

**B.Tech. SEM -V (Chemical/ Civil/ Electrical/ Mechanical/ Production/
Computer/ Info. Tech./ Electronics / Bio Medical / E & TC) 2014
Course (CBCS) : SUMMER - 2019
SUBJECT : ENGINEERING MATHAMATICS - IV**

Day : Friday
Date : 17/05/2019

S-2019-2648

Time : 10.00 AM TO 01.00 PM
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 Find the root of equation $xe^x = \cos x$ using Regula Falsi method correct to (10)
four decimal place

OR

Using Newton's iterative method, find the root of $3x = \cos x + 1$ correct to
five decimal places.

Q. 2 Solve the following equations by Gauss Jordan method: (10)

$$\begin{aligned}10x - 2y - z - t &= 3 \\ -2x + 10y - z - t &= 15 \\ -x - y + 10z - 2t &= 27 \\ -x - y - 2z + 10t &= -9\end{aligned}$$

OR

Solve:

$$\begin{aligned}10x - 7y + 3z + 5u &= 6 \\ -6x + 8y - z - 4u &= 5 \\ 3x + y + 4z + 11u &= 2 \\ 5x - 9y - 2z + 4u &= 7\end{aligned}$$

by Gauss Elimination method..

Q. 3 Solve simultaneous difference equations: (10)

$$\begin{aligned}y_{x+1} - z_x &= 2(x+1) \\ z_{x+1} - y_x &= -2(x+1)\end{aligned}$$

OR

Solve: $u_{n+2} - 4u_{n+1} + 3u_n = 5^n$

P. T. O.

Q. 4

Find the cubic polynomial which takes following values:

(10)

x	0	1	2	3
f(x)	1	2	1	10

OR

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

- Simpson's 1/3rd rule
- Simpson's 3/8th rule.

Q. 5

Using modified Euler's method, find an approximate value of y when x=1.2 (10)

and x=1.4 with h=0.2, given that $\frac{dy}{dx} = \log(x+y)$, $y(0) = 2$.

OR

Using Runge-Kutta method of fourth order, solve $\frac{dy}{dx} = x+y$ with $y(0)=1$ at $x=0.2$, $h=0.1$

Q. 6

Find the values $u(x, t)$ satisfying the parabolic equation $\frac{\partial u}{\partial t} = 4 \frac{\partial^2 u}{\partial x^2}$ subject (10)

to the conditions $u(0, t) = u(8, t) = 0$ and $u(x, 0) = 4x - \frac{1}{2}x^2$ at the points

$x = i : i = 0, 1, \dots, 8$ and $t = \frac{1}{8}j : j = 0, 1, \dots, 5$.

OR

Solve the Laplace equation $u_{xx} + u_{yy} = 0$ given that

0	11.1	17	19.7	18.6
8	u_1	u_2	u_3	21.9
0	u_4	u_5	u_6	21
0	u_7	u_8	u_9	17
0	9.7	12.1	12.5	9

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