Hall Ticket Number :										

R-19

Code: 19A441T

II B.Tech. II Semester Supplementary Examinations February 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
		UNIT–I			
1.	a)	Draw and explain the block diagram of op-amp	7M	CO1	L2
	b)	Explain briefly about DC Characteristics of op-amp	7M	CO1	L2
		OR			
2.	a)	Mention the characteristics of Ideal and Practical op-amp	6M	CO1	L2
	b)	Explain the working of non-Inverting op-amp and derive the equation of its gain	8M	CO1	L3
		UNIT–II			
3.	a)	What is an instrumentation amplifier? Explain the working of three op-amp instrumentation amplifier and derive its gain.	8M	CO2	L3
	b)	Explain the operation of Integrator using op-amp	6M	CO2	L2
		OR			
4.	a)	Explain the operation of Current to Voltage Converter using op-amp	7M	CO2	L4
	b)	Design an adder circuit using an op-amp to get output expression as $V_0 = -(0.1V_1+V_2+10V_3)$	7M	CO2	L6
		UNIT–III			
5.	a)	Design Astable multivibrator using IC 741 op-amp and calculate its pulse width	7M	CO2	L3
	b)	Derive the expression for log and antilog computation using op-amp with neat circuit diagram	7M	CO2	L3
		OR			
6.	a)	Explain the working of Schmitt trigger using IC 741 op-amp	7M	CO2	L2
	b)	Design first order LPF at a cutoff frequency of 2KHz and pass band gain of unity and plot the frequency response curve for the designed filter	7M	CO3	L6
		UNIT–IV			
7.	a)	Design a Monostable multivibrator using 555 timer to produce a pulse width of 100 msec	6M	CO4	L3
	b)	Explain working of PLL using appropriate block diagram and explain any one application of PLL	8M	CO4	L2
		OR			
8.	a)	Explain the functional block diagram of 555 timer and mention its features.	7M	CO4	L2
	b)	Explain the operation of Missing heart beat detector using IC 555 timer	7M	CO4	L2
		UNIT–V			
9.	a)	Explain the working of R-2R ladder type DAC with neat diagram and write its limitations	9M	CO5	L2
	b)	What would be the output voltage produced by a D/A converter whose output range is 0 to 10V with a binary number 10101100 (for an 8-bit DAC)	5M	CO5	L3
		OR			
10.	a)	Draw and explain the operation of dual slope ADC	7M	CO5	L2
	b)	Explain the operation of parallel comparator type ADC with neat circuit diagram	7M	CO5	L2

END

Hall Ticket Number :										

R-19

Code: 19A442T

II B.Tech. II Semester Supplementary Examinations February 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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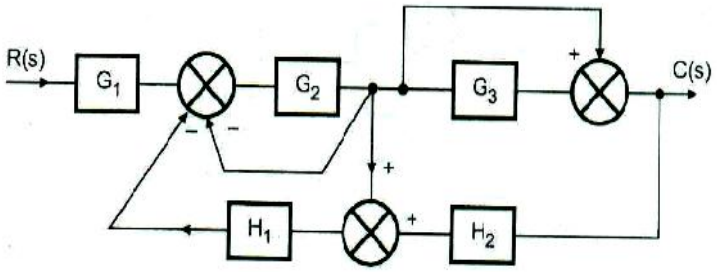
		Marks	CO	Blooms Level

UNIT–I

1. a) Explain the following terms w.r.t closed loop control systems
   i. Plant ii. Reference input iii. Error detector
   iv. Feedback path elements v. Controller — 7M

   b) Reduce the given block diagram and hence obtain the transfer function C(s)/R(s)

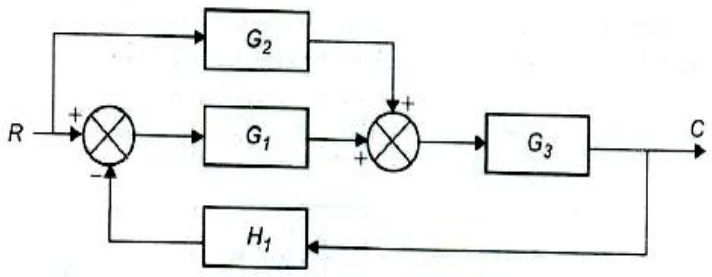


7M

OR

2. a) State and explain Mason's gain formula for the signal flow graph. 7M

   b) Determine the transfer function C(s)/R(s) for the following block diagram



7M

UNIT–II

3. Sketch the root locus plot of the system whose open loop T.F. is given by $G(s)H(s)=\frac{K}{s(s+4)(s^2+4s+13)}$. 14M

OR

4. a) Define the following terms
   i. absolute stability ii. marginal stability iii. conditional stability — 6M

   b) By means of RH criterion determine the stability of the system represented by the characteristic equation $s^4+2s^3+8s^2+4s+3=0$ — 5M

   c) State the advantages of RH Stability criterion? 3M

UNIT–III

5. a) Show that Bode plots of a system with transfer function having many factors can be obtained by adding the Bode plots of individual factors 7M

   b) Show that in Bode magnitude plot the slope corresponding to a quadratic factor is -40 dB/dec. 7M

OR

6. A certain system transfer function is $G(s)H(s)=\frac{75(1+0.2s)}{s(s^2+16s+100)}$ using Bode plots, find gain margin and phase margin. Comment on stability. 14M

UNIT–IV

7. A unity feedback system has an open loop transfer function $G(s)=\frac{K}{S(1+2S)}$ Design a suitable lag Compensator so that phase margin is 40^0 and the steady state error for ramp input is less than or equal to 0.2 14M

OR

8. a) What are the deferent types of compensators available? Explain briefly. 7M

   b) Explain the deferent steps to be followed for the design of lead compensator using Bode plot. 7M

UNIT–V

9. a) What are the properties of state transition matrix? 5M

   b) Given $\dot{X}(t)=\begin{bmatrix}0 & 1\\ -2 & -3\end{bmatrix}\begin{bmatrix}x_1(t)\\ x_2(t)\end{bmatrix}+\begin{bmatrix}0\\ 1\end{bmatrix}u(t)$

   Find the unit step response when $X(0)=\begin{bmatrix}1\\ 1\end{bmatrix}$ 9M

OR

10. Find the Unit step response for the following system with initial conditions

$$\dot{X}(t)=\begin{bmatrix}0 & 1\\ -6 & -2\end{bmatrix}\begin{bmatrix}x_1(t)\\ x_2(t)\end{bmatrix}+u(t)\begin{bmatrix}0\\ 1\end{bmatrix}$$

$$Y(t)=\begin{bmatrix}3 & 0\end{bmatrix}X(t)$$

14M

END

Hall Ticket Number :										

R-19

Code: 19A444T

II B.Tech. II Semester Supplementary Examinations February 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
		UNIT–I			
1.	a)	Determine the electric flux density **D** everywhere of a sphere with radius *a* having uniform charge density ρ_0 C/m^3 and sketch the |**D**| against the radius of the sphere.	10M	CO1	L3
	b)	Two point charges -4 μC and 5 μC are located at (2, -1, 3) and (0,4,-2), respectively. Find the potential at (1, 0, 1), assuming zero potential at infinity.	4M	CO1	L3
		OR			
2.	a)	A square plate described by $-2 \le x \le 2$, $-2 \le y \le 2$, $z=0$ carries a charge $12\|y\|$ mC/m^2. Find the total charge on the plate and the electric field intensity at (0,0,10).	6M	CO1	L3
	b)	State and explain the Gauss's law? find the electric field intensity of an infinite sheet of uniform charge ρ_s C/m^2 lying on the x=0 plane.	8M	CO1	L1,L3
		UNIT–II			
3.	a)	Explain the convection and conduction currents with suitable examples and equations?	6M	CO2	L2
	b)	If $J = (1/r^3)(2\cos\theta\, a_r + \sin\theta\, a_\theta)$ A/m^2, calculate the current passing through (i) A hemispherical shell of radius 20 cm, $0<\theta<\pi/2$, $0 < \emptyset < 2\pi$ (ii) A spherical shell of radius 10 cm	8M	CO2	L3
		OR			
4.	a)	Explain the polarization in dielectrics?	8M	CO2	L2
	b)	A coil is made of 150 turns of copper wire wound on a cylindrical core. If the mean radius of the turns is 6.5 mm and the diameter of the wire is 0.4 mm, calculate the resistance of the coil.	6M	CO2	L3
		UNIT–III			
5.	a)	Define magnetic scalar and vector potentials?	4M	CO3	L1

	b)	A charged particle of mass 1 kg and charge 2 C starts at the origin with zero initial velocity in a region where $E = 3a_z$ V/m. Find the following: (i) The force on the particle (ii) The time it takes to reach point P(0, 0, 12 m) (iii) Its velocity and acceleration at P (iv) Its kinetic energy at P	10M	CO3	L3
		OR			
6.	a)	Explain the inconsistency in ampere's law and write the final Maxwell equations	8M	CO3	L2
	b)	In free space, $E = 20 \cos(\omega t - 50x)\, a_y$ V/m. Calculate (i) J_d (ii) H (iii) ω	6M	CO3	L3
		UNIT–IV			
7.	a)	Define reflection and transmission coefficients and explain their properties for different mediums?	7M	CO4	L2
	b)	A plane wave travelling in air is normally incident on a material with $\epsilon_r=4$ and $\mu_r=1$. Find the reflection and transmission coefficients.	7M	CO4	L3
		OR			
8.	a)	Derive the relation between E and H in a Uniform plane wave	7M	CO4	L3
	b)	State and prove Poynting theorem?	7M	CO4	L1,L2
		UNIT–V			
9.	a)	At 60 MHz, the following characteristics of a lossy line are measured: $Z_0=50\Omega$, $\alpha = 0.04$ dB/m, $\beta = 2.5$ rad/m. Calculate R, L, C, and G of the transmission line.	8M	CO5	L3
	b)	Define Smith Chart and explain the various applications of smith chart in Transmission line?	6M	CO5	L1
		OR			
10.	a)	What are the applications of transmission lines?	5M	CO5	L1
	b)	A telephone line has R = 30 Ω/km, L = 100 mH/km, G = 0, and C = 20 μF/km. At f = 1 kHz, obtain: (i) The characteristic impedance of the line (ii) The propagation constant (iii) The phase velocity	9M	CO5	L3

END

Hall Ticket Number :										

R-19

Code: 19AC44T

II B.Tech. II Semester Supplementary Examinations February 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
		UNIT–I			
1.	a)	What is chloroplast? Explain in detail about its structure and functions and also draw the labeled diagram?	7M	1	1
	b)	What is molecular taxonomy? Explain its role in the classification of living organisms	7M	1	2
		OR			
2.		Explain the differences between prokaryotes and eukaryotes?	14M	1	1
		UNIT–II			
3.	a)	Describe the structure of hemoglobin and draw the labeled diagram?	7M	2	1
	b)	What are antibodies and elaborate its structure with suitable diagram?	7M	2	2
		OR			
4.		Write in detail about the structure and functions of nucleic acids?	14M	2	2
		UNIT–III			
5.		What is photosynthesis and explain the mechanism of photosynthesis?	14M	3	1
		OR			
6.	a)	Elaborate oxidative phosphorylation?	7M	3	1
	b)	Write the industrial applications of enzymes with suitable examples?	7M	3	2
		UNIT–IV			
7.		What is cell division? Elaborate mitosis and meiosis with suitable diagrams?	14M	4	2
		OR			
8.	a)	What are the three laws of inheritance with examples?	7M	4	1
	b)	What is RNA? Explain its structure and functions and draw labeled diagram?	7M	4	3
		UNIT–V			
9.	a)	Define transgenecis and explain the applications of transgenic microbes?	7M	5	4
	b)	What are biosensors and biochips and add a note on their applications?	7M	5	3
		OR			
10.		What is recombinant DNA technology and explain various steps involved in recombinant DNA technology?	14M	5	1

END

Hall Ticket Number :										

R-19

Code: 19AC42T

II B.Tech. II Semester Supplementary Examinations February 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	Blooms Level

UNIT–I

1. a) By using Regula – False method, determine an approximate root of the equation $x^4 - x - 10 = 0$ that lies between 1.8 and 2. Carry out three approximations. 7M 1 3

   b) Solve $x^3 = 2x + 5$ for a positive root by iteration method. 7M 1 3

OR

2. a) Determine $y(54)$ of the following table using Newton's forward formula

x	50	60	70	80
y	205	225	248	274

7M 1 3

   b) The population of a town is as follows

years	1921	1931	1941	1951	1961	1971
population	20	24	29	36	46	51

Estimate the increase in population during the period 1955 to 1961. 7M 1 3

UNIT–II

3. a) Evaluate $\int_0^{\cdot 5} \frac{dx}{4x+5}$ by Trapezoidal rule using 11 coordinates. 7M 2 5

   b) Evaluate $\int_0^{\cdot 1} \frac{dx}{\sqrt{1+x^4}}$ by Trapezoidal rule using Simpson's $\frac{3}{8}$ rule. 7M 2 5

OR

4. a) Using Taylor's series, determine y at $x = 0.1$ and $x = 0.2$ given $\frac{dy}{dx} = y^2 + x, \quad y(0) = 1$ 7M 2 3

   b) By using Runge-Kutta third order formula determine $y(0.25)$, when $\frac{dy}{dx} = 1 + xy$ and $y(0) = 1$? 7M 2 3

UNIT–III

5. a) Determine the Taylor's series to represent the function $\frac{z^2-1}{(z+2)(z+3)}$, in the region $|z| < 2$ 7M 3 3

   b) Determine the Laurent series expansion of the function $f(z) = \frac{z^2-6z-1}{(z-1)(z-3)(z+2)}$ *in the region* $3 < |z+2| < 5$ 7M 3 3

OR

6.	a)	Determine the poles and residues at each pole $\frac{ze^z}{(z-1)^3}$	7M	3	3
	b)	Evaluate $\oint_C \frac{4-3z}{z(z-1)(z-2)}dz$ where C is the circle |z|=3/2 using residue theorem.	7M	3	5
		UNIT–IV			
7.	a)	Determine the Fourier transform of f(x) defined by $f(x) = \begin{cases} 1, & \|x\| < a \\ 0, & \|x\| > a \end{cases}$	7M	4	3
	b)	Using Fourier integral, show that $\int_0^\infty \frac{1-\cos\pi\lambda}{\lambda} \sin x\lambda d\lambda = \begin{cases} \frac{\pi}{2}, & if\ 0 < x < \pi \\ 0, & if\ x > \pi \end{cases}$	7M	4	3
8.	a)	Determine the Fourier sine and cosine transforms of $f(x) = \frac{e^{-ax}}{x}$ and deduce that $\int_0^\infty \frac{e^{-ax}-e^{-bx}}{x} \sin sx dx$ t = tan^{-1}{s/a}-tna^{-1}{s/b}.	7M	4	3
	b)	Determine the Fourier cosine transforms of f(x) = e^{-ax} cosax	7M	4	3
		UNIT–V			
9.	a)	Showthat $Z(\cos n^-) = \frac{z(z-\cos^-)}{z^2 - 2z\cos^- + 1}$ and $Z(\sin n^-) = \frac{z\sin^-}{z^2 - 2z\cos^- + 1}$	7M	5	3
	b)	Solve the difference equation using Z-transform y (n + 2) + 5y(n + 1) + 4y(n) = 2^n given that y(0) = 1, y(1) = – 4.	7M	5	3
		OR			
10.	a)	Using convolution, determine Z-Transform of $\left[\frac{z^2}{(z-1)(z-3)}\right]$	7M	5	3
	b)	Using the Z –transform , solve $u_{n+2} + 4u_{n+1} + 3u_n = 3^n$ with $u_0 = 0$, $u_1 = 1$	7M	5	3

END

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES, RAJAMPET
(AUTONOMOUS)

II B.Tech I & II Semesters **CSE & ECE Mandatory Course Supplementary** Examination

19AC37T, 19AC47T-Contitution of India

H.T. No:-										

R19

Date:-05-03-2022 ***Duration: 2Hrs.***

Answer any five questions from the following. **5X20=100 Marks**

		Marks
1	Define the term 'Constitution', and write a detailed note on the 'Preamble' of Indian Constitution.	20M
2	What are 'Fundamental Rights'? What is their importance according to Indian Constitution?	20M
3	Explain the powers and functions of the Supreme Court.	20M
4	How are the powers distributed between the Centre and State in Indian Constitution?	20M
5	Write in detail about the role of Chief Minister and Council of Ministers.	20M
6	What is called 'Local Administration'? Explain about the Panchayat Raj System in India.	20M
7	Write about the roles and responsibilities of the Chief Election Commissioner of India.	20M
8	Write about the National Commission for Backward Classes.	20M

Hall Ticket Number :										

R-19

Code: 19A443T

II B.Tech. II Semester Supplementary Examinations February 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
	UNIT–I			
1. a)	Explain the filter method for SSB-SC generation	6M	CO1	L2
b)	An audio baseband signal is described as m (t) =30 sin (5000t) amplitude modulated by a carrier which is described as C (t) = 65 sin (500000t). (i) Draw the spectrum of amplitude modulated wave. (ii) What is modulation index? (iii) Find the sideband frequencies. (iv) What is transmission bandwidth of the AM wave?	8M	CO1	L2
	OR			
2. a)	With a neat circuit diagram, explain the principle of envelope detection of an amplitude modulated wave	6M	CO1	L2
b)	When carrier wave of 1KW is modulated using a sinusoidal signal with percentage of modulation 50%, how much the AM transmitter generates? To what value will this power change if it is simultaneously modulated by another signal to the extent of 80%? What will be the percentage saving in power if the carrier and one of the sidebands are suppressed before transmission?	8M	CO1	L2
	UNIT–II			
3. a)	Explain the Armstrong method of FM generation.	6M	CO2	L3
b)	A single tone FM signal is given by $s(t) = 10\cos(16® \times 10^6 t + 20\sin 2® \times 10^3)$ Find the modulation index, modulating frequency, deviation, carrier frequency, and the power of the FM signal.	8M	CO2	L3
	OR			
4. a)	Explain with suitable diagram, how the Narrow band FM signal may be generated.	6M	CO2	L3

	b)	A certain sinusoid at a frequency *fm* Hz is used as the modulating signal in both a conventional AM system and a FM system. When modulated. The peak frequency deviation of the FM system is set to three times the bandwidth of the AM system. The magnitudes of those sidebands spaced at ± *fm* Hz from the carrier in both systems are equal, and the total average powers are equal in both systems. Determine i) Modulation index of the FM system ii) Modulation index of the AM system.	8M	CO2	L3

UNIT–III

5.	a)	Discuss the role of pre emphasis and de-emphasis in commercial FM	7M	CO3	L5
	b)	Calculate the SNR for SSB-SC signal. Consider white input noise	7M	CO3	L5

OR

6.	a)	Compare AM and FM by considering noise.	6M	CO3	L5
	b)	Give the output power appearing at the output of an RC low pass filter of cutoff frequency 'fc' when white noise of PSD N0/2 is input to it.	8M	CO3	L5

UNIT–IV

7.	a)	With suitable block diagram explain Super-heterodyne receiver.	10M	CO4	L1
	b)	List out the ideal characteristics of a receiver.	4M	CO4	L1

OR

8.	a)	Explain TRF receiver.	7M	CO4	L1
	b)	With neat sketch explain Variable reactance type FM transmitter	7M	CO4	L1

UNIT–V

9.	a)	With neat sketched, explain briefly the basic principle of FDM.	7M	CO5	L4
	b)	Describe with suitable method of generation of PWM and PPM signal.	7M	CO5	L4

OR

10.	a)	Explain how double polarity PAM is different from single polarity PAM. Briefly explain the generation of double polarity PAM.	7M	CO5	L4
	b)	Explain how an audio signal can be sent using TDM.	7M	CO5	L4

END