CBCS SCHEME

USN | | | | | | | | | |

17MN751

Seventh Semester B.E. Degree Examination, Jan./Feb. 2021
Mine Systems 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 in detail the scope, characteristics and phase of Mine System Engineering. **(10 Marks)**

b. Solve the following by Graphical method :

Max $Z = 3000x_1 + 2000x_2$

subject to $x_1 + 2x_2 \leq 6$

$2x_1 + x_2 \leq 8$

$x_2 \leq 2$

$x_2 - x_1 \leq 1$

$x_1, x_2 \geq 0$ **(10 Marks)**

OR

2 a. Explain the models in system analysis. **(10 Marks)**

b. Solve following by Simplex method

Min $Z = x_2 - 3x_3 + 2x_5$

subject to $3x_2 - x_3 + 2x_5 \leq 7$

$-2x_2 + 4x_3 \leq 12$

$-4x_2 + 3x_3 + 8x_5 \leq 10$

$x_2, x_3, x_5 \geq 0$ **(10 Marks)**

Module-2

3 a. Use dual simplex to solve the LPP

Min $Z = 2x_1 + x_3$

subject to $x_1 + x_2 - x_3 \geq 5$

$x_1 - 2x_2 + 4x_3 \geq 8$

$x_1, x_2, x_3 \geq 0$ **(10 Marks)**

b. Explain the simulation techniques for equipment selection and production scheduling. **(10 Marks)**

OR

4 a. Explain deterministic models. Probabilistic models and their applications to mining. **(10 Marks)**

b. Write the dual of the following LPP and Solve it. Hence find the solution to the primal.

Max $Z = 4x_1 + 2x_2$

subject to $x_1 + x_2 \geq 3$

$x_1 - x_2 \geq 2$

$x_1, x_2 \geq 0$ **(10 Marks)**

Module-3

5 a. Find initial feasible solution and then optimize by MODI method.

origin \ Destination	P	Q	R	Supply
A	5	7	8	70
B	4	4	6	30
C	3	7	7	50
Demand	65	42	43	

(10 Marks)

b. Solve the following transportation problem.

	D_1	D_2	D_3	D_4	D_5	supply
S_1	4	2	3	2	6	8
S_2	5	4	5	2	1	12
S_3	6	5	4	7	3	4
Demand	4	4	6	8	8	

(10 Marks)

OR

6 a. A company has 4 salesmen A, B, C and D. These salesmen are to be allotted 4 cities 1, 2, 3 and 4. The estimated profit per day for each salesman in each city if given in the following table :

	1	2	3	4
A	16	10	14	11
B	14	11	15	15
C	15	15	13	12
D	13	12	14	15

What is the optimum assignment which will yield maximum profit? **(10 Marks)**

b. Solve the following travelling salesman job.

from city \ To city	1	2	3	4	5
1	-	10	25	25	10
2	1	-	10	15	2
3	8	9	-	20	10
4	14	10	24	-	15
5	10	8	25	27	-

(10 Marks)

Module-4

7 A project consists of the following jobs and their duration.

Activity	Precedence	Duration (in days)
A	-	10
B	A	9
C	A	6
D	B	7
E	B	5
F	C, D	9
G	E, F	8

i) Draw a network diagram
ii) Identify the critical path
iii) find the project duration
iv) calculate the floats – Total, Free, Independent and Interference
v) Compute Slack time for each event. **(20 Marks)**

OR

8 The three times estimates of a certain project are given below:

Activity	Time optimist	Time Normal	Time Pessimistic
0 – 1	2	3	4
1 – 3	15	16	17
1 – 2	3	6	9
1 – 4	6	10	14
2 – 3	4	8	12
3 – 4	3	5	7
4 – 5	2	3	4

i) Draw network, find the control path
ii) If the scheduled time for the end event is equal to the earliest expected time of the last event, find the probability of completion of project work
iii) If the scheduled time is 28 days, find the probability of completion of the project work.

(20 Marks)

Module-5

9 a. Explain the characteristics of Queuing system. **(10 Marks)**

b. Solve the following (2 × 4) game by graphical method

		B			
		I	II	III	IV
A	I	2	2	3	-1
	II	4	3	2	6

(10 Marks)

OR

10 a. With the help of Kendall's Notation, explain the birth and death model. **(10 Marks)**

b. Solve the following problem by using Dominance principle

		Player B				
		B_1	B_2	B_3	B_4	B_5
Player A	A_1	2	4	3	3	4
	A_2	5	6	3	7	8
	A_3	6	7	9	8	7
	A_4	4	2	8	4	3

(10 Marks)

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