M.B.A. DEGREE EXAMINATION, JUNE 2017.

Second Semester

Business Administration

OPERATIONS MANAGEMENT

Time : Three hours   Maximum : 100 marks

SECTION A — (5 × 6 = 30 marks)

Answer any FIVE questions.

1. What are the factors that affect plant location decisions?

2. What is meant by aggregate planning?

3. What are the limitations of operations research?

4. State the phases of OR and its significance in decision making.

5. Find the duality of the following :
   Minimize $Z = 4x_1 + 3x_2$

   Subject to the constraints $x_1 + 3x_2 \geq 9$

   $$2x_1 + 3x_2 \geq 12$$
   $$x_1 + x_2 \geq 5$$
   $$x_1, x_2 \geq 0.$$

6. Discuss the steps in obtaining the initial feasible solution using north west corner rule.

Activity	Preceding activity (ies)	Time estimates (weeks)		
		Most optimistic	Most likely	Most pessimistic
A	-	2	4	6
B	-	6	6	6
C	-	6	12	24
D	A	2	5	8
E	A	11	14	23
F	B, D	8	10	12
G	B, D	3	6	9
H	C, F	9	15	27
I	E	4	10	16

(a) Show the PERT network for the project.

(b) Identify the critical activities.

(c) What is the expected project completion time and its variance?

(d) What is the probability of completing the project one week before the expected time?

(e) If the project is required to be completed by December 31 of a given year and the manager wants to be 95% sure of meeting the deadline, when should he start the project work?

(f) A penalty of Rs. 15,000 per week is to be imposed on the contractor if the project is not completed in 36 weeks. What is the probability that he has to pay a penalty? a penalty of Rs. 45,000?

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7. What are the assumptions underlying the classical EOQ model?

8. State the operating characteristics of queuing system.

SECTION B — (5 × 10 = 50 marks)

Answer any FIVE questions.

9. Illustrate Decision-Tree analysis.

10. Briefly explain the major applications of linear programming in business. What are the steps required in solving an LPP graphically?

11. Solve using simplex method.
Maximize $Z = 5x_1 + 2x_2$
Subject to $4x_1 + 2x_2 \leq 16$
$$3x_1 + x_2 \leq 9.$$
$$3x_1 - x_2 \leq 9$$
$$x_1, x_2 \geq 0.$$

12. Solve the following transportation problem using VAM.

Warehouse	Market A	B	C	Supply
1	10	12	7	180
2	14	11	6	100
3	9	5	13	160
4	11	7	9	120
Demand	240	200	220	

13. Illustrate the inventory model with planned shortages.

14. Describe the algorithm for finding the critical path and explain the rules for network construction.

15. Arrivals at a telephone booth are considered to be poisson, with an average time of 10 minutes between one arrival and the next. The length of a phone call is assumed to be distributed exponentially with mean 3 minutes. Find

(a) the probability that an arrival finds that four persons are waiting for their turn.

(b) the average number of persons waiting and making telephone calls.

(c) the average length on the queue that is formed from time to time.

16. Solve the following game.

		B's strategy	
		B_1	B_2
	A_1	28	0
A's strategy	A_2	2	12
	A_3	4	7

SECTION C — (1 × 20 = 20 marks)

Compulsory.

17. A project consists of nine activities whose time estimates (in weeks) and other characteristics are given below.