CBCS SCHEME

USN | | | | | | | | | | |

18MN71

Seventh Semester B.E. Degree Examination, July/August 2022
Mine System Engineering

Time: 3 hrs.

Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1   a.   Explain the following with examples : i) The Maximax decision Criterion
          ii)   The Minimax decision Criterion   iii) The Maximin decision Criterion.   **(12 Marks)**
    b.   Explain : i) Opportunity loss table   ii) Pay off table   iii) Event   iv) Decision maker.
                                                                                            (08 Marks)

OR

2   a.   By Graphical method, Solve the following LPP :
          Max $Z = 3x_1 + 4x_2$
          Subject to $5x_1 + 4x_2 \leq 200$
          $\qquad\qquad 3x_1 + 5x_2 \leq 150$
          $\qquad\qquad 5x_1 + 4x_2 \geq 100$
          $\qquad\qquad 8x_1 + 4x_2 \geq 80 \qquad \& \;\; x_1 , x_2 \geq 0.$ **(10 Marks)**
    b.   Use Simplex method to solve the LPP
          Max $Z = 3x_1 + 2x_2$
          Subject to $x_1 + x_2 \leq 4$
          $\qquad\qquad x_1 - x_2 \leq 2$
          $\qquad\qquad x_1 , x_2 \geq 0.$ **(10 Marks)**

Module-2

3   a.   Use Penalty method to Maximize $Z = 6x_1 + 4x_2$
          Subject to the constraint $2x_1 + 3x_2 \leq 30$
          $\qquad\qquad\qquad 3x_1 + 2x_2 \leq 24$
          $\qquad\qquad\qquad x_1 + x_2 \geq 3$
          $\qquad\qquad\qquad x_1 , x_2 \geq 0.$ **(10 Marks)**
    b.   Explain the steps involved in two phase Simplex method.   **(10 Marks)**

OR

4   a.   Explain the types of Inventory.   **(10 Marks)**
    b.   Explain the Inventory Cost Associated with keeping inventories of items.   **(10 Marks)**

Module-3

5   a.   Find Initial Basic Feasible solution by NWC method and optimize by U – V method.

3	1	7	4	250
2	6	5	9	350
8	3	3	2	400
200	300	350	150	

(12 Marks)

b. Find the Initial basic feasible solution for the following transportation problem by VAM.

11	13	17	14	250
16	18	14	10	300
21	24	13	10	400
200	225	275	250	

(08 Marks)

OR

6 a. List out the difference between Transportation problem and Assignment problem. (04 Marks)

b. Solve the following Assignment problem in order to minimize the total cost.

	M_1	M_2	M_3	M_4
J_1	5	7	11	6
J_2	8	5	9	6
J_3	4	7	10	7
J_4	10	4	8	3

(08 Marks)

c. A travelling salesman has to visit 5 Cities. He wishes to start from a particular City, visit each City once and then return to his starting point. Cost of going from one City to another is shown. Find the Least Cost route.

	A	B	C	D	E
A	∞	4	10	14	2
B	12	∞	6	10	4
C	16	14	∞	8	14
D	24	8	12	∞	10
E	2	6	4	16	∞

(08 Marks)

Module-4

7 The following table shows the jobs of a Project with their duration in days. Draw the network and determine the critical path. Also calculate all the floats.

Jobs	1-2	1-3	1-4	2-5	3-7	4-6	5-7	5-8	6-7	6-9	7-10
Duration	10	8	9	8	16	7	7	7	8	5	12

Jobs	8-10	9-10	10-11	11-12
Duration	10	15	8	5

(20 Marks)

OR

8 a. Explain the steps involved in Project Scheduling. (06 Marks)

b. Explain the following terms related to PERT and CPM :
i) Network   ii) Activity   iii) Total float   iv) Free float   v) Critical path
vi) Optimistic time   vii) Pessimistic time. (14 Marks)

Module-5

9 a. Explain the following related to Queuing System :
i) Input (Arrival pattern).
ii) Service Mechanism (Service pattern)
iii) Queue discipline.
iv) Customer's behavior. (12 Marks)

b. In a Mine face, dumpers arrive at a rate of 30 per day. Assuming that inter arrival time and the service time distribution follows an exponential distribution with an average of 30 minutes Calculate the following :
   i)   The Mean queue size.
   ii) The Probability that queue size exceeds 10.
   iii) If the input of the train increases to an average of 33 per day, what will be the changes in (i) and (ii)?   (08 Marks)

OR

10 a. Solve the following Payoff matrix, determine the optimal strategies and the value of game.

$$A\begin{array}{c}\quad B\\\begin{bmatrix}5 & 1\\3 & 4\end{bmatrix}\end{array}.$$ (10 Marks)

   b. Explain the following terms related to Game Theory :
   i)   Pure strategy.
   ii) Mixed strategy.
   iii) Two person zero sum game.
   iv) Saddle point.
   v)   Game.   (10 Marks)

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