QP CODE

B2060

Enrollment Number: ……

Name: ……

MA DEGREE EXAMINATIONS, APRIL 2025
First Semester
M.A. Economics
M23EC04DC – Quantitative Methods for Economics I
(2024 July admissions)

Time: 3 Hours **Max Marks: 70**

Section A

Answer any ten of the following questions in a word or sentence each. Each question carries 1 mark.

1. What is set?
2. If TC = $3Q^2 + 7Q + 12$, what is MC?
3. What is marginal utility?
4. Define optimization.
5. What is sample?
6. What do you mean by parameter?
7. What is sample variance?
8. Define hypothesis.
9. Explain null hypothesis.
10. Define Type I Error.
11. What is integral of a constant '2'?
12. Define population.
13. What is the integral of a constant k?
14. What is ANOVA?
15. Define primal.in LPP.

(1X10=10)

Section B

Answer any five of the following questions in two or three sentences each. Each question carries 2 marks.

16. Find the value of $\lim_{X \to 0} (7x + 5x + 1)$

17. Consider the function $y = 2x^2 - 5x + 3$. Determine whether the function is concave or convex at $x = 2$.
18. Define law of large numbers.
19. Differentiate mean and variance.
20. List small sample properties of t distribution.
21. What is statistical inference?
22. Differentiate between parametric and non-parametric tests.
23. Explain the steps to perform the one way ANOVA test.
24. What is Lagrange multiplier?
25. List two characteristics of linear programming.

(2X5=10)

Section C

Answer any five of the following questions. Each question carries 4 marks.

26. Explain different types of functions.
27. The total cost function of a firm is given as $TC = 100 + 10 x^2$ and the total revenue function is given as $TR = 80x$. Find the profit maximising level of output?
28. Optimise $f(x) = 2x^3 - 30x^2 + 126x + 65$
29. Find the relative maxima and minima for the function $f(x, y) = 3x^2 - 2xy + y^2 - 8y$
30. Suppose an economist is studying the average monthly expenditure on consumer goods in a city. The population of expenditure values follows a normal distribution with a mean of Rs. 800 and a standard deviation of Rs. 150. The economist takes a random sample of size 150 households from this population. What is the probability that the sample mean expenditure will be between Rs. 780 and Rs. 820?
31. Differentiate between point and interval estimation.
32. Explain Wilcoxon - Mann Whitney U test?
33. It is claimed that a random sample of 100 tyres with mean life of 15269 kms is drawn from a population of tyres which has a mean life of 15200 kms and the standard deviation is 124.8 kms. Test the validity of the claim.

(4X5=20)

Section D

Answer any three of the following questions in two pages each. Each question carries 10 marks.

34. Prepare a note on rules of integration.
35. Find the consumer's surplus and producer's surplus for the demand function $D(x) = 25 - 3x$ and supply function $S(x) = 5 + 2x$.
36. Optimise the function: $f(x, y) = 2x^2 - 5xy + 3y^2$
    Subject to the constraint: $x + 2y = 20$
    (Hint:- using langrage multiplier method)

QP CODE
B2060

37. Use simplex method to solve the following LPP.

    Maximise $z = 7x_1 + 5x_2$
    Subject to the constraints:
    $x_1 + 2x_2 < 6$
    $4x_1 + 3x_2 < 12$
    $x_1, x_2 \geq 0$

38. It is given that X, the daily sale of bread in a bakery follows standard normal distribution with (mean) $\mu = 70$ and (variance) $\sigma^2 = 9$ i.e., $X \sim (70, 9)$. What is the probability that on any given day the sale of bread is greater than 75 loaves?
39. Suppose that a census of city dwellers reveals an average family size of 4.2 with a standard deviation of 0.5. A random sample of 100 city side families reveals a family size of 4.29. Test whether the family size in the city side is the same as in the city.

(10X3=30)