Question Bank (G scheme)

Name of subject: Engg.Mathematics **Unit Test :II**
Subject code: 17216 **Course : CM/IF/CH/ME**
Semester: II

Chapter 1 (DERIVATIVE)[24 MARKS]

3 marks-

1) If $y = sin^{-1}x$ Prove that $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} = 0$
2) Find $\frac{dy}{dx}$ if $y = e^x \tan x$
3) Find $\frac{dy}{dx}$ if $y = \sec x \tan x$
4) Find $\frac{dy}{dx}$ if $y = \frac{\sin x}{1-\cos x}$
5) Find $\frac{dy}{dx}$ if $y = \log(x^2 + 2x + 5)$
6) Find $\frac{dy}{dx}$ if $y = x^3 + xy^2 = y^3 + yx^2$
7) Find $\frac{dy}{dx}$ if $x = a\ cos^3\theta\ ,\ y = b\ sin^3\theta$
8) Differentiate w.r.t. x $:7^{\sqrt{x^2+1}}$

4 marks-

1) Differentiate w.r.t. x $:y = \frac{e^x+e^{-x}}{e^x-e^{-x}}$
2) If $y = tan^{-1}\left(\frac{13\,x}{1-42x^2}\right)$ find $\frac{dy}{dx}$
3) If $y = sin^{-1}\left(\frac{2\,x}{1+x^2}\right)$ find $\frac{dy}{dx}$
4) Find $\frac{dy}{dx}$ if $\sin y = \log(x + y)$
5) If $e^x = y^x$ Prove that $\frac{dy}{dx} = \frac{(\log y)^2}{\log y - 1}$
6) If $y = e^{m\,sin^{-1}x}$Prove that $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} - m^2y = 0$
7) Differentiate $(\sin x)^{\tan x}$ w.r.t. x
8) Differentiate $tan^{-1}\left(\frac{2x}{1-x^2}\right)$ w.r.t. $sin^{-1}\left(\frac{2x}{1+x^2}\right)$

Chapter- 2(NUMERICAL METHODS)[14 MARKS]

3 marks:

1) Find the approximate root of the equation $x^3 - 9x + 1 = 0$ lies between 2 and 3 using bisection method (Two Iteration)
2) Using Bisection method find the approximate value of $\sqrt{10}$ perform two Iteration
3) By using method of False Position find root of equation $x^2 + x - 1 = 0$ in the interval (0,1) (perform two Iteration)
4) Solve following equations for x and y using Gauss-Elimination Method

$$x + y + z = 4\ ;\quad 2x + y + z = 5;\quad 3x + 2y + z = 7$$

5) Solve following equations for y and z using Gauss-Elimination Method

$$x + y + z = 6\ ;\quad 3x - y + 3z = 10;\quad 5x + 5y - 4z = 3$$

6) Show that root of the equation $x.\log x = 1.2$ lies between (1,2)
7) Show that root of the equation $3x - \cos x - 1 = 0$ lies between (0,1)

4 marks:

8) Solve using Gauss-Elimination Method:

$$2x - 3y + 4z = 7\ ;\quad 5x - 2y + 2z = 7;\quad 6x - 3y + 10z = 23$$

9) Solve using Jacobie's Method:

$$10x + y + 2z = 13\ ;\quad 3x + 10y + z = 14;\quad 2x + 3y + 10z = 15$$

10) Solve using Jacobie's Method:

$$5x - y + z = 10\ ;\quad 2x + 4y = 12;\quad x + y + 5z = -1$$

11) Solve using Gauss-Seidal Method:

$$10x + y + z = 12\ ;\quad x + 10y + z = 12;\quad x + y + 10z = 12$$

12) Solve using Gauss-Seidal Method:

$$20x + y - 2z = 17\ ;\quad 3x + 20y - z = -18;\quad 2x - 3y + 20z = 25$$

13) Find approximate root of the equation $x^3 - 2x - 5 = 0$ using Bisection method in the interval (2,3) carry out three iterations.
14) Find approximate root of the equation $x^3 + 2x^2 - 8 = 0$ using Regula Falsi method carry out three iterations.
15) Evaluate $\sqrt[3]{7}$ using Newton Raphson Method carry out two iterations.