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**MBAH 454**

**Second Semester M.B.A. Degree Examination, May/June 2017**  
**BUSINESS ADMINISTRATION**  
**(Choice Based Credit System)**  
**Operations Research**

Time : 3 Hours

Max. Marks : 70

**SECTION – A**

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College of Business Management, Mangalore  
Post Graduate Centre for Management  
Studies and Research Library

**Note :** Answer **any two** questions. **Each** question carries **ten** marks. Answer to the question should **not** exceed **five** pages. **(2×10=20)**

1. Define OR model and give four examples. State their properties, advantage and limitations.
2. Describe the kind of problems for which Monte Carlo will be an appropriate method of solution.
3. Explain the linear programming problem giving two examples.

**SECTION – B**

**Note :** Answer **any three** questions. **Each** question carries **twelve** marks. Answer to the question should **not** exceed **six** pages. **(3×12=36)**

4. The following is the cost matrix of assigning 4 clerks to key punching jobs. Find the optimal assignment if clerk 1 cannot be assigned to job 1.

Clerk	Job			
	1	2	3	4
1	–	5	2	0
2	4	7	5	6
3	5	8	4	3
4	3	6	6	2



5. Solve the following L.P. problem:

$$\text{Minimize } Z = 5x_1 + 3x_2$$

$$\text{s.t. } 2x_1 + 4x_2 \leq 12$$

$$2x_1 + 2x_2 = 6$$

$$\text{and } 5x_1 + 2x_2 \geq 10, x_1, x_2 \geq 0$$

6. A cashier at a bank takes an average of 3 minutes to serve a person, the service time being exponentially distributed. Customers arrive at his counter in Poisson fashion, the average arrival rate being one customer every 4 minutes. Find

- the probability that there are more than two customers in the queue.
- the probability that there is atleast a one customer in the queue.
- the probability that there is no one in the customer, and the average time a customer spends in the bank.

7. A company has 3 factories A, B, C which supply to 5 warehouse its small car fans. The production capacity of factories and the demand of customers – Assumed constant and distribution cost are given in the following table. The objective is to supply the wholesaler with their demand in a cheapest way, use VAM for optimal solution.

Wholeseller		A	B	C	D	E	Available units
Factories	a	5	7	10	5	3	5
	b	8	6	9	12	4	10
	c	10	9	8	10	15	10
Requirement		3	3	10	5	4	25

8. In a game of matching coins with two players, suppose a wins one unit of value when there are two head, wins nothing when there are two tails and losses  $\frac{1}{2}$  unit of value when there is one head and one tail. Determine the payoff matrix, the best strategies for each player and the value of game to A.



SECTION – C

(Compulsory)

(1×14=14)

9. The following table gives the activities in a construction project and also gives other relevant information :

Activity	Normal time (days)	Manpower required per day
1-2	10	2
1-3	11	3
2-4	13	4
2-6	14	3
3-4	10	1
4-5	7	3
4-6	17	3
5-7	13	5
6-7	9	8
7-8	1	11

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- a) Draw the network and find out total float of each activity.
- b) The contractor stipulates that during the first 26 days only 4 to 5 men and during remaining days 8 to 11 men only can be made available. Rearrange the activities suitably for leveling the manpower resources, satisfying the above condition.