

**Code: AE62/AC62/AT62**  
**Subject: OPERATIONS RESEARCH & ENGG. MANAGEMENT**  
**AMIETE – ET/CS/IT (Current Scheme)**

Time: 3 Hours

**December 2016**

Max. Marks: 100

**PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.**

**NOTE: There are 9 Questions in all.**

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions, answer any FIVE Questions. Selecting THREE questions from part A and TWO questions from part B.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

**Q.1 Choose the correct or the best alternative in the following: (2×10)**

- a. While solving a LP model graphically, the area bounded by the constraints is called:  
 (A) Feasible region (B) In feasible region  
 (C) Unbounded solution (D) None of these
- b. Probabilistic time for completion of any activity can be found out from  
 (A) Optimistic time (B) pessimistic time  
 (C) most likely time (D) all of these
- c. \_\_\_\_\_ has several objective functions, each having a target value.  
 (A) Queuing model (B) Linear programming  
 (C) Goal programming (D) Inventory control method
- d. When the customer arrivals are completely random, the \_\_\_\_\_ is followed.  
 (A) Deterministic model (B) Poisson distribution  
 (C) Statistical model (D) Probability concept
- e. What kind of organizational structure is typically used in multinational companies?  
 (A) Functional structure (B) Divisional structure  
 (C) Matrix structure (D) None of these
- f. Which of the following is not the job of the manager?  
 (A) Setting objectives (B) Organising  
 (C) Motivating (D) None of these
- g. The Process of dividing the markets into groups of customers sharing similar set of wants is:  
 (A) Positioning (B) Segmentation  
 (C) Targeting (D) None of these
- h. The term marketing mix was first expressed by:  
 (A) J McCarthy (B) Philip Kotlar  
 (C) Taylor (D) McGregor

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- i. PERT is basically \_\_\_\_\_ method.  
 (A) Size-oriented (B) Scale-oriented  
 (C) Time-oriented (D) Time and size oriented
- j. \_\_\_\_\_ is a rule where in customer is allowed to enter in to the service immediately after entering in to the system.  
 (A) FIFO (B) LIFO  
 (C) Priority service (D) Preemptive priority

**PART A**

**Answer any THREE Questions. Each question carries 16 marks.**

**Q.2 (a)** Explain various models in Operations Research. **(6)**

(b) A toy company manufactures two types of dolls, a basic version doll A and a Deluxe version doll B. Each doll of type B takes twice as long to produce as one of type A, and the company would have time to make a maximum of 2000 per day. The supply of plastic is sufficient to produce 1500 dolls per day (both A and combined). The Deluxe version requires a fancy dress of which there are only 600 per day available. If the company makes a profit of Rs.3 and Rs.5 per doll, respectively on doll A and B, then how many of each doll should be produced per day in order to maximize the total profit. Formulate this problems a L.P.P. and solve it graphically. **(12)**

**Q.3 (a)** What do you understand by Duality in L.P.P.? **(6)**

(b) Solve using Simplex method: **(12)**

$$\text{Maximize } Z = 3x_1 + 2x_2$$

Subject to the constraints

$$x_1 + x_2 \leq 4$$

$$x_1 - x_2 \leq 2$$

$$x_1, x_2 \geq 0$$

**Q.4 (a)** Briefly describe the steps for solving a transportation problem. **(6)**

(b) Solve the following assignment problem: **(12)**

		Person				
		I	II	III	IV	V
Job	A	1	3	2	3	6
	B	2	4	3	1	5
	C	5	6	3	4	6
	D	3	1	4	2	2
	E	1	5	6	5	4

**Q.5 (a)** Distinguish between CPM and PERT network. Give one application of CPM network. **(6)**

(b) Assuming that the expected time are normally distributed, find the earliest and latest expected time to each event and critical path with project duration of: **(12)**

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	Activity		Days	
	Optimistic time	Most likely time	Pessimistic time	
1-2	3	6	15	
1-6	2	5	14	
2-3	6	12	30	
2-4	2	5	8	
3-5	5	11	17	
4-5	3	6	15	
6-7	3	9	27	
5-8	1	4	7	
7-8	4	19	28	

**Q.6** (a) What are the basic characteristics of a queuing system? (7)

(b) The payoff matrix of a game is given, find the solution of the game to the player A and B: (9)

		<b>Player B</b>				
		<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>
<b>Player A</b>	<i>I</i>	-2	0	0	5	3
	<i>II</i>	3	2	1	2	2
	<i>III</i>	-4	-3	0	-2	6
	<i>IV</i>	5	3	-4	2	-6

**PART B**

**Answer any TWO Questions. Each question carries 16 marks.**

**Q.7** (a) Indicate why the different management functions are of greater importance at different levels of an organization? (8)

(b) Explain, with suitable examples, the important principles used in developing an organization. (8)

**Q.8** (a) Explain in brief the pictorial representation techniques available for presentation of data. (8)

(b) Compare and contrast the economic, passive, cognitive and emotional models of consumer decision making. (8)

**Q.9** (a) Define leadership and motivation. Explain Herzberg's two-factor model of motivation. (8)

(b) Explain the various sources of marketing data available. (8)