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| Name: |  |
| Enrolment No: | |

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May-23

Course: Mathematical Economics-II
Program: BA, Economics (Hons.)
Time: 03 Hours

Semester: IV
Course code: ECON1017
Max. Marks: 100

SECTION A

1. Each Question will carry 2 Marks

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| Q1 | Find the following: a. $\int 12e^x dx$ b. $\int 6e^{-(2x+7)} dx$ c. $\int (3e^x + \frac{4}{x}) dx$ d. $\int (5e^x + \frac{4}{x^2}) dx$ e. $\int xe^{x^2+9} dx$ | CO1 |

SECTION B

1. Each question will carry 5 marks
 2. Instruction: Write short / brief notes

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| Q2. | Find $\int_2^5 \frac{3x}{(x+1)^2}$ using the method of integration by parts. | CO2 |
| Q3. | Use the formula for a general solution to solve the following equations: a. $\frac{dy}{dt} + 5y = 0$ b. $\frac{dy}{dt} = 3y$ | CO2 |
| Q4. | Solve the first-order difference equation. $y_{t+1} - 5y_t = 1 \quad (y_0 = \frac{7}{4})$ | CO2 |
| Q5. | The rate of net Investment is $I = 60t^{1/3}$ and capital stock at $t = 0$ is 85. Find K? | CO2 |

SECTION-C

1. Each Question carries 10 Marks.
 2. Instruction: Write long answer

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| Q 6. | Given $\frac{dC}{dY} = 0.6 + \frac{0.1}{\sqrt[3]{Y}} = MPC$ and $C = 45$ when $Y = 0$. Find the Consumption Function? | CO3 |
| Q7. | Given the data below, $C_t = 90 + 0.8Y_{t-1} \quad I_t = 50 \quad Y_0 = 1200$ Find, a. The time path of national income Y_t b. Comment on the stability of the time path | CO3 |
| Q8. | For the following data given below, determine (a) the market price P_t in any time period, (b) the equilibrium price P_e , and (c) the stability of the time path. $Q_{dt} = 180 - 0.75 P_t \quad Q_{st} = -30 + 0.3P_{t-1} \quad P_0 = 220$ | CO3 |

SECTION-D

1. Each Question carries 15 Marks.

2. Instruction: Write long answer

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| Q9. | Given, $A = \begin{bmatrix} 0.2 & 0.3 & 0.2 \\ 0.4 & 0.1 & 0.3 \\ 0.3 & 0.5 & 0.2 \end{bmatrix}$ and final demands are $\begin{bmatrix} F_1 \\ F_2 \\ F_3 \end{bmatrix} = \begin{bmatrix} 150 \\ 200 \\ 210 \end{bmatrix}$. Find the output levels consistent with the model? | CO4 |
| Q10. | What is a linear programming problem? Solve graphically the linear programming problem stated below: $\text{Maximize } U = 50x_1 + 60x_2$ Subject to: $2x_1 + x_2 \leq 30$ $3x_1 + 4x_2 \leq 50$ $4x_1 + 7x_2 \leq 80$ | CO4 |