Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 161601 **Date: 12/05/2017**

Subject Name: Modelling, Simulation and Operations Research

Time: 10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Define Operation Research. Write Operation Research Approach to solve problem **07**

(b) Distinguish between transportation model and assignment Model. **07**

Q.2 **(a)** Write the full form of PERT and CPM and give the differences between PERT and CPM **07**

(b) Formulate following Problem as Linear Programming Problem **07**

A firm manufactures three products A,B and C. The profits are Rs. 3, Rs. 2 and Rs.4 respectively. The firm has two machines and required processing time in minutes for each machine on each product is given below

		Product		
		A	B	C
Machine	C	4	3	5
	D	2	2	4

Machines C and D have 2000 and 2500 machine minutes respectively. The firm must manufacture 100 A's, 200 B's and 50 C's but no more than 150 A's.

OR

(b) Solve Following L.P problem with graphical method. **07**

Maximize : $Z = 5X_1 + 3X_2$

$3X_1 + 5X_2 \leq 15$

$5X_1 + 2X_2 \leq 0$ Where $X_1, X_2 \geq 0$

Q.3 **(a)** Find Solution of Following Transportation Problem with North West Corner Method, Least Cost Method. **07**

	A	B	C	D	E	Supply
	2	11	10	3	7	4
	1	4	7	2	1	8
	3	9	4	8	12	9
Demand	3	3	4	5	6	

(b) What is an assignment model? Discuss practical application related to IT field of assignment problem. **07**

OR

Q.3 **(a)** What do you mean by random number? Explain the same with its applications and also describe the method to generate such numbers. **07**

(b) Describe Vogel's approximation method with example. **07**

Q.4	**(a)**	What is the function of slack, surplus and artificial variables in simplex procedure of LPP?	**07**
	(b)	Describe BIG-M method with example.	**07**
		OR	
Q.4	**(a)**	What is replacement problem? Describe some important replacement situations and policies.	**07**
	(b)	Define Minimum Spanning Tree. Explain one algorithm for generating MST with example.	**07**
Q.5	**(a)**	Discuss various Queuing models. Also state the scope and applicability of queuing theory in IT field.	**07**
	(b)	Explain the phases of a simulation model.	**07**
		OR	
Q.5	**(a)**	Describe Group replacement method with example.	**07**
	(b)	Describe various phases of Operation Research.	**07**

****