NP – 397

V Semester B.B.A. Examination, January/February 2025
(NEP Scheme)
(Freshers/Repeaters)
AVIATION MANAGEMENT
5.1 : Operation Research

Time : 2½ Hours Max. Marks : 60

***Instruction** : Answers should be written in **English** only.*

SECTION – A

Answer **any 6** questions out of 8 questions. **(6×2=12)**

1. a) Differentiate between pure and mixed strategies in game theory.
   b) Expand PERT and CPM.
   c) What is the objective of linear programming ?
   d) Define the term "initial basic feasible solution".
   e) What do you mean by basic feasible solution ?
   f) What is meant by 2 person game ?
   g) List the advantages of PERT.
   h) What is time scale analysis ?

SECTION – B

Answer **any 3** questions out of 5 questions. **(3×4=12)**

2. A small manufacturer employs 5 skilled men and 10 semi skilled men and makes an article in 2 qualities, a deluxe model and an ordinary model, the making of deluxe model requires 2 hours work by skilled man and 2 hours work by semi skilled man. The ordinary model requires 1 hour work by a skilled man and 3 hours work by semi skilled man. By union rules no man can work for more than 8 hours per day. The manufacturers clear profit of the deluxe model in ₹ 10 and ordinary model by ₹ 8. Formulate the model of the problem.

P.T.O.

3. Given the following transportation problem, find the Initial Basic Feasible Solution (IBFS) using North West Corner Rule.

	Factory 1	Factory 2	Factory 3	Supply
Warehouse A	5	8	6	70
Warehouse B	3	6	4	60
Warehouse C	7	2	5	50
Demand	60	70	50	

4. Solving a 2 × 2 game using graphical solution.

	Column 1	Column 2
Row 1	3	1
Row 2	2	4

5. Define the following types of queuing system in queuing theory.
   - M/M/1 Queue
   - M/M/c Queue

6. Define and differentiate between early start, late start, early finish, late finish in project scheduling.

SECTION – C

Answer **any 3** questions out of 5 questions. **(3×12=36)**

7. Problem statement : A company spends its marketing budget on two types of campaigns : Online campaigns and print campaigns. The company has a total budget of ₹ 2,00,000. Each online campaign costs ₹ 20,000 and each print campaign costs ₹ 10,000. The company expects a return of ₹ 5,000 per online campaign and ₹ 2,000 per print campaign. The company wants to maximize its return on investment while keeping within the budget. Formulate linear programming problem and solve it using graphical method.

8. Explain the following in the context of assignment problem :
   a) Balanced assignment problem.
   b) The Hungarian method.
   c) An infeasible assignment.

9. Solve the following two persons zero-sum game using the dominance property and find the optimal mixed strategies for both players.

	Column 1	Column 2	Column 3
Row 1	3	2	4
Row 2	1	5	2
Row 3	2	3	3

10. The following table provides the time duration and precedence relationships for the activities in a project; calculate total duration, slack and critical path.

Activity	Duration (in days)	Predecessor (s)
A	6	–
B	3	A
C	4	A
D	5	B
E	2	C
F	8	D, E

11. In a project, the following activities have uncertain durations. Use PERT to calculate the probability of completing the project in 15 days.

Activity	Optimistic (O)	Most likely (M)	Pessimistic (P)
A	3	5	7
B	2	4	6
C	4	5	8
D	2	3	5
E	1	3	4

Task :

- Calculate the expected duration (TE) and standard deviation (σ) for each activity.
- Find the critical path and the variance of total project duration.
- Calculate the probability of completing the project in 15 days or less using a normal distribution.