COSM Question Bank

BE Sem IV IT (A.T.K.T) Examination – 2013.

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<table>
<tr><td>1</td><td>Solve using newton Raphson method $x^3 + 2x^2 + 10x - 20 = 0$</td></tr>
<tr><td>2</td><td>Solve using gauss elimination method to solve the equations: 2x + y + z = 10, 3x + 2y +3z = 18, x + 4y + 9z = 16.</td></tr>
<tr><td>3</td><td>Given that $\frac{dy}{dx}$ = x + y^2, y(0) = 1. Using Runge- Kutta fourth order method find approximate value of y(0.2), take step-size 0.1</td></tr>
<tr><td>4</td><td>Evaluate $\int_1^5 \log_{10} x \, dx$, taking 8 subintervals, correct to four decimal places by Trapezoidal method.</td></tr>
<tr><td>5</td><td>A train is moving at speed of 30m/sec. suddenly brakes are applied. The speed of the train per second after t seconds is given by the below table. Apply Simpson’s three-eighth rule to determine the distance moved by the train in 30 seconds.
<table>
<tr><td>Time(t)</td><td>0</td><td>5</td><td>10</td><td>15</td><td>20</td><td>25</td><td>30</td></tr>
<tr><td>Speed(y)</td><td>30</td><td>24</td><td>19</td><td>16</td><td>13</td><td>11</td><td>10</td></tr>
</table></td></tr>
<tr><td>6</td><td>If P is the pull required to lift a load W by means of pulley block, find a linear law of form P=mW+c connecting P and W using below given data where P and W are taken in kg-wt. Compute P when W= 200 kg.
<table>
<tr><td>P:</td><td>12</td><td>15</td><td>21</td><td>25</td></tr>
<tr><td>W:</td><td>50</td><td>70</td><td>100</td><td>120</td></tr>
</table></td></tr>
<tr><td>7</td><td>Fit cubic spline and evaluate y(1.5)
<table>
<tr><td>x:</td><td>X0= 1</td><td>X1= 2</td><td>X2= 3</td><td>X3= 4</td></tr>
<tr><td>y:</td><td>Y0= 1</td><td>Y1= 2</td><td>Y2= 5</td><td>Y3= 11</td></tr>
</table></td></tr>
<tr><td>8</td><td>Using Lagrange’s formula, find the values of f(0) on the table given below.
<table>
<tr><td>x:</td><td>-1</td><td>-2</td><td>2</td><td>4</td></tr>
<tr><td>f(x):</td><td>-1</td><td>-9</td><td>11</td><td>69</td></tr>
</table></td></tr>
<tr><td>9</td><td>Solve the following equations by Gauss- seidel iteration correct method upto 3 significant digits.
$20x_1 + 2x_2 + x_3 = 30$
$x_1 - 40x_2 + 3x_3 = -75$
$2x_1 - x_2 + 10\,x_3 = 30$</td></tr>
<tr><td>10</td><td>Explain different types of Errors with suitable examples.</td></tr>
<tr><td>11</td><td>Use Runge Kutta second order method to approximate y when x= 0.8 with $\frac{dy}{dx} = \sqrt{x+y}$, x_0 = 0.4 and y_0 = 0.41.</td></tr>
<tr><td>12</td><td>Evaluate the integral using simpson’s one-third rule. $\int_0^1 (4x - 3x^2)dx$, taking n=10.</td></tr>
</table>

13 Use Eulers's method to find an approximate value of y at x=0.1. in five steps, given that $\frac{dy}{dx}$ = x - y^2 and y(0) = 1

14 Write and explain program for Regula Falsi Method

15 Write Program for matrix inversion

16 Solve using Gauss Seidal method, accurate upto four significant digits.
$10x_1 + x_2 + 2x_3 = 44$
$2x_1 + 10x_2 + x_3 = 51$
$x_1 + 2x_2 + 10\,x_3 = 61$

17 Use modified Euler's method to find the solution in the interval [1,1.5] using step size h=0.1 for $\frac{dy}{dx}$ = xy with y(1) = 5.

18 Given a table of values for the function. Fit the second degree polynomial

x:	1.0	1.5	2.0	2.5	3.1	4.0
y:	1.1	1.3	1.6	2.0	3.4	4.2

19 Use three iterations of Newton Raphson Method to solve the non-linear equations,
$x^2 - y^2 + 7 = 0$, $x - xy + 9 = 0$. Take $(x_0\ ,\ y_0)$ = (3.5, 4.5) as the initial approximation.

20 The distance (s) covered by a car in a given time (t) is given below
Time(Minutes) : 10 12 16 17 22
Distance(Km.) : 12 15 20 22 32
Find the speed of car at time t =14 minutes.

21 The following data gives pressure and volume of superheated steam
V: 2 4 6 8 10
P: 105 42.7 25.3 16.7 13
Find the rate of change of pressure w.r.t. volume when V=8

22 Following table shows speed in m/s and time in second of a car

t:	0	12	24	36	48	60	72	84	96	108	120
v:	0	3.60	10.08	18.90	21.60	18.54	10.26	5.40	4.50	5.40	9.00

Using simpson`s one-third rule find the distance travelled by the car in 120 second

23 Use three iterations of Jacobi`s method to solve the system of equations
$20x + y - 2z - 17 = 0, 2x - 3y + 20z - 25 = 0, 3x + 20y - z + 18 = 0$

24 Given that $\frac{dy}{dx}$ = x + y^2, y(0) = 1. Using Runge-Kutta method find approximate value of $y\,(0.2)$,take step size 0.1

25 Use Gauss elimination method to solve the equations:
$2x + y + z = 10, 3x + 2y + 3z = 18, x + 4y + 9z = 16$. also write pseudo code for this method.

26 From the following data calculate two lines of regression
X 16 20 17 21 15
Y 50 60 58 60 55
(a) Estimate value of Y when X = 25
(b) Estimate value of X when Y = 50.

27 Compute $f'(0.75)$, from the following table

x:	0.50	0.75	1.00	1.25	1.50

		F(x)	0.13	0.42	1.00	1.95	2.35
28	Find the root of the equation $4\sin x + x^2 = 0$ by Secant method.						
29	Use Lagrange's formula to find third degree polynomial which fits into the data below x: 0 1 3 4 F(x) -12 0 12 24 Evaluate the polynomial for x = 4.						
30	Suppose that you have the task of measuring the lengths of a bridge and a rivet and come up with 9999 and 9 cm respectively. If true values are 10,000 and 10 cm respectively. Compute (a) absolute error and (2) percentage relative error for each case.						
31	Find the square root of 10 correct upto three decimal place by using newton raphson method.						
32	Fit the least square parabola to the data x: -1 0 1 2 Y: -2 1 2 4						
33	Use 4th order Runge Kutta method to solve dy/dx = $y^2 + x^2$, y(0)= 1. Evaluate the value of y when x=0.1						
34	First three moments of a variable measured by point "2" are gradually 1,16 and -40. Prove that mean is 3, Variance is 15 and μ4 = -86.						
35	Find the root of the equation cos x = xe^x using secant method upto four decimal palces.						
36	Write program for Newton raphnson method.						
37	Using Lagrange's formula to find a polynomial of degree three which fits into the data below: x: -1 0 1 3 f: 2 1 0 -1						
38	Compute the skewness based on the third moment for the following data. Class 0-2 2-4 4-6 6-8 8-10 frequency 5 18 42 27 8						
39	Find the approximate value of y for x=0.1, x=0.2 by Picard's method given dy/dx = x + y , y(0) = 1. Check the result with the exact value.						
40	Write program for secant method.						