BRANCH	CSE
SESSION	

SAGAR INSTITUTE OF SCIENCE & TECHNOLOGY(SISTec)
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

QUESTION BANK

NAME OF THE FACULTY:
SUBJECT/CODE: BT-401/Engineering Mathematics-III

UNIT-1

Q No.	QUESTIONS	Bloom's Taxonomy Level
1.	Solve the root of equation $x^4 - x - 9 = 0$ which lies between 1 and 2 by the method of False position	3(Apply)
2.	Using the divided difference formula and Lagrange's Interpolation formula find $f(9)$ if x : 4, 5, 7, 10, 11, 13 $y = f(x)$: 48, 100, 294, 900, 1210, 2028	3(Apply)
3.	Interpret the sale for 1966 using Newton's forward interpolation formula Year: 1931, 1941, 1951, 1961, 1971, 1981 Sales: 12, 15, 20, 27, 39, 52	3(Apply)
4.	Evaluate $\frac{\Delta^2}{E}\sin(x+h) + \frac{\Delta^2 \sin(x+h)}{E\sin(x+h)}$	3(Apply)
5.	Solve the real root of $cos\ x - x^2 = x$ by Newton Raphson method correct to 4 decimal places.	3(Apply)
6.	Using Lagrange's method to find the value of x when $f(x) = 15$ from the given data: x: 5, 6, 9, 11 $y = f(x)$: 12, 13, 14, 16	3(Apply)
7.	Solve the cubic polynomial which takes the following values: x: 0, 1, 2, 3 $f(x)$: 1, 2, 1, 10	3(Apply)
8.	Solve the cube root of 2 approximately by Newton Raphson method correct to five decimal Places.	3(Apply)
9.	Solve real root of the equation $x^3 - 9x + 1$ by using bisection method to three place of decimal	3(Apply)

<table>
<tr><td>10.</td><td>The following table gives the marks obtained by 100 students in Mathematics in a certain examination:
<table>
<tr><td>Marks:</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td><td>70-80</td></tr>
<tr><td>No. of candidates:</td><td>25</td><td>35</td><td>22</td><td>11</td><td>7</td></tr>
</table>
How many of students got more than 55 marks?</td><td>3(Apply)</td></tr>
<tr><td>11.</td><td>(i) Evaluate $\Delta(e^{ax}\log bx)$
(ii)Evaluate $\left(\frac{\Delta^2}{E}\right)e^x.\frac{Ee^x}{\Delta^2 e^x}$</td><td>3(Apply)</td></tr>
<tr><td>12.</td><td>The pressure p of wind corresponding to velocity v is given by the following data estimate p when v=1.5.
<table>
<tr><td>v</td><td>10</td><td>20</td><td>30</td><td>40</td></tr>
<tr><td>p</td><td>1.1</td><td>2.0</td><td>30</td><td>40</td></tr>
</table></td><td>3(Apply)</td></tr>
<tr><td>13.</td><td>Find the cubic polynomial which takes the following values:
<table>
<tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>f(x)</td><td>1</td><td>2</td><td>1</td><td>10</td></tr>
</table>
Hence or otherwise evaluate f(4)</td><td>3(Apply)</td></tr>
<tr><td>14.</td><td>Find the root of equation $x\log_{10} x = 4.772393$ by Newton Raphson method correct to 6 decimal places.</td><td>3(Apply)</td></tr>
<tr><td>15.</td><td>Find the root of the equation $xe^x = \cos x$ by Regula falsi Method correct to 4 decimal places.</td><td>3(Apply)</td></tr>
</table>

UNIT-II

<table>
<tr><th>Q No.</th><th>QUESTIONS</th><th>Bloom's Taxonomy Level</th></tr>
<tr><td>1.</td><td>Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at x=1.1 from the following table
<table>
<tr><td>x</td><td>1.0</td><td>1.2</td><td>1.4</td><td>1.6</td><td>1.8</td><td>2.0</td></tr>
<tr><td>y</td><td>0</td><td>0.1280</td><td>.5440</td><td>1.2960</td><td>2.4320</td><td>4.0</td></tr>
</table></td><td>3(Apply)</td></tr>
<tr><td>2.</td><td>Find $\frac{dy}{dx}$ at x=.5 from the following table:
<table>
<tr><td>x</td><td>0.5</td><td>0.75</td><td>1</td><td>1.25</td><td>1.5</td></tr>
<tr><td>y</td><td>0.3521</td><td>0.3011</td><td>0.2420</td><td>0.1827</td><td>0.1295</td></tr>
</table></td><td>3(Apply)</td></tr>
<tr><td>3.</td><td>Find $\frac{dy}{dx}$ at x=0.4 from the following table:
<table>
<tr><td>x</td><td>0.1</td><td>0.2</td><td>0.3</td><td>0.4</td></tr>
<tr><td>y</td><td>1.10517</td><td>1.22140</td><td>1.34986</td><td>1.49182</td></tr>
</table></td><td>3(Apply)</td></tr>
<tr><td>4.</td><td>Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at x = 4, using
<table>
<tr><td>x</td><td>1</td><td>2</td><td>4</td><td>8</td><td>10</td></tr>
<tr><td>f(x)</td><td>0</td><td>1</td><td>5</td><td>21</td><td>27</td></tr>
</table></td><td>3(Apply)</td></tr>
<tr><td>5.</td><td>Evaluate $\int_0^6 \frac{1}{1+x^2}dx$ by using (i) Trapezoidal rule (ii)Simpson's 1/3 rule(iii) Simpson's 3/8 rule(taking h=1)</td><td>3(Apply)</td></tr>
<tr><td>6.</td><td>Evaluate $\int_{0.5}^{0.7} x^{1/2}e^{-x}dx$ by using-by-using suitable formula.</td><td>3(Apply)</td></tr>
<tr><td>7.</td><td>Evaluate $\int_0^5 \frac{1}{4x+5}dx$ by using Simpson's 1/3 rule dividing the range into 10 equal part and find an approximate value log5.</td><td>3(Apply)</td></tr>
<tr><td>8.</td><td>Find the value of $\int_1^2 \frac{1}{x}dx$ by Simpson's rule. Hence obtain approximate value of $\log_e 2$</td><td>3(Apply)</td></tr>
<tr><td>9.</td><td>Find the value of $\int_0^{0,6} e^{-x^2}dx$ by Simpson's 1/3 rule.</td><td>3(Apply)</td></tr>
<tr><td>10.</td><td>Solve the following equations by Gauss elimination method
2x + y + z = 10, 3x + 2y + 3z = 18 , x + 4y + 9z = 16</td><td>3(Apply)</td></tr>
<tr><td>11.</td><td>Solve the following equation by Gauss Jordon method
10x + y + z = 12, 2x + 10y + z = 13 , x + y + 5z = 7</td><td>3(Apply)</td></tr>
<tr><td>12.</td><td>Solve the following equations by Crout's method
(i) 3x + 2y + 7z = 4, 2x + 3y + z = 5 , 3x + 4y + z = 7
(ii) 10x + y + z = 12, 2x + 10y + z = 13 , 2x + 2y + 10z = 14</td><td>3(Apply)</td></tr>
<tr><td>13.</td><td>Solve the following equation by (i) Gauss –Jacobi method and (ii) Gauss Seidel method
27x + 6y-z = 85, 6x + 15y + 2z = 72 , x + y + 54z = 110</td><td>3(Apply)</td></tr>
<tr><td>14.</td><td>Solve the following equation by (i) Gauss –Jacobi method and Gauss Seidel method
10x-5y-2z = 3, 4x-10y + 3z = -3 , x + 6y + 10z = -3</td><td>3(Apply)</td></tr>
<tr><td>15.</td><td>Solve the following equation by Gauss Jordan method
10x-2y-3z = 205, -2x + 10y-2z = 154 , -2x-y + 10z = 120</td><td>3(Apply)</td></tr>
</table>

UNIT-III

Q No.	QUESTIONS	Bloom's Taxonomy Level
1.	Using Taylor's series method to obtain approximate value of y at x = 0.2 for the Differential equation $\frac{dy}{dx} = 2y + 3e^x$, $y(0) = 0$ .compute the numerical solution with the exact solution.	3(Apply)
2.	Using Taylor's series method to obtain approximate value of y at x = 0.1 and x=0.2 for the Differential equation $\frac{dy}{dx} = x^2y - 1$, $y(0) = 0$	3(Apply)
3.	Using Euler's method find an approximate value of y corresponding to x = 0.1, given that $\frac{dy}{dx} = \frac{y-x}{y+x}$ with $y(0) = 1$.	3(Apply)
4.	Using Euler's method, solve the differential equation in six steps $\frac{dy}{dx} = x + y$ with the initial conditions $y(0) = 0$, choosing $h = 0.2$	3(Apply)
5.	Solve by Euler's modified method $\frac{dy}{dx} = \log_e(x + y)$, $y(0) = 2$ at x = 1.2 and at x = 1.4 with h = 0.2.	3(Apply)
6.	If $\frac{dy}{dx} = x+y^2$ and y = 1 at x = 0. Find approximate value of y at x = 0.2 by Euler's modified method (taking h=0.1).	3(Apply)
7.	Solve the equation $5x\frac{dy}{dx} = 2-y^2$;$y(4) = 1$, for $y(4.1)$, (taking h=0.1) Using Euler's modified method.	3(Apply)
8.	Apply Runge-Kutta method to solve $10\frac{dy}{dx} = x^2 + y^2$;$y(0) = 1$, for x = 0.1	3(Apply)
9.	Apply Runge-Kutta method to obtain y when x = 1.1 given that y = 1.2 when x=1 and y satisfy the equation $\frac{dy}{dx} = 3x + y^2$.	3(Apply)
10.	Apply Runge-Kutta method to solve $\frac{dy}{dx} = xy$;$y(1) = 2$, for x = 1.2(taking h=0.1).	3(Apply)

11.	Using Milne's method to find a solution of the differential equation $\frac{dy}{dx} = x - y^2$ in the range $0 \le x \le 1$, for the boundary condition $y = 0$ at $x = 0$	3(Apply)
12.	Using Milne's method to find a solution of the differential equation $\frac{dy}{dx} = x + y$ with $y(0) = 1$ from $x = 0$ to $x = 0.4$	3(Apply)
13.	Using Milne's method to find a solution of the differential equation $\frac{dy}{dx} = x^2 + y^2$; $y(0) = 1$. Find the initial values $y(-0.1)$, $y(0.1)$ and $y(0.2)$ From the Taylor's method	3(Apply)
14.	Given $\frac{dy}{dx} = x^2(1 + y)$ and $y(1) = 1, y(1.1) = 1.233, y(1.2) = 1.548, y(1.3) = 1.979$ Evaluate $y(1.4)$ by Adam base forth method.	3(Apply)
15.	Given $\frac{dy}{dx} = x^2 - y$ and $y(0) = 1$ and the starting $y(0.1) = 0.90516, y(0.2) = .82127, y(0.3) = .74918$ Evaluate $y(0.4)$ by Adam base forth method.	3(Apply)

UNIT-IV

Q No.	QUESTIONS	Bloom's Taxonomy Level
1.	Find the Laplace transform of the following function: (i) $4\cos^2 2t$ (ii) $e^{3t}\sin^2 t$	3(Apply)
2.	Find the Laplace transform of the following function (i) $t^2 \sin at$ (ii) $(te^{-t}\sin at)$	3(Apply)
3.	Find the Laplace transform of the following function (i) $\frac{1-\cos 2t}{t}$ (ii) $\{\int_0^t \frac{e^t \sin t}{t} dt\}$	3(Apply)
4.	Evaluate $\int_0^\infty t^3 e^{-3t} \sin t dt$	3(Apply)
5.	Find inverse Laplace transform of the following function : (i) $L^{-1}\{\frac{5s-18}{9s^2+25}\}$ (ii) $L^{-1}\left\{\frac{3s+7}{s^2-2s-3}\right\}$	3(Apply)
6.	Find inverse Laplace transform of the following function : (ii) $L^{-1}\left\{\frac{2s+3}{(s-1)(s^2+2s+5)}\right\}$ (iii) $L^{-1}\left\{\frac{s^2+6}{(s^2+1)(s^2+4)}\right\}$	3(Apply)
7.	Evaluate $L^{-1}\left\{\log\left(\frac{s(s+1)}{(s^2+4)}\right)\right\}$	3(Apply)
8.	Using convolution theorem, evaluate :$L^{-1}\left\{\left(\frac{s}{(s^2+a^2)^2}\right)\right\}$	3(Apply)
9.	Using convolution theorem, evaluate $L^{-1}\left\{\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right\}$	3(Apply)
10.	Solve $(D^2+6D+9)y = \sin x$ given that $y = 1, y' = 0$ when $x = 0$	3(Apply)
11.	Solve $(D^2+9)y = \cos 2t$ if $y(0) = 1$, $y\left(\frac{\pi}{2}\right) = -1$	3(Apply)
12.	Solve $y'' + 2y' + 5y = 3e^{-t}\sin t$ if $y(0) = 0, y'(0) = 1$	3(Apply)
13.	Find $L\{F(t)\}$, if $F(t) = (t-1)^2$, $t > 1$ and 0, $0 < t < 1$	3(Apply)
14.	Find inverse Laplace transform of the following function : (ii) $L^{-1}\left\{\frac{2s+3}{(s-1)(s^2+2s+5)}\right\}$ (iii) $L^{-1}\left\{\frac{s^2+6}{(s^2+1)(s^2+4)}\right\}$	3(Apply)
15.	Define convolution of two functions f(t) and g(t).Apply convolution theorem to evaluate $L^{-1}\left\{\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right\}$	3(Apply)

UNIT-V

Q No.	QUESTIONS	Bloom's Taxonomy Level
1.	Find the value of K for the density function :$f(x) = \begin{cases} Kx^2 & 0 \le x \le 3, \\ 0 & \text{otherwise.} \end{cases}$ and compute $P(1 \le x \le 2)$.	3(Apply)
2.	If $f(x) = \frac{c}{1+x^2}, -\infty < x < \infty$, then find c and show that its corresponding distribution function is $F(x) = \frac{1}{\pi}\tan^{-1}x + \frac{1}{2}$.	3(Apply)
3.	3 A frequency distribution is defined by $f(x) = \begin{cases} x^3, & 0 \le x < 1 \\ 3(2-x)^3, & 1 \le x \le 2 \end{cases}$ Prove that f(x) is a p.d.f. Also find mean and the standard deviation.	3(Apply)
4.	For the distributive function $dF = y_0 e^{-\lvert x \rvert} dx$, $-\infty \le x \le \infty$. Prove that $y_0 = \frac{1}{2}$, mean = 0, S.D. = $\sqrt{2}$, variance = 2 and mean deviation about mean is 1.	3(Apply)
5.	Find the mean, variance and standard deviation of Binomial distribution.	3(Apply)
6.	A set of 8 biased coins was tossed 256 times and the frequencies of heads obtained are given by the following table No of heads(x): 0 | 1 | 2 | 3 | 4 | 5 | 6 Frequencies(f): 2 | 6 | 24 | 63 | 64 | 50 | 36 Fit a binomial distribution to this data.	3(Apply)
7.	Out of 800 families with 5 children each how many would you expect to have (i) 3 boys (ii) 5 girls (iii) either 2 or 3 boys	3(Apply)
8.	If 10% of the bolts produced by a machine are defective, determine the probability that out of 5 bolts chosen at random at least two will be defective.	3(Apply)
9.	Find the mean, variance and standard deviation of Poisson distribution.	3(Apply)
10.	Fit a Poisson's Distribution to the following calculate theoretical frequencies: r: 0 | 1 | 2 | 3 | 4 f: 122 | 60 | 15 | 2 | 1	3(Apply)
11.	Assuming that the diameters of 1000 brass plugs taken consecutively from a machine from a normal distribution with mean 0.7515 cm.and standard deviation 0.0020cm. How many of the plugs are likely to be rejected.	3(Apply)
12.	If the probability that an individual suffers a bad reaction from a certain injection is 0.001, determine the probability that out of 2000 individuals (i) exactly 3 (ii) more than 2 individuals (iii) none (iv) more than one individuals	3(Apply)
13.	Define Normal distribution. Give the properties of normal curve.	3(Apply)
14.	The mean deviation from the mean of the normal distribution is 4/5 times its standard deviation.	3(Apply)
15.	A sample of 100 dry battery cells tasted to find the length of life produced the	3(Apply)

	following: Mean $\bar{x}$ = 12 hours, standard deviation σ = 3 hours. Assuming the data to be normally distributed, what percentage of battery cells are expected to have life (i) more than 15 hours (ii) less than 6 hours (iii) between 10 and 14 hours?	