

**M.A./M.Sc. 1st Semester Examination, 2019**

**ECONOMICS**

**PAPER —ECO-103(GR.-A +B)**

*Full Marks : 40*

*Time : 2 hours*

*The figures in the right-hand margin indicate marks*

*Candidates are required to give their answers in their own words as far as practicable*

*Illustrate the answers wherever necessary*

**Write the answers to Questions of each Units in separate books wherever necessary**

**GROUP — A**

**[ Marks : 20 ]**

**1. Answer any *two* questions : 2 × 2**

**(a) Is nonlinear programming technique an improvement over linear programming ?**

***Justify.***

- (b) Consider the following nonlinear programming problem and write the Kuhn-Tucker condition for this problem

$$\begin{aligned} \text{Max } Z &= xy \\ \text{subject to } P_x X + P_y y &\leq M \\ x &\leq 40 \\ \text{and } x_1, x_2 &\geq 0. \end{aligned}$$

- (c) Define cartesian product of sets.
- (d) Distinguish between one-to-one and onto-mapping.

2. Answer any *two* questions : 4 × 2

- (a) What is constraint qualification ? What are its requirements ?
- (b) Give suitable examples of the prevalence of nonlinearity in economics.
- (c) What are test vectors and qualifying arc ?
- (d) State and proof De' Morgan's law.

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3. Answer any *one* questions : 8 × 1

- (a) Derive the Kuhn-Tucker condition for a non-linear programming problem of maximization type.
- (b) Distinguish between Kuhn-Tucker sufficiency theorem and Arrow-Enthoven sufficiency theorem for a maximization problem.

GROUP – B

[ Marks : 20 ]

4. Answer any *two* questions : 2 × 2

- (a) What is functional ?
- (b) Write any two types of variable terminal points.
- (c) What is dominant strategy ?
- (d) What do you mean by Bayesian games ?

5. Answer any *two* questions : 4 × 2

- (a) Explain mixed strategy equilibrium of game.

- (b) Explain different problems of Nash equilibrium with suitable examples.
- (c) Explain the saddle path in phase diagram analysis.
- (d) How can you find solution for dynamic optimization problem involving discounting?

6. Answer any *one* questions : 8 × 1

- (a) Define and explain subgame perfect equilibrium with suitable example.
- (b) Solve the following dynamic optimization problem using Hamiltonian identifying state and control variables :

$$\int_0^T (K - aK^2 - I^2) dt$$

$$K' = I - \delta K$$

$$K(0) = K_0.$$


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