

**I B. Tech II Semester Supplementary Examinations, Nov - 2017**  
**MATHEMATICS-II (MM)**

(Com. to CE,ME,CSE,PCE,IT,Chem E,Aero E, Auto E,Min E, Pet E,Metal E & Textile E)  
 Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answering the question in **Part-A** is Compulsory  
 3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

1. a) Find the value of  $\frac{1}{5}$  using Newton Raphson method. (4M)
- b) If the interval of differencing is unity, prove that (3M)  
 $\Delta[x(x+1)(x+2)(x+3)] = 4(x+1)(x+2)(x+3).$
- c) Evaluate y (0.1) using Euler's method for  $\frac{dy}{dx} = x - ye^x$ ,  $y(0) = 1$  (4M)
- d) Write the half range sine series for  $f(x) = \frac{x}{a}$  in  $(0,1)$ . (4M)
- e) Write Fourier cosine integral. (3M)
- f) Find Z (  $n^2$ ). (4M)

**PART -B**

2. a) Find the Real root of the equation  $x \log_{10} x = 1.2$  using false position method. (8M)
- b) Find the Real root of the equation  $x^3 - x - 11 = 0$  using bisection method. (8M)
3. a) Find the number of men getting wages between 10 and 15 from the following data. (8M)

| Wages in rupees | 0-10 | 10-20 | 20-30 | 30-40 |
|-----------------|------|-------|-------|-------|
| Frequency       | 9    | 30    | 35    | 42    |

- b) Find y(25), Given that  $y_{20}=24, y_{24}=32, y_{28}=35, y_{32}=40$  using Gauss forward difference formula. (8M)
4. a) Evaluate y (0.1) using RK method of fourth order for  $\frac{dy}{dx} = y - \frac{2x}{y}$ ,  $y(0) = 1$  (8M)
- b) Evaluate y (0.1) using Picard's method for  $\frac{dy}{dx} = y + x^2$ ,  $y(0) = 1$  (8M)

5. a) Obtain the Fourier expansion of  $x \sin x$  in  $(0, 2\pi)$ . (8M)
- b) Find the half range cosine expansion of  $f(x) = \begin{cases} 2, & \text{if } 0 < x < 1 \\ x, & \text{if } 1 < x < 2 \end{cases}$  (8M)
6. a) Prove that (i)  $F_s\{f(ax)\} = \frac{1}{a} F_s\left(\frac{p}{a}\right)$  (ii)  $F_s\left\{f\left(\frac{x}{a}\right)\right\} = a F_s(ap)$  (8M)
- b) Find the Fourier cosine and sine transform of  $e^{-ax}$ ,  $a > 0$  and hence deduce the inversion formula. (or) Deduce the integrals (i)  $\int_0^\infty \frac{\cos px}{a^2 + p^2} dp$  (ii)  $\int_0^\infty \frac{p \sin px}{a^2 + p^2} dp$  (8M)
7. a) Solve the difference equation, using Z – transform (8M)  
 $y_{n+2} - 4y_{n+1} + 3y_n = 0$  given that  $y_0 = 2$  and  $y_1 = 4$ .
- b) Find  $Z[e^n \sin n\theta]$ . (8M)