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End Semester Examination of Semester-II, 2016

Subject : MATHEMATICS (PG)

Paper : MTMPG-205

Full Marks : 40

Time : 2 Hrs

*The figures in the margin indicate the marks
corresponding to the question*

*Candidates are requested to give their answers
in their own word as far as practicable.*

Illustrate the answers wherever necessary

Use Separate Answer sheet for Unit I & Unit II

Unit I (20 Marks)

Group A

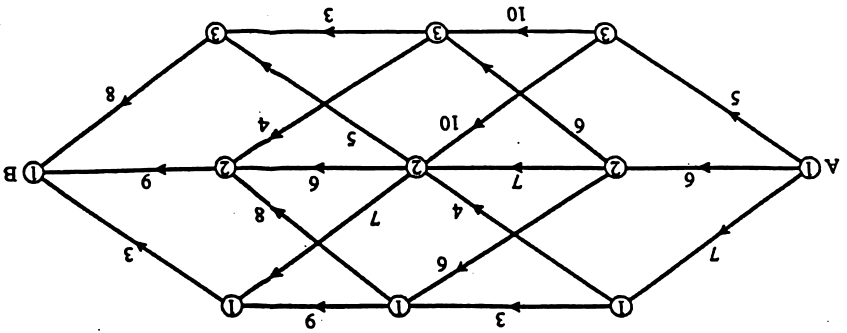
Answer any one out of two questions : 10x1=10

1. a) Solve the LPP by revised Simplex method

$$\text{Max } Z = x_1 + 2x_2$$

Subject to $x_1 + x_2 \leq 3$, $x_1 + 2x_2 \leq 5$, $3x_1 + x_2 \leq 6$
and $x_1, x_2 \geq 0$. 5

- b) Find the shortest path from vertex A to Vertex B along arcs joining various vertices lying between A and B. Length of each path is given as below :



2. a) Derive the optimum lot-size and cycle length of production inventory model without shortages. 6

b) Define optimal Central problem and find the necessary condition for optimal control. 4

Group B

Answer any one out of two questions : 6x1=6

3. Find the stationary path $x = x(t)$ for the functional

$$J = \int_1^0 \left[1 + \left(\frac{d^2 x}{dt^2} \right)^2 \right] dt$$

Subject to the boundary conditions $x(0) = 0, \dot{x}(0) = 1, x(1) = 1, \dot{x}(1) = 1$

4. Solve the non-linear programming problem
 Minimize $z = x_1^2 + x_2^2 + x_3^2$ subject to
 $4x_1 + x_2^2 + 2x_3 = 14, x_1, x_2, x_3 > 0.$