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

AMIETE – ET/CS/IT

Time: 3 Hours   **DECEMBER 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. Hungarian method is used for

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

b. Motivational theories that emphasize the needs that motivate people are called

   (A) process theories   **(B)** goal-setting theories
   (C) content theories   **(D)** path-goal theories

c. The management technique used for increasing productivity is:

   (A) work measurement   **(B)** method study
   (C) production planning   **(D)** all of these

d. To compute initial BFS a non-negative variable is used in simplex method known as

   (A) Unrestricted variable   **(B)** Artificial variable
   (C) Surplus variable   **(D)** None of these

e. Minimum Matrix Method is used in

   (A) LPP   **(B)** Game Theory
   (C) Queuing Theory   **(D)** Transportation Problem

f. Communication is complete when which of the following takes place?

   (A) Verbal expression   **(B)** Face-to-face communication
   (C) Written reply   **(D)** Mutual understanding

g. 'Hertzberg's Theory' deals with

   (A) Production planning and control **(B)** Motivation Theory
   (C) Queuing Theory   **(D)** None of these

h. The North West Corner rule

   (A) is used to find an initial feasible solution
   (B) is used to find an optimal solution
   (C) is based on the concept of minimizing opportunity cost
   (D) none of these

i. A quantitative technique for decision making that shows a complete picture of potential alternative decision paths is called _____.

   (A) the delphi technique   **(B)** a decision tree
   (C) brainstorming   **(D)** payback analysis

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

   (A) number of players is finite
   (B) the players make individual decision without direct communication
   (C) the playoff is fixed and determined in advance
   (D) all of these

PART A
Answer any THREE Questions. Each question carries 16 marks.

Q.2 a. Explain the assumptions of terms:
   (i)   Certainty
   (ii) Divisibility (Continuity)
   (iii) Additivity
   (iv) Linearity used while solving linear programming problems   **(4)**

   b. Solve the following LPP by graphical method

   Maximize $Z = 2.80X_1 + 2.20X_2$
   Subject to constraints:
   $X_1 \leq 20{,}000$
   $X_2 \leq 40{,}000$
   $0.003X_1 + 0.001X_2 \leq 66$
   $X_1 + X_2 \leq 45{,}000$
   $X_1, X_2 \geq 0$ **(12)**

Q.3 a. Write a note on dual simplex method.   **(6)**

   b. Using simplex method solve the following linear programming problem: **(10)**

   Minimize $Z = 8X_1 - 2X_2$
   Subject to
   $-4X_1 + 2X_2 \leq 1$
   $5X_1 - 4X_2 \leq 3$
   $X_1, X_2 \geq 0$

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

Q.4   a. Define:
    (i) Feasible solution
    (ii) Basic feasible solution in transportation problems   **(4)**

   b. In a machine shop there are four machines A,B,C and D and four jobs I, II, III and
      IV are to be performed. The machines differ in efficiency and the jobs differ in
      there intrinsic difficulty. Estimate of the time each machine would take to perform
      each job is given below.

	I	II	III	IV
A	44	80	52	60
B	60	56	40	72
C	36	60	48	48
D	52	76	36	40

   Solve this as an assignment problem   **(12)**

Q.5   a. State when the following approaches are used   **(4)**
      (i) Competitive strategy models
      (ii) Network analysis

   b. Construct the Network for the following Project and calculate the probability of
      completing the project in 25 days.   **(12)**

Activity	to	tm	tp
1-2	2	6	10
1-3	4	8	12
2-3	2	4	6
2-4	2	3	4
3-4	0	0	0
3-5	3	6	9
4-6	6	10	14
5-6	1	3	5

Q.6   a. Briefly explain the General Structure of a Queuing System.   **(4)**

   b. A warehouse has only the loading dock manned by a three person crew. Trucks
      arrive at the loading dock at an average rate of 4 trucks per hour and the arrival
      rate is Poisson distributed. The loading of a truck takes 10 minutes on an average
      and can be assumed to be exponentially distributed. The operating cost of a truck
      is Rs.20 per hour and the members of the crew are paid @ Rs.6 each per hour.
      Would you advice the truck owner to add another crew of three persons?   **(12)**

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

Q.7   a. Explain various functional areas of management.   **(8)**

   b. Draw a simple matrix management scheme. Elaborate project responsibilities within a matrix organization.

Q.8   a. Define Forecasting. Explain different methods of forecasting.   **(10)**

   b. What is Strategic Management? Explain the purpose and importance of strategic management in an organization.   **(6)**

Q.9   a. Write concept and assumptions used in the 'McGregor's Theory X and Theory Y of Motivation.   **(10)**

   b. Define Product Management. Explain the various components of it.   **(6)**