ROLL NO. _____

Code: AE62/AC62/AT62 Subject: OPER. RESEARCH & ENGG. MANAGEMENT

AMIETE – ET/CS/IT

Time: 3 Hours **JUNE 2013** **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. Which of the following management techniques used for improving productivity?

(A) Production planning **(B)** Work Measurement
(C) Method study **(D)** All of these

b. Economic development of a country depends more upon :

(A) money demands **(B)** availability of markets
(C) capital formation **(D)** entrepreneurs

c. In Vogel's Approximation Method; the opportunity cost associated with a row is determined by

(A) the difference between the smallest cost and the next smallest cost in the row
(B) the difference between the smallest unused cost and the next smallest unused cost in the row
(C) the difference between the smallest cost and next smallest unused cost in the row
(D) none of these

d. In a departmental store customers arrive at a rate of 20 customers per hour. The average number of customers that can be handled by cashier is 24 per hour. Probability that cashier is idle?

(A) 1 **(B)** 1/6
(C) 5 **(D)** 5/6

e. A competitive situation is known as a 'game' if it has given characteristics

(A) numbers of players is finite
(B) the players make individual decision without direct communication
(C) the payoff is fixed and determined in advance
(D) All of these

f. Pricing strategies change over the _____ of the product

(A) life cycle **(B)** material
(C) skill of operator manufacturing **(D)** none of these

g. In a PERT network, an event is normally represented by:

(A) arrow **(B)** rectangle
(C) rhombus **(D)** circle

h. Hungarian method is used for

(A) LPP **(B)** Material handling
(C) Assignment Problem **(D)** Queuing problem

i. _____ Segmentation divides a market into groups based on variables as age, gender, family size, income, education, occupation, race, generation and nationality

(A) Geographic **(B)** Demographic
(C) Psychographic **(D)** Behavioral

j. Factors of motivation that comes from outside (environment) or organization like pay, bonuses, tangible benefits etc. are known as:

(A) Extrinsic Motivators **(B)** Intrinsic Motivators
(C) Hybrid motivators **(D)** None of these

PART A

Answer any THREE Questions. Each question carries 16 marks.

Q.2 a. For solving linear programming problems what are the assumptions made? Explain. **(4)**

b. The objective function of a LPP is given by $Z = 10X_1 + 8X_2$. This objective function is required to be dealt as maximization problem with following constraints:

$2X_1 + X_2 \leq 20$
$X_1 + 3X_2 \leq 30$
$X_1 - 2X_2 \geq -15$
$X_1, X_2 \geq 0$

Solve this LPP using graphical method. **(12)**

Q.3 a. When the dual simplex method is preferred for solving LPP? Explain the approach through which LPP can be solved using dual simplex method. **(4)**

b. Using Simplex Method, solve the following linear programming problem:

Maximize $Z = 10 X_1 + 15 X_2 + 20 X_3$
Subject to:
$2 X_1 + 4 X_2 + 6 X_3 \leq 24$
$3 X_1 + 9 X_2 + 6 X_3 \leq 30$
$X_1 , X_2 , X_3 \geq 0$ **(12)**

Q.4 a. Explain the terms feasible solution and basic feasible solution while dealing with transportation problems. **(4)**

b. ABC company has three warehouses from which it has to ship the goods to four retailers. The transportation cost (in Rs.) per unit from each of the warehouse to retailer is shown in the table below as cell entries. **(12)**

		Retailer				
		1	2	3	4	Supply
Warehouse	1	*3*	*1*	*7*	*4*	*300*
	2	*2*	*6*	*5*	*9*	*400*
	3	*8*	*3*	*3*	*2*	*500*
Demand		*250*	*350*	*400*	*200*	

Obtain the initial basic feasible solution for this transportation problem using the Vogel's Approximation Method.

Q.5 a. Construct an arrow diagram for the following project **(6)**

Job	Immediate predecessor	Duration
A	**-**	**14 Days**
B	**A**	**3 Days**
C	**A**	**7 Days**
D	**C**	**4 Days**
E	**B,D**	**10 Days**

b. Construct the Network for the following Project and determine the following
(i) Critical Path
(ii) ES,EF,LS,LF
(iii) TF,FF **(10)**

Activity	Duration
1-2	2
2-3	3
2-4	5
3-5	4
3-6	1
4-6	6
4-7	2
5-8	8
6-8	7
7-8	4

Q.6 a. List the assumptions of Poisson-exponential single server model – infinite population **(4)**

b. A repairman is to be hired to repair machines which breakdown at an average rate of 6 per hour. The breakdowns follow Poisson distribution. The non-production time of a machine is considered to cost Rs. 20 per hour. Two repairmen Mr. X and Mr. Y have been interviewed for this purpose. Mr. X charges Rs.10 per hour and he service breakdown machines at the rate of 8 per hour. Mr. Y demands Rs.14 per hour and he services at an average of 12 per hour. Which repairman should be hired? (Assume 8 hours shift per day) **(12)**

PART B
Answer any TWO questions. Each question carries 16 marks.

Q.7 a. Explain the concept of "Taylor's Scientific Management". List the various elements of Taylor's Scientific Management. **(7)**

b. List the essential managerial functions of a Manager. Explain. **(9)**

Q.8 a. Explain the following Quantitative forecasting techniques
(i) Time-series methods
(ii) Causal or explanatory models **(8)**

b. Explain the various features of a Product Management Model. **(8)**

Q.9 a. Explain the following with respect to decision making approaches:
(i) Group decision making
(ii) directive, analytic, conceptual and behavioral decision making styles **(8)**

b. Explain
(i) McGregor's Theory X and Theory Y
(ii) Motivation-hygiene theory **(8)**