Code No. 7075

FACULTY OF SCIENCE

M.Sc. IV-Semester Examination, May / June 2017

Subject : Mathematics / Applied Mathematics

Paper - III (c)
Advanced Operation Research

Time : 3 hours Max. Marks : 80

Note : Answer all questions from Part-A and Part-B. Each question carries 4 marks in Part-A and 12 marks in Part-B.

PART – A (8 x 4 = 32 Marks)
(Short Answer Type)

1 What is Game theory? Describe two person zero sum game.
2 Explain the differences between pure and mixed strategy.
3 Write the rules of Network construction.
4 Distinguish between PERT and CPM.
5 Obtain the set of necessary conditions for the non-linear programming problem : Max $Z = x_1^2 + 3x_2^2 + 5x_3^2$ subject to the constraints $x_1+x_2+3x_3 = 2$, $5x_1+2x_2+x_3=5$, $x_1,x_2,x_3 \geq 0$.
6 Write Kuhn-Tucker condition for general NLPP with m(<n) constraints.
7 What is NLPP? Give two examples.
8 Write a short note on quadratic programming.

PART – B (4 x 12 = 48 Marks)
(Essay Answer Type)

9 a) Solve the game whose payoff matrix is given below.

$$\begin{bmatrix} 9 & 3 & 1 & 8 & 0 \\ 6 & 5 & 4 & 6 & 7 \\ 2 & 4 & 3 & 3 & 8 \\ 5 & 6 & 2 & 2 & 1 \end{bmatrix}$$

OR

b) Solve the following 2 x 2 game graphically

		Player B			
		B_1	B_2	B_3	B_4
Player A	A_1	2	1	0	−2
	A_2	1	0	3	2

10 a) Write a short note on the following :
i) Float of an activity and event
ii) Forward and backward pass calculations.

OR

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b) Given the following information :

Activity	0-1	1-2	1-3	2-4	2-5	3-4	3-6	4-7	5-7	6-7
Duration in days	2	8	10	6	3	3	7	5	2	8

i) Draw the arrow diagram.
ii) Identify critical path and find the total project duration.
iii) Determine total, free and independent floats.

11 a) Solve the NLPP. Optimize $Z = 4x_1^2 + 2x_2^2 + x_3^2 - 4x_1x_2$ subject to the constraints $x_1 + x_2 + x_3 = 15$, $2x_1 - x_2 + 2x_3 = 20$.

OR

b) Determine x_1, x_2 and x_3 so as to Max $Z = -x_1^2 - x_2^2 - x_3^2 + 4x_1 + 6x_2$ subject to the constraints $x_1 + x_2 \leq 2$, $2x_1 + 3x_2 \leq 12$, $x_1, x_2 \geq 0$.

12 a) Solve the QPP by using Wolfe's method
Max $Z = 2x_1 + 3x_2 - 2x_1^2$ Subject to the constraints $x_1 + 4x_2 \leq 4$, $x_1 + x_2 \leq 2$ and $x_1, x_2 \geq 0$,

OR

b) Solve the QPP by Beale's method
Max $Z = 2x_1 + 3x_2 - x_1^2$ subject to the constraints $x_1 + 2x_2 \leq 4$ and $x_1, x_2 \geq 0$.

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