ROLL NO. _____

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

AMIETE – ET/CS/IT

Time: 3 Hours **JUNE 2014** **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. The solution to a transportation problem with m rows and n–columns is feasible if number of positive allocations are

(A) m + n **(B)** m × n
(C) m + n - 1 **(D)** m + n + 1

b. In queuing system the calling population is assumed to be infinite when

(A) arrivals are independent of each other
(B) capacity of the system is infinite
(C) service rate is faster than the arrival rate
(D) all of these

c. If an optimal solution is degenerate in simplex method, then

(A) There are alternative optimal solutions
(B) The solution is infeasible
(C) The solution is of no use to the decision maker
(D) None of these

d. Decision variables in OR are

(A) Controllable **(B)** Uncontrollable
(C) Parameters **(D)** None of these

e. An ISO-Profit line in LPP represents

(A) an infinite number of solutions all of which yield the same cost
(B) an infinite number of solutions all of which yield the same profit
(C) an infinite number of optimal solution
(D) a boundary of the feasible region

f. The size of the pay off matrix of a game can be reduced by using the principle of

(A) game inversion **(B)** rotation reduction
(C) dominance **(D)** game transpose

g. In PERT/CPM the activity which can be delayed without affecting the execution of the immediate succeeding activity is determined by

(A) total float **(B)** free float
(C) independent float **(D)** none of these

h. Maslow and Herzberg are two examples of _____ theories of motivation.

(A) Expectancy **(B)** Content
(C) Process **(D)** Equity

i. Which of following might be classified as functions of the "Staff organisation" as opposed to functions of the "line organisation"?

(A) Computer support services **(B)** Personnel
(C) Public relations **(D)** All of these

j. Contingency theories of leadership are based on the belief that

(A) There is a single style of leadership appropriate to all managers
(B) There is no single style of leadership appropriate to all situations
(C) There is a single style of leadership appropriate to all situations
(D) None of these

PART A

Answer any THREE Questions. Each question carries 16 marks.

Q.2 a. Write the dual of the following LPP-

minimise $z = 10x_1 + 20x_2$

subject to

$3x_1 + 2x_2 \geq 18$

$x_1 + 3x_2 \geq 8$

$2x_1 - x_2 \leq 6$

$x_1, x_2 \geq 0$ **(6)**

b. Solve the following LPP using simplex method **(10)**

maximise $z = 2x_1 + 4x_2$

Subject to

$2x_1 + x_2 \leq 18$

$3x_1 + 2x_2 \geq 30$

$x_1 + 2x_2 = 26$

$x_1, x_2 \geq 0$

Q.3 a. Solve the linear programming problem by Graphical method

maximise $z = 3x_1 + 5x_2$

Subject to :

$x_1 + 2x_2 \le 2000$

$x_1 + x_2 \le 1500$

$x_2 \le 600$

$x_1 \ge 0, x_2 \ge 0$ **(10)**

b. Model building is the essence of the "O.R. approach", Discuss. **(6)**

Q.4 a. A Project has the following time schedule **(12)**

Activity:	1-2	1-3	1-4	2-5	3-6	3-7	4-6	5-8	6-9	7-8
Time in Month:	2	2	1	4	8	5	3	1	5	4

Activity	8-9
Time in Months	3

Construct network diagram and compute

(i) Total float for each activity

(ii) Critical path and its duration

b. Distinguish between PERT and CPM techniques. **(4)**

Q.5 a. Solve the following minimal assignment problem **(8)**

		Man 1	2	3	4
	I	12	30	21	15
Job	II	18	33	9	31
	III	44	25	24	21
	IV	23	30	28	14

b. Find the initial solution for the transportation problem by Vogel's approximation method (VAM) **(8)**

To

		W1	W2	W3	Supply
	F1	2	7	4	5
From	F2	3	3	1	8
	F3	5	4	7	7
	F4	1	6	2	14
Demand		7	9	18	

Q.6 a. What do you understand by queue? Give some important applications of queuing theory? **(8)**

b. What do you mean by-
(i) Two person zero sum game
(ii) Saddle point
(iii) Pure and mixed strategies **(8)**

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

Q.7 a. What are the different functions of management and what are the importance of these functions at various levels of management? **(8)**

b. What is the organisation structure and how the organisation charts are helpful to provide a broad picture of positions of authorities and their relationships in the organisation structure. **(8)**

Q.8 a. Explain the various techniques of business forecasting. **(8)**

b. Explain the process of decision making. **(8)**

Q.9 a. What do you understand by marketing mix? **(8)**

b. Define leadership and explain leadership characteristics. **(8)**