

**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 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)**

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

**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

- i. Simpson's 1/3<sup>rd</sup> rule
- ii. Simpson's 3/8<sup>th</sup> 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

\* \* \* \* \*