

Code: 7GC32

II B.Tech. I Semester Supplementary Examinations March/April 2023

Engineering Mathematics-III
(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks

UNIT-I

1. Use Milne's method to find $y(0.3)$ from $y' = x^2 + y^2$ $y(0) = 1$. Find the initial values $y(-0.1)$, $y(0.1)$, $y(0.2)$ from the Taylor's series method. 14M

OR

2. Find a real root of the equation $3x = \cos x + 1$ by Newton-Raphson's method correct to four decimal places. 14M

UNIT-II

3. The following table of values of x and y is given.

| | | | | | | | |
|-----|--------|--------|--------|--------|--------|--------|--------|
| x | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| y | 6.9897 | 7.4036 | 7.7815 | 8.1291 | 8.4510 | 8.7506 | 9.0309 |

Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x=6$ 14M

OR

4. Estimate the value of $f(22)$ and $f(42)$ from the following table by Newton's forward and backward interpolation formula. 14M

| | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|
| x | 20 | 25 | 30 | 35 | 40 | 45 |
| y | 354 | 332 | 291 | 260 | 231 | 204 |

UNIT-III

5. Form a partial differential equation by eliminating the arbitrary functions $f(x)$ and $g(y)$ from $z = y f(x) + x g(y)$. 14M

OR

6. Solve $\frac{\partial^2 u}{\partial x^2} - 2 \frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 0$ 14M

UNIT-IV

7. Find the Fourier series to represent $f(x) = |x|$ when $-f < x < f$ and deduce that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \frac{f^2}{8}$ 14M

OR

8. Find the half range cosine series for the function $f(x) = x$, when $0 < x < f$ hence show that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \frac{f^2}{8}$ 14M

UNIT-V

9. If $F(s)$ is the complex Fourier transform of $f(x)$ then prove that $F\{f(ax)\} = \frac{1}{a} F\left(\frac{s}{a}\right), a \neq 0$ 14M

OR

10. Find the Fourier transform of $e^{-|x|}$. Hence show that $\int_0^\infty \frac{x \sin mx}{1+x^2} dx = \frac{f}{2} e^{-m}, m > 0$ 14M

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| R-17 |
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Code: 7G334

II B.Tech. I Semester Supplementary Examinations March/April 2023

Analog Electronics-I

(Electrical and Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks

UNIT-I

1. A CC amplifier has the h-parameters given as $h_{ie}=1100$ $h_{re}=2 \times 10^{-4}$ and $h_{oe}=25 \mu A/V$ and $h_{fe}=50$. Where both load and source resistances are $2k$. Then determine current gain, voltage gain, input and output resistances, overall input and output resistances. 14M

OR

2. a) Explain about Two stage RC-coupled amplifier. 7M
b) Briefly explain how transistor acts as an amplifier, and draw h-parameter model of transistor. 7M

UNIT-II

3. a) Briefly discuss about the effect of feedback on amplifier bandwidth 7M
b) List out the Classification of feedback amplifiers 7M

OR

4. a) List out the Classification of feedback amplifiers 7M
b) Derive the expression for transfer gain with feedback? 7M

UNIT-III

5. a) List out the classification of oscillators 9M
b) What is Barkhausen criteria for oscillations? 5M

OR

6. Derive the expressions of frequency of oscillations of a Colpitts oscillator with relevant diagram. 14M

UNIT-IV

7. a) List out classification of Power Amplifiers. 7M
b) Derive the expression for efficiency of series fed Class A power amplifier 7M

OR

8. For a class-B Power Amplifier providing a 22V Peak signal to an 8 load and a power supply of $V_{CC}=25V$. determine:(a)Input Power, $P_i(dc)$ (b)Output Power, $P_o(ac)$ and (c)Circuit efficiency, % . 14M

UNIT-V

9. a) Define linear wave shaping? Write short notes on Integrator and Differentiator circuits. 8M
b) What are the applications of Linear wave shaping. 6M

OR

10. a) In a low pass RC circuit, $R=2k$ and $C=1\mu F$ is applied as exponential input, and then determine the output wave form. 7M
b) Explain the operation of two level slicer. 7M
