SM-360

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Seat No.	

M.E. (Civil) (Construction & Management) (Semester - II) Examination, May - 2017

COMPUTATIONAL METHODS AND OPTIMIZATION TECHNIQUES

Sub. Code: 34327

Day and Date : Tuesday, 23 - 05 - 2017 **Total Marks : 100**

Time :10.00 a.m. to 1.00 p.m.

Instructions : 1) **Q.1 & Q.8 are compulsory.**

2) **Out of remaining attempt any two questions from each section.**

3) **Figures to the right indicate full marks.**

SECTION-I

Q1) a) Explain the term 'Relative error'. **[4]**

b) Determine the roots of following equation by using Newton Raphson Method. Starting with $x_0 = 5.5$, $x^2 = 33$. **[10]**

c) What is linear regression and multiple linear regression. **[6]**

Q2) a) Explain the term 'correlation'. **[4]**

b) Fit a straight line to the following data. **[6]**

x:	0	2	4	6	8
f(x):	20	23	42	58	72

c) Describe in brief principle of least squares in curve fitting. **[5]**

Q3) a) Solve the following equations by Gauss Jordon method. **[10]**

$$2x_1 + x_2 + 4x_3 = 8$$

$$x_1 - 3x_2 - x_3 = 12$$

$$3x_1 - 2x_2 + 2x_3 = 32$$

b) Describe in brief Gauss Jordon method to solve the simultaneous linear equations. **[5]**

P.T.O.

Q4) a) Determine the solution of the differential equation using Runge - Kutta second order method $dy/dx = \log_e(x + y)$ taking $x_0 = 0$ and $y_0 = 2$ at x=0.2. **[6]**

b) Compute the integral of f(x) between x = 0 to x = 0.6 by Trapezoidal rule for the following data. **[9]**

x:	0	0.1	0.2	0.3	0.4	0.5	0.6
f(x)	2.2	4.5	7.9	8	9.2	10	11

SECTION-II

Q5) a) Explain in brief convex function and concave function. **[7]**

b) What is Dynamic programming? Write its applications in civil engineering. **[8]**

Q6) a) Solve the LPP by simplex method **[10]**

$$\max Z = 2x_1 + 4x_2 + 3x_3$$

subject to $3x_1 + 4x_2 + 2x_3 \leq 60$

$$2x_1 + x_2 + 2x_3 \leq 40$$

$$x_1 + 3x_2 + 2x_3 \leq 80$$

$$x_1, x_2, x_3 \geq 0$$

b) Explain the Mathematical formulation of LPP. **[5]**

Q7) a) Find out the IBFS for the following Transportation problem by Vogel's approximation method. **[8]**

	P	Q	R	S	Supply
A	4	6	8	13	50
B	13	11	10	8	70
C	14	4	10	13	30
D	9	11	13	8	50
Demand	25	35	105	35	

b) How will you solve Assignment problem? Explain with example. **[7]**

Q8) Write short note on the following (any four): **[20]**

a) Linear Programming.

b) Convex function.

c) Duality theory.

d) Quadratic programming.

e) Vogel's approximation method.

EEE