Roll No. ....

ME-701

B. E. (Seventh Semester) EXAMINATION, June, 2010

(Mechanical Engg. Branch)

INDUSTRIAL ENGINEERING AND

OPERATIONS RESEARCH

(ME – 701)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Define Productivity. Differentiate between partial productivity and total productivity.   6

   (b) What is work study ? State the advantages of work study.   8

   (c) Explain the basic procedure of method study.   6

2. Write short notes on the following :   20

   (i) Standard time and allowance
   (ii) Types and procedure of work sampling
   (iii) Simo chart and its advantage
   (iv) Purpose of PMTS

3. (a) What are the characteristic features that differentiate man-machine system from non man-machine system ? 8

   (b) What is the importance of ergonomics ?   5

   (c) What do you mean by fatigue ? Discuss the cause of industrial fatigue.   7

P. T. O.

4. (a) What is supply chain management ? How is it useful in increasing the productivity of an industry ?   10

   (b) What is Business process outsourcing ? Discuss the advantages and disadvantages associated with it.   10

5. (a) What are the essential characteristics of Linear Programming model ?   4

   (b) A company manufactures two products, radio and transistors which are processed through assembly and finishing department. Assembly has 90 hours available and finishing can handle up to 72 hours of work. Manufacturing one radio requires 6 hours in assembly and 3 hours in finishing. Each transistor requires 3 hours in assembly and 6 hours in finishing. If profit is Rs. 150 per radio and Rs. 90 per transistor, determine the best combination of two products to realize a maximum profit of Rs. 2,100.   16

6. A product is produced by four factories A, B, C and D. The unit production costs for them are Rs. 2, Rs. 3, Re. 1 and Rs. 5 respectively. The production capacities of factories are A—50 units, B—70 units, C—30 units and D—50 units. The factories supply the product to four stores, demands of which are 25, 35, 105 and 20 units respectively. Unit transportation cost of product from each factory to each store is given in the following table :

Stores / Factory	1	2	3	4
A	2	4	6	11
B	10	8	7	5
C	13	3	9	12
D	4	6	8	3

Determine the extent of deliveries from each of the factory to each of the stores so that the total production and transportation cost is minimum.   20

7. (a) Differentiate between AOA and AON diagrams.   3

   (b) Draw the network for the following project and compute the earliest and latest time for each event and also find the critical path :   17

Activity	Immediate Predecessor	Time (Days)
1—2	—	5
1—3	—	4
2—4	1—2	6
3—4	1—3	2
4—5	2—4 & 3—4	1
4—6	2—4 & 3—4	7
5—7	4—5	8
6—7	4—6	4
7—8	6—7 & 5—7	3

8. Write short notes on any *four* of the following :   20

   (i) Performance rating

   (ii) Third Party Logistics

   (iii) National Productivity

   (iv) Big M Method

   (v) Crushing of Network