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

II B.Tech. II Semester Supplementary Examinations July/August 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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	Marks	CO	Blooms Level
<b>UNIT-I</b>			
1. a) Explain different types of coordinates systems	7M	CO1	L2
b) Recall stokes theorem and write its equation	7M	CO1	L1
<b>OR</b>			
2. a) Examine on Energy density	7M	CO1	L3
b) Describe electric potential	7M	CO1	L2
<b>UNIT-II</b>			
3. a) Explain the properties of materials and Dielectric Constant & strength	7M	CO2	L2
b) Identify different types of materials and explain	7M	CO2	L1
<b>OR</b>			
4. a) List and explain the steps to determine Resistance	7M	CO2	L2
b) Infer the formula for series resistance	7M	CO2	L4
<b>UNIT-III</b>			
5. a) List and explain Maxwell's Equations for Static EM Fields	7M	CO3	L1
b) Discuss the applications of Ampere circuits law in the case of infinite long coaxial transmission line	7M	CO3	L3
<b>OR</b>			
6. Demonstrate on Transformer EMF	14M	CO3	L3
<b>UNIT-IV</b>			
7. a) Write equations of $\epsilon'$ and $\epsilon''$ . Explain Planes waves in Lossless dielectrics	7M	CO4	L2
b) Determine the expression for intrinsic impedance and propagation constant in a good conductor.	7M	CO4	L3
<b>OR</b>			
8. A lossy dielectric has an intrinsic impedance of $200 \angle 30^\circ$ at a particular radian frequency $\omega$ . If at that frequency the plane wave propagation through the dielectric has the magnetic field component $\mathbf{H} = 10 e^{-\alpha x} \cos(\omega t - \frac{1}{2} x) \mathbf{a}_y$ A/m. Find E and $\beta$ . Determine the skin depth and wave polarization.	14M	CO4	L4
<b>UNIT-V</b>			
9. a) Discuss on the Phase and Group Velocities	7M	CO5	L2
b) Derive the Expressions for Characteristic Impedance	7M	CO5	L3
<b>OR</b>			
10. a) Write a note on Infinite line concepts	7M	CO5	L2
b) Obtain input impedance relations	7M	CO5	L3

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<b>R-19</b>
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**Code: 19AC44T**

II B.Tech. II Semester Supplementary Examinations July/August 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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		Marks	CO	Blooms Level
<b>UNIT-I</b>				
1. a)	Describe is Nucleus? Write their structure and important functions and draw the labelled diagram?	7M	CO1	2
b)	Write about the Characteristics of Cells?	7M	CO1	1
<b>OR</b>				
2.	Explain the comparison of biological organisms with manmade systems?	14M	CO1	2
<b>UNIT-II</b>				
3.	Describe are the Carbohydrates? Write the types and functions of carbohydrates?	14M	CO2	2
<b>OR</b>				
4.	Explain the Hemoglobin and Write the functions of Hemoglobin?	14M	CO2	2
<b>UNIT-III</b>				
5.	Explain the reaction of Krebs/TCA cycle?	14M	CO3	2
<b>OR</b>				
6.	Describe the structure of neuron and types? Give an account of the Synaptic and neuromuscular junctions?	14M	CO3	4
<b>UNIT-IV</b>				
7.	Define the genetics? Explain the Mendel's Laws?	14M	C04	1
<b>OR</b>				
8.	Describe the meiosis cell division process?	14M	C04	2
<b>UNIT-V</b>				
9.	Describe the Recombinant Vaccines?	14M	CO5	2
<b>OR</b>				
10.	Explain the various process of recombinant DNA technology?	14M	CO5	2

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**Code: 19AC42T**

II B.Tech. II Semester Supplementary Examinations July/August 2022

**Numerical Methods and Transform Techniques**

( Common to EEE &amp; 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      Blooms  
Level**UNIT-I**

1. Find the real root of  $x^3 - x - 1 = 0$  using Bisection Method 14M    CO1    L3  
**OR**

2. a) Find the real root of  $x^3 - 2x - 5 = 0$  using Bisection Method 7M    CO1    L3  
b) Find f(3) using Lagrange's formula for the following data

x	0	1	2	5
f(x)	2	3	12	147

7M    CO1    L3

**UNIT-II**

3. Evaluate  $\int_0^6 \frac{1}{1+x^2} dx$  using i) Trapezoidal rule ii) Simpson's 1/3 rule,  
iii) Simpson's 3/8 rule and compare with exact solution 14M    CO2    L4  
**OR**

4. a) Compute the value of  $\int_{0.2}^{1.4} (\sin x - \log x + e^x) dx$  using Simpson's 3/8 rule 7M    CO2    L3  
b) Using Modified Euler's method, find y(0.2) given  $y' = y + e^x$ ,  $y(0) = 0$ . 7M    CO2    L3

**UNIT-III**

5. Use Cauchy Residue theorem to find  $\oint_c \frac{4-3z}{z(z-1)(z-2)} dz$ , where 'c' is the  
circle  $|z| = \frac{3}{2}$  14M    CO3    L3  
**OR**

6. Find Taylor's expansion of  $f(z) = \frac{1}{(z+1)^2}$  about the point  $z=-i$  14M    CO3    L4

**UNIT-IV**

7. Find the Fourier transform of  $f(x) = \begin{cases} 1-x^2, & |x| \leq 1 \\ 0, & |x| > 1 \end{cases}$ . Hence evaluate  
 $\int_0^{\infty} \frac{x \cos x - \sin x}{x^3} \cos \frac{x}{2} dx$  14M    CO4    L2  
**OR**

8. Find the Fourier cosine transform of  $e^{-x^2}$  14M    CO4    L1

**UNIT-V**

9. Use Convolution theorem to evaluate  $Z^{-1} \left( \frac{z^2}{(z-a)(z-b)} \right)$  14M    CO5    L3  
**OR**

10. If  $U(z) = \frac{2z^2 + 5z + 14}{(z-1)^4}$  then evaluate  $u_2$  and  $u_3$  14M    CO5    L2

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Code: 19A443T

II B.Tech. II Semester Supplementary Examinations July/August 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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	Marks	CO	Blooms Level
<b>UNIT-I</b>			
1. a) Derive the expressions of various power calculations involved in AM.	7M	1	6
b) Describe the frequency spectrum of AM with relevant expressions.	7M	1	2
<b>OR</b>			
2. a) Explain about balanced ring modulator and its operation with neat sketches	7M	1	1
b) Derive an expression for efficiency ( ) of a single tone AM signal and show that max efficiency is 33.3% for $\mu = 1$ .	7M	1	2
<b>UNIT-II</b>			
3. a) Discuss about the spectral analysis of sinusoidal FM wave?	7M	2	2
b) The FM signal has a sinusoidal modulation frequency of 15KHz and a modulation index is 2, using Carson's rule find the transmission BW	7M	2	3
<b>OR</b>			
4. a) Explain principle of operation of Balanced slope-detector for detecting the FM signal.	7M	2	2
b) The FM signal has a sinusoidal modulation frequency 20KHz and a modulation index =2.5. Find the transmission bandwidth of FM using Carson's rule.	7M	2	3
<b>UNIT-III</b>			
5. a) Derive an expression for output SNR for DSB-SC system.	7M	3	6
b) Determine an expression for figure of merit of coherent reception of SSB.	7M	3	3
<b>OR</b>			
6. a) Determine the expression for figure of merit of an FM system?	8M	3	3
b) Discuss about threshold effect in FM system.	6M	3	2
<b>UNIT-IV</b>			
7. a) Describe the block diagram of FM receiver with neat sketches.	8M	4	2
b) List out the ideal characteristics of a receiver.	6M	4	1
<b>OR</b>			
8. a) Discuss about the reactance modulated FM transmitter with neat sketches.	7M	4	2
b) Explain the working principle AGC with the merits of delayed AGC as compared with simple AGC.	7M	4	2
<b>UNIT-V</b>			
9. a) Explain about the basic principle of operation of FDM.	8M	5	2
b) Explain how double polarity PAM is different from single polarity PAM. Briefly explain the generation of double polarity PAM.	6M	5	2
<b>OR</b>			
10. a) Outline about the generation and detection of PWM with neat sketches.	7M	5	4
b) Justify, how a PPM signal can be generated from PWM signal?	7M	5	5

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**R-19**

**Code: 19A442T**

II B.Tech. II Semester Supplementary Examinations July/August 2022

**Control Systems**

( Electronics and Communication Engineering )

Max. Marks: 70

Time: 3 Hours

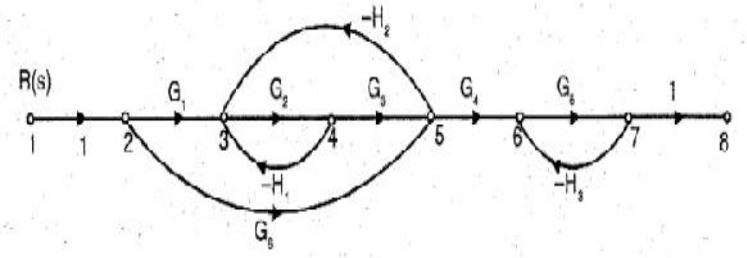
Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks	CO	Blooms Level
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**UNIT-I**

1. a) Classify various types of control systems
- b) Find the transfer function of signal flow graph given below by using mason's gain formula



6M CO1 L2

**OR**

2. Derive an expression for the transfer function of an armature controlled DC servo motor

8M CO1 L1

**UNIT-II**

3. a) Define the following terms
  - i. Absolute stability
  - ii. Marginal stability
  - iii. Conditional stability
- b) By means of RH criterion determine the stability of the system represented by the characteristic equation  $S^4+2S^3+8S^2+4S+3=0$

14M CO1 L6

7M CO2 L3

**OR**

4. a) Determine the range of K for stability of unity feedback system whose open loop transfer function is  $G(s)= K/s(s+1)(s+2)$
- b) Explain the RH Criterion to determine the stability of the system

7M CO2 L3

7M CO2 L2

**UNIT-III**

5. a) A system has open loop pole and two closed loop poles in right half of s-plane. Show that Nyquist plot encircles the (-1+j0) point once in clockwise direction
- b) Addition of poles to the open loop transfer function reduces the closed loop stability of the system. Justify by Nyquist plots

7M CO3 L1

7M CO3 L4

**OR**

6. a) Sketch the bode plot for the following transfer function and determine the phase margin and gain margin  
 $G(s) = \frac{75(1+0.2s)}{s(s^2+16s+100)}$  7M CO3 L4  
 b) Describe the procedure for developing the Bode plot 7M CO3 L2

<b>UNIT-IV</b>
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7. a) Explain about compensation? What are the different types of compensators 7M CO4 L2  
 b) List out the procedural steps to design lead compensator 7M CO4 L1

**OR**

8. a) Distinguish the P,D and I controllers 7M CO4 L4  
 b) Determine the transfer function lag compensator 7M CO4 L3

<b>UNIT-V</b>
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9. a) Discuss the significance of state space analysis 7M CO5 L2  
 b) Define the terms controllability and observability and write necessary conditions for verification of controllability and observability 7M CO5 L1

**OR**

10. a) Distinguish between transfer function model and state space model 7M CO5 L4  
 b) Discuss about the properties of state transition matrix 7M CO5 L2

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