Question Bank (I scheme - Unit test 2)

Name of subject: Applied Mathematics **Unit Test : II**
Subject code: 22206/22224/22210 **Course : CH/CM/EJ/IF/IS/ME**
Semester: II

Chapter 1 (APPLICATION OF INTEGRATION) -------(CO 3)

2 marks-

1) Find the area bounded by the curvey = 3x – 2from x = 1 to x = 3.
2) Find the area bounded by the parabola y= x^2 – 2x with x- axis.
3) Find the area bounded under the curvey= x^3 – 5x^2 + 4xfrom x = 0 to x = 3.
4) Find the volume of solid formed by revolving a line y = x about x axis from x = 0 to 4.

4 marks-

1) Find the area of the circle x^2 + y^2 = 25 using integration.
2) Find the area of the ellipse 9x^2 + 4y^2 = 36 using integration.
3) Find the area bounded by the parabola y^2= 4xand the line 2x – y = 4.
4) Find the area of the circle y^2– 2x = 0 and y^2 + 4x – 12 = 0.
5) Find the area between the curves y = sin x and y = cos x for [0, 90^0].
6) Find the volume of sphere formed by revolving a semicircle $x^2 + y^2 = 25$ about x axis.
7) Find the volume of solid formed by revolving y = r about x axis bounded by x = hand y axis.

Chapter- 2(DIFFERENTIAL EQUATION) -------(CO 4)

2 marks:

1) Find the order and degree of

i) $\frac{d^2y}{dx^2} = \sqrt{1 + (\frac{dy}{dx})^3}$ ii) $x^2(\frac{d^2y}{dx^2})^2 + y\,(\frac{dy}{dx})^3 + y^2 = 0$---- **(2M Each)**

2) Form a differential equation by eliminating constants from

i)xy = a^2 ii) y^2= 4ax. **---- (2M Each)**

3) Solve $\sec^2 x$ .tan y dx + $\sec^2 y$ .tan x dy = 0.

4) Solve $\frac{dy}{dx} = e^{3x-2y} + x^2 . e^{-2y}$

4 marks:

1) Solve $xy \log y\, dx + (1 + x^2)dy = 0$
2) Solve $\frac{dy}{dx} = (4x + y + 1)^2$

3) Solve $x\log x\,\frac{dy}{dx}+y=2\log x$

4) Solve $\frac{dy}{dx}+y\,tan\,x=cos^2x$

5) Solve $x\frac{dy}{dx}+y=\log x$

Chapter- 3 (APPLICATON OF DIFFERENTIAL EQUATION) -------(CO 4)

2 marks:

1) Find the equation of curve passing through (2, 3) having slope 2x – 4.
2) The velocity of a particle is given by $V=t^2-6t+7$. Find distance covered in 3 seconds.

4 marks:

1) If the body obeys the law of motion $v\frac{dv}{dx}=-cv-bv^2$, find the velocity of particle on terms of x if it starts from rest.
2) The acceleration of a particle is given by $\frac{d^2x}{dt^2}=3t^2-6t+8$ find the distance covered in 2 sec. Given that v = 0, x = 0 at t = 0.

(For Mechanical & Chemical Group)

Chapter- 4(PROBABILITY DISTRIBUTION) -------(CO 5)

2 marks:

1) An unbiased coin is tossed 5 times, find the probability of getting at least 4 heads.
2) In poisson distribution, if P(3) = P(4), find m.
3) Fit a Poisson distribution to set of following observations

x_i	0	1	2	3	4
f_i	122	60	15	2	1

4 marks:

1) If 30% of the bulbs are defective, find the probability that out of 4 bulbs Selected a) one is defective b) at the most two are defective.
2) Using Poisson's distribution, find the probability that the ace of spade will bedrown from a pack of cards at least once in 104 consecutive trials.
3) Assuming that 2 in 10 industrial accidents are due to fatigue, find the probability that exactly 2 out of 8 accidents will be due to fatigue.
4) A multiple choice test contains 20 questions. Each question has five choices for correct answer. What is the probability of making an 80% with randomguessing?

5) 95% of students at college are between 1.1 m and 1.7m fall. Find mean and S. D., assuming normal distribution.

(For Computer Group)

Chapter- 4(NUMERICAL METHODS) -------(CO 5)

2 marks:

1) Find the approximate root of the equation $x^3 - 9x + 1 = 0$ lies between 2 and 3 using bisection method (one Iteration)
2) Using Bisection method find the approximate value of $\sqrt{10}$ perform one Iteration
3) By using method of False Position find root of equation $x^2 + x - 1 = 0$ in the interval (0,1) (perform one 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 Jacobi's Method:
$$10x + y + 2z = 13\ ;\quad 3x + 10y + z = 14;\quad 2x + 3y + 10z = 15$$
10) Solve using Jacobi'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.

(For Electronics Group)

Chapter 4 (COMPLEX NUMBER) -------(CO 5)

2 marks-

1) Find modulus and amplitude of $-1 + i\sqrt{3}$
2) If $Z_1 = 4 - 5i \ and \ Z_2 = 3 + 7i \ find \ |3Z_1 - 2Z_2| \ and \ \left|\frac{Z_1}{Z_2}\right|$
3) If $Z = 1 + 2i$ find value of $Z^2 - 2Z + 6$
4) Express in $(x + iy) \ from \ \frac{2-3i}{1+2i}$

4 marks:

1) Express in polar form $(-2 - 2\sqrt{3}\, i)$
2) Show that$(1 + i)^8 + (1 + i)^8 = 32.$
3) Find real and imaginary parts of $+z^{-1} \ where \ z = \frac{3+4i}{1-i}$.

Chapter 5 (LAPLACE TRANSFORM) -------(CO 5)

2 marks-

1) Obtain : $L\{5 + 2t - e^{-t}\}$
2) Obtain : $L\{5 \sinh 3t - 3 \cos 4t\}$
3) Obtain : $L\{\sin^3 t\}$
4) Obtain : $L^{-1}\left\{\frac{2}{s-3} + \frac{3s}{s^2+9} + \frac{4}{s^2+16}\right\}$
5) Obtain : $L^{-1}\left\{\frac{6}{3s-2} + \frac{s}{s^2+2}\right\}$

4 marks:

1) Use Laplace transform to solve the differential equation:

$$y' - y = 3.e^{-2t}, \qquad if \ y(0) = -1.$$

2) Solve using Laplace transform $\frac{dx}{dt} + 2x = e^{-t}$given that $x(0) = 2.$
3) Solve using Laplace transform $3y' - 2y = 4.e^{2t}$given: $y = 1 \ when \ t = 0.$

4) Use Laplace transform to solve the differential equation:

$$\frac{dy}{dx} = 3y + 1 - e^t, \qquad given : y = -1 \; when \; t = 0.$$