M. TECH. (NANO TECHNOLOGY) SEM-II (CBCS – 2015 COURSE) : WINTER - 2017

SUBJECT: NANO COMPUTING

Day: **Monday** Time: **11.00 AM TO 02.00 PM**

Date: **27/11/2017** **W-2017-2750** Max. Marks: 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Answers to both the sections should be written in **SEPARATE** answer books.

SECTION-I

Q.1 Describe algorithm to implement Bisection method, solve equation **(10)**

$$f(c)=\frac{gm}{c}\left[1-e^{-(c/m)t}\right]-v=0$$

To arrive at value of c given m = 68.1, t = 10, v = 40 and g = 9.8. Start with values of c between integral 12 and 16.

OR

Q.1 Use the Gauss- Seidel method to obtain the solution of the simultaneous equations. **(10)**

$3x_1-0.1x_2-0.2x_3=7.85$

$0.1x_1+7x_2-0.3x_3=-19.3$

$0.3x_1-0.2x_2+10x_3=71.4$

Q.2 Describe the difference between Finite Element and finite Difference methods. **(10)**

OR

Q.2 Compute by using fourth order Runge Kutta method at $x=1$, following differential equation: **(10)**

$\frac{dy}{dx}=-2x^3+12x^2-20x+8.5$ Using a step size of h = 0.5 and an initial condition y (0) = 1.

Q.3 Using Laplace transform solve the following differential equation: **(10)**

$y''+5y'+6y=U(t-1)+\delta(t-2), y(0)=0, y'(0)=1.$

OR

Q.3 Find the Fourier series of the function **(10)**

$f(x)=x+\pi$, if $-\pi<x<\pi$ and $f(x+2\pi)=f(x)$.

SECTION-II

Q.4 What is simulation? Discuss data manipulation and data exchange of structures, role in simulation. **(10)**

OR

Q.4 Discuss Fourier Transform of Derivatives. **(10)**

Q.5 Discuss Galerkin approximation in relation to finite element method. **(10)**

OR

Q.5 State difference between molecular dynamics and Monte Carlo dynamics. **(10)**

Q.6 Discuss Nano- Design and Nano CAD. **(10)**

OR

Q.6 What is MATLAB? Explain in detail with respect to nano modeling. **(10)**

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