B.Tech. SEM -V (Chemical/ Civil/ Electrical/ Mechanical/ Production/ Computer/ Info. Tech./ Electronics / Bio Medical / E & TC) 2014
Course (CBCS) : WINTER - 2018
SUBJECT : ENGINEERING MATHAMATICS - IV

Day : Thursday **W-2018-2383** Time : 02.30 PM TO 05.30 PM
Date : 06/12/2018 Max. Marks : 60

N. B. :

1) All question are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labelled diagram **WHEREVER** necessary.
4) Assume suitable data, if necessary.

Q. 1 By using the bisection method, find an approximate root of the equation $\sin x = \frac{1}{x}$, that lies between x=1 and x=1.5(measured in radians).Carry out computations upto 7^{th} stage. **(10)**

OR

Using Newton's iterative method, find the root of $x \log_{10} x = 1.2$ correct to five decimal places.

Q. 2 Solve the following equations by Gauss Seidel iteration method: **(10)**

10x-2y-z-t=3
-2x+10y-z-t=15
-x-y+10z-2t=27
-x-y-2z+10t=-9

OR

Solve:

10x-7y+3z+5u=6
-6x+8y-z-4u=5
3x+y+4z+11u=2
5x-9y-2z+4u=7 by Gauss Elimination method.

Q. 3 Solve simultaneous difference equations: **(10)**

$u_{x+1} + v_x - 3u_x = x$
$3u_x + v_{x+1} - 5v_x = 4^x$

OR

Solve: $u_{n+2} - 4u_{n+1} + 4u_n = 2^n$

P. T. O.

Q. 4 The table gives distances in nautical miles of the visible horizon for given heights in feet above the earth's surfaces: **(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 x=218 ft.

OR

Evaluate: $\int_0^6 \frac{dx}{1+x^2}$ by using

i. Trapezoidal rule.
ii. Simpson's 1/3rd rule.

Q. 5 Using modified Euler's method, find an approximate value of y when x=0.3, given that $\frac{dy}{dx} = x + y$ and y=1 when x=0. **(10)**

OR

Using Runge – Kutta method of fourth order, solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with y(0)=1 at x=0.2,0.4

Q. 6 Solve the equation $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$ subject to the conditions $u(x,0) = \sin \pi x$, $0 \le x \le 1$;u(0,t)=u(1,t)=0.Carry out computations for two levels, taking h=1/3,k=1/36. **(10)**

OR

Solve the Poisson's equation $u_{xx} + u_{yy} = -81xy, 0 < x < 1, 0 < y < 1$, given that $u(0, y) = 0$, $u(x,0) = 0, u(1, y) = 100, u(y,1) = 100$ and h=1/3.

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