

Mid-West University
Examinations Management Office
Birendranagar, Surkhet
End-Semester Examination -2082

Subject: DE 544 H- Mathematics for Economists

FM: 60

Level/program: Master (M.A)

Semester: IV

Time: 3 Hours

PM: 30

Candidates are required to answer the questions in their own words as far as practicable.

Attempt ALL of the following Very Short Answer Questions.

10x1=10

1. Let $A = \{a, b, c\}$ and $B = \{p, q\}$ be two sets. Calculate $A \times B$ and $B \times A$.
2. Find \vec{a} , when $\vec{b} = (2, 1)$ and $2\vec{a} - \vec{b} = (4, 7)$.
3. Define homogeneous and non-homogeneous equation.
4. Define vector. List its types.
5. If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$. Find A^{-1} .
6. Define pivot value.
7. Applying matrix method, find the value of x and y from the following equations:
 $2x - y = 5$ and $x - 2y = 1$
8. Find Y_p from: $\frac{dy}{dt} - 4y = 2$
9. Explain differential equation with its types.
10. Define Input-Output model.

Attempt any THREE of the Following Short Questions.

3x8=24

11. a) A sample of 640 tourists showed 300 visited Paris, 280 visited Rome, 260 visited London, 120 visited Paris and Rome, 110 visited Paris and London, 100 visited Rome and London, 80 visited all three, 50 visited none.
Find: a) How many visited only Rome?
b) How many visited exactly two of the cities?
c) Represent the data using a Venn diagram.
b) Let $A = \{2, 3, 4\}$ and $B = \{2, 3, 4, 6\}$. Find the relation from set A and set B determined by a condition that X divides Y . Also find the domain and range of relation. Find the inverse function.
12. If the model is; $Q_{dt} = 21 - 2P_t$
 $Q_{st} = -3 + 6P_t$ and
 $P_{t+1} = P_t + 0.3(Q_{st} - Q_{dt})$
Find the G.S. of difference equation.
13. Using simplex method find the maximum solution of the following LP problem.
Maximize : $P = x + 3y$
Subject to : $x + y \leq 7$ and $x + 2y \leq 10$
 $x, y \geq 0$
14. Find the General Solution from the differential equation:
 $4\frac{dy}{dt} + 8y = 12$

Attempt any TWO of the Following Long Questions.

2x13 =26

15. Demand and supply functions for sugar (kg/week) are given by:

$$Q_d = 200 - 3P + 6 \frac{dP}{dt} \quad \text{and} \quad Q_s = -40 + 4P + 30 \frac{dP}{dt}$$

Where P is price and t is time. Initial price is Rs. 20 per kg.

Find: a) The time path of price P(t) for dynamic equilibrium

b) Price after 10 weeks

16. Explain the Harrod Growth model.

17. If $A = \begin{bmatrix} 0.4 & 0.1 \\ 0.7 & 0.6 \end{bmatrix}$ and $d = \begin{bmatrix} 100 \\ 50 \end{bmatrix}$

a) Gross output of steel and coal.

b) Total labour requirement assuming that 15 days are required to produce one unit of another in industry I and 20 days in industry II.

c) Equilibrium prices if wage rate is Rs. 20 per man days.

d) Gross value added.
