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L – 6243

Reg. No. : .....

Name : .....

**First Semester M.A. Degree Examination, August 2021**

**Economics**

**EC 214 : QUANTITATIVE METHODS FOR ECONOMICS**

**(2018 Admission Onwards)**

Time : 3 Hours

Max. Marks : 75

PART – A

Answer **all** questions from this part. Each question carries **1** mark.

1. Define norm of a matrix.
2. State Cayley Hamilton theorem.
3. What is a surplus variable?
4. What is an objective function?
5. Define order and degree of a differential equation.
6. Give an example of a second order difference equation.
7. Define binomial distribution.
8. What do you mean by sampling distribution?
9. Define power of a test.
10. Define critical region.

**(10 × 1 = 10 Marks)**

P.T.O.



PART – B

Answer any **seven** questions. Each question carries **5** marks.

11. Solve the following system of equations by matrix method :

$$x + 2y + 3z = -5$$

$$3x + y - 3z = 4$$

$$-3x + 4y + 7z = -7$$

12. Obtain the characteristic roots and vectors of the matrix

$$\begin{pmatrix} 5 & 1 & -1 \\ 1 & 3 & -1 \\ -1 & -1 & 3 \end{pmatrix}$$

13. Show by an example that dual of a dual is primal.
14. Consider two types of foods  $F_1$  and  $F_2$  which contains Vitamins  $V_1$ ,  $V_2$  and  $V_3$ . The contents of vitamins in each type of food and its requirements are given in the following table. The cost of each type of food is also given.

	Food	$F_1$	$F_2$	Minimum requirements
Vitamins				
$V_1$		2 mg	4 mg	3 mg
$V_2$		100 mg	40 mg	50 mg
$V_3$		10 mg	30 mg	10 mg
Cost per unit food		Rs. 1.00	Rs. 1.50	

A person wants to formulate the constituents of a diet which will fulfill his daily requirements of vitamins  $V_1$ ,  $V_2$  and  $V_3$  at minimum cost. Formulate the linear programming problem.

15. Explain the Lagrange multiplier method of optimization with equality constraints.
16. What are the economic applications of difference equations?



17. For a binomial distribution, mean = 16 and variance = 8. Find  $P(X = 0)$  and  $P(X \leq 2)$ .
18. Define chi-square t and F statistics. Obtain the interrelationships among them.
19. Define null hypothesis. What are the various steps used for testing hypothesis?
20. A driving school examined the result of 200 candidates who were taking driving test for the first time. They found that out of 90 men 52 passed and out of 110 women 59 passed. Do these results indicate at 1% level of significance a relationship between sex of candidate and the ability to pass for first time?

**(7 × 5 = 35 Marks)**

PART – C

Answer any **three** questions. Each question carries **10** marks.

21. Evaluate the following determinants by Laplace method.

$$\begin{vmatrix} 1 & 2 & 0 & 9 \\ 2 & 3 & 4 & 6 \\ 1 & 6 & 0 & -1 \\ 0 & -5 & 0 & 8 \end{vmatrix}$$

22. Solve the following LPP by simplex method :

$$\text{Maximize } Z = x_1 + x_2 + x_3$$

Subject to :

$$3x_1 + 2x_2 + x_3 \leq 3$$

$$2x_1 + x_2 + 2x_3 \leq 2$$

$$x_1 \geq 0; x_2 \geq 0; x_3 \geq 0$$

23. Explain the use of first order difference equations in economic analysis, using Cob-Web model.
24. Explain the different methods of sampling.



25. The following are the weights “before and after” of 8 adult females experimenting with a new diet.

Female :	1	2	3	4	5	6	7	8
Weight before :	127	130	114	139	150	147	167	153
Weight after :	122	120	116	132	144	138	155	152

Test the null hypothesis that the diet is not effect at  $\alpha = 0.01$ .

**(3 × 10 = 30 Marks)**

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