M COM ENTRANCE

BUSINESS MATHEMATICS PRACTICE QUESTIONS

CH 4: DIFFERENTIATION & APPLICATIONS OF DIFFERENTIATION

1. If $y = \log\left(5x^2 + 7\right)$ then $\frac{dy}{dx}$ is:

   A $\frac{10x}{5x^2 + 7}$

   B $\frac{10}{5x^2 + 7}$

   C $\frac{5x^2 + 7}{10}$

   D $\frac{5x^2 + 7}{10x}$

2. The differentiation of x^3e^{2x} is

   A $(2x+3)x^3e^{2x}$

   B $(2x+3)x^2e^{2x}$

   C $4x^2e^{2x}$

   D $2x^2e^{2x}$

3. The function $y = x^2 + 4$ is concave up for:

   A $x \geq 0$

   B $x \leq 0$

   C $x = 0$

   D All values of x

4. The function $f(x) = x^3 - 6x^2 + 9x - 8$ has maximum value at

   A $x = 3$

   B $x = 0$

   C $x = 1$

D None of these

5. If cost function of a firm is given by: $C(x) = \frac{1}{3}x^3 + 3x^2 - 7x + 16$ then rate of change of Marginal Cost is given by:

A $2x + 5$

B $2x + 6$

C $2x - 7$

D $3x + 6$

6. The cost function of a firm is given by $C = 2x^2 + x - 5$. Find the marginal cost, when $x = 4$.

A 17

B 18

C 19

D 20

7. For the given cost function $c = \frac{x^2}{4} + 3x + 400,$ minimum average cost occurs at:

A $x = 30$

B $x = 40$

C $x = 35$

D $x = 50$

8. A swimming club offers memberships at the rate of Rs.200, provided that a minimum of 100 people join. For each member in excess of 100, the membership fee will be reduced Rs.1 per person (for each member). How many memberships should the club try to sell to maximize its revenue?

A 50

B 100

C 150

D 175

9. A television manufacturer find that the total cost of producing and selling x television sets is $C(x) = 50x^2 + 3000x + 43750$. Each product is sold for `6000. Determine the break even points.

A 25, 35

B 20, 40

C 50, 10

D 30

10. The total cost function for a company is given by $C(x) = \frac{3}{4}x^2 - 7x + 27$. The level of output for which MC = AC is

A 15

B 12

C 10

D 6

11. Economic ordering quantity (EOQ) is that quantity size which:

A minimises cost of ordering the stock

B minimises cost of keeping the stock

C minimises total cost of inventory

D minimises cost of purchasing stock

12. The lead time in EOQ Model is assumed to be:

A zero

B infinity

C minimum

D important

13. A certain toll road averages 36,000 cars per day when charging Rs.50 per car. A survey concludes that increasing the toll will result in 300 fewer cars for each rupee of increase. What toll should be charged to maximize the revenue?

A 35

B 50

C 85

D 100

14. If a total cost function is $C(x) = .0001x^3 - .06x^2 + 12x + 100$, then at x = 100, the marginal cost curve:

A is increasing

B is decreasing

C is not changing

D has a point of inflexion

15. A linear demand function provides that quantity demanded is NIL at P=Rs.50 and demand is 100 units if P=0. Its price elasticity of demand |EP| at P=Rs.25 will be:

A –2

B –1.5

C 1

D 1.5

16. A firm has to produce 36,000 units of an item during a year. If it costs Rs.250 to make the machine run regardless of the number of items (x) produced in a run. The cost of storage is 50 paise per item per year on average inventory $x/2$ in hand. The cost of material per item is Rs.5. Find the economic lot size x.

A 4000

B 5000

C 6000

D 9000

17. The demand and average cost functions for a monopolist's product are $p = 400 – 2x$ and $AC = 0.2x + 4 + (400/x)$ respectively. Find the maximum profit after a tax of Rs.22 per unit is imposed by the government on the monopolist.

A Rs.17420

B Rs.15495

C Rs.15595

D Rs.17240

18. A monopolist has the following demand and cost functions:

$$p = 50 – x \text{ and } C = 160 + 8x$$

The government imposes tax at the rate of Rs.2 per unit. The difference between maximum profit earned before and after tax is imposed is:

A Rs.41

B Rs.42

C Rs.51

D Rs.40

19. The proportion of people responding to an advertisement of a new product in a certain area is given by $(1 - e^{-0.3t})$ where t is the number of days the advertisement is run. The area contains 4,00,000 potential customers and each response to the advertisement results in an average profit of Rs.2. The fixed cost of advertisement is Rs.30,000 and variable cost is Rs.4,000 per day. The approximate number of days advertisement should be run to maximize the profit is:

A 10

B 12

C 14

D 15

20. If price of a commodity is Rs.20 and its price elasticity of demand is 2, marginal revenue is:

A Rs.30

B Rs.20

C Rs.15

D Rs.10

21. A manufacturer's total cost is $C = \frac{1}{6}x^3 + 642x + 400$. Current production level is 12. The proportionate decrease in production to reduce cost by 3% is:

A 3%

B 2.8%

C 2.4%

D 3.8%

22. The demand function for a product is $x = 500 - 40p + p^2$ and the current price is Rs.15. The approximate percentage change in demand when price is increased by 2% is:

A 1.2%

B 1.5%

C 2.4%

D 3.0%

23. The demand (x) for a good as a function of income (I) is given by: $x = 75 - \frac{1}{5}I$. At an income level of 125, the income elasticity and nature of good is:

A 0.5, Necessity

B – 0. 5, Necessity

C – 0.5, Luxury

D –0.5, Inferior

24. The demand and supply functions of a good are $p^2 + q^2 = 20$ and $2p + q = 8$ respectively. The equilibrium price is:

A Rs.22/5

B Rs.32/5

C Rs.2

D Rs.3

25. If the consumption function is given by $C = 7 + 0.6I - 0.25\sqrt{I}$. Find the marginal propensity to save when I = 16.

A 0.56

B 0.44

C 0.65

D 0.40