Hall Ticket Number :										

R-17

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)

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Marks

UNIT–I

1. Use Milne's method to find $y(0.3)$ from $y' = x^2 + y^2$ $y(0) = 1$. Find the intial values $y(-0.1)$, $y(0.1)$, $y(0.2)$ from the Taylors 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 $-® < x < ®$ and deduce that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots = \frac{®^2}{8}$ 14M

OR

8. Find the half range cosine series for the function $f(x) = x$, when $0 < x < ®$ hence show that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots = \frac{®^2}{8}$ 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 $\int_0^\infty \frac{x \sin mx}{1+x^2}\,dx = \frac{®}{2}e^{-m}, m > 0$ 14M

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Hall Ticket Number :										

R-17

Code: 7G333

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

Signals and Systems

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

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

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Marks

UNIT–I

1. a) Obtain the expressions to represent trigonometric Fourier coefficients in terms of exponential Fourier coefficients. 7M

   b) Define Fourier series of signal f(t) .Derive the Relationship between various types of Fourier series representation 7M

OR

2. a) Find the even and odd components of the following signal
   x(t) = cost + sint + 2sint + 4cost 7M

   b) Determine whether the following signals are periodic or not? If periodic determine fundamental period.
   i) $\cos t + \sin \sqrt{2}t \cos t$ ii) $2\cos 100\pi t + 5\sin 50t$ 7M

UNIT–II

3. Define Fourier transform. Explain the properties of Fourier transform 14M

OR

4. a) Obtain the Fourier transform of a periodic train of impulses with period T. 7M

   b) Obtain the Fourier transform of the following functions.
   i) Unit step function ii) Unit impulse function 7M

UNIT–III

5. a) What is the impulse response of two LTI systems connected in parallel? 7M

   b) Explain the Filter characteristics of linear systems 7M

OR

6. a) Explain the difference between the following systems.
   i) Linear and non-linear systems. ii) Time variant and time invariant systems 7M

   b) Discuss the conditions for distortionless transmission. 7M

UNIT–IV

7. a) Explain the relation between convolution and correlation. 7M

   b) Derive the relation between PSDs of input and output for an LTI system 7M

OR

8. a) With an example explain the Graphical representation of convolution. 7M

   b) Prove that auto correlation function and energy/power spectral density function forms Fourier Transform pair. 7M

UNIT–V

9. a) Derive the relation between Z transform and Fourier transform 7M

   b) Discuss any 3 properties of Laplace transform. 7M

OR

10. a) Prove the differentiation property of Z-transform. Explain the concept of ROC in Z transform 7M

    b) Give the relationship between z-transform ,Fourier transform and Laplace Transform 7M

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Hall Ticket Number :										

R-17

Code: 7G331

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

Electronic Circuits

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

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

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Marks

UNIT–I

1. Consider a single Stage CE Amplifier with Rs=1KΩ, R_1=50KΩ, R_2=2KΩ, Rc=2KΩ, hfe=50, hie=1.1KΩ, hoe=25μA/V and hre= 2.5X10-14.Find Ai!, Ri!, AV!, Ai=I_L/I_S, AVS=V_O/V_S. 14M

OR

2. a) Derive the expressions of Millers theorem and its dual. 7M

   b) Draw and explain the circuit of cascaded amplifier and mention the advantages 7M

UNIT–II

3. a) What is the significance of 3dB bandwidth? 6M

   b) Explain the frequency response of amplifier at Low, Mid and High frequencies 8M

OR

4. a) A BJT has the following parameters measured at ic=1mA, hie=3KΩ, hfe=500, FT=4MHz, Cc=2pF, Ce=18pF. Find rb!e, gm, rce and fH for RL=1KΩ 6M

   b) The following low frequency parameters are known for a given transistor at room temperature (3000 K) at IC = 10 mA and VCE = 8 volts: hie = 500 Ω, hoe = 2 x 10^{-4} μS, hfe = 100 and hre = 10^{-4}. At the same operating point, fT = 50 MHz and Cob (Cc)=3pF. Calculate the values of hybrid-Π parameters. 8M

UNIT–III

5. When the negative feedback is applied to an amplifier of gain 100, the overall gain falls to 50. Calculate (i) the feedback factor β (ii) if the same feedback factor maintained, the value of the amplifier gains required if the overall gain is to be 75. 14M

OR

6. Derive the expression for input impedance and output impedance for the current series and current shunt feedback amplifiers. 14M

UNIT–IV

7. a) List out the types of oscillators. 7M

   b) With neat diagram explain about amplitude stability of oscillators. 7M

OR

8. a) What are the features and advantages of crystal oscillator? 7M

   b) With neat diagram explain about frequency stability of oscillators. 7M

UNIT–V

9. a) Explain crossover distortion in Class B power amplifier 7M

   b) What is Q Factor? Write about unloaded and loaded Q in tuned circuit. 7M

OR

10. Draw and explain class B push pull amplifier. Show that in class B push pull amplifier the maximum conversion efficiency is 78.5%. 14M

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