

UG 1st Semester Examination 2021**ECONOMICS (Honours)****Paper: DC- 2****[Mathematical Methods in Economics 1]****Time: 2 Hours****Full Marks: 32****Answer the following questions****Group A****Answer any four questions****2×4 = 8**

1. If in any set there are 4 elements, what will be the power of that set?
2. Find the convex combination of the points (2,1) and (-3,2), if $\lambda = 1/2$.
3. Given the relation $R = \{(6,5), (6,8), (5,4), (8,10)\}$ does it qualify for a function?
4. Given $y = 2x^2 + 4$, the domain of this function is the set $\{x | 2 \leq x \leq 4\}$, find the Range.
5. Consider the function $f(x) = \frac{x^2 - 25}{x - 5}$ find out $\lim_{x \rightarrow 7} f(x)$
6. Find the relative maximum of the function $y = 3x - 12x^2$.

Group B**Answer any four questions from the following****4×4 = 16**

7. In an examination 25% students passed in Economics, 40% in Mathematics and 10% in both the subjects. If there were 300 students in all, how many students passed none?
8. Show that $f(x) = 4x + 3$ and $g(x) = \frac{x-3}{4}$ are inverse to each other.
9. Examine whether $y = \frac{2x+1}{x-1}$ is continuous at $x = 1$
10. In a market the demand and the supply curves are as follows:
 $p = (2.44)^2 q^{-2}$ and $q = 1.5$. Find the price elasticity of demand.
11. The cost function of the manufacturer is given as $C = 0.03q^3 + 0.5q^2 - 12q + 2$,
Find the Marginal cost, slope of Average cost.
12. How the degree of Homogeneity of a production function describes the different returns to scale?

13. A single input x is used to produce output y . If the production function is $y = x^{\frac{1}{3}}$, $x > 0$ then show that cost function $C(y)$ is convex.
14. Explain the method of constrained optimization with an example of equality constraint.

Group C

Answer any one question from the following

8×1=8

15. For the total product function $y = 40L^2 - L^3$, show that AP(L) rises when MP(L) exceeds AP(L), falls when MP(L) is less than AP(L) and is horizontal at point where MP(L) = AP(L). (8)
16. State the Euler's Theorem on homogenous function of two variables. If $U = x^2 - y^2 + 3xy$, find the value of $x \frac{du}{dx} + y \frac{du}{dy}$ and hence verify the Euler's Theorem for the function U. (2+6)