

APR.-17/BE/Insem.-10
B.E. (CIVIL)
STATISTICAL ANALYSIS AND COMPUTATIONAL
METHODS
(2012 Pattern)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q. 6.
- 2) Figures to the right indicate full marks.
- 3) Assume suitable data, if necessary.
- 4) Use of electronic pocket calculator is allowed in the examination.
- 5) Use of cell phone is prohibited in the examination hall.

Q1) a) Find a root of the equation $x^3 - 4x - 9 = 0$ using False Position Method. [6]

b) Explain Bisection Method and its applications. [4]

OR

Q2) a) Explain the following: [4]

- i) Secant Method;
- ii) Newton Raphson Method

b) Using Secant Method, find the real root of $x - e^{-x}$ up to 4 decimal places. [6]

Q3) a) Evaluate using Gauss Quadrature formula $\int_1^5 \frac{1}{x} dx$. [3]

b) Evaluate using Trapezoidal Rule $\int_0^1 \frac{1}{1+x^2} dx$ taking $h = 1/4$. [2]

c) The velocity v (km/min) of a vehicle which starts from rest is given at fixed intervals of time t (min) as follows : [5]

t	2	4	6	8	10	12	14	16
v	10	18	25	29	32	20	11	5

Estimate approximately the distance covered in 20 min

OR

P.T.O.

Q4) a) Evaluate $\int_2^4 1+x^4 dx$ by Gauss Quadrature method. [4]

b) Given that : [6]

x	4.0	4.2	4.4	4.6	4.8	5.0	5.2
log x	1.3863	1.4351	1.4816	1.5261	1.5686	1.6094	1.6487

Evaluate $\int_4^{5.2} \log x dx$ by

- i) Trapezoidal rule
- ii) Simpson's 1/3 Rule
- iii) Simpson's 3/8 Rule

Q5) a) Solve the following using Gauss Jordan Method. [5]

$$x_1 + 3x_2 + 3x_3 = 16$$

$$x_1 + 4x_2 + 3x_3 = 18$$

$$x_1 + 3x_2 + 4x_3 = 19$$

b) Apply Gauss Elimination method to solve : [5]

$$2x_1 + 4x_2 + x_3 = 3$$

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

$$x_1 - x_2 + x_3 = 6$$

OR

Q6) a) Using Gauss Siedel iterative method, solve the following equations.[5]

$$27x_1 + 6x_2 - x_3 = 85$$

$$x_1 + x_2 + 54x_3 = 110$$

$$6x_1 + 15x_2 + 2x_3 = 72$$

b) Use Gauss Jordan method to find the inverse of the following matrix.[5]

$$\begin{bmatrix} 2 & 1 & 2 \\ 2 & 2 & 1 \\ 1 & 2 & 2 \end{bmatrix}$$

