qd} \times \frac{\Delta Qd}{\Delta P}$ d) $\frac{P}{Qd} \times \frac{\Delta P}{\Delta Qd}$

- 2) If $y = x^n$, then $\int x^n dx$ is

a) $\frac{x^{n+1}}{n} + c$ b) $\frac{x^{n+1}}{n+1} + c$ c) $\frac{x^{n+1}}{n+1}$ d) $\frac{x^{n-1}}{n-1} + c$

- 3) If $x+2$, $3x$ and $4x+1$ are in AP. Then the value of x is

a) 3 b) 2 c) 1 d) 4

- 4) If $f(x) = \begin{cases} \frac{x^2-x}{2x} & \text{for } x \neq 0 \\ k & \text{for } x = 0 \end{cases}$ and if f is continuous at $x=0$, then $k = ?$

a) -1 b) $-\frac{1}{2}$ c) 0 d) $\frac{1}{2}$

- 5) The sum of the percent frequencies for all classes will always equal

a) One b) number of classes
 c) the number of items in the body d) 100

- 6) You are allowed to choose four whole numbers from 1 to 10 (inclusive, without repeats) which of the following is false?

a) The numbers 1, 2, 9, 10 have the largest possible standard deviation.
 b) The numbers 1, 5, 6, 10 have the largest possible standard deviation.

- c) The numbers 4, 5, 6, 7 have the largest possible standard deviation.

- d) The numbers 7, 8, 9, 10 have the largest possible standard deviation.

- 7) For $[-2, 2]$, which one is correct?

a) $\{x: -2 \leq x \leq 2\}$ b) $\{x: -2 \leq x < 2\}$
 c) $\{x: -2 \leq x < -2\}$ d) $\{x: 2 \leq x \leq -2\}$

- 8) The demand function of a commodity is $P = 50 - 2Q$. What is the value of Q when $P=10$?

a) -20 b) 50 c) 10 d) 20

- 9) The elasticity of demand is said to be perfectly inelastic if,

a) $|\epsilon_d| = 0$ b) $1 < |\epsilon_d| < \infty$ c) $|\epsilon_d| = 1$ d) $|\epsilon_d| = \infty$

- 10) If $y = 4x^3 + 6$, find the value of $\frac{dy}{dx}$.

a) $4x^2$ b) $12x^3$ c) $12x^2$ d) $24x$

- 11) What is the value of $7! - 5!$?

a) 9420 b) 9402 c) 2940 d) 4920

Group 'B'

(5 x 8= 40)

- 12) A firm sells a single product for Rs.70 per unit variable cost per unit are Rs. 20 for materials and Rs. 30 for labour. Annual fixed cost is Rs. 100,000.

a) Construct the profit function in terms of x . (i.e. the number of units produced and sold).

b) What profit is earned if annual sales are 10,000 units?

- 13) The demand function of a good is given by $P = 100 - 0.1Q$. Find the arc price elasticity of demand when,

a) Price decreases from Rs.50 to Rs. 40

b) Price increases from Rs.10 to Rs. 20.

14) Discuss the continuity of the following functions at the point

$$\text{specified. } f(x) = \begin{cases} 3 + 2x & \text{for } -\frac{3}{2} \leq x < 0 \\ 3 - 2x & \text{for } 0 \leq x < \frac{3}{2} \\ -3 - 2x & \text{for } x \geq \frac{3}{2} \end{cases} \quad \text{at } x \geq 0 \text{ \& } x = \frac{3}{2}.$$

15) Solve the system of linear equations :

$$2x - y + 3z = 9, \quad x + y + z = 6 \quad \text{and} \quad x - y + z = 2$$

16) Evaluate: a) If $y = 7x^{10} + 5x^3 - 6$, find $\frac{dy}{dx}$.

17) The marginal cost of a product is $MC = 4(x+2)^2$ and the fixed cost is Rs. 1050 . If the marginal revenue is $MR = 60x + 40$, Find a) Total cost . b) Total revenue & c) Total loss or profit when $x=8$ units.

18) Find Q_1 , Q_3 , 7th decile and 60th percentile for the following distribution.

Wages(Rs)	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of persons	1	3	11	21	43	32	9

19) Suppose two groups of human males yield the following information:

	Group A	Group B
Age	24yrs	15yrs
Mean weight	145lbs.	80lbs.
Variance	100lbs.	100lbs.

Find which is more variable , the weight of 24 years old or the weight of 15 years old.

Group 'C' (8×3=24)

20 .a) Find the derivative of: $y = \frac{1}{\sqrt{x+a} + \sqrt{x+b}}$. (4)

b) Evaluate by the method of substitution.

$$\int \frac{2x+3}{(x^2+3x-5)^3} dx. \quad (4)$$

21. a) If the revenue function is given by $R = \frac{x^3+14x}{3}$, find the marginal revenue and its value at production level 10. (4)

b) If the average cost function is $AC = 2Q - \frac{15}{Q}$ & demand function is $P = 2 + Q$, find the cost function, revenue function and break-even quantity. (4)

22. a) Mr. Prashant has got 15 friends of whom 10 are relatives. In how many ways can he invite 9 guests so that 7 of them be his relatives? (4)

b) A, B, C are three mutually exclusive and exhaustive events associated with a random experiment if $P(B) = \frac{3}{2}P(A)$ and

$$P(C) = \frac{1}{2}P(B), \text{ find } P(A). \quad (4)$$

“GOOD LUCK”