

**BACHELOR OF ARTS EXAMINATION, 2025****ECONOMICS (Honours)****2nd Year, 2nd Semester****Subject Code : ECO/B/SE 4.3(OLD)****LINEAR PROGRAMMING AND INPUT OUTPUT ANALYSIS****Time : Two Hours****Full Marks : 30**

Answer any three questions from the following :

10×3 = 30

1. (a) Write down the constraints of a LPP from the given problem :

For an examination there are two sets of questions  $\alpha$  and  $\beta$ . Set  $\alpha$  has 22 questions and set  $\beta$  has 24 questions. Each student has to answer 36 marks questions from two sets where it is mandatory to answer at least 10 marks from each set. Each set  $\alpha$  question contains 1 mark and each set  $\beta$  question contains 2 marks each.

- (b) Solve the following LLP problem using dual simplex method (write up to 2 iterations).

$$\text{Minimise } P = 2Y_1 + 3Y_2$$

$$\text{Subject to } Y_1 + Y_2 \leq 5$$

$$Y_1 + 2Y_2 \geq 8$$

$$3Y_1 + Y_2 \geq 10$$

$$\text{and } Y_1, Y_2 \geq 0$$

4+6

2. For the given LLP problem, find out the solution :

10

$$\text{Minimise } C = 7Z_1 + 4Z_2$$

$$\text{Subject to } Z_1 + Z_2 \leq 10$$

$$Z_1 + 2Z_2 \geq 12$$

$$Z_1 + 3Z_2 \geq 22$$

$$\text{and } Z_1, Z_2 \geq 0$$

3. Read the following closed static input output table and answer the questions given below (where first three columns represent the input requirement of the three industries for producing one unit of output. Every entry in the table are measured in same monetary units)

Industries	Industry I	Industry II	Industry III
Industry I	.2	.7	.1
Industry II	.5	.2	.5
Industry III	.3	.1	.4

- (a) Write down the input coefficient matrix.
- (b) If industry III is producing 15 units of output, what will be the requirements of outputs of the three industries for that production.
- (c) Write down the system of equation to solve for the equilibrium output of the model.
- (d) Find out the non-trivial solutions for the model. 1+1.5+2+5.5
4. For a open static input output model with 3 industries and 1 primary activity, write down how to find out the equilibrium output levels. 10
5. Answer the following questions : 5×2
- (a) Write short notes on Social Account Matrix.
- (b) Write down the dual of the following problem stating the criteria you are utilising :

$$\text{Minimise } A = 4B_1 + 3B_2 - 2B_3$$

$$\text{Subject to } B_1 + B_2 + B_3 \leq 5$$

$$2B_1 + 2B_2 + B_3 \leq 11$$

$$B_1 + 5B_2 + B_3 \geq 15$$

$$2B_1 - 2B_2 + 2B_3 \geq 9$$

$$3B_1 + 2B_2 + 2B_3 \leq 24$$

and  $B_1, B_2$  and  $B_3 > 0$ .

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