



# MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution – UGC, Govt. of India)

(Affiliated to JNTU, Hyderabad, Approved by AICTE - - ISO 9001:2015 Certified)

Accredited by NBA & NAAC – 'A' Grade

NIRF India Ranking, Accepted by MHRD, Govt. of India

**B.TECH II YEAR II SEMESTER REGULAR END EXAMINATIONS, JULY-2024**

**ANALOG AND DIGITAL COMMUNICATIONS**

(ECE)

[Time: 3 Hours]

[Max. Marks: 60]

**PART – A**

(10x 1 = 10M)

- Note:** 1. This Part consists of 10 QUESTIONS  
2. Answer **All Questions**. Each question carries 1Mark.

1.	A	Draw spectrum of Amplitude Modulation (AM) for an arbitrary baseband signal $x(t)$ .	1M	BTL1
	B	What is meant by modulation?	1M	BTL1
	C	Draw the block diagram of indirect FM method.	1M	BTL1
	D	Define modulation index, percentage modulation of FM.	1M	BTL1
	E	Define the sensitivity of a receiver.	1M	BTL1
	F	What is meant by information?	1M	BTL1
	G	What are the disadvantages of delta modulation?	1M	BTL1
	H	Draw the ASK waveforms for the bit stream 1011000	1M	BTL4
	I	Define coding efficiency.	1M	BTL1
	J	State the significance of the constellation diagram.	1M	BTL2

**PART – B**

(5 x 10 = 50M)

- Note:** 1. This Part consists of 10 QUESTIONS  
2. Answer any 1 question from each Section. Each question carries 10 Marks.  
3. Illustrate your answers with NEAT sketches wherever necessary.

## SECTION - I

2.A	Considering single tone modulation, derive time domain and frequency Domain expression for AM wave and draw its spectrum.	6M	BTL2
2.B	Draw the block diagram of phase discrimination method of generating SSB wave	4M	BTL2

(OR)

3.A	With a block diagram and necessary equations explain generation of NBFM	4M	BTL1
3.B	A 20 MHz carrier is frequency modulated by a sinusoidal signal such that the peak frequency deviation is 100 kHz. Determine the modulation index and the approximate bandwidth of the FM signal if the frequency of the modulating signal is: (i) 1 kHz (ii) 15 kHz	6M	BTL4

## SECTION - II

4.A	Explain the noise performance of DSB-SC scheme with the help of neat block diagram.	6M	BTL2
4.B	Write short note on Pre-Emphasis and De-Emphasis circuits.	4M	BTL2

(OR)

5.A	Draw block diagram of Super-heterodyne AM receiver and explain function of each block.	6M	BTL3
5.B	With neat sketch explain about Frequency Division Multiplexing	4M	BTL3

## SECTION - III

6.A	With block diagram explain the generation of PWM signals.	5M	BTL2
6.B	Discuss the Advantages and Disadvantages of Digital Communication	5M	BTL3

(OR)

7.A	Draw a neat block diagram explain the PCM system	4M	BTL2
7.B	A signal having bandwidth equal to 3.5KHz is sampled, quantized and coded by a PCM system. The coded signal is then transmitted over a transmission channel of supporting transmission rate of 50kbits/ sec. Determine the maximum SNR that can be obtained by this system. The input signal has peak of peak value of 4V and rms value of 0.2V	6M	BTL5

## SECTION – IV

8.A	Define Entropy, Information rate, Channel capacity theorem, Mutual information	4M	BTL2
8.B	<p>A generator matrix of (6, 3) linear block code is given by</p> $G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}$ <p>(i) find the check matrix  (ii) Find all code vectors  (iii) Find minimum hamming distance  (iv) How many errors can be detected and how many errors can be corrected?</p>	6M	BTL3

(OR)

9.A	With an example discuss the Huffman coding	4M	BTL3
9.B	A Discrete source emits one of 5 symbols once every millisecond. The symbol Probabilities are 1/2, 1/4, 1/8, 1/16 and 1/16. Find entropy and information rate?	6M	BTL4

## SECTION – V

10.A	Draw the signal space representation, PSD and calculate band width requirement of BFSK	6M	BTL3
10.B	Explain the generation and detection of QPSK	4M	BTL2

(OR)

11.A	Draw the constellation diagrams for 8PSK and QAM	4M	BTL3
11.B	Explain coherent generation and detection of BPSK signals and derive the expression for probability of error	6M	BTL2



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## B.TECH II YEAR II SEMESTER REGULAR END EXAMINATIONS, JULY-2024

### ANALOG CIRCUITS

(ECE)

[Time: 3 Hours]

[Max. Marks: 60]

#### PART – A

(10x 1 = 10M)

- Note:** 1. This Part consists of 10 QUESTIONS  
2. Answer **All Questions**. Each question carries 1Mark.

1	A	Write the advantages of multi stage amplifier.	1M	BTL2
	B	What is the need of bypass capacitor	1M	BTL1
	C	Write the relation between $f_{\beta}$ and $f_T$ .for CE amplifier	1M	BTL1
	D	Define gain –bandwidth product	1M	BTL1
	E	Write the expression for FET drain current in terms of $V_{GS}$	1M	BTL2
	F	Write two comparisons between JFET and BJT	1M	BTL2
	G	Give required Conditions for oscillations.	1M	BTL2
	H	Mention the advantages of negative feedback	1M	BTL1
	I	What is conversion efficiency ( $\eta$ ) of class B power amplifier and $\eta_{max}$	1M	BTL1
	J	Define harmonic distortion and give the expression for it.	1M	BTL1

#### PART – B

(5 x 10 = 50M)

- Note:** 1. This Part consists of 10 QUESTIONS  
2. Answer any 1 question from each Section. Each question carries 10 Marks.  
3. Illustrate your answers with NEAT sketches wherever necessary.

#### SECTION - I

2.	Derive an equation for Current gain, voltage gain, input resistance and output resistance of Darlington emitter follower.	10M	BTL4
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(OR)

3.A	Describe the low frequency response of BJT Amplifiers	5M	BTL3
3.B	Discuss the effect of coupling and bypass capacitors on low frequency response	5M	BTL3

#### SECTION - II

4.	Determine the high frequency parameters of hybrid $\pi$ model in terms of low frequency h parameter model for CE Transistor	10M	BTL4
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(OR)

5.A	Discuss about Gain Bandwidth product	5M	BTL3
5.B	Describe the Hybrid- $\pi$ – Common Emitter model	5M	BTL3

**SECTION - III**

6.	Derive the expressions for Voltage gain, current gain, input resistance of CS amplifier	10M	BTL4
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(OR)

7.A	Describe the MOSFET Characteristics in Depletion mode	5M	BTL3
7.B	Compare performance of FET amplifiers with BJT Amplifiers	5M	BTL3

**SECTION – IV**

8.A	Give the block diagram of general feedback amplifier and state the Function of each block.	5M	BTL2
8.B	Compare performance analysis of four feedback amplifiers	5M	BTL3

(OR)

9.A	Explain the operation of RC Phase shift Oscillator using BJT and derive the expression for frequency of oscillations	6M	BTL4
9.B	Find capacitor C for FET RC Phase shift oscillator for a frequency of 2.5KHz and feedback resistor of $1K\Omega$	4M	BTL5

**SECTION – V**

10.	Explain the operation of class B push pull power amplifier and derive the expression for conversion efficiency	10M	BTL2
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(OR)

11.	Explain the operation of transformer coupled class A power amplifier and derive the expression for conversion efficiency.	10M	BTL4
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## B.TECH II YEAR II SEMESTER REGULAR END EXAMINATIONS, JULY -2024 COMPLEX VARIABLES AND TRANSFORM TECHNIQUES (COMMON TO ECE, EEE )

[Time: 3 Hours]

[Max. Marks: 60]

### PART – A

(10x 1 = 10M)

- Note:** 1. This Part consists of 10 QUESTIONS  
2. Answer **All Questions**. Each question carries 1Mark

1.	A	Evaluate $\int (z-3)^4 dz$ where $c$ is the circle $ z-3 =4$ .	1M	BTL3
	B	Evaluate $\int_c \frac{dz}{z-2}$ where $C$ is the circle $ z-2 =1$ .	1M	BTL3
	C	Define isolated singularity.	1M	BTL1
	D	Find the residue of the function $f(z) = \frac{4}{z^3(z-2)}$ at $z=2$ .	1M	BTL2
	E	Find the Fourier co-efficient $b_n$ for $x \sin x$ in $-\pi < x < \pi$ .	1M	BTL2
	F	State Fourier Integral theorem.	1M	BTL1
	G	Find $L[e^{-t}t^3]$ .	1M	BTL2
	H	State convolution theorem.	1M	BTL1
	I	Find the Z-transform of $\frac{1}{n}$ .	1M	BTL2
	J	Find $Z^{-1}\left[\frac{z}{z+2}\right]$ .	1M	BTL2

### PART – B

(5 x 10 = 50M)

- Note:** 1. This Part consists of 10 QUESTIONS  
2. Answer any 1 question from each Section. Each question carries 10 Marks.  
3. Illustrate your answers with NEAT sketches wherever necessary.

#### SECTION – I

2.A	Using Cauchy's integral formula, evaluate $\int_c \frac{z}{(z+1)^2(z+3)} dz$ , where $C$ is the Circle $ z+1 =1$ .	5M	BTL3
2.B	Find the Taylor's series to represent $\frac{z^2-1}{(z+2)(z+3)}$ in $ z  < 2$ .	5M	BTL2

(OR)

3.A	Use Cauchy's integral formula to evaluate $\int_c \frac{\sin \pi z^2 + \cos \pi z^2}{(z-2)(z-3)} dz$ where $C$ is $ z =4$ .	5M	BTL4
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3.B	Find the Laurent's series expansion of $\frac{z-1}{(z+2)(z+3)}$ valid in the region $2 <  z  < 3$ .	5M	BTL2
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## SECTION - II

4.A	Obtain the residues of the function $f(z) = \frac{z-3}{(z+1)(z+2)}$ at its poles.	5M	BTL4
4.B	Using residue theorem, evaluate $\int_C \frac{dz}{(z^2+4)^2}$ where C is the circle $ z-i =2$ .	5M	BTL3

(OR)

5.A	Evaluate $\int_0^{2\pi} \frac{d\theta}{13+5\sin\theta}$ using Contour Integration.	10M	BTL5
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## SECTION - III

6.A	Find the Fourier series for $f(x)= x $ when $-\pi < x < \pi$ . Hence deduce the sum of the series $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots \infty$ .	5M	BTL3
6.B	Obtain the Fourier cosine series for $f(x)=l-x$ , in $0 < x < l$ .	5M	BTL3

(OR)

7.A	Find the Fourier sine transform of $e^{-x^2}$ .	5M	BTL3
7.B	Evaluate $\int_0^\infty \frac{dx}{(x^2+a^2)(x^2+b^2)}$ by using Fourier Cosine Transform.	5M	BTL5

## SECTION - IV

8.A	Find the Laplace Transform of $e^{at} \sin bt$ .	5M	BTL3
8.B	Using Laplace transform of derivatives, prove that $L[t \sin at] = \frac{2as}{(s^2+a^2)^2}$ .	5M	BTL4

(OR)

9.A	Find the inverse Laplace Transform of $\frac{s+1}{s^2+2s+2}$ .	5M	BTL3
9.B	Using Laplace Transform, Solve $y'' + 2y' - 3y = 3$ , $y(0) = 4$ , $y'(0) = 1$ .	5M	BTL4

## SECTION - V

10.A	Find $Z[(n+2)(n+1)]$ .	5M	BTL3
10.B	State and prove initial and final value theorem of Z-Transform.	5M	BTL2

(OR)

11.A	Find the $Z^{-1}\left(\frac{z^2}{(z-1)(z-3)}\right)$ using Convolution theorem.	5M	BTL3
11.B	Solve the difference equation $y(n+2) - 4y(n+1) + 4y(n) = 0$ , $y(0) = 1$ , $y(1) = 0$ .	5M	BTL4



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**B.TECH II YEAR II SEMESTER REGULAR END EXAMINATIONS, JULY-2024**

**CONTROL SYSTEMS**

(ECE)

[Time: 3 Hours]

[Max. Marks: 60]

(10x 1 = 10M)

## PART – A

- Note:** 1. This Part consists of 10 QUESTIONS  
2. Answer **All Questions**. Each question carries 1Mark.

1	A	List out the types of Control Systems?	1M	BTL1
	B	Write the Mason's gain formula for the overall gain of system.	1 M	BTL1
	C	What are standard test signals?	1 M	BTL1
	D	What is rise time, peak overshoot and mention relevant formulas.	1 M	BTL1
	E	What are frequency domain specifications?	1 M	BTL2
	F	What is Polar Plot?	1 M	BTL1
	G	What is the effect of P and PI controllers?	1 M	BTL1
	H	List the advantages of different compensators?	1 M	BTL1
	I	Write down state model of the system?	1 M	BTL2
	J	Briefly explain concept of observability?	1 M	BTL1

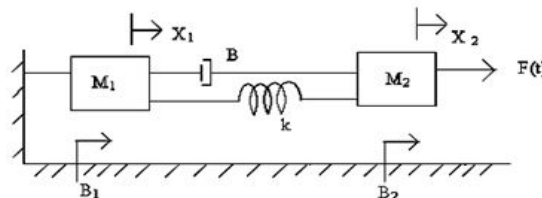
## PART – B

(5 x 10 = 50M)

- Note:** 1. ThisPart consists of 10 QUESTIONS  
2. Answer any 1 question from each Section.Each question carries 10 Marks.  
3. Illustrate your answers with NEAT sketches wherever necessary.

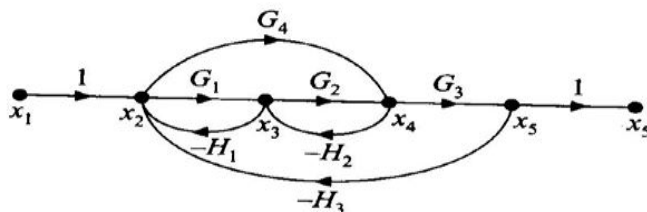
### SECTION - I

2.	Write the differential equation governing the mechanical system shown in figure. Obtain an analogous electric circuit based on force –current analogy.	10M	BTL2
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(OR)

3.	Find the transfer function $x_5/x_1$ for the system whose signal flow graph is shown in figure.	10 M	BTL2
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## SECTION - II

4.A	<p>A unity feedback control system has the forward transfer function</p> $G(s) = \frac{16}{s(s+5)}$ <p>Find the response, damping ratio, rise time, peak time and the maximum peak over shoot for unit step input.</p>	10 M	BTL2
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(OR)

5.A	Derive the expression for Time-Domain specifications.	10 M	BTL3
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## SECTION - III

6.A	Briefly explain about Routh-Hurwitz criterion.	5 M	BTL3
6.B	Consider the unity feedback system shown with transfer function $G(S)$ is $K/S(S+3)(S+5)(S+7)$ . Draw the root locus and identify the Stability.	5 M	BTL2

(OR)

7.A	<p>Comment on the stability of the system whose characteristic equations are</p> <p>i) <math>s^6+2s^5+8s^4+12s^3+20s^2+16s+16=0</math>.</p> <p>ii) <math>s^5+s^4+2s^3+2s^2+3s+5=0</math> and determine the number of roots lying on the left, right half and on Imaginary axis.</p>	10 M	BTL3
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## SECTION – IV

8.A	<p>Sketch the Bode plot and determine the Phase Margin and Gain Margin for the open loop transfer function given</p> $G(s) = \frac{8}{s(1+0.3s)(1+0.1s)}$	10 M	BTL4
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(OR)

9.A	<p>Construct the Nyquist plot for a system whose open loop transfer function is given by</p> $G(s)H(s) = \frac{10}{s(s+3)(s+6)}$ <p>Find the range of K for stability.</p>	10 M	BTL2
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## SECTION – V

10.A	<p>Test the Controllability and Observability for the following state –space representation.</p> $\dot{x} = \begin{bmatrix} -3 & 0 \\ 2 & -1 \end{bmatrix} x + \begin{bmatrix} 3 \\ 1 \end{bmatrix} u$ $y = [1 \quad 2]x$	10 M	BTL2
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(OR)

11.A	What is state transition matrix and list the properties of it.	5M	BTL3
11.B	<p>Convert the transfer function to the state space representation.</p> $G(s) = \frac{s+4}{s^2+3s+2}$	5M	BTL4

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## B.TECH II YEAR II SEMESTER REGULAR END EXAMINATIONS, JULY-2024

### MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

(COMMON TO EEE, ECE, CSE-DS,AIML, IOT)

[Time: 3 Hours]

[Max. Marks: 60]

#### PART – A

(10x 1 = 10M)

- Note:** 1. This Part consists of 10 QUESTIONS  
2. Answer **All Questions**. Each question carries 1 Mark.

1	A	Define is law of demand.	1M	BTL1
	B	Explain the scope of managerial economics.	1M	BTL2
	C	Write short notes on Cobb-Douglas production function.	1M	BTL2
	D	Define Angle of incidence.	1M	BTL1
	E	List out the features of monopoly.	1M	BTL2
	F	What are the characteristics of partnership.	1M	BTL1
	G	Discuss the significance of capital.	1M	BTL3
	H	Describe the Pay Back Period	1M	BTL3
	I	What is ledger?	1M	BTL1
	J	What is cash flow?	1M	BTL1

#### PART – B

(5 x 10 = 50M)

- Note:** 1. This Part consists of 10 QUESTIONS  
2. Answer any 1 question from each Section. Each question carries 10 Marks.  
3. Illustrate your answers with NEAT sketches wherever necessary.

#### SECTION - I

2.A	Define managerial economics and explain the features of managerial economics.	5M	BTL2
2.B	What do you mean by demand forecasting? Explain various demand forecasting techniques.	5M	BTL2

(OR)

3.A	How do you explain the relation of managerial economics with other subjects? Explain.	5M	BTL3
3.B	Explain types of Elasticity of Demand.	5M	BTL2

#### SECTION - II

4.A	Calculate margin of safety and the amount of actual sales from the following: i) Profit Rs. 10,000 ii) PV Ratio 50% iii) BEP sales Rs. 20,000.	5M	BTL3
4.B	Explain the production function with reference to Law of variable proportions and substitutability of factors.	5M	BTL2

(OR)

5.A	What is cost function? How to estimate the different costs.	5M	BTL3
5.B	Explain internal and external economies of Scale.	5M	BTL2

#### SECTION - III

6.A	Define monopoly. How is price under monopoly determined?	5M	BTL3
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6.B	Define Joint Stock Company What are the characteristics of a joint stock company?	5M	BTL2
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(OR)

7.A	What is pricing? Explain different methods of pricing.	5M	BTL3
7.B	Explain the different steps involved in the process of business cycle.	5M	BTL2

## SECTION – IV

8.A	A company is considering whether to purchase a new machine. Machines A and B are available for Rs 80,000 each. Earnings after taxation are as follows:		10M	BTL4	
	Year	Machine A (Rs)			Machine B ( Rs)
	1	24,000			8,000
	2	32,000			24,000
	3	40,000			32,000
	4	24,000			48,000
	5	16,000			32,000
	Required: Evaluate the two alternatives using the following: (a) payback method, (b) rate of return on investment method, and (c) net present value method. You should use a discount rate of 10%.				

(OR)

9.A	Elaborate the various methods and sources of finance to raise the funds for an organizations.	10M	BTL3
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## SECTION – V

10.A	<p>Edward's books show the following balances. Prepare his trading and profit and loss A/c for the year ended 31st December, 2016 and a balance sheet on at that date.</p> <table border="1"> <thead> <tr> <th>Debit balances</th><th>₹</th><th>Credit balances</th><th>₹</th></tr> </thead> <tbody> <tr> <td>Drawings</td><td>5,000</td><td>Capital</td><td>1,31,500</td></tr> <tr> <td>Sundry debtors</td><td>60,000</td><td>Loan at 6% p.a.</td><td>20,000</td></tr> <tr> <td>Coal, gas and water</td><td>10,500</td><td>Sales</td><td>3,56,500</td></tr> <tr> <td>Returns inward</td><td>2,500</td><td>Interest on investments</td><td>2,550</td></tr> <tr> <td>Purchases</td><td>2,56,500</td><td>Sundry creditors</td><td>40,000</td></tr> <tr> <td>Stock on 1-1-2016</td><td>89,700</td><td></td><td></td></tr> <tr> <td>Travelling expenses</td><td>51,250</td><td></td><td></td></tr> <tr> <td>Interest on loan paid</td><td>300</td><td></td><td></td></tr> <tr> <td>Petty cash</td><td>710</td><td></td><td></td></tr> <tr> <td>Repairs</td><td>4,090</td><td></td><td></td></tr> <tr> <td>Investments</td><td>70,000</td><td></td><td></td></tr> <tr> <td></td><td>5,50,550</td><td></td><td>5,50,550</td></tr> </tbody> </table> <p>Adjustments:</p> <ol style="list-style-type: none"> <li>Closing stock was Rs. 1,30,000 on 31st December, 2016.</li> <li>Create 5% provision for bad and doubtful debts on sundry debtors</li> <li>Create provision at 2% for discount on debtors</li> <li>Interest on loan due for 9 months.</li> </ol>	Debit balances	₹	Credit balances	₹	Drawings	5,000	Capital	1,31,500	Sundry debtors	60,000	Loan at 6% p.a.	20,000	Coal, gas and water	10,500	Sales	3,56,500	Returns inward	2,500	Interest on investments	2,550	Purchases	2,56,500	Sundry creditors	40,000	Stock on 1-1-2016	89,700			Travelling expenses	51,250			Interest on loan paid	300			Petty cash	710			Repairs	4,090			Investments	70,000				5,50,550		5,50,550	10M	BTL4
Debit balances	₹	Credit balances	₹																																																				
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	5,50,550		5,50,550																																																				

(OR)

11.A	Explain accounting concepts and conventions.	5M	BTL3
11.B	Discuss the proforma of funds flow statements .	5M	BTL2