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<b>R-19</b>
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**Code: 19A441T**

II B.Tech. II Semester Supplementary Examinations December 2022

**Analog IC Applications**

(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	CO	Blooms Level
<b>UNIT-I</b>			
1. a) Draw the circuit of inverting amplifier and derive the gain of the same.	7M	1	L2
b) With a neat circuit diagram explain basic operational amplifier circuit	7M	1	L2
<b>OR</b>			
2. a) Design an inverting Op Amp with gain 100.	6M	1	L6
b) Derive the expression for gain of non-inverting amplifier	8M	1	L2
<b>UNIT-II</b>			
3. a) Explain how voltage can be converted into current using Op-Amp.	7M	2	L2
b) Illustrate the operation of inverting summer circuit using IC 741.	7M	2	L3
<b>OR</b>			
4. Discuss the Op-amp ideal differentiator and mention its drawbacks. Also explain how to overcome these drawbacks with practical differentiator	14M	2	L2
<b>UNIT-III</b>			
5. a) What is the basic principle of operation of a comparator? And discuss the operation of inverting Comparator using Op-Amp.	7M	3	L2
b) Demonstrate the applications of Op-Amp Comparator.	7M	3	L3
<b>OR</b>			
6. a) Discuss the operation of Anti-Log Amplifier.	7M	3	L2
b) Write Short notes on RC active filters.	7M	3	L2
<b>UNIT-IV</b>			
7. a) Explain how PLL can be used for FM demodulator.	6M	4	L4
b) Discuss how PLL can be used as frequency translator.	8M	4	L2
<b>OR</b>			
8. a) With the help of functional block diagram explain the operation of IC 555.	8M	4	L2
b) Draw the pin diagram of IC 555 and list out its applications	6M	4	L1
<b>UNIT-V</b>			
9. Construct the R-2R DAC and explain in detail.	14M	5	L2
<b>OR</b>			
10. a) With the help of neat diagram explain the operation of Monolithic DAC	7M	5	L2
b) Calculate the values of $V_{LSB}$ , $V_{MSB}$ and full-scale output voltage for an 8-bit DAC for the range of 0v to 10V.	7M	5	L3

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**Code: 19A442T**

II B.Tech. II Semester Supplementary Examinations December 2022

**Control 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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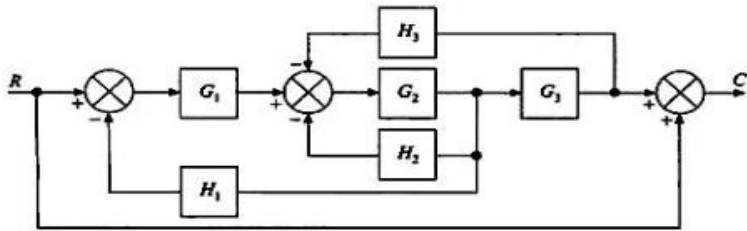
Marks CO BL

**UNIT-I**

- 1. a) Explain about sensitivity of open loop and closed control systems 7M 1 2
- b) List out the block diagram reduction rules 7M 1 1

**OR**

- 2. For the system shown in figure below obtain the transfer function using block diagram reduction technique



14M 1 2

**UNIT-II**

- 3. a) Write the expressions for time domain specifications of a standard second order system with unit step input 7M 2 1
- b) Establish the Stability of the system having characteristic equation  $s^6+2s^5+8s^4+12s^3+20s^2+16s+16=0$  using Routh stability criterion 7M 3 3

**OR**

- 4. Obtain the steady state error  $e_{ss}$  of Type-0, Type-1 and Type-2 systems for unit step, ramp and parabolic inputs 14M 2 3

**UNIT-III**

- 5. Consider a unity feedback system having an open loop transfer function  $G(s)=K/s(1+0.5s)(1+4s)$ . Sketch the polar plot and determine the value of K so that (i) Gain margin is 20dB (ii)Phase margin is  $30^\circ$  14M 3 4

**OR**

- 6. Define the terms (i) Gain cross over frequency (ii) Phase cross over frequency (iii) Gain margin (iv) Phase margin 14M 3 1

**UNIT-IV**

- 7. Design a lead compensator for the system with an open loop transfer function  $G(s)=K/s^2(1+0.1s)$  for the specifications of  $K_a = 10$  and  $\phi_{pm} = 30^\circ$  14M 4 6

**OR**

- 8. Determine the Transfer function of PID controller 14M 4 3

**UNIT-V**

- 9. a) Define (i) state (ii) state variables (iii) state space representation 7M 5 1

$$\dot{X} = \begin{bmatrix} -2 & 1 & 0 \\ 0 & -2 & 1 \\ 0 & 0 & -2 \end{bmatrix} x.$$

- b) Find the state transition matrix for 7M 5 2

**OR**

- 10. Write short notes on i) Controllability and Observability ii) State Transition matrix iii) Diagonalization 14M 5 1

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<b>R-19</b>
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**Code: 19A444T**

II B.Tech. II Semester Supplementary Examinations December 2022

**Field Theory and Transmission Lines**  
(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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<b>UNIT-I</b>
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- |  | Marks | CO  | BL |
|--|-------|-----|----|
| 1. a) Explain in detail about Gauss's Law                  | 7M    | CO1 | L2 |
| b) Summarize the advantages and applications of Gauss law? | 7M    | CO1 | L2 |

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 2. a) Define Electric field intensity? Derive Electric field intensity for surface charge.  | 7M | CO1 | L1 |
| b) Point Charges $Q_1=4\mu\text{C}$ , $Q_2=-5\mu\text{C}$ and $Q_3=2\mu\text{C}$ are located at (0,0,1), (-6,8,0) and (0,4,-3) respectively find D at the origin. | 7M | CO1 | L4 |

<b>UNIT-II</b>
----------------

- |  |    |     |    |
|--|----|-----|----|
| 3. a) Define Linear, Isotropic and Homogeneous Dielectrics | 7M | CO2 | L1 |
| b) Identify the convection and conduction currents         | 7M | CO2 | L1 |

**OR**

- |  |    |     |    |
|--|----|-----|----|
| 4. a) Describe the Conductors in Electric fields in material space | 7M | CO2 | L2 |
| b) Write a note on polarization in dielectrics                     | 7M | CO2 | L2 |

<b>UNIT-III</b>
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- |  |     |     |    |
|--|-----|-----|----|
| 5. State and explain Biot savart law with neat diagram and expressions | 14M | CO3 | L2 |
|--|-----|-----|----|

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 6. a) Define Faradays laws and explain with suitable equation | 7M | CO3 | L2 |
| b) Write Maxwells equations in final forms                    | 7M | CO3 | L1 |

<b>UNIT-IV</b>
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- |   |    |     |    |
|---|----|-----|----|
| 7. a) Define an em wave and briefly explain waves in general          | 7M | CO4 | L1 |
| b) Compare the propagation of waves in Lossy and lossless dielectrics | 7M | CO4 | L3 |

**OR**

- |   |    |     |    |
|---|----|-----|----|
| 8. a) Analyze the propagation of Plane waves in Good conductors     | 7M | CO4 | L4 |
| b) Illustrate the nature of propagation of plane wave in free space | 7M | CO4 | L3 |

<b>UNIT-V</b>
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- |   |    |     |    |
|---|----|-----|----|
| 9. a) What is a Transmission Line? Label different types of transmission lines? | 7M | CO5 | L1 |
| b) Explain transmission line primary parameters                                 | 7M | CO5 | L2 |

**OR**

- |  |    |     |    |
|--|----|-----|----|
| 10. a) With the help of a neat diagram explain the smith chart | 7M | CO5 | L2 |
| b) List the properties of smith chart                          | 7M | CO5 | L2 |

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**R-19**

**Code: 19AC44T**

II B.Tech. II Semester Supplementary Examinations December 2022

**Life Sciences for Engineers**  
(Common to EEE & ECE)

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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**UNIT-I**

1. Describe the cellular basis of life?

**OR**

- 2. a) Explain the kingdom of Animalia?
- b) Describe the functions of Lysosomes?

**UNIT-II**

3. Describe the mechanism of enzyme action?

**OR**

4. Describe the enzymes and write the importance of enzymes?

**UNIT-III**

5. Explain the reaction of Electron Transport Chain?

**OR**

- 6. a) Explain respiration and types of respiration?
- b) Explain the Oxidative phosphorylation?

**UNIT-IV**

- 7. a) Briefly describe the transcription and translation?
- b) Write the importance of Genetic code?

**OR**

8. Discuss the Gene Mapping?

**UNIT-V**

9. Describe the **DNA Microarray technique**, types and applications?

**OR**

- 10. a) Explain the Importance of DNA Cloning?
- b) Describe the types of Biosensors?

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**R-19**

**Code: 19AC42T**

II B.Tech. II Semester Supplementary Examinations December 2022

**Numerical Methods and Transform Techniques**

(Common to EEE & ECE)

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 CO BL

**UNIT-I**

1. a) Find the real root of  $x - \cos x = 0$  by Newton Raphson Method.

7M 1 1

b) Find  $y$  at  $x = 21$  from the following data

x	20	23	26	29
y	0.3420	0.3907	0.4384	0.4848

7M 1 1

**OR**

2. Calculate  $y(160)$  and  $y(390)$  from the following data

x	100	150	200	250	300	350	400
y	10.63	13.03	15.04	16.81	18.42	19.90	21.27

14M 1 3

**UNIT-II**

3. Compute  $y(0.1)$ ,  $y(0.2)$ ,  $y(0.3)$  from  $y' = x - y^2$ ,  $y(0) = 1$  using Taylor series method.

14M 2 3

**OR**

4. Apply Runge Kutta Fourth order method to find the value of  $y$  when  $x=0.2$  given that  $\frac{dy}{dx} = x + y^2$ ,  $y=1$  when  $x=0$

14M 2 3

**UNIT-III**

5. Determine the poles of the function  $f(z) = \frac{z^2}{(z-1)^2(z+2)}$  and the residues at each pole.

14M 3 3

**OR**

6. Find  $\int_c \frac{e^{2z}}{(z-1)(z-2)} dz$  where  $c : |z| = 3$

14M 3 4

UNIT-IV
---------

7. a) Express  $f(x) = \begin{cases} 1, & 0 \leq x \leq f \\ 0, & x > f \end{cases}$  as a Fourier sine integral

and hence evaluate  $\int_0^{\infty} \frac{1 - \cos(fx)}{x} \sin(x) dx$

7M 4 2

- b) Show that  $F_s \{xf(x)\} = -\frac{d}{ds} F_c(s)$

and  $F_c \{xf(x)\} = \frac{d}{ds} F_s(s)$

7M 4 2

OR

8. Find the Fourier Cosine transform of  $f(x) = \frac{1}{1+x^2}$

14M 4 1

UNIT-V
--------

9. a) Find  $Z((n+1)^2)$   
b) Find  $Z(\cos n)$

7M 5 1

7M 5 1

OR

10. a) Find  $Z(\sin(3n+5))$

7M 5 1

- b) Find Z transform of  $3n - 4 \sin \frac{nf}{4} + 5a$

7M 5 1

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**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES, RAJAMPET  
(AUTONOMOUS)**

II B.Tech I & II Semester **CE & ECE Mandatory Course Supplementary Examination**  
**19AC37T, 19AC47T-Constitution of India**

<b>H.T. No:-</b>										
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**Date:-26-12-2022**

**Duration: 3Hrs.**

**Answer all of the following.**

**5X20=100 Marks**

- |   | Marks |
|---|-------|
| 1 Define the word constitution and write about the history of Indian Constitution.  | 20M   |
| <b>(OR)</b>   |       |
| 2 Describe the administrative structure of Union Government in India.   | 20M   |
| 3 How do the powers are distributed between the central and state governments in India?   | 20M   |
| <b>(OR)</b>   |       |
| 4 Write about the powers and functions of Supreme Court of India.   | 20M   |
| 5 What are the rights and responsibilities of Prime Minister according to Indian Constitution?                                    | 20M   |
| <b>(OR)</b>   |       |
| 6 Illustrate the administrative structure of State Government. Explain the role of Council of Ministers in State Governance.      | 20M   |
| 7 Elaborate the Panchayat Raj System in India, and write about the salient features of 73 <sup>rd</sup> Constitutional Amendment. | 20M   |
| <b>(OR)</b>   |       |
| 8 Explain the role of Mayor in Local Administration.  | 20M   |
| 9 What are the powers and functions of the Chief Election Commissioner of India?  | 20M   |
| <b>(OR)</b>   |       |
| 10 Explain the commissions made for the welfare of the Scheduled Castes, Scheduled Tribes, and Backward Castes.                   | 20M   |

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<b>R-19</b>
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**Code: 19A443T**

II B.Tech. II Semester Supplementary Examinations December 2022

**Analog Communication 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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<b>UNIT-I</b>
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Marks    CO    BL

- |  |    |   |   |
|--|----|---|---|
| 1. a) What is Costas Loop? How it can be used in the detection of DSBSC signals.   | 7M | 1 | 1 |
| b) A 400W carrier is modulated to a depth of 75%. Find the total power of the amplitude modulation scheme by assuming the modulating signal is sinusoidal. | 7M | 1 | 4 |

**OR**

- |   |    |   |   |
|---|----|---|---|
| 2. a) Derive an expression for single-tone amplitude modulated wave. Also draw its spectrum | 7M | 1 | 2 |
| b) Explain about the SSB-SC generation method.  | 7M | 1 | 2 |

<b>UNIT-II</b>
----------------

- |  |     |   |   |
|--|-----|---|---|
| 3. a) Explain about the block diagram of Indirect method of FM with its working principle. | 10M | 2 | 2 |
| b) Compare between FM and AM.  | 4M  | 2 | 5 |

**OR**

- |  |    |   |   |
|--|----|---|---|
| 4. a) Explain with suitable diagram, how the Narrow band FM signal may be generated. | 7M | 2 | 2 |
| b) Describe the working principle of detection of FM                                 | 7M | 2 | 2 |

<b>UNIT-III</b>
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- |   |    |   |   |
|---|----|---|---|
| 5. a) Compare AM and FM by considering noise.                         | 7M | 3 | 5 |
| b) Discuss the role of pre-emphasis and de-emphasis in commercial FM. | 7M | 3 | 2 |

**OR**

- |  |    |   |   |
|--|----|---|---|
| 6. a) Describe the noise performance of FM system.           | 7M | 3 | 2 |
| b) Determine the expression for output SNR for DSB-SC system | 7M | 3 | 3 |

<b>UNIT-IV</b>
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- |  |    |   |   |
|--|----|---|---|
| 7. a) Classify the radio Receivers based on type of modulation and service involved. | 7M | 4 | 4 |
| b) Explain the effect of Image frequency on voice communication.                     | 7M | 4 | 2 |

**OR**

- |   |    |   |   |
|---|----|---|---|
| 8. a) Describe the steps to improve the image frequency rejection and how it is rejected?     | 7M | 4 | 2 |
| b) Discuss the factors influencing the choice of Intermediate frequency for a radio receiver? | 7M | 4 | 2 |

<b>UNIT-V</b>
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- |  |    |   |   |
|--|----|---|---|
| 9. a) Describe the scheme of generation of PAM signals with neat sketches. | 6M | 5 | 2 |
| b) Summarize the working principle of Frequency division multiplexing?     | 8M | 5 | 2 |

**OR**

- |  |    |   |   |
|--|----|---|---|
| 10. a) Explain the method of generation and detection of PAM signals with neat schematics. | 8M | 5 | 2 |
| b) Describe with suitable circuit, the scheme of detection of PAM signals.                 | 6M | 5 | 2 |

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