1-6-2024

DOON UNIVERSITY, DEHRADUN

End Semester Examination, 2nd Semester, 2024
Academic Year 2023-24 (Even Semester)
School of Social Sciences, Department of Economics
Programme Name: B.Sc. Economics
Course Code with Title: ECC153-Mathematics-II (812113)

Time Allowed 2.00 Hours ***Maximum Marks: 50***

INSTRUCTIONS:

1. ***There are three sections.***
2. ***Section A consists of five questions. All questions are compulsory in this section.***
3. ***Section B consists of three questions. Attempt any two questions in this section.***
4. ***Section C comprises three questions. Attempt any two.***
5. ***Any candidate found using a calculator during the examination will face immediate disqualification and potential disciplinary actions.***

SECTION: A -All questions are compulsory (5*2=10 marks)

Ques 1. Write the degree and order of the following:

$\left(\frac{d^2y}{d^2x}\right) - \frac{5dy}{dx} + 6 = 0$

Ques 2. Solve $\frac{dy}{dx} + 3y = 4$

Ques 3. Solve $y_{x+2} - 4y_{x+1} + 4y_x = 0$

Ques 4. Calculate the amount and compound interest on ₹ 8000 at 5% per annum for 2 years.

Ques 5. Differentiate between linear and non-linear mathematical models.

SECTION: B - Attempt any two (2*10=20marks)

Ques 6. Obtain the demand function for a commodity for which elasticity of demand is constant α, throughout.

Ques 7. Solve the following $y_t = 5y_{t-1} + 8$, $y_0 = 4$

Ques 8. Use the Lagrange multiplier to optimize

$Z = 2x^2 - 3xy + 3y^2$ subject to $3x + 2y = 212$

SECTION: C – Attempt any two (2*10=20marks)

Ques 9. "The mathematical model is a translation of a real-life word problem into a mathematical description". Discuss its applicability with examples from economic theory.

Ques 10. The demand and supply functions for tea are given by

$$X_d = 100 - p + \frac{dp}{dp}$$

$$X_s = -50 + 2p + 10\frac{dp}{dt}$$

Find the time path of p for dynamic equilibrium if the initial price is given to be ₹10 per kg. what will be the price at time t = 10.

Ques 11. Solve the following demand-supply model:

$X_d = \alpha - \beta P_t$

$X_s = -\gamma + \delta P_{t-1}$

Determine the time path P_t