**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

Time : 10.00 AM TO 01.00 PM
Max. Marks : 60

**S-2019-2648**

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**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.

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**Q. 1** Find the root of equation $xe^x = \cos x$ using Regula Falsi method correct to four decimal place **(10)**

**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)**

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)**

$$y_{x+1} - z_x = 2(x+1)$$
$$z_{x+1} - y_x = -2(x+1)$$

**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

i. Simpson's 1/3rd rule
ii. Simpson's 3/8th rule.

**Q. 5** Using modified Euler's method, find an approximate value of y when x=1.2 and x=1.4 with h=0.2,given that $\frac{dy}{dx} = \log(x+y), y(0) = 2$. **(10)**

**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 to the conditions $u(0,t) = u(8,t) = 0$ and $u(x,0) = 4x - \frac{1}{2}x^2$ at the points $x = i : i = 0,1,...8$ and $t = \frac{1}{8}j : j = 0,1,..5$. **(10)**

**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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