Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2022

Subject Code:3172212 Date:08/06/2022

Subject Name:Mine System Engineering

Time:02:30 PM TO 05:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	List the need of system engineering in mining.	**03**
	(b)	Define and explain the relation between system, sub-system and system environment.	**04**
	(c)	List the factors influencing creativity. Also explain the significance of creativity in an organization.	**07**
Q.2	**(a)**	Write a note on application of linear programming.	**03**
	(b)	Consider the following linear programming problem: Maximize Z=3x+2y Such that, 3x+2y>=15, 2x+3y<=6, x>=0 and y>=0. Find the solution for the above LPP.	**04**
	(c)	Explain the process of solving a LPP using Simplex method.	**07**
		OR	
	(c)	Compare CPM and PERT.	**07**
Q.3	**(a)**	Define: i. Basic feasible solution ii. Optimal solution	**03**
	(b)	Explain the use of transportation model.	**04**
	(c)	Draw the network diagram and determine the critical path for the following project:	**07**

Activity	Time estimate (weeks)
1-2	5
1-3	6
1-4	3
2-5	5
3-6	7
3-7	10
4-7	4
5-8	2
6-8	5
7-9	6
8-9	4

OR

Q.3	**(a)**	List the advantages of PERT.	**03**
	(b)	Explain the application of assignment model.	**04**
	(c)	Information on activity-time duration of a project is provided:	**07**

Activity	Predecessor event	Successor event	Estimated time duration (weeks)		
			Pessimistic	Most likely	Optimistic
A	1	2	20	15	4
B	1	3	12	8	4
C	2	3	16	11	6
D	3	4	20	13	12
E	2	4	13	8	3
F	1	4	45	35	25

Calculate the expected project duration in weeks.

Q.4 **(a)** Write a note on application of network models in mining. **03**

(b) Discuss the scope and limitations of simulation. **04**

(c) An assignment problem is given below with the cost of assignment as shown below: **07**

Task / Group	T1	T2	T3	T4
G1	6	10	5	4
G2	4	100	6	4
G3	6	9	6	2
G4	3	7	6	4

If only one task can be assigned to one group, calculate the minimum cost of the assignment.

OR

Q.4 **(a)** Define: **03**

i. Dummy activity
ii. Critical activity
iii. Slake time

(b) Explain EOQ model. **04**

(c) A firm manufactures 3 products A, B and C. the profits are Rs. 3, Rs. 2 and Rs. 4 respectively. The firm has two machines M1 and M2 and below is the required processing time in minutes for each machine on each product. **07**

		Product		
		A	B	C
Machine	M1	4	3	5
	M2	2	2	4

Machines M1 and M2 have 2000 and 25000 machine-minutes respectively. The firm must manufacture 100 A's, 200 B's and 50 C's but not more than 150 A's. Set up an LPP to maximize profit.

Q.5 **(a)** List the factors to consider for designing an inventory model. **03**

(b) Write a note on minimal spannial tree network model. **04**

(c) Discuss Monte-Carlo simulation system. **07**

OR

Q.5 **(a)** Write a note on components of inventory model. **03**

(b) Write a note on system type vs. simulation technique. **04**

(c) Discuss the key parameters of inventory management. **07**

****