CBCS SCHEME

USN | | | | | | | | | |

17MN751

Seventh Semester B.E. Degree Examination, July/August 2021
Mine System Engineering

Time: 3 hrs. Max. Marks: 100

Note : ***Answer any FIVE full questions.***

1 a. Explain Maximax Criterion and Minimax Criterion with example. **(10 Marks)**

b. Define i) Events ii) Pay off table iii) Feasible solution iv) Redundant constraint v) Unbounded solution. **(10 Marks)**

2 a. Solve by Graphical method.

Max. $Z = 3x_1 + 5x_2$

Subject to the constraint $x_1 + 2x_2 \leq 2000$

$x_1 + x_2 \leq 1500$

$x_2 \leq 600$

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

b. Solve by Simplex method

Max. $Z = x_2 - 3x_3 + 2x_5$

Subject to the constraint $3x_2 - x_3 + 2x_5 \leq 7$

$-2x_2 + 4x_3 \leq 12$

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

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

3 a. Solve by Big – M method

Min $Z = 2x_1 + x_2$

Subject to the constraint $3x_1 + x_2 = 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 3$

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

b. Solve by two phase method.

Max. $Z = -4x_1 - 3x_2 - 9x_3$

Subject to the constraints $2x_1 + 4x_2 + 6x_3 \geq 15$

$6x_1 + x_2 + 6x_3 \geq 12$

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

4 a. Explain the types of Inventory. **(10 Marks)**

b. Define i) Inventory ii) Shortage cost iii) Lead time iv) Demand v) Recorder level. **(10 Marks)**

5 a. Compare the Initial Basic feasible solution by North West Colour method , Least Cost method and Vogel's approximation method for the given transportation problem. Table 5(a).

	D_1	D_2	D_3	D_4	Supply
O_1	6	4	1	5	14
O_2	8	9	2	7	16
O_3	4	3	6	2	5
Demand	6	10	15	4	

Table 5(a)

(10 Marks)

b. Find Initial basic solution by NWC method and optimize the solution by U – V method. Table 5(b).

	D_1	D_2	D_3	D_4	
O_1	3	1	7	4	250
O_2	2	6	5	9	350
O_3	8	3	3	2	400
	200	300	350	150	

Table 5(b)

(10 Marks)

6 a. 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 in Table 6(a). Find the least cost route. **(10 Marks)**

	A	B	C	D	E
A	∞	4	10	14	2
B	12	∞	6	10	4
C	16	14	∞	8	14
D	24	18	12	∞	10
E	2	6	4	16	∞

Table 6(a)

b. Four Professors are each capable of teaching anyone of the four different subjects. Class preparation time (in hours) for different topics varies from Professors to Professors and is given in Table 6(b). Each Professor should be assigned only one subject. Find the schedule so as to minimize the total subject preparation time following all subjects Professors.

	S_1	S_2	S_3	S_4
P_1	2	10	9	7
P_2	15	4	14	8
P_3	13	14	16	11
P_4	3	15	13	8

Table 6(b)

(10 Marks)

7 a. Explain different phases of Project scheduling. **(06 Marks)**

b. Different between PERT and CPM. **(08 Marks)**

c. Construct a network for the Project whose activities and their precedence relationship are given below : **(06 Marks)**

Activities	A	B	C	D	E	F	G	H	I
Predecessor	-	A	A	-	D	B, C, E	F	D	G, H

8 a. Project schedule has the characteristics shown in Table 8(a) below :

Activity	1-2	1-3	2-4	3-4	3-5	4-9	5-6	5-7	6-8	7-8	8-10	9-10
Time	4	1	1	1	6	5	4	8	1	2	5	7

Table 8(a)

i) Construct Network diagram.
ii) Compute EST & LFT for each event.
iii) Calculate EFT & LST and all floats.
iv) Find critical path and project durations. **(10 Marks)**

b. The three time estimates of a certain project are given in Table 8(b) below :
   i) Draw network diagram, find the critical 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 the project work.

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

Table 8(b)

(10 Marks)

9 a. Define i) Customer ii) Server iii) Service iv) Queue v) Arrival. **(10 Marks)**

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

10 a. In a game of matching coins, Player 'A' wins Rs 8. If both coins shown heads and Rs 1, if both are tails, Player B wins Rs 3 when coins do not match. Given the choice of being Player A or Player B, which would you choose and what would be your strategy? **(10 Marks)**

b. Use the dominance principle to solve the game given in Table 10(b) below :

	I	II	III	IV
1	20	15	12	35
2	25	14	8	10
3	40	2	19	5
4	5	4	11	0

Table 10(b)

(10 Marks)

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