BACHELOR OF TECHNOLOGY (C.B.C.S.) (2021-COURSE)
B. Tech. Sem - II COMPUTER :SUMMER- 2022
SUBJECT : NUMERICAL COMPUTATION

Day : Monday
Date : 1/8/2022

S-24013-2022

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B.

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable calculator is allowed.

Q.1 Find a real root of the equation $x^3 - 2x - 5 = 0$ by the method of false position correct to the three decimal places. **(10)**

OR

Find the positive root of $x^4 - x = 0$ correct to three decimal places, using Newton-Raphson method.

Q.2 Apply factorization method to solve the equation **(10)**
$3x + 2y + 7z = 4;\ \ 2x + 3y + z = 5;\ 3x + 4y + z = 7$

OR

Solve by Jacobi's iteration method, the equations
$20x + y - 2z = 17;\ \ 3x + 20y - z = -18;\ 2x - 3y + 20z = 25$

Q.3 The table gives the distances in nautical miles of the visible horizon for the given heights in feet above the earth's surface **(10)**

x = height	100	150	200	250	300	350	400
y = distance	10.63	13.03	15.04	16.81	18.42	19.90	21.27

Find the values of y when **i)** $x = 218$ft **ii)** 410 ft using Newtons interpolation formulae.

OR

Apply Bessel's formula to find the value of F(27.5) from the table.

x	25	26	27	28	29	30
$f(x)$	4.000	3.846	3.704	3.571	3.448	3.333

Q.4 Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using **i)** Trapezoidal rule **ii)** Simpson's 1/3rd rule. **(10)**

OR

Evaluate $\int_0^2 e^{x^2} dx$ taking 10 intervals, by using:

i) Simpson's 3/8th rule **ii)** Weddles rule

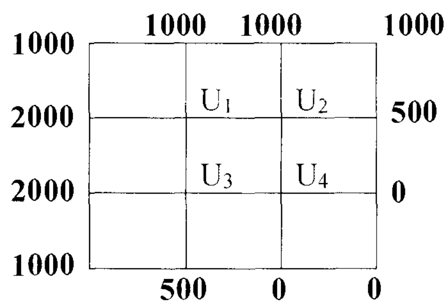
Q.5 Using Picard's process of successive approximation, obtain a solution upto the fifth approximation of the equation $\frac{dy}{dx} = y + x$, such that $y = 1$ when $x = 0$. **(10)**

P.T.O.

OR

Apply Runge-Kutta fourth order method, to find an approximate values of y when $x = 0.2$, given that $\frac{dy}{dx} = x + y$ & $y = 1$ when $x = 0$.

Q.6 Solve the Laplace equation $Uxx + Uyy = 0$ for the square mash of figure with boundary values as shown **(10)**



OR

Solve the equation $y'' = x + y$ with boundary conditions $y(0) = y(1) = 0$.

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