



Seat No. : _____

NN-104

November-2025

Integrated B.Com. LL.B. (Hons.), Sem.-III

IL B.Com.-202 : Statistics

Time : 2:30 Hours]

[Max. Marks : 70

1. A Factory owner wants to purchase two type of machines A and B. 4 workmen are required on machine A and 6 workmen are required on machine B. According to rules and regulations not more than 36 workmen can be engaged on each day and looking to availability of space not more than 14 machines can be kept. Profit of ₹ 40 can be earned from machine A and that of ₹ 48 can be earned from machine B. How many machines of each type should be purchased so as to earn maximum profit ? **18**

OR

1. (A) Minimize the objective function $Z = 8x + 6y$ under the following constraints : **10**

$$x, y \geq 0$$

$$4x + 2y \geq 80$$

$$2x + 4y \geq 100$$

$$2x + 2y \geq 70$$

1. (B) Give the meaning of Linear programming and discuss the users of Linear programming. **8**

2. Obtain a basic feasible solution of the following transportation problem by North-West corner rule, least cost method and Vogel's Approximation method. **18**

Origins	Destinations				Supply
	P	Q	R	S	
A	5	10	6	13	10
B	9	7	2	3	7
C	3	11	8	13	3
Demand	6	7	5	2	

OR

2. (A) Obtain solution of the following transportation problem by any two methods. **10**

Origins	Destinations				Supply
	D1	D2	D3	D4	
Q1	5	4	6	5	20
Q2	8	7	6	4	30
Q3	7	6	5	8	40
Q4	9	8	7	4	10
Demand	30	30	25	15	

2. (B) What is transportation problem ? Explain the mathematical form of transportation problem. **8**

3. A company has 5 jobs to be done on 5 machines. The following matrix shows the return in ₹ of assigning i^{th} machine ($i = 1, 2, \dots, 5$) to j^{th} Job ($j=1, 2, \dots, 5$). Assign the five jobs to the five machines so as to maximise the total profit. **18**

Machines	Jobs				
	a	b	c	d	e
1	12	18	20	8	20
2	20	4	8	1	16
3	21	7	13	10	17
4	2	18	21	16	16
5	9	13	20	15	19

OR

3. (A) Four persons are available to do four different jobs. From past records, the time (in hours) that each person takes to do each job is known, and is given in the following table : **10**

Person	Job			
	I	II	III	IV
A	26	28	4	15
B	19	17	38	18
C	26	24	11	13
D	10	19	15	8

Find assignments of persons to jobs that will minimize the total time required.

3. (B) Following table gives the running cost per year and resale price of a certain equipment whose purchase price is ₹ 5,000. At what year is the replacement due ? **8**

Year	1	2	3	4	5	6	7	8
Maintenance Cost	1500	1600	1800	2100	2500	2900	3400	4000
Resale Value	3500	2500	1700	1200	800	500	500	500

4. A project is divided into five activities. The estimated time for each activity is given below. Draw PERT diagram after finding out expected time : 10

Activity	Sequence	Optimistic Time	Most likely Time	Pessimistic Time
a	1-2	7	12	13
b	1-3	7	10	12
c	2-5	8	13	15
d	3-5	10	12	22
e	5-6	10	14	18

OR

- Prepare a PERT-diagram for the following project and determine critical path 10

Activity	Time (hours)
1-2	13
2-4	12
2-3	13
3-4	10
3-5	13
4-5	17
3-6	12
5-6	16
4-6	15

5. MCQs : 6

- (1) In Linear Programming, $x \geq 0$ and $y \geq 0$ are called _____
- (A) Non-negativity constraints
 (B) Zero Condition
 (C) Objective Function
 (D) None of these
- (2) To solve transportation problem, _____ method is best method.
- (A) North-west corner rule
 (B) Hungarian
 (C) Vogel's
 (D) Metric-Minima
- (3) In transportation problem having m rows and n column then no. of possible feasible solution _____.
- (A) $m = n$
 (B) $m + n - 1$
 (C) $m + n$
 (D) None of these

- (4) Hungarian method is used to solve _____ problem.
- (A) Transportation
 - (B) Assignment
 - (C) Linear programming
 - (D) Replacement
- (5) Who developed a technique CPM ?
- (A) U.S. Navy
 - (B) Walker
 - (C) Vogel
 - (D) Kelley
- (6) In PERT diagram, Dummy activity is represented by _____.
- (A) Dotted Arrow
 - (B) Dotted Line
 - (C) Straight Arrow
 - (D) None of these
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