

YMCA University of Science and Technology ,Faridabad
B.Tech (EL,ECE,EIC)(4th Semester) (Under-CBS Scheme)

Computational Techniques (E-206)May-2018

M.Marks:60

Time:3hrs

Note: All questions are compulsory in Part-I

Attempt any four questions from Part -II

Part-I

Que1.(a)Find the relative error in calculation of $7.342/0.241$.Numbers are correct to three decimal places. Determine the true smallest interval in which true result lies.

(b)Write the formula for Gauss backward interpolation.

(c)Prove $E = e^{hD}$

(d) Find the root of $x^3 - 4x - 9 = 0$ using Bisection method.

(e)Integrate numerically $\int_0^{\pi/2} \sqrt{\cos \theta} d\theta$.

(f)Using Taylor's series method ,solve $dy/dx = xy + y^2$, at $x = 0.1$,given $y(0) = 1$.

(g)Find the real root of the equation $x^3 - 2x - 5 = 0$ by the method of false position.(upto three stage only).

(h)Write the formula for simpson's $1/3^{\text{rd}}$ and simpson's $3/8^{\text{th}}$ rule.

(i)Use Euler's method to find the approximate value of y when $x = 0.4$, if $dy/dx = 1-2xy$, given that $y = 0$ when $x = 0$ and $h = 0.2$

(j)Describe Dufort and Frankel method.

(2 x 10 =20)

Part-II

Que.2(a) Use Lagrange's interpolation formula to find the value of $f(x)$ corresponding to $x=27$ from the following data:

x	: 14	17	31	35	
f(x)	: 68.7	64	44	39.1	(5)

(b)Using Newton's forward interpolating formula, find y at $x = 8$ for the following:

x	: 0	5	10	15	20	25	
y:	7	11	14	18	24	32	(5)

Que.3(a) Find the root of the equation $xe^x = \cos x$ using secant method. (5)

(b) Using Newton-Raphson method, find the real root of the equation $3x = \cos x + 1$ correct to four decimal places. (5)

Que.4 Solve the given system of equation using Relaxation method:

$$12x + y + z = 31, \quad 2x + 8y - z = 24, \quad 3x + 4y + 10z = 58. \quad (10)$$

Que.5(a) Evaluate $\int_0^{10} e^x dx$, using weddle's rule, ($h=1$). (5)

(b) Evaluate $\int_4^{5.2} \log x dx$ using Trapezoidal rule. (5)

Que.6 Using Milne's predictor-corrector method, find the solution of $dy/dx = x - y^2$ at $x = 0.8$, given :

x:	0	0.2	0.4	0.6	
y:	0.0	0.02	0.0795	0.1762	(10)

Que.7 Solve the equation $u_{xx} + u_{yy} = 0$ for the given square mesh with the given boundary values. (10)

