



DHARMSINH DESAI UNIVERSITY, NADIAD  
FACULTY OF TECHNOLOGY  
THIRD SESSIONAL  
SUBJECT: (BS 201) MATHEMATICS-II

|             |                        |            |          |
|-------------|------------------------|------------|----------|
| Examination | : B.Tech. Semester -II | Seat No.   | :        |
|             | [CE,EC,IT]             |            |          |
| Date        | : 29/05/2023           | Day        | : MONDAY |
| Time        | : 10:30 to 11:45 am    | Max. Marks | : 36     |

**INSTRUCTIONS:**

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

**Q.1 Do as directed.** [12]

CO5 A (a) Evaluate  $\int_0^1 \left( \frac{1}{1+x^2} \right) dx$ , taking  $h = \frac{1}{4}$ , by Simpson's 1/3 rule. [2]

CO5 A (b) Derive *Newton-Raphson's* formula to find  $q^{th}$  root of a real number R. [2]

CO5 A (c) Use *Trapezoidal's* rule to evaluate  $\int_0^1 \sqrt{(\sin x + \cos x)} dx$ , given  $h = 0.2$  and  $x$  is in radians. [2]

CO6 A (d) Find  $L[e^{5t+6} + 7^t]$ . [2]

CO6 A (e) Find  $L[(1+t)^2 e^{-t}]$ . [2]

CO6 A (f) Find  $L^{-1} \left[ \log \left( \frac{(s+1)}{(s+2)(s+3)} \right) \right]$ . [2]

**Q.2 Attempt Any TWO from the following questions.** [12]

CO5 A (a) Using the *Newton-Raphson's method*, find the real root of  $e^x - 3x = 0$ , correct up to four places of decimal, that lies between 0 and 1. [6]

CO5 A (b) Find  $L^{-1} \left[ \frac{1}{(s-2)(s+2)^2} \right]$ , using convolution theorem [6]

CO5 A (c) Solve the differential equation using *Laplace* transform. [6]

$$\frac{d^2y}{dt^2} + 2 \frac{dy}{dt} + 2y = 5 \sin t \quad \text{given } y(0) = y'(0) = 0.$$

**Q.3 Attempt Any ONE from the following questions.** [12]

CO6 A (a) Find  $L\{t^2 e^{-t} \sin 4t\} + L\left\{\frac{\cos 2t - \cos 3t}{t}\right\}$ . [6]

CO6 A (b) Find  $L^{-1} \left[ \frac{s}{s^4 + s^2 + 1} \right]$ . [6]

OR

CO6 A (a) Evaluate  $\int_0^\infty [t^3 e^{-t} \sin t] dt$ , using *Laplace* transform. [6]

CO6 A (b) Find  $L^{-1} \left[ \frac{1}{s^3 (s^2+1)} \right] + L^{-1} \left[ \frac{3s+5\sqrt{2}}{(s^2+8)} \right]$ . [6]

Blooms Taxonomy levels : R-Remembering, U- Understanding, A-Applying, N-Analyzing, E- Evaluating, C-Creating