

M.B.A. (E) SEM-IV (2 YEAR COURSE) : WINTER - 2017

SUBJECT: ELECTIVE –II: c) OPERATIONS RESEARCH
(PRODUCTION MANAGEMENT)Day: **Wednesday**
Date: **20/12/2017**Time: **02.00 P.M. TO 05.00 P.M.**
Max. Marks: 70**W-2017-4390****N.B.:**

- 1) Attempt any **FOUR** questions from Section –I and any **TWO** questions from Section– II.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.
- 4) Use of non- programmable **CALCULATOR** is allowed.

SECTION-I

- Q.1** Explain sensitivity Analysis. (10)
- Q.2** Describe GOLF analysis in Inventory Control Techniques. (10)
- Q.3** Explain the Replacement Problems with examples. (10)
- Q.4** A warehouse has only one loading dock manned by a three person crew. Trucks arrive at the loading dock at an average of 4 trucks per hour and the arrival rate is Poisson distributed. The loading of a truck takes 10 minutes on an average and can be assumed to be exponentially distributed. The operating cost of a truck is Rs. 20 per hour and the members of the loading crew are paid Rs. 6 each per hour. Would you advise the truck owner and to add another crew of three persons? (10)
- Q.5** Write short notes on any **TWO** of the following: (10)
- a) Parametric programming
 - b) ABC Analysis
 - c) Queuing Process

SECTION-II

- Q.6** A research and development department is developing a new power supply for a console television set. It has broken the job down into the following: (15)

Job	Description	Immediate predecessors	Time (day)
A	Determine output voltages	-	5
B	Determine whether to use solid state rectifiers	A	7
C	Choose rectifier	B	2
D	Choose filters	B	3
E	Choose transformer	C	1
F	Choose chassis	D	2
G	Choose rectifier mounting	C	1
H	Layout chassis	E, F	3
I	Build and test	G, H	10

- i) Draw the network diagram of activities involved in the project and indicate the critical path.
- ii) What is the minimum completion time for the project?

P. T. O.

Q.7 Use Dynamic Programming to solve the following linear programming (15)
problem.

$$\text{Max. } Z = 3x_1 + 7x_2$$

Subject to the constraints

$$i) x_1 + 4x_2 \leq 8,$$

$$ii) x_2 \leq 2$$

$$\text{and } x_1, x_2 \geq 0.$$

Q.8 The operations Research team of the ABC Company has come up with the (15)
mathematical data (daily basis) needed for two products which the firm
manufactures. It also has determined that this is a non-linear programming
problem, having linear constraints and objectives function which is the sum
of a linear and a quadratic form. The relevant data, gathered by the OR term
are:

$$\text{Maximize (contribution)} = 12x + 21y + 2xy - 2x^2 - 2y^2$$

Subject to the constraints

$$i) 8 - y \geq 0$$

$$ii) 10 - x - y \geq 0$$

$$\text{and } x, y \geq 0$$

Find the maximum contribution and number of units that can be expected for
these two products which are a part of the firm's total output. (x and y
represent the number of units of the two products)

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