

MN3ADE

FYBMS
Business Maths

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MARKS :60

TIME : 2 Hrs.

Note:- (1) All Questions are compulsory.

(2) Figures to the right indicate full marks.

(3) Only Simple Calculators are allowed.

- Q.1 (a) Gunjan has been offered two jobs. In the first job, she will get initial salary of Rs. 12,000p.m. with an annual increment of Rs.2,000. The second jobs offers initially salary of Rs.13,000p.m. with an annual increment of Rs. 1500. Advice her on the selection of job by considering her total earnings after 6 years. (5)
- (b) In how much time will Rs.500 at 3%p.a. produce the same income at Rs. 10,000 in 2 years at 3% p.a. simple interest? (5)
- (c) The total cost function is given by $C = 4300 + 40x$ and the total revenue function is given by $R = 60x$ where x is the quantity produced and sold. Find the break- even point. (5)

OR

- Q.1 (a) If the value of a car gets depreciated by 20% per year, what would be its estimated value at the end of 5 years, if its present value is Rs.18000? If the car has an estimated life of 15 years. Find its scrap value. Given $(0.8)^{15} = 0.3518$. (5)
- (b) A man purchases a house and take a mortgage on it for Rs. 10,00,000. to be paid off in 4 years by equal annual payments payable at the end of each year. If the interest rate is 6% p.a. Find the sum of money that he will pay each year. (5)
- (c) The demand D and the price P of a commodity are related by $100D + 2P = 440$. Express (i) demand function (5)
- (ii) total revenue function in terms of D . Find $P(2), P(3)$. (5)

Q.2 (a) Show that the matrix $A = \begin{bmatrix} 1 & 3 \\ 0 & 3 \end{bmatrix}$

Satisfied the equation $A^2 - 4A + 3I = 0$. Hence find A^{-1} . (5)

(b) Solve the following equations by using determinants:

$$x+4y+2z=7$$

$$8x+4y+z=13$$

$$-3x-2y+5z=0$$

(5)

(c) Draw a graph for the following inequalities

$$4x+2y \leq 12$$

$$3x+6y \leq 18, x \geq 0, y \geq 0. \text{ Mark the feasible region.}$$

(5)

OR

Q.2 (a) By adjoint method find the inverse of the matrix $A = \begin{bmatrix} 5 & 6 \\ 3 & 4 \end{bmatrix}$ if it exists

(5)

(b) Evaluate $\begin{vmatrix} 21 & 35 & 49 \\ 4 & 12 & 20 \\ 5 & 10 & 20 \end{vmatrix}$

(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 out-put matrix.

(5)

Q. 3(a) Find $\frac{dy}{dx}$ where i) $y = x^3 \log x$

ii) $y = \frac{\log x}{x}$

(5)

(b) The demand function is given by $P = 30 + 6D - D^2$. Where P = price, D= demand.

Find the total revenue, the average revenue and the marginal revenue when

the demand is 4.

(5)

(c) If $D = 25 - 3P - P^2$ be a demand function, find elasticity of demand when $P = 3$.

(5)

OR

Q.3 (a) Examine the following function for maxima and minima

$$F(x) = 2x^3 - 9x^2 + 12x + 5.$$

(5)

(b) If the total cost function is given by $C = 4x^2 + 7x + 3$. Find the AC and MC when

$X = 4$.

(5)

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(c) The demand $D = \frac{P+2}{P-1}$

, Find the rate of change of demand when the price is 2. (5)

Q.4 (a) Find all the partial derivatives of $u = x^2 + 3xy^2 + y^2 + 3x - 4y$. (5)

(b) Find the marginal productivities of labour and capital at $K=3, L=1$

if $Q = 20K - L^2 + 3LK$. (5)

(c) Find the consumer's surplus and producers surplus at equilibrium price if

demand and supply functions are $P = 14 - 4D$ and $P = 3D$ respectively. (5)

OR

Q.4(a) Evaluate (i) $\int [x^3(x^2-1)(x+7)]dx$

ii) $\int_0^2 (6x + e^x)dx$ (5)

(b) Find the total cost function and average cost function when marginal cost function $MC = 4 + 2x + 3x^2$ and the fixed cost is 50. (5)

(c) Find the values of the first order partial derivatives of the function

$u = x^3 + 8x^2y + y^3$ at (1,2) (5)

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