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

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 2172004 **Date: 06/05/2017**

Subject Name: Production Optimization Techniques

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.**

Q.1 **(a)** A manufacturing company is engaged in producing three types of products: A, B and C. The production department produces, each day, components sufficient to make 50 units of A, 25 units of B and 30 units of C. The management is confronted with the problem of optimizing the daily production of products in assembly department where only 100 man hours are available daily to assemble the products. The following additional information is available: **07**

Type of product	Profit contribution per unit of product (Rs.)	Assembly time per product (hrs)
A	12	0.8
B	20	1.7
C	45	2.5

The company has a daily order commitment for 20 units of A and a total of 15 units of B and C. Formulate this problem as an LP model so as to maximize the total profit.

(b) Discuss the importance of Primal and Dual problem along with Sensitivity Analysis in Linear programming? **07**

Q.2 **(a)** "A Transportation problem cannot be solved using Simplex Method". Evaluate. **07**

(b) Maximize **07**

$Z = 3X_1 + 5X_2 + 4X_3$

Subject to Constraints $2X_1 + 3X_2 \leq 8$

$2X_2 + 5X_3 \leq 10$

$3X_1 + 2X_2 + 4X_3 \leq 15$

$X_1, X_2, X_3 \geq 0$

OR

(b) What is the logic of introducing an artificial variable in a simplex Table? Describe the two phase process of solving an LPP by simplex method. Why is a solution containing an artificial variable considered as an Infeasible solution? **07**

Q.3 **(a)** Differentiate between the following terms: **07**

1. Logical and Identity Dummy
2. Earliest starting time (EST) & Latest starting time (LST)
3. Earliest finishing time (EFT) & Latest finishing time (LFT)
4. Merge and Burst event

(b) Explain the significance and types of floats used in network analysis. **07**

OR

Q.3 **(a)** Differentiate between CPM and PERT techniques. **07**

(b) "Crashing, Resource leveling and Resource Smoothing can be considered as Sensitivity analysis of Networks". Evaluate. **07**

Q.4 **(a)** Explain the techniques of assigning different wok to operators. Discuss the advantages of Hungarian Assignment method. **07**

(b) A department has 5 employees with five jobs to be performed. The time in Hours each men will take to perform each job is given in the effectiveness matrix. **07**

	I	II	III	IV	V
A	10	5	13	15	16
B	3	9	18	13	6
C	10	7	2	2	2
D	7	11	9	7	12
E	7	9	10	4	12

How should the jobs be allocated so as to minimize the total man hours?

OR

Q.4 **(a)** "An assignment problem can be easily and effectively solved using Transportation technique" Evaluate. **07**

(b) Explain the techniques used for solving a transportation problem. **07**

Q.5 **(a)** What is the significance of Decision Theory? Explain the Kendalls notation for Queuing models. **07**

(b) What is a replacement problem? Explain the situations which makes the replacement of items necessary. **07**

OR

Q.5 **(a)** Define : **07**

(i) Lead time
(ii) Reorder time
(iii) Buffer stock

(b) Explain the Johnson rule of sequencing for n jobs 3 machine problem. Justify the rule with a proof. **07**

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