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

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 2163201 **Date: 27/04/2017**

Subject Name: Operation 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.**

MARKS

Q.1 **Short Questions** **14**

1 The scientific method in O.R. study generally involves
A. Judgment Phase B. Research Phase
C. Action Phase D. All of the given
E. None of the given

2 In a departmental store customers arrive at a rate of 20 customers per hour. The average number of customers that can be handled by cashier is 24 per hour. Probability that cashier is idle?
A. 1 B. 1/6 C. 5 D. 5/6

3 A constant service time means that there is a constant time between each service.
A. True B. False

4 Research is
A. Searching again and again
B. Finding solution to any problem
C. Working in a scientific way to search for truth of any problem
D. None of the above

5 The assignment model is a special case of the _____ model.
A. Maximum-flow B. Transportation
C. Shortest-route D. none of the above

6 A _____ probability is the probability that an event will occur given that another event has already occurred.
A. subjective B. objective C. conditional D. binomial

7 Which of the following is not a major requirement of a Linear Programming Problem?
A. There must be alternative course of action among which to decide
B. An objective for the firm must exist
C. The problem must be of maximization type
D. Resources must be limited

8 What is meant by 'Payoffs' in Game Theory?
A. Outcome of a game when different alternatives are adopted by players
B. No. of players involved in a game
C. Value of a game
D. Strategies used by players

9 The more complex waiting line problems can almost always be handled by:
A. Mathematical models B. Queuing models
C. Linear programming D. Computer simulation

10 Queue discipline refers to the amount of patience possessed by the customer.

A. True B. False

11 Which of the following is the most common queue discipline?

A. Shortest processing rule
B. First-come first-served
C. Longest processing rule
D. Minimum slack time

12 Which of the following assertations is true of an optimal solution to a Linear Programming Problem?

A. Every LP has an optimal solution
B. The optimal solution always occur at extreme points
C. If an optimal solution exists, there will always be at least one at a corner
D. All of the given

13 To find the optimum route ___ is used

A. Transportation B. Assignment
C. Pert_cpm D. All of the above

14 _____ of an event is the difference between its latest occurrence time and its earlier occurrence time

A. Float B. Slack C. (A) and (B) Both D. None of these

Q.2 **(a)** Discuss in brief the areas of application of Operation Research. **03**

(b) Write note on scope of Operation research in the various sector. **04**

(c) Find the minimize value of following LPP using graphical approach **07**

Z= -X1+2X2
S/t, –X1+3X2=10
X1+X2<=6
X1-X2 <=2 and X1, X2 >=0

OR

(c) Solving the Following LPP using Simple Method **07**

Maximize Z=3X1+5X2 Subject to
X1+2X2 >= 2000
X1+X2 >= 1500
X2 =600
X1 =0; X2 =0; and X1, X2>=0

Q.3 **(a)** Classify the Assignment problems in detail. **03**

(b) Illustrate graphically; **04**

(a) No-feasible solution
(b) Unbounded solution.

(c) Solve the following linear programming problem using Big-M Method **07**

Minimize: Z = 7X1 + 15X2 + 20X3
Subject to
2X1+4X2+6X3 >= 24
3X1 + 9X2 +6X3 >= 30 X1, X2 and X3 >= 0

OR

Q.3 **(a)** What is the degeneracy in simplex method? How it can be resolved? **03**

(b) Explain the following term in the context of game theory **04**

(a) Saddle point (b) Two persons Zero-sum game

(c) Solve the following linear programming problem using Two-Phase Method **07**

Minimize: Z = 12X1 + 15X2 + 9X3
Subject to

8X1+16X2+12X3 = 250
4X1 + 8X2 +6X3 + 10X2 = 80
7X1 + 9X2 +6X3 + 8X2 = 105 X1 X2 and X3 = 0

Q.4 **(a)** Explain the meaning of following items in inventory management; **03**
a. Re-order Level b. Buffer Stock

(b) Explain the various elements of queuing system. **04**

(c) A firm is considering replacement of machine whose cost price is Rs 12,000 and scrap valve is Rs 200. The maintenance cost are as follows: **07**

Year	1	2	3	4	5	6	7	8
Maintenance Cost	200	500	800	1200	1800	2500	3200	4000

OR

Q.4 **(a)** What is degeneracy in transportation problems? **03**

(b) Define: Event, Dummy activity, Free float **04**

(c) At a certain petrol pump, customers arrive in a passion process with an average time of 5 minutes between successive arrivals. The time taken at the petrol pump to serve the customers. Follows exponential distribution with an average of the 2 minutes. **07**
a. Arrival and service rate
b. The utilization parameter
c. Probability that there shall be for customers in the system.

Q.5 **(a)** What is the meaning float in project management? State the various types float **03**

(b) Define the following dynamic programming terms: **04**
a. Decision variable
b. Immediate return
c. Optimal return

(c) Explain steps in Monte Carlo simulation process. **07**

OR

Q.5 **(a)** Explain the terms: State, Stage and Policy **03**

(b) Explain Bellman's Principle of Optimality and Explain: Transformation function and Return function. **04**

(c) Define Simulation, explain methodology of simulation in brief and give its advantages and disadvantages. **07**

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