MA ECONOMICS
FIRST SEMESTER
MATHEMATICAL METHODS FOR ECONOMIC ANALYSIS
MEC – 104
[USE **OMR** SHEET FOR OBJECTIVE PART]

SET A

Duration: 1.30 hrs.

Full Marks: 35

(Objective)

Time: 15 mins.

Marks: 10

Choose the correct answer from the following:

$1\times10=10$

1. If total revenue, TR=100-100Q^2, then what is the marginal revenue?
   a. 100Q^2
   b. -100Q
   c. -200Q
   d. 200Q^2

2. Norm of a matrix is
   a. largest column sum
   b. maximum number of linearly independent row
   c. maximum number of linearly independent column
   d. largest row sum

3. Linear Programming as an economic tool was first developed and applied by:
   a. Prof. Dantzig
   b. Von- Neumann
   c. Morgenstern
   d. Prof W.W Leontif

4. Matrix A is a singular matrix because
   a. A^{-1}= [A]
   b. A^{-1} does not exist
   c. A^{-1} = 0
   d. A^{-1} does exist

5. For multiplication of two matrices, they must be
   a. Conformable
   b. Equal
   c. Comfortable
   d. Unequal

6. If marginal revenue, TR= 20Q-Q^2/2+C then what is the MR?
   a. 20-Q^2/2+C
   b. 10Q-Q^2/2+C
   c. 20-Q
   d. 20Q-Q/2+C

7. In Cobb Douglas Production function, $\alpha+\beta$=
   a. 1
   b. ¹⁄₁₀
   c. 1/2
   d. $\ominus$

8. In Game theory model, strategies include
   I.   The potential choices to change the price
   II.   To develop new or differentiated products
   III. To introduce a new or different advertisement campaign
   IV.   To build excess capacity
   a. II and III are correct   b. I and II are correct
   c. I, II and III are correct   d. All are correct

9. What is derivative of ax^n?
   a. n   b. $2nx^{n-a}$
   c. anx^{n-1} d. nx^{a-1}

10. The integration is the technique of finding the function y=f(x) from a given derivative
   a. $A = \pi r^2$ b. $\frac{dy}{dx}$
   c. $A = \pi r^2$ d. $\sqrt{x}_y{=}$

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$$\left(\underline{\textbf{Descriptive}}\right)$$

Time : 1 Hr. 15 Mins.   Marks : 25

[Answer question no.1 & any two (2) from the rest]

1. A consumer has a utility function   5
   $U=U(Q)=\alpha Q^\beta$, $\alpha>0$, $0<\beta<1$
   Does the utility function display diminishing marginal utility?

2. What is an Idempotent matrix? Prove that   2+8=10
   $A=[I-X(X'X)^{-1}X']$ is an Idempotent matrix, where X=

1	1
1	2
1	3

3. Given the demand function $D=AP^\alpha N^\beta$ 10
   Where D is demand, P is price, N is income and A, α,β are parameters.
   Find the followings.
   Show that α is the parameter of price elasticity and β is the parameter of
   income elasticity.

4. What is diminishing marginal product of labour? Given the production   2+8= 10
   function:
   $Q=f(L)=-\dfrac{2}{3} L^3 + 10 L^2$, where L is the labour employed, show that

   diminishing marginal product of labour operates when employment of
   labour is 6 units or more.

5. Given a consumption function   3+3+4=10
   $C=C(Y)=1000-5000(3+Y)^{-1}$
   Find
   a) MPC when Y=97
   b) MPS when Y= 97
   c) Determine whether MPC & MPS move in the same direction when
      Y changes.

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