

**ILLB Sem.-3 Examination  
ILBCom-202/BCom (Hons)**

**Statistics**

**May-2025**

**Time : 2-30 Hours]**

**[Max. Marks : 70**

**Q-1. [A]** Explain Meaning of linear programming and uses of linear programming. **[08]**

**Q-1. [B]** Maximize  $Z = 20x + 10y$ , such that **[10]**

$$x, y \geq 0;$$

$$3x + y \geq 30;$$

$$x + 2y \leq 40;$$

$$4x + 3y \geq 60$$

**OR**

**Q-1.A** A manufacturer has two machines A & B. He manufactures two products P & Q on these machines. For manufacturing product P he has to use machine A for 3 hours and machine B for 6 hours, and for manufacturing Q he has to use machine A for 6 hours and machine B for 5 hours. On each unit of P he earns Rs. 4 and on each Unit of Q he earns Rs. 5. How many units of P & Q should be manufactured to get maximum profit? Each machine cannot be used for more than 2100 hours. **[18]**

**Q-2 [A]** Solve the following transportation method using **Any Two Methods** of Transportation Problem i.e. North-West Corner Rule, Matrix Minima and Vogel's Approximation method. **[10]**

Origins	Destinations				Supply
	A	B	C	D	
1	11	6	15	3	16
2	7	8	4	13	18
3	22	17	8	11	24
<b>Demand</b>	<b>11</b>	<b>15</b>	<b>17</b>	<b>15</b>	<b>58</b>

**Q-2 [B]** What is Transportation Problem? Explain Mathematical form of a Transportation problem. **[08]**

(P.T.O)

E675-2

OR

Q-2. Solve the transportation problem by using three methods (1) North- West Corner Rule (2) Matrix Minima Method (3) Vogel's Approximation Method. Which method is superior? [18]

Origins	Destinations						Supply
	D1	D2	D3	D4	D5	D6	
O1	6	12	9	6	9	10	5
O2	7	3	7	7	5	5	6
O3	6	5	9	11	3	11	2
O4	6	8	11	2	2	10	9
<b>Demand</b>	<b>4</b>	<b>4</b>	<b>6</b>	<b>2</b>	<b>4</b>	<b>2</b>	<b>22</b>

Q-3. Solve the following assignment problem to Maximum Profit (in thousand Rs.) [18]

JOB	PERSONS				
	P1	P2	P3	P4	P5
J1	13	12	15	17	10
J2	14	16	18	20	26
J3	13	12	11	28	14
J4	27	26	25	23	19
J5	24	21	19	22	25

OR

Q. 3 [A] Solve the following assignment problem to minimize the total cost. [10]

JOB	PERSONS			
	P1	P2	P3	P4
J1	10	26	19	12
J2	15	27	8	13
J3	40	22	16	14
J4	17	23	22	9

E675-3

Q. 3 [B] A machine cost Rs. 6,100 and its scrape value is Rs. 100. If the maintenance cost at the end of each year is as follows, determine the time at which it is advisable to replace it? [08]

YEAR	1	2	3	4	5	6	7	8
MAINTENANCE COST IN Rs.	100	250	400	600	900	1200	1600	2000

Q. 4 [A] Determine the critical path for the following project. Find EFT, LFT, and Float Times. [10]

JOB	TIME
1-2	25
1-3	30
2-3	15
2-4	17
3-4	10
4-5	15

OR

Q. 4 [A] For the following information find Expected times of the activities and prepare a PERT chart. Determine also critical path. [10]

JOB	Optimistic Time	Most Likely Time	Pessimistic Time
1-2	7	12	13
1-3	7	10	12
2-5	8	13	15
3-5	10	12	22
3-6	10	14	18

Q. 4 [B] Objective (Multiple Choice Questions)

[06]

1. PERT is used for:

- a) Routine jobs
- b) Research & development projects
- c) Daily maintenance work
- d) Production planning

2. The objective function in LPP represents:

- a) Constraints
- b) Decision variables
- c) Goal of the problem
- d) Inequalities

(P.T.O)

E675-4

**3. In graphical LPP, maximum number of decision variables allowed is:**

- a) 3
- b) 2
- c) 4
- d) Unlimited

**4. Assignment problem deals with:**

- a) Maximizing costs
- b) Assigning jobs to machines
- c) Network diagrams
- d) Transportation cost

**5. Replacement models are used when items deteriorate due to:**

- a) Inflation
- b) Economic policy
- c) Wear and tear
- d) Government rules

**6. Which method is used to find the initial feasible solution in transportation?**

- a) MODI
- b) Simplex
- c) Northwest Corner Rule
- d) VAM

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