



R18 Regulation

**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**

(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code:2B3BA

## B.Tech III Semester Supplementary Examinations, July 2022

### NUMERICAL METHODS AND TRANSFORMS (Common to ECE & EEE)

**Maximum Marks: 70**

Date:19.07.2022

Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
  3. Part B consists of 10 questions. Answer any 5 questions which carry 10M.
  4. Each question carries 10 marks and may have a, b, c, d as sub questions.

#### Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Write the formula of Newton Raphson method.
- 2 Define transcendental equation.
- 3 State Trapezoidal and Simpson's  $\frac{3}{8}$  th rules.
- 4 Write the formula of Simpson's  $\frac{1}{3}$  and  $\frac{3}{8}$  rules.
- 5 If  $\frac{dy}{dx} = y - x$ ,  $y(0) = 2$ ,  $h=0.1$  find  $k_2$  by RK fourth order method.
- 6 Write the two advantages of R-K method over Taylor's series
- 7 State Change of Scale property of Fourier Transform.
- 8 If  $F(p)$  is the Fourier transform of  $f(x)$ , then what is the Fourier transform of  $xf(x)$ .
- 9 Expand  $Z(u_{n+1})$ .
- 10 Find  $Z(k)$ , where  $k$  is a constant.

#### Part-B

Answer all the questions

(5 X 10M=50Marks)

- 11 Find a positive root of the equation  $f(x) = x^3 - 2x - 5 = 0$  by Bisection method. [10]

OR

- 12 Using Newton – Raphson method derive a formula to find the reciprocal of a number. Find the reciprocal of 22 using Newton-Raphson method. [10]

- 13 Evaluate  $y=e^{2x}$  for  $x=0.05$  using the following table by using interpolation formula. [10]

x	0	0.1	0.2	0.3	0.4
Y=f(x)	1	1.2214	1.4918	1.8221	2.255

OR

- 14 Evaluate  $\int_0^1 \frac{1}{1+x} dx$  by Trapezoidal rule and Simpson's 1/3 rule (n=6). [10]
- 15 Find  $y(0.2)$  from the equation,  $y' = x + y^2$ , given  $y(0)=1$  using Runge-Kutta method of Fourth order. [10]

OR

- 16 Given  $\frac{dy}{dx} = \frac{(1+x^2)y^2}{2}$  and  $y(0)=1, y(0.1)=1.06, y(0.2)=1.12, y(0.3)=1.21$ . Evaluate  $y(0.4)$  by Milne' method. [10]
- 17 Find the half-range Fourier Cosine series of the function  $f(x)$  given by [10]
- $$f(x) = \begin{cases} x, & \text{for } 0 < x < \pi/2 \\ \pi - x, & \text{for } \pi/2 < x < \pi \end{cases}$$

OR

- 18 Find Fourier transform of  $e^{-a|x|}$  ( $a>0$ ) and hence ST [10]
- $$\int_0^{\infty} \frac{\cos px}{a^2+p^2} dp = \frac{\pi}{2a} e^{-a|x|}$$

- 19 Find  $z^{-1} \left[ \frac{z^3-2z}{(z-2)^3(z-4)} \right]$  [10]

OR

- 20 If  $z(u_n) = \frac{2z^2+5z+14}{(z-1)^4}$  then find  $u_2$  and  $u_3$ . [10]