

UG/1st Sem/H/20(CBCS)

2020

ECONOMICS (Honours)

Paper : 1.2 - ECOH - DC-2

[Mathematical Methods in Economics 1] (CBCS)

Full Marks : 32

Time : Two Hours

*The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.*

Group - A

Answer any *four* questions.

2×4=8

1. What are the sub-sets of the set $A = \{a, b, c\}$.
2. When the two vectors are said to be linearly dependent?
3. Express the equation $4x + 2y - 5 = 0$ as a explicit function of x .
4. In the cost function $C = 1/3 q^3 - 4q^2 + 5q + 12$, find out the Average cost and Marginal cost.
5. If $y = x^4$, find $\frac{d^2x}{dy^2}$.
6. Find the slope of the straight line joining the points (4, 6) and (0, 7).

Group - B

Answer any *four* questions.

4×4=16

7. The utility function : $U = xy$, the budget equation : $M = p_1x + p_2y$, where notations have their usual meanings. Derive the demand functions.

8. The cost function of the firm is given as $C = 0.03q^3 + 0.5q^2 - 12q + 2$, derive the supply curve of this firm.
9. Show that the function $x^3 - 3x^2 + 3x + 1$ is neither a maximum nor a minimum at $x = 1$.
10. In a class of 100 students, 45 students read Economics, 52 students read English and 17 students read both the subjects. Find the number of students who study neither Economics nor English.
11. Consider a homogeneous production function. How can you explain returns to scale in terms of degree of homogeneity?
12. State and prove the Euler's Theorem on homogenous function of two variables.
13. $U = x^2 - y^2 + 3xy$, find the value of $x \frac{du}{dx} + y \frac{du}{dy}$. What does it imply?
14. The demand function is given by $P = 36 - 3x^2$. For what value of x , the elasticity of demand will be unity?

Group - C

Answer any *one* question.

8×1=8

15. $A = \{1, 2, 3, \dots, 10\}$, $B = \{5, 6, 7, \dots, 15\}$ and $U = \{1, 2, 3, \dots, 20\}$. Verify the De-Morgans Laws.

16. Consider the Cobb-Douglas production function

$$Q = 4 K^{3/4} L^{1/4}, \text{ where } K = 10,000 \text{ units and } L = 625 \text{ units.}$$

Find the value of Q . If K is increased by 100 units, how much output will be increased? 5+3
