UG 3rd Semester Examination 2021

Economics (Honours)

Paper: DC - 7

[Mathematical Methods in Economics 2]

Full Marks: 32 **Time: 2 Hours**

Answer the following questions

Group A

Answer any four questions **2×4=8**

1. Give an example of Autonomous first order differential equation.
2. For the difference equation: $y_t = \beta a^t + \bar{Y}$, point out the complementary function and the particular solution.
3. Integrate: $\int (x^3 + x^4) dx$
4. An array that consists of only one row or one column is known as----------. Fill in the blank.
5. Find the length of $\begin{bmatrix} -2 \\ 3 \\ 2 \end{bmatrix}$
6. For the two vectors v and w if $\mathbf{v^T w} = 0$ the v and w are orthogonal- true or false?

Group B

Answer ant four questions **4×4=16**

7. Find the scalars λ_1 and λ_2 that are attached to v= $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$ and w= $\begin{bmatrix} 3 \\ 2 \end{bmatrix}$ to yield a new vector u= $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$ and also draw the diagram of this linear combination.
8. For matrix A= $\begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$ write the characteristic equation and find the characteristic roots.
9. In a perfectly competitive market, the demand and the supply functions are given as: P_d= 12-q and P_s = 4+q. Derive the equilibrium price and the consumer's surplus.
10. Given MPS = 0.2, output- capital ratio =2.5 and initial level on income is 500. Find the time path of income and investment.
11. The marginal cost function is given as MC=75 +20x -3x^{2s}. If fixed cost is Rs. 1000, how much cost is required to produce 10 units?
12. Consider the following macroeconomic model:

    $C_t = 0.5Y_t + 0.4Y_{t-1} + 300,$

    $I_t = 0.2Y_{t-1} + 200,$

    $Y_0 = 6500$

    Where notations have their usual meanings. Find the equilibrium national income.

13. What do you mean by dynamic stability of Equilibrium? What is intertemporal equilibrium?
14. For certain product the demand and supply functions are:
    $D(Q) = 1000 - 25Q$
    $S(Q) = 100 + Q^2$
    Find the consumer surplus and producer surplus.

Group C

Answer ant one question **8×1=8**

15. Solve the system of unknowns X_1, X_2 and X_3 using Cramer's rule:
    $2X_1+4X_2 - X_3= 15$
    $X_1 - 3X_2 + 2X_3= -5$
    $6X_1 +5X_2 + X_3 =28$
16. Solve the equation $5dy - (25y + 125)dt = 0$ given the initial condition, $y(t = 0) = 3$.