H.T No: | | | | | | | | | | | **R18** Course Code: A30405

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech IV Semester Supplementary Examinations January-2025

Course Name: Signals & Systems

(Common for EEE & ECE)

Date: 07.01.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1.	Find the periodicity of $\cos(0.2\pi n)$.	2 M
2.	What is the significance of the complex Fourier spectrum?	2 M
3.	Express the Time shifting Property of Fourier Transform.	2 M
4.	Mention the types of sampling.	2 M
5.	Define system bandwidth and signal bandwidth.	2 M
6.	State the Paley-wiener criterion.	2 M
7.	Write the convolution property of Fourier Transform.	2 M
8.	Differentiate Energy Density Spectrum and Power Density Spectrum?	2 M
9.	Specify the relation between Laplace transform and Fourier transform?	2 M
10.	Define Region of Convergence (ROC) for Z-Transform.	2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	i) Explain how a function can be approximated by a set of Orthogonal functions. ii) Define signal. Discuss the classification of signal with examples.	5 M 5 M
	OR	
11. B).	A sawtooth wave is defined as: $x(t) = t, -\frac{T}{2} < t < \frac{T}{2}$, repeated periodically. Obtain the Fourier series and sketch its spectrum.	10 M
12. A).	i) Find the Fourier transform of the following. a) $x(t) = e^{-t}u(t)$ b) $x(t) = sgn(t)$ ii) State and prove any two properties of Fourier Transform.	6 M 4 M
	OR	
12. B).	i) What is aliasing? How can it be prevented in sampled signals? ii) Demonstrate the reconstruction of signal from its samples.	5 M 5 M
13. A).	A stable LTI system is characterized by the differential equation $\frac{d^2y(t)}{dt^2} + 4\frac{dy(t)}{dt} + 3y(t) = \frac{dx(t)}{dt} + 2x(t)$. Derive its frequency response & impulse response using Fourier transform.	10M
	OR	
13. B).	Derive the relation between rise time and band width for an LTI system.	10M

(P.T.O..)

14. A). Explain the detection of periodic signals in the presence of noise by cross correlation. 10M

OR

14. B). i) Verify Parseval's theorem for the periodic signal $x(t)=A\sin(\omega_0 t)$. 5 M

ii) Write the properties of Auto Correlation for periodic signals. 5 M

15. A). i) State and prove time differentiation and time integration property of Laplace transform. 5 M

ii) Find the Laplace transform of the signal $x(t) = e^{-3t}u(t) - e^{5t}u(-t)$ and find its ROC. 5 M

OR

15. B). Compute the Inverse Z-transform of 10 M

$$X(z) = \frac{z(z+1)}{(z+1)^3(z+2)} \quad ; ROC\ |z| > 2$$

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H.T No: | | | | | | | | | | | R18 Course Code: A30406

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech IV Semester Supplementary Examinations January-2025
Course Name: Electronic & Pulse Circuits
(Electronics & Communication Engineering)

Date: 09.01.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. 10x2=20M

1.	Which configuration is the best in cascade for an output stage and for an intermediate stage?	2 M
2.	Show that band width improved with negative feedback.	2 M
3.	Show the benefits of h-parameters.	2 M
4.	Define gain bandwidth product of an amplifier.	2 M
5.	What is the conduction angle for Class A, Class B, and Class AB amplifiers?	2 M
6.	What is Heat sink and explain its advantages?	2 M
7.	How to allow High pass RC circuit acts as an integrator?	2 M
8.	List the applications of Voltage Comparator.	2 M
9.	List various triggering techniques used in Monostable Multivibrator.	2 M
10.	What is the use of commutating capacitors?	2 M

PART-B

Answer the following. Each question carries TEN Marks. 5x10=50M

11.A).	Explain in detail different Coupling Methods used in Multistage Amplifier.	10M
	OR	
11. B).	Simplify β and open loop gain of an amplifier which has a gain of 50 with negative feedback, for a specified output voltage, if the input required is 0.1V without feedback and 0.8V with feedback.	10M
12. A).	Develop an expression for the high frequency parameters in terms of low frequency parameters of a BJT.	10M
	OR	
12. B).	Develop an expression for current gain, input resistance, voltage gain and output Resistance of CE amplifier with emitter resistance using simplified h parameter model.	10M
13. A).	Show that the maximum conversion efficiency of a class B power amplifier is 78.5% With the help of a suitable circuit diagram.	10M
	OR	
13. B).	Interpret the efficiency of a class A power amplifier with necessary diagram.	10M
14. A).	Explain in detail the response of high pass RC circuit for a square wave input with relevant expression.	10M
	OR	
14. B).	Develop Clamping circuit theorem.	10M
15. A).	Develop a collector coupled Monostable multivibrator with neat circuit diagram.	10M
	OR	
15. B).	Construct an Astable multivibrator to meet the following specifications: V_{CC}=12V, I_C=3mA, h_{FE}=30. The output should be a square wave of 1 kHz with 50% duty cycle.	10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30408**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech IV Semester Supplementary Examinations January-2025

Course Name: Electromagnetic Waves & Transmission Lines

(Electronics & Communication Engineering)

Date: 17.01.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1.	State Stoke's theorem.	2 M
2.	Convert the point P(3,4,5) from Cartesian to spherical coordinates.	2 M
3.	Define magnetic flux density.	2 M
4.	Write Lorentz force equation?	2 M
5.	Define phase velocity.	2 M
6.	What is Brewster angle?	2 M
7.	A lossless line has a shunt capacitance of 69 pF and a series inductance of 0.387μH, Calculate the characteristic impedance.	2 M
8.	Define Reflection loss.	2 M
9.	State the assumptions for the analysis of the performance of the radio frequency line.	2 M
10.	What are standing waves?	2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A).	Point charges 1mC and -2mC are located at (3, 2, -1) and (-1, -1, 4). Calculate the electric force on 10nC charge located at (0, 3,1) and electric field intensity at that point.	10M
	OR	
11. B).	Derive the expression for the capacitance of parallel plate capacitor.	10M
12. A).	Obtain the expression for magnetic field intensity at a point P with distance R from infinitely long straight current carrying conductor.	10M
	OR	
12. B).	Derive the boundary conditions for the normal and tangential components of magnetic field at the interface of two different media.	10M
13. A).	Derive the electromagnetic wave equation in conducting medium for E and H fields.	10M
	OR	
13. B).	Explain Poynting theorem and derive the integral and point form of it.	10M
14. A).	Explain about open and short-circuited transmission line and derive its input impedance.	10M
	OR	
14. B).	A generator of 1V, 1KHz supplies power to a 100Km long line terminated in Z_0 and having following constants: R=10.4Ω/Km; L=0.00367 H/Km; G=0.8x10-6 mho/Km; C=0.00835 $x10^{-6}$ F/Km. Calculate characteristic impedance Z_0, attenuation constant α and phase constant β.	10M

(P.T.O..)

15. A). Derive the expression for voltage and current in dissipation less line. 10M

OR

15. B). Explain about single stub matching with neat diagram. 10M

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H.T No: | | | | | | | | | | | **R18** | **Course Code: A30230**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech IV Semester Supplementary Examinations January-2025

Course Name: Control Engineering

(Electronics & Communication Engineering)

Date: 20.01.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. Define the Transfer function and mention the limitations of the transfer function. 2 M
2. List the Practical applications of Open Loop control system. 2 M
3. Draw the characteristic curves of AC servo motor. 2 M
4. Elaborate the Mason's Gain formula to indicate each term with a signal flow graph. 2 M
5. Sketch and indicate performance parameters of the first order system time response. 2 M
6. List different controllers and their effects on system performance. 2 M
7. Sketch the Polar plot for G(s)H(s) = 1/S. 2 M
8. Define Gain Margin and Phase Margin. 2 M
9. List the properties of State Transition matrix. 2 M
10. List the advantages of Diagonalization related to state space model. 2 M

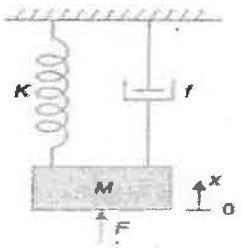
PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Explain the effects of feedback on a control system. 10M

OR

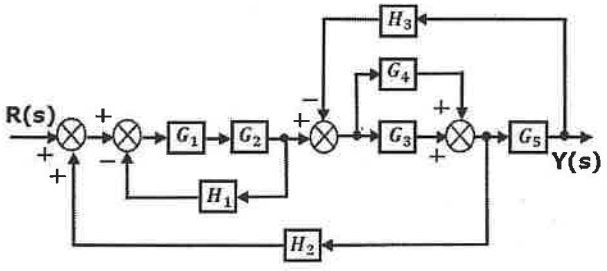
11. B). Derive the Transfer function X(s)/F(s) for the mechanical system as shown in figure. 10M



12. A). Derive the Transfer function $\frac{\theta(s)}{Ec(s)}$ of AC Servomotor. 10M

OR

12. B). Apply Block diagram reduction technics to find the transfer function of the system shown below. 10M



(P.T.O..)

13. A). Determine the step, ramp, and parabolic error constants of the following unity feedback control system whose open loop transfer functions are given by $G(S) = \frac{100}{s(s+10)}$ $M(S) = \frac{0.5}{s^2(s+100)}$. 10M

OR

13. B). Sketch the Root locus for a unity feedback system whose open loop transfer function is $G(S) = \frac{K}{s(s+2)(s+1)}$. 10M

14. A). The forward path transfer function of a unity feedback system is given by $G(S) = \frac{K}{(S+3)^2}$. Using Nyquist Stability Criterion; determine the range of K for the closed-loop system to be stable? 10M

OR

14. B). Determine the Phase margin and Gain margin for the open loop transfer function $G(s) = \frac{0.5}{s^2(s+100)}$ using Polar plot. 10M

15. A). i) What are the advantages and limitations of state space analysis over conventional methods? 5M

ii) Determine the State Transition matrix for the state model whose $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ 5M

OR

15. B). A system is characterized by the following state space equations 10M

$$\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ -2 & 0 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t); \; y = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix}$$

Find the Transfer function of the system.

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H.T No: | | | | | | | | | | | R18 | Course Code: A30407

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech IV Semester Supplementary Examinations January-2025

Course Name: Analog & Digital Communications

Branch : ECE

Date: 27.01.2025 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks. **10x2=20M**

1.	List the properties of Hilbert Transform	2 M
2.	Write the time domain representation of SSB signal?	2 M
3.	Compare and contrast narrowband and wideband FM?	2 M
4.	Give the frequency spectrum of narrowband FM	2 M
5.	What are the demerits of PAM transmission?	2 M
6.	Draw the block diagram of PCM?	2 M
7.	Differentiate ASK and FSK?	2 M
8.	Define Coherent and Non coherent detection	2 M
9.	What are the transmission errors?	2 M
10.	What is entropy and name the source coding techniques?	2 M

PART-B

Answer any FIVE questions. One question from each unit either A or B (Compulsory)

Each question carries TEN Marks. **5x10=50M**

11. A.	An amplitude modulated signal represented in time domain a 4Cos (1800_t) + 10Cos (2000_t) + 4Cos (2200_t). Sketch the spectrum and calculate the band width and total power?	10M
	OR	
11. B.	Explain the Frequency discrimination method for generating SSB signal.	10M
12. A.	Compare FM & AM in detail.	10M
	OR	
12. B.	What is the difference between direct and indirect methods of FM generation? Explain the working of a balanced frequency discriminator with the help of circuit diagram.	10M
13. A.	Explain (i)Natural PAM sampling (ii) Flat-top PAM sampling.	10M
	OR	
13. B.	Explain the generation of pulse code modulation (PCM) with a neat diagram. List the applications of PCM.	10M
14. A.	(i) Illustrate the concept of QAM	3M
	(ii)Explain the principle of FSK transmitter and receiver.	7M
	OR	

(P.T.O)

14. B. Compare phase shift keying, quadrature phase shift keying, and differential phase shift keying (DPSK). 10M

15. A. Write in detail the procedure of Shannon-fano coding scheme 10M

OR

15. B. Write short notes on run length and Huffman encoding schemes 10M

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