2021/TDC/CBCS/ODD/
ECOHCC-101T/451

TDC (CBCS) Odd Semester Exam., 2021
held in March, 2022

ECONOMICS

(1st Semester)

Course No. : ECOHCC-101T

(Introductory Microeconomics)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer any *ten* of the following questions : 2×10=20

1. Define economics.

2. What is an economic problem?

3. What are the main economic systems?

4. State two assumptions under which the demand curve of a consumer is drawn.

5. Distinguish between supply and stock.

6. Define price elasticity of demand.

7. Distinguish between substitute goods and complementary goods.

8. What is diminishing rate of substitution?

9. State the meaning of consumer's budget constraint.

10. Distinguish between explicit and implicit costs.

11. What are economies of scale?

12. Give the meaning of optimum firm.

13. Define marginal productivity of labour.

14. Mention two factors that affect the labour market.

15. Distinguish between land market and labour market.

SECTION—B

Answer any *five* of the following questions : 10×5=50

16. *(a)* What is economic efficiency? How can an economy achieve it? 2+4=6

(b) Scarcity is the basis of all economic choices. Explain. 4

17. Why are graphs used in economics? Explain with examples the use of line graphs and pie graphs in microeconomic analysis. 2+4+4=10

18. *(a)* What is market demand? State any three determinants of market demand. 2+3=5

(b) Give briefly the applications of elasticity of demand. 5

19. *(a)* What is producer's surplus? How can it be measured? 2+2=4

(b) Analyze briefly the effects of ceiling price and floor price on producer's surplus. 3+3=6

20. Define consumer's equilibrium. Explain with the help of a diagram the consumer's equilibrium through scale of preferences. 2+8=10

21. Distinguish between income effect and substitution effect. Explain briefly the superiority of indifference curves analysis over the utility analysis. 4+6=10

22. *(a)* Distinguish between plant curve and envelope curve. 3

(b) Illustrate graphically the relationship between AFC, AVC, AC and MC. Why does AFC take the form of a hyperbola? 5+2=7

23. *(a)* Explain clearly the relationship between AR, MR and price elasticity of demand. 5

(b) Does a firm maximise its total revenue when it maximises its total profit? Explain briefly. 5

24. *(a)* What is derived demand? How does labour fit into derived demand? 2+3=5

(b) What is input productivity? How is productivity being measured? 2+3=5

25. Write short notes on the following : 5×2=10

(a) Wage determination in competitive labour market

(b) Importance of public policy in labour market

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ECOHCC–102T/452

TDC (CBCS) Odd Semester Exam., 2021
held in March, 2022

ECONOMICS

(1st Semester)

Course No. : ECOHCC–102T

(Mathematical Methods in Economics—I)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer any *ten* of the following questions : 2×10=20

1. If $A = \{0, 1\}$, $B = \{2, 3\}$ and $C = \{2, 3, 4\}$, then find $A \times (B \cap C)$.

2. Construct a truth table for $\sim p \wedge q$.

3. Convert $(101101)_2$ into decimal number.

4. Give example of explicit and implicit functions one of each.

5. Formulate rule of the following sequence :

$$\{-6, -3, -2, 9, 18, \cdots\}$$

6. Define convergent series with example.

7. Given, $y = x^3 - 3x + 1$, find

$$\frac{dy}{dx} \text{ and } \frac{d^2y}{dx^2}$$

8. The average cost function of a firm is as

$$AC = Q^2 - 3Q + 15 + \frac{27}{Q}$$

Find MC function of the firm.

9. Find the partial derivatives of $z = x^3 e^{2y}$.

10. How is saddle point differed from stationary point?

11. Define local and global optima.

12. Mention any two properties of convex function.

13. Mention any two applications of integration in economic theory.

14. If MPS = 0·4 and saving(s) = −50 when income (y) = 0, then find saving function.

15. What do you mean by 'definite integral'?

SECTION—B

Answer any *five* of the following questions : 10×5=50

16. *(a)* In a survey on reading newspaper in Silchar, the following results are obtained :

(i) 60% of the people read Dainik Jugasankha, 50% read Samayik Prasanga and 40% read Sentinal

(ii) 32% read Jugasankha and Sentinal

(iii) 20% read Samayik Prasanga and Sentinal

(iv) 30% read Samayik Prasanga and Jugansankha

(v) 8% do not read any of these newspapers.

Using operation of sets, find out percentage of people who read all these newspapers. 4

(b) Show that

$$(A - B) \cap B = \phi$$ 2

(c) If

$$f(x) = \begin{cases} \dfrac{x^2-1}{x-1} & \text{for } x \neq 1 \\ 2 & \text{for } x = 1 \end{cases}$$

check the continuity of the function at $x = 1$. 4

17. (a) Evaluate limit of the following : 2+2=4

(i) $\lim\limits_{x \to 0} \dfrac{e^x - 1}{x}$

(ii) $\lim\limits_{x \to \infty} \dfrac{3x^2 - x + 2}{x^2 + 8x - 1}$

(b) If $A = \{1, 2, 3\}$ and $B = \{-1, 0, 1\}$, $x \in A$, $y \in B$, then find xRy if $y = 2x$. Also find domain and range of the relation. 2+2=4

(c) Convert $2 \cdot \overline{28}$ into rational number. 2

18. (a) If

$$\frac{\log a}{a+b-2c} = \frac{\log b}{b+c-2a} = \frac{\log c}{c+a-2b}$$

then prove that $abc = 1$. 3

(b) If

$$f(x) = b\frac{x-a}{b-a} + a\frac{x-b}{a-b}$$

then show that $f(a) + f(b) = f(a+b)$. 3

(c) Draw the graph of the following functions : 2+2=4

(i) $y = \log x$

(ii) $y = \dfrac{c}{x}$ (c is constant)

19. (a) Show that

$$\{1^2 + 2^2 + 3^2 + \cdots + n^2\} = \frac{n(n+1)(2n+1)}{6}$$ 3

(b) Test the convergence of the following series : 3½+3½=7

(i) $\dfrac{1\times2}{3\times4\times5} + \dfrac{2\times3}{4\times5\times6} + \dfrac{3\times4}{5\times6\times7} + \cdots \infty$

(ii) $\sum \sqrt{\dfrac{n}{n^2+1}}$

20. (a) Following are the demand functions for the two commodities x_1 and x_2 :

$$x_1 = P_1^{-1.7} P_2^{0.8} \text{ and } x_2 = P_1^{0.5} P_2^{-0.2}$$

(i) Determine whether the commodities are complementary or competitive.

(ii) Find four partial elasticities of demand. 2+4=6

(b) Find dy/dx of the following : 2+2=4

(i) $y = x^x$

(ii) $y = \dfrac{(x-2)(2x+3)}{(x+7)(1-x)}$

21. (a) Find the maximum and minimum of the following function : 4

$$y = 3x^4 - 10x^3 + 6x^2 + 5$$

(b) Given the demand function $x = \sqrt{90 - P}$ and the cost function $c = 10 + 2x^2 + 3x^3$, determine the profit maximising output of a monopolist firm. What would be the impact of a tax of ₹ 10 per unit of output on price and profit? 3+3=6

22. (a) Find the global extrema of the function $f(x) = x^3 - 3x^2 + 5$ on the interval $[-1, 2 \cdot 5]$. 4

(b) For a convex function, prove that a local minimum is a global minimum. 6

23. (a) Check the convexity/concavity of the function

$$f(x) = \frac{x^2}{2} - 0 \cdot 9x + 2$$ 3

(b) Find possible inflection points for

$$f(x) = \frac{1}{9}x^3 - \frac{1}{6}x^2 - \frac{2}{3}x + 1$$ 4

(c) What conditions must be imposed on constants a and b in order that $f(x) = x^3 + ax^2 + bx$ will have stationary points at $x = 1$ and $x = 3$? 3

24. (a) Find integral of the following : 3+3=6

(i) $\int \dfrac{3x+4}{6x+7} dx$

(ii) $\int \dfrac{1}{\sqrt{x+1} - \sqrt{x}} dx$

(b) The price in the competitive market is determined by demand and supply laws. Find the producer's surplus when

$P_d = 3x^2 - 20x + 5$

$P_s = 15 + 9x$ (x is quantity) 4

25. (a) Solve $y_{t+1} - 5y_t = 12$ with $y_0 = 10$. 4

(b) Given the demand and supply functions for Cobweb model :

$Q_{dt} = 10 - 2P_t$

$Q_{st} = -5 + 3P_{t-1}$

Find intertemporal equilibrium price and also determine whether you will get stable equilibrium. 6

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