PG – 923

II Semester M.B.A. Degree Examination, July 2016
(CBCS)
MANAGEMENT
2.6 : Quantitative Techniques and Operation Research

Time : 3 Hours   Max. Marks : 70

SECTION – A

Answer **any five** of the following. **Each** question carries **five** marks.   (5×5=25)

1. Distinguish between Analytical and Simulation Models.

2. A firm is considering replacement of a machine whose cost price is Rs. 12,200 and the scrap value is Rs. 200. The maintenance costs are found from experience to be as follows :

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

   What is the optimal replacement interval for this machine ?

3. Five jobs are to be processed and five machines are available. Any machine can process any job with resulting. Profit (in Rs.) as follows. Find assignment pattern that maximizes the sales.

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Machines

		A	B	C	D	E
	1	70	75	71	60	80
Jobs	2	55	57	64	61	50
	3	60	54	80	71	55
	4	80	72	75	65	70
	5	50	56	70	51	72

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4. Explain the essential features of queuing system.

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5. What is degeneracy ? How it can be resolved in case of Transportation ?

6. Find out the sequence that minimizes the total elapsed time required in performing the following tasks on machine M_1 and M_2 in the order M_1, M_2. Also, find the minimum total elapsed time.

Task	A	B	C	D	E	F	G	H	I
M_1	2	5	4	9	6	8	7	5	4
M_2	6	8	7	4	3	9	3	8	11

7. Moon Light Bakery keeps stock of a popular brand of cake. Previous experience indicates the daily demand as given here.

Daily Demand	0	10	20	30	40	50
Probability	.01	.20	.15	.50	.12	.02

Consider the following sequence of random numbers.

R. No. 48, 78, 19, 51, 56, 77, 15, 14, 68, 09.

Simulate the demand for next 10 days. Find out the stock situation if the owner of the bakery decides to make 30 cakes every day. Also estimate the daily average demand for the cakes on the basis of simulated data.

SECTION – B

Answer **any three** of the following questions **each** question carries **ten** marks.   (10×3=30)

8. National Oil Co. has three refineries and 4 depots. Transaction costs per barrel and requirements are given below. Determine optimal allocation of output.

	D_1	D_2	D_3	D_4	Capacity
R_1	5	7	13	10	700
R_2	8	6	14	13	400
R_3	12	10	9	11	800
Requirement	300	600	700	400	

9. "Operation Research is the application of Scientific Methods, techniques and tools to problems involving in the operations of a system so as to provide those in control of the systems with optimum solution to the problems." Discuss with suitable examples.

10. Determine the dominance principle of game theory using the following :

Firm B

	B_1	B_2	B_3	B_4
A_1	15	35	25	5
Firm A A_2	10	20	5	0
A_3	20	50	10	5
A_4	25	55	15	20

11. A project consists of eight activities with the following relevant information :

Activities	Immediate Predecessor	Estimated	Duration	(Days)
		Optimistic	Most Likely	Pessimistic
A	–	1	1	7
B	–	1	4	7
C	–	2	2	8
D	A	1	1	1
E	B	2	5	14
F	C	2	5	8
G	D,E	3	6	15
H	F,G	1	2	3

1) Draw the PERT network and determine critical path.

2) If a 30 days deadline is imposed, what is the probability that the project will be finished within the time ?

3) If the project manager wants to be 99% sure that the project is completed on the scheduled date, how many Weeks before that date should he start the project work ?

SECTION – C

12. Case Study (**Compulsory**) :   (1×15=15)

A company manufactures three types of parts which use precious metals platinum and gold. Due to shortage of these precious metals, the govt. regulates the amount that may be used per day. The relevant data with respect to supply requirements and profit are summarized in the table shown below :

Product	Platinum Per Unit (gm)	Gold Required Per Unit (gm)	Profit Per Unit (Rs.)
A	2	3	500
B	4	2	600
C	6	4	1200

Daily allotment of platinum and gold are 160 gm and 120 gm respectively. Determine the optimum profit under Simplex Method.