

Question Bank (G scheme)

Name of subject: Engg.Mathematics
Subject code: 17216
Semester: II

Unit Test :II
Course : CM/IF

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 $y = \tan^{-1} \left(\frac{13x}{1-42x^2} \right)$ find $\frac{dy}{dx}$
- 3) If $y = \sin^{-1} \left(\frac{2x}{1+x^2} \right)$ 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 $x \cdot \log x = 1.2$ 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.