



CBCS SCHEME

15MN751

Seventh Semester B.E. Degree Examination, Aug./Sept.2020 Mine System Engineering

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Define system engineering. Explain the steps involved in operations research. (07 Marks)
 b. Explain the maximax decision criteria, minimax decision criteria and maximin decision criteria. (09 Marks)

OR

- 2 a. Solve the following LPP Graphically :
 $\text{Max } Z = 5x_1 + 6x_2$
 Subject to $x_1 + 2x_2 \leq 40$
 $3x_1 + x_2 \leq 20$
 $2x_1 + 2x_2 \leq 30$
 $x_1, x_2 \geq 0.$ (12 Marks)
- b. Explain the following :
 i) Feasible solution
 ii) Degeneracy
 iii) Redundancy
 iv) Solution space. (04 Marks)

Module-2

- 3 a. Resolve Degeneracy and solve by Simplex method :
 $\text{Max } Z = 3x_1 + 9x_2$
 Subject to $x_1 + 4x_2 \leq 8$
 $x_1 + 2x_2 \leq 4$
 $x_1, x_2 \geq 0.$ (10 Marks)
- b. List the different Artificial variable technique available to solve LPP and explain the procedure of Big – M method. (06 Marks)

OR

- 4 a. Define Inventory. State reasons for maintaining inventories. (06 Marks)
 b. Explain how computer programs are used in equipment selection and martial handling in mining activities. (10 Marks)

Module-3

- 5 a. Find the initial basic feasible solution by matrix minima method and optimize by MODI – method, for the transportation problem given in the table.

	D ₁	D ₂	D ₃	D ₄	Supply
O ₁	5	8	6	6	500
O ₂	4	7	7	6	100
O ₃	8	4	6	6	400
Demand	200	300	350	150	

- b. Differentiate between transportation problem and assignment problem. (12 Marks)
 (04 Marks)

OR

- 6 a. Four projects are to be done on four computers, the cost for completing the P^{th} project on C^{th} computer is given in table. Assign the project to different computers so as to minimize the cost.

	C_1	C_2	C_3	C_4
P_1	15	11	13	15
P_2	17	12	13	13
P_3	14	15	10	14
P_4	16	13	11	17

(08 Marks)

- b. A travelling salesman has to visit 5 cities. He wishes to start from a particular city, visit each city one and then return to his starting point. Cost of going from one city to another is shown below. 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 A project consist of the following jobs and their duration.

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

- Draw the network diagram
- Identify the critical path
- Find the project duration
- Calculate floats–total, Free, independent and Interference
- Compute slack time for each event.

(16 Marks)

OR

- 8 a. Differentiate between PERT and CPM. (06 Marks)
 b. Explain the steps involved in PERT/CPM technique. (06 Marks)
 c. Define the following : (04 Marks)
 i) Network ii) Activity iii) Slack of an event iv) Critical path.

Module-5

- 9 a. State the characteristics of game theory. (06 Marks)
 b. Solve the following 2×3 game Graphically.

		Player B		
		B_1	B_2	B_3
Player A	A_1	1	3	12
	A_2	8	5	2

(10 Marks)

OR

- 10 a. List the characteristics of queueing system. (06 Marks)
 b. Explain Queue discipline and customer behavior. (10 Marks)