MALLA REDDY COLLEGE OF ENGINEERING &TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade, ISO 9001:2008 Certified)

Maisammaguda, Dhulapally, Secunderabad – 500100.

DEPARTMENT OF
ELECTRONICS & COMMUNICATION ENGINEERING

II BTECH II SEMESTER

QUESTION BANK (2024-2025)

R22

Code No: R22A0407

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Examinations, 2024

Linear & Digital IC

(ECE)

MODEL PAPER -1

Roll No										

Time: 3 hours **Max. Marks: 60**

PART-A

Answer All Questions

All Questions carries equal marks.

1	Discuss the characteristics of a practical Op-Amp	**[1M]**
2	List the requirements of good Instrumentation Amplifier	**[1M]**
3	List the applications of Differentiator?	**[1M]**
4	State the various advantages of IC voltage regulators	**[1M]**
5	What are the advantages of active filters over the passive filters?	**[1M]**
6	What is the importance of pin 4 in IC 555?	**[1M]**
7	Define i) lock in range ii) capture range iii) pull in range	**[1M]**
8	Write short notes on DAC	**[1M]**
9	What are the applications of ADC	**[1M]**
10	**What are Current driven DACs?**	**[1M]**

PART-B

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 5 marks.*******

SECTION-I

What are characteristics of ideal Op-Amp? **[5M]**

OR

Explain the operation of Schmitt trigger. **[5M]**

SECTION-II

What are the steps required to design the first order Butterworth LPF? Draw the frequency response. **[5M]**

OR

Illustrate the working principle and operation of 555timer as a Monostable Multivibrator. **[5M]**

SECTION-III

Explain the working of R-2R type DAC. **[5M]**

OR

Describe the working principle and operation of Dual slope integrator type ADC. **[5M]**

SECTION-IV

Explain about the classification of Integrated circuits. **[5M]**

OR

Design 4 bit Binary to Gray code converter **[5M]**

SECTION-V

Draw the JK flip-flop and explain it's operation with truth table. **[5M]**

OR

Design a 3 bit Synchronous counter and explain its operation. **[5M]**

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R22

Code No: R22A0407

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Examinations, 2024

Linear & Digital IC

(ECE)

MODEL PAPER -2

Roll No										

Time: 3 hours **Max. Marks: 60**

PART-A

Answer All Questions
All Questions carries equal marks.

1	State the characteristics of an ideal Op-Amp	**[1M]**
2	What are the salient features of Op-Amps?	**[1M]**
3	What is an AC Amplifier?	**[1M]**
4	State the applications of Sample and Hold circuit	**[1M]**
5	Distinguish between active and passive filters	**[1M]**
6	What is pass band and stop band for filters?	**[1M]**
7	What are the applications of VCO 566	**[1M]**
8	State the features of IC 555	**[1M]**
9	State the types of DAC	**[1M]**
10	**Compare three ADC types**	**[1M]**

PART-B

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 5 marks.*******

SECTION-I

Describe the AC characteristics of Op-Amp. **[5M]**

OR

How an op-amp act as an Integrator? Derive the output voltage of an Integrator. **[5M]**

SECTION-II

Describe the function of square wave generator. **[5M]**

OR

List the applications of Monostable Multivibrator. **[5M]**

SECTION-III

Illustrate the functioning of Weighted resistor DAC. **[5M]**

OR

List the specifications of DAC's and ADC's. **[5M]**

SECTION-IV

What are the major differences between two major logic families CMOS and TTL? **[5M]**

OR

Draw and explain 3 to 8 line decoder **[5M]**

SECTION-V

What is the shift register? What are the different kinds of shift Register? List the applications. **[5M]**

OR

Differentiate Static RAM and Dynamic RAM **[5M]**

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R22

Code No: R22A0406

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Regular Examinations-Model Paper-1

Analog & Digital Communications

(ECE)

Time: 3 Hours **Max. Marks: 60**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 10 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(10 Marks)

1. a) Define Modulation and list different types of modulations.
b) A Radio transmitter radiates 10 KW and carrier power is 8.5 KW. Calculate modulation index.
c) Define Frequency deviation.
d) Compare narrow band and wide band FM.
e) Define AM Transmitter.
f) Explain the image frequency rejection of a radio receiver.
g) What is the bandwidth requirement of a PCM system?
h) Distinguish between PAM and PWM.
i) Define baseband transmission.
j) Define FSK modulation and give its applications.

PART – B

(50 Marks)

SECTION-I

2. a. How AM is generated using switching modulator? Derive relevant expressions.
b. Explain the demodulation of AM using envelope detector. [5+5]

OR

3. a. With necessary circuit diagram and waveforms, explain how DSB-SC wave is generated using Balance Modulator.
b. Explain demodulation of DSB-SC using Coherent Detector with neat block diagram and necessary equations. [5+5]

SECTION-II

4.a) Discuss the generation of FM wave using direct method.
b) Discuss the detection of FM wave using Balanced slope detector. [5+5]

OR

5. a. Derive the expression for single tone frequency modulated signal.
b. A 100 M Hz carrier is frequency modulated by a sinusoidal signal of amplitude 20V and frequency 100K Hz. The frequency sensitivity of the modulator is 25K Hz/volt. Determine
i) frequency deviation ii) modulation index (β) iii) bandwidth. [5+5]

SECTION-III

6. Draw the block diagram of AM transmitter using High level modulation. Explain the significance

of each block. [10]

OR

7. a. Explain the operation of Tuned Radio frequency Receiver using a neat block diagram and list its limitations. [10]

SECTION-IV

8. Explain the generation and demodulation of PAM. [10]

OR

9. Explain DPCM transmitter & receiver with a neat block diagram & necessary equations. [10]

SECTION-V

10.a. Explain the process of generating ASK signals.

b. Describe the process of detecting Coherent BPSK signals. [5+5]

OR

11. a. Explain how ISI occurs in base-band binary data transmission system.

b. What is an optimum receiver? Derive its probability of error. [5+5]

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R22

Code No: R22A0406

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Regular Examinations-Model Paper-2

Analog & Digital Communications

(ECE)

Time: 3 Hours **Max. Marks: 60**

Note: i) Question paper consists of Part A, Part B.
iv)Part A is compulsory, which carries 10 marks. In Part A, Answer all questions.
v) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(10 Marks)

1. a) State how a DSB-SC signal may be generated.
   b) Write down an expression for the time-domain representation of a VSB signal.
   c) Define the term modulation index for FN in the case of single-tone modulation.
   d) Compare to AM and FM which more immune to noise and why?
   e) What is meant by tracking error?
   f) Distinguish between simple AGC & delayed AGC
   g) What are the drawbacks of delta modulation?
   h) Write advantages of digital communications?
   i) What are the advantages and disadvantages of DPSK when compared to BPSK?
   j) Define Inter symbol Interference (ISI)?

PART – B

(50 Marks)

SECTION-I

2. Give the time domain and frequency domain expression for DSB-SC and draw its spectrum. [10]

OR

3. a. Explain generation of SSB using phase shift method.
   b.Describe the single tone modulation of SSB. Assume both modulating and carrier signals are sinusoids. [5+5]

SECTION-II

4. a. Explain how FM signal is detected with the help of PLL.
   b. Compare AM & FM. [5+5]

OR

5. Derive the expression for Narrow band frequency modulated signal. Draw its Phase representation and compare it with that of AM. [10]

SECTION-III

6. Explain the operation of Low level AM Transmitter with a neat block diagram. [10]

OR

7. Explain the operation of Super Heterodyne Receiver using a neat block diagram. [10]

SECTION-IV

8. Explain the generation and demodulation of PWM. [10]

OR

9. Explain DM transmitter & receiver with neat block diagrams & necessary equations. [10]

SECTION-V

10. a. Explain detection of ASK using a coherent detector.
    b. Explain detection of FSK using PLL. [5+5]

OR

11. Explain Eye Diagrams with neat diagram. [10]

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R22

Code No: R22A0406

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Regular Examinations-Model Paper-3

Analog & Digital Communications

(ECE)

Time: 3 Hours **Max. Marks: 60**

Note: i) Question paper consists of Part A, Part B.
vi) Part A is compulsory, which carries 10 marks. In Part A, Answer all questions.
vii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(10 Marks)

1.a) What is modulation index? What happens if it is greater than unity?

b) Discuss the advantages and disadvantages of SSB-SC transmission.

c) Define frequency modulation and phase modulation.

d) An FM system has a frequency deviation of 30KHz. The modulating frequency is 3 KHz. Calculate the bandwidth and modulation index.

e) List the factors on which selectivity depends.

f) What exactly, does an amplitude limiter do in FM receiver?

g) List the drawbacks of PAM.

h) Define uniform quantization?

i) Sketch the wave form of the FSK signal for the input binary sequence 101?

j) Compare Coherent and Non-Coherent Detection.

PART – B

(50 Marks)

SECTION-I

2. a. Derive necessary equations for Power relations in AM waves.

b. An AM transmitter radiates 50W power when carrier is modulated and μ=0.707. Determine i) carrier power ii) modulation efficiency. [5+5]

OR

3. Explain about COSTAS loop with a neat block diagram for demodulating DSB-SC wave. [10]

SECTION-II

4. Explain how PM signal can be generated from FM signal. Justify with the necessary mathematics and draw the block diagram of the corresponding implementation. [10]

OR

5. Explain the generation of FM using Reactance modulator. [10]

SECTION-III

6. Explain the operation of FM Transmitter with a neat block diagram [10]

OR

7. Explain the operation of FM receiver using a neat block diagram. [10]

SECTION-IV

8. Explain FDM using neat block diagram. [10]

OR

9. a. Explain the Need for non-uniform quantization
   b. Explain drawbacks of Delta Modulation [5+5]

SECTION-V

10. a. Explain generation of BPSK signal and its coherent reception.
    b. Write a short note on optimum receiver. [5+5]

OR

11. a. Explain the working of ASK modulator and demodulator.
    b. Illustrate about Eye pattern and its significance. [5+5]

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R22

Code No: R22A0406

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Regular Examinations-Model Paper-4

Analog & Digital Communications

(ECE)

Time: 3 Hours **Max. Marks: 60**

Note: i) Question paper consists of Part A, Part B.

viii) Part A is compulsory, which carries 10 marks. In Part A, Answer all questions.

ix) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(10 Marks)

1. a). A carrier signal is sinusoidal modulated to a depth of μ=0.8. What is the percentage of the total power of the modulated signal is in the two sidebands?

b) State the advantages and disadvantages of AM. Where it is used?

c) Compare FM and PM.

d) Define Angle modulation and state is advantage over Amplitude modulation.

e) List the drawbacks of Tuned Radio Frequency Receiver.

f) Draw block diagram of AM Transmitter.

g) What is multiplexing? Differentiate TDM & FDM.

h) Write about companding in PCM?

i) Draw the black diagram of coherent detection of FSK?

j) List out the advantages of pass band transmission over base band transmission?

PART – B

(50 Marks)

SECTION-I

2. Define Amplitude Modulation. Derive Single tone AM Equation. Draw the relevant waveforms in time domain and frequency domain. [10]

OR

3. a. Derive the time domain expression for an SSB wave.

b. Compare all Amplitude Modulation Techniques. [5+5]

SECTION-II

4. a. Explain the generation of NBFM.

b. Compare NBFM and WBFM [5+5]

OR

5. a. Write about the Concept of Pre-emphasis and De-emphasis.

b. A 107.6MHz carrier signal is frequency modulated by a 7KHz sine wave. The resultant FM signal has frequency deviation of 50KHz, determine the

following:

i) Carrier swing of FM signal
ii) Highest and Lowest frequencies attained by modulated signal
iii) Modulation index [5+5]

SECTION-III

6. a. Compare AM and FM Transmitters.
   b. Define the terms sensitivity, selectivity and fidelity of a radio receiver. [5+5]

OR

7. Explain the different types of AGC. [10]

SECTION-IV

8. Explain the concept of Time Division Multiplexing using a neat block diagram. [10]

OR

9. a. Derive an expression for signal to quantization noise ratio of a Delta Modulator
   b. Explain operation of Adaptive DM transmitter and receiver. [5+5]

SECTION-V

10. Explain the concept of QAM. [10]

OR

11. Write short notes on (a) ISI (b) Eye Diagrams. [5+5]

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R22

Code No: R22A0408

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Regular Examinations, January 2024 model paper-I

Electronic Circuit and analysis

(ECE)

Roll No										

Time: 3 hours **Max. Marks: 60**

Note: This question paper contains two parts A and B
Part A is compulsory which carries 10 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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PART-A

(Write all answers of this part at one place)

1	A	Explain the basic concept of power amplifier	**[1M]**
	B	What is the tuned amplifier	**[1M]**
	C	What is the multivibrator	**[1M]**
	D	List out the types of multivibrators and their states	**[1M]**
	E	What is the time base generator	**[1M]**
	F	What is the sampling gates	**[1M]**
	G	How to remove the pedestal in sampling gates	**[1M]**
	H	What are the advantages class B power amplifier	**[1M]**
	I	What are the advantages of bi-stable multi vibrator	**[1M]**
	J	What is stagger tuning amplifier	**[1M]**

PART-B

SECTION-I

2	A	Explain the operation of class -B amplifier with circuit diagram and also derive an expression for maximum efficiency of push -pull class B amplifier.	**[5M]**
	B	Draw and explain the series fed class A power amplifier	**[5M]**
		OR	
3	A	Derive the expressions for efficiency of the class A power amplifier	**[5M]**
	B	Explain the operation of class -AB amplifier with circuit diagram and also derive an expression for maximum efficiency	**[5M]**

SECTION-II

4	A	Explain about staggered tuned amplifier	**[5M]**
	B	Describe briefly the effect of bandwidth of double tuned amplifier, when amplifiers are cascaded.	**[5M]**
		OR	
5	A	Explain about single tuned amplifier	**[5M]**

	B	Explain the frequency response of single tuned amplifiers	**[5M]**

SECTION-III

6	A	With the help of a neat diagram and waveforms, explain the principle of operation of Astable multivibrator.	**[5M]**
	B	Explain the transistor switching times with the help of a neat circuit diagram.	**[5M]**

OR

7	A	With the help of a neat diagram and waveforms, explain the principle of operation of Bistabel multivibrator.	**[5M]**
	B	Explain the working of Schmitt trigger with the help of a neat circuit diagram and calculate LTP and UTP	**[5M]**

SECTION-IV

8	A	Draw and explain the circuit of Bootstrap sweep generator. Derive an expression for sweep speed error	**[5M]**
	B	Briefly describe various methods to achieve sweep linearity in time-base circuit	**[5M]**

OR

9	A	Draw and explain the circuit of Miller sweep generator. Derive an expression for sweep speed error	**[5M]**
	B	Comparison of bootstrap sweep generator and Miller sweep generator	**[5M]**

SECTION-V

10	A	Explain basic principle of Sampling Gate. Draw and explain the circuit diagram of a four diode sampling gates	**[5M]**
	B	Compare unidirectional and bi-directional Sampling Gates.	**[5M]**

OR

11	A	Draw and explain the circuit diagram of a two-DIODE sampling gate.	**[5M]**
	B	How to reduce the pedestal in sampling gates	**[5M]**

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Code No: R22A0408

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Regular Examinations, January 2024 model paper-II

Electronic Circuit and analysis

(ECE)

Roll No										

Time: 3 hours **Max. Marks: 60**

Note: This question paper contains two parts A and B
Part A is compulsory which carries 10 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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PART-A

(Write all answers of this part at one place)

1	A	Comparison of power amplifiers and small signal amplifiers	**[1M]**
	B	What is the single tuned amplifier	**[1M]**
	C	What is the Schmitt trigger circuit	**[1M]**
	D	Comparison of multi vibrators	**[1M]**
	E	What is the voltage time base generator	**[1M]**
	F	What is the basic principal of sampling gate	**[1M]**
	G	How to remove crossover distortions in power amplifiers	**[1M]**
	H	What are the advantages class AB power amplifier	**[1M]**
	I	What are the Applications of bi-stable multi vibrator	**[1M]**
	J	What is double tuned amplifier	**[1M]**

PART-B

SECTION-I

2	A	Explain the operation of class -B power amplifier with circuit diagram	**[5M]**
	B	Derive an expression for maximum efficiency of transformer coupled class A amplifier	**[5M]**
		OR	
3	A	Explain the operation of Complimentary Symmetry amplifier with circuit diagram	**[5M]**
	B	Derive an expression for maximum efficiency of push -pull class B amplifier	**[5M]**

SECTION-II

4	A	Explain about tuned amplifiers, and Q- factor, frequency response	**[5M]**
	B	Describe briefly the effect of bandwidth of double tuned amplifier, when amplifiers are cascaded.	**[5M]**

OR

5	A	Briefly explain the Q-factor and bandwidth in tuned amplifiers	[5M]
	B	Explain the working of single tuned amplifiers	[5M]

SECTION-III

6	A	Draw and explain the circuit of Mono-stable multivibrator with necessary waveforms	[5M]
	B	Explain the different types of triggering in multivibrators	[5M]

OR

7	A	With the help of a neat diagram and waveforms, explain the principle of operation of Astable multivibrator.	[5M]
	B	Explain the Schmitt trigger circuit with neat circuit diagrams	[5M]

SECTION-IV

8	A	Draw and explain the circuit of Bootstrap sweep generator.	[5M]
	B	Derive an expression for sweep speed error in Bootstrap sweep generator	[5M]

OR

9	A	Draw and explain the circuit of millers sweep generator.	[5M]
	B	Derive an expression for sweep speed error in millers sweep generator	[5M]

SECTION-V

10	A	Draw and explain the circuit diagram of a unidirectional sampling gates	[5M]
	B	Compare unidirectional and bi-directional Sampling Gates.	[5M]

OR

11	A	Draw and explain the circuit diagram of a four-DIODE sampling gate.	[5M]
	B	Explain basic principle of Sampling Gates	[5M]

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Code No: R22A0408

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Regular Examinations, January 2024 model paper-III

Electronic Circuit and analysis

(ECE)

Roll No										

Time: 3 hours **Max. Marks: 60**

Note: This question paper contains two parts A and B
Part A is compulsory which carries 10 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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PART-A

(Write all answers of this part at one place)

1	A	Comparison Of Series Fed And Transformer Coupled Power amplifier	**[1M]**
	B	What are the applications of tuned amplifiers	**[1M]**
	C	What is the triggering	**[1M]**
	D	List out the types of multivibrators and their states	**[1M]**
	E	What is the time base generator	**[1M]**
	F	What is the sampling gates	**[1M]**
	G	How to remove the pedestal in sampling gates	**[1M]**
	H	What are the advantages class B power amplifier	**[1M]**
	I	What are the advantages of bi-stable multi vibrator	**[1M]**
	J	What is stagger tuning amplifier	**[1M]**

PART-B

SECTION-I

2	A	Draw and Explain the operation of class -A amplifier with circuit diagram	**[5M]**
	B	Derive the efficiency of the series fed class A power amplifier	**[5M]**
		OR	
3	A	Derive the expressions for efficiency of the class AB power amplifier	**[5M]**
	B	Explain the operation of class -B amplifier with circuit diagram and also derive an expression for maximum efficiency of push -pull class B amplifier.	**[5M]**

SECTION-II

4	A	Explain about DOUBLE tuned amplifiers, and Single tuned amplifiers	**[5M]**
	B	Describe briefly the effect of bandwidth of double tuned amplifier, when amplifiers are cascaded.	**[5M]**
		OR	
5	A	Explain the stagger tuning amplifiers	**[5M]**
	B	Comparison of single tuned and double tuned amplifiers	**[5M]**

SECTION-III

6	A	Draw and explain the circuit of bistable multivibrator with necessary waveforms and calculate stable state voltages and currents	**[5M]**
	B	Explain the monostable multivibrators with necessary waveforms	**[5M]**
		OR	
7	A	With the help of a neat diagram and waveforms, explain the principle of operation of Schmitt trigger	**[5M]**
	B		**[5M]**

SECTION-IV

8	A	Draw and explain the circuit of current time base sweep generator.	**[5M]**
	B	Derive an expression for sweep speed error and slope error, displacement error	**[5M]**
		OR	
9	A	Draw and explain the circuit of millers sweep generator.	**[5M]**
	B	Derive an expression for sweep speed error in millers sweep generator	**[5M]**

SECTION-V

10	A	Draw and explain the circuit diagram of a unidirectional sampling gates	**[5M]**
	B	Compare unidirectional and uni-directional Sampling Gates.	**[5M]**
		OR	
11	A	Draw and explain the circuit diagram of a two-DIODE sampling gate.	**[5M]**
	B	Explain basic principle of Sampling Gates and logic gates	**[5M]**

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Code No: R22A0408

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Regular Examinations, January 2024 model paper-IV

Electronic Circuit and analysis

(ECE)

Roll No										

Time: 3 hours **Max. Marks: 60**

Note: This question paper contains two parts A and B
Part A is compulsory which carries 10 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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PART-A

(Write all answers of this part at one place)

1	A	Comparison Of Power amplifiers	**[1M]**
	B	What is the Q factor In Tuned Amplifiers	**[1M]**
	C	What is the Multivibrator	**[1M]**
	D	Comparisons of multivibrators and their states	**[1M]**
	E	What is the applications of time base generators	**[1M]**
	F	What is the unidirectional sampling gates	**[1M]**
	G	Define UTP and LTP in Schmitt trigger circuits	**[1M]**
	H	What are the advantages of push pull class B power amplifier	**[1M]**
	I	What are the Applications of bi-stable multivibrator	**[1M]**
	J	What is the unidirectional and bidirectional logic gates	**[1M]**

PART-B

SECTION-I

2	A	Draw and Explain the operation of Complementary and symmetry -B amplifier with circuit diagram	**[5M]**
	B	Derive the efficiency of the transformer coupled class A power amplifier	**[5M]**
		OR	
3	A	Derive the expressions for efficiency of the class B power amplifier	**[5M]**
	B	Explain the operation of class -A amplifier with circuit diagram and also derive an expression for maximum efficiency is 78.5%	**[5M]**

SECTION-II

4	A	Explain about DOUBLE tuned amplifiers, and Single tuned amplifiers	**[5M]**
	B	Describe briefly the effect of bandwidth of Single tuned amplifier, when amplifiers are cascaded.	**[5M]**

		OR	
5	A	Explain the stagger tuning amplifiers	**[5M]**
	B	Comparison of single tuned and double tuned amplifiers	**[5M]**
		SECTION-III	
6	A	Draw and explain the circuit of astable multivibrator with necessary waveforms and calculate stable state voltages and currents	**[5M]**
	B	Explain the Schmitt trigger circuit with necessary waveforms	**[5M]**
		OR	
7	A	Derive the UTP and LTP in Schmitt trigger circuit	**[5M]**
	B		**[5M]**
		SECTION-IV	
8	A	Derive the linearity of deviation in time base generators	**[5M]**
	B	Derive an expression for sweep speed error in miller circuit	**[5M]**
		OR	
9	A	Draw and explain the circuit of millers sweep generator.	**[5M]**
	B	Derive an expression for sweep speed error in boot strap sweep generator	**[5M]**
		SECTION-V	
10	A	Comparison of between unidirectional and bi-directional Sampling Gates	**[5M]**
	B	Explain basic principle of Sampling Gates	**[5M]**
		OR	
11	A	Draw and explain the circuit diagram of a four DIODE sampling gate.	**[5M]**
	B	Explain the pedestal in of Sampling Gates and how to remove	**[5M]**

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MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B. Tech II year – II Semester Examinations, Model Paper-1

ELECTROMAGNETIC FIELDS AND TRANSMISSION LINES

Time: 3 hours **Max. Marks: 60**

PART- A (10 Marks)

1. a. Define Dot product of two vectors. (1 M)

   b. State the properties of Base vectors. (1 M)

   c. Define and Express the relation between magnetic field intensity &Magnetic Flux Density. (1 M)

   d. Ampere's Circuital Law (1 M)

   e. Define Uniform Plane wave. (1 M)

   f. State Faraday's law of electromagnetic induction. (1 M)

   g. Define primary and secondary constants of transmission line. (1 M)

   h. Define the phase velocity. (1 M)

   i. Expand and Define VSWR (1 M)

   j. Calculate the characteristics impedance of free space. (1 M)

PART-B (5*10=50 Marks)

Section-1

2. state and explain Coulomb's Law for two and 'N' number of point charges. (10M)

OR

3. Derive the 'E' at an observation point due to infinite line charge element (10M)

Section-1I

4. a. Define and Explain Ampere's circuit Law. (5M)

   b. State Maxwell's Equations in Differential and Integral form with clear statement. (5M)

OR

5. Explain about Magnetic Scalar and Vector Potentials. (10M)

Section-III

6. a. Derive the wave equation for dielectric medium. (10M)

OR

7. The magnetic field component of a wave is given by H=30cos (10^8 t-6x)$\bar{a}_y$ mA/m. Determine a) The direction of Wave Propagation b) The wave length, and c) The wave velocity (10M)

Section-IV

8. a. Derive the expression for α and β in terms of primary constants of a line (5M)

   b. Given R = 10.4 /mt (5M)
   L = 0.00367 H/mt
   G = 0.8×10^{-4} mhos/mt
   C = 0.00835 μF/mt.
   Calculate Z0 and γ at 1.0 KHz.

OR

9. Derive the Expression for Transmission Line Equation. (10M)

Section-V

10. a) Establish the relations for Z_{sc} and Z_{oc} of transmission line. (5M)

    b) A 60ohm lossless line is 30m long and is terminated with a load of 75+j50ohms at 3MHz find its reflection coefficient, VSWR, if the line velocity is 60% of the velocity of light (5M)

OR

11. a) Derive the relation between Reflection Coefficient and VSWR (5M)

    b) List out the advantages and applications of smith chart. (5M)

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R22A0405

R22

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.Tech II year – II Semester Examinations, Model Paper-2

ELECTROMAGNETIC FIELDS AND TRANSMISSION LINES

Time: 3 hours **Max. Marks: 60**

PART- A (10 Marks)

1 .	a What are the different types of charge distributions.	(1M)
	b. State Gauss Law	(1M)
	c. State and Express The Amperes Force Law	(1M)
	d. Define the boundary condition	(1M)
	e. Define Brewster Angle	(1M)
	f. write formulas for reflection coefficient and transmission coefficient.	(1M)
	g. Define the Propagation constant in terms of primary constants	(1M)
	h. Define the group velocity	(1M)
	i. Give the relation between SC and OC impedances.	(1M)
	j. Write down the Applications of Smith chart	(1M)

PART-B (5*10=50 Marks)

Section-I

2.a	**S**tate and prove the Continuity Equation?	(5M)
	b. Find the force on a charge of -100mC located at P(2,0,5) in free space due to another charge 300μC located at Q(1,2,3).	(5M)

OR

3.	a. State and Prove Laplace's and Poisson's Equation Starting from Gauss's Law	(5M)
	b. If D= (2y2 +z) ax find ρv at (-1,0,3).	(5M)

Section-II

4.	a. Define Ampere's Circuit Law in point and integral forms for Static fields.	(5M)
	b. Obtain the integral form of Maxwell's equations for time varying fields.	(5M)

OR

5.	State and Prove Boundary condition between Dielectric-Dielectric.	(10M)

Section-III

6. Derive Expression for reflection and transmission coefficients of an EM wave when it is incident normally on a dielectric. (10M)

OR

7. a. Define Total Internal Reflection (3M)

b. A perpendicularly polarized wave is incident at an angle of θ_i=15degrees. It is propagating from medium1 to medium2. medium 1 is defined by ε_{r1}=8.5,μ_{r1}=1,σ_1=0 and medium 2 is free space if E_i=1mv/m, determine E_r, H_i, H_r. (7M)

Section-IV

8. a. Derive the Condition for Distrotionless Transmission Line. (5M)

b. Measurements on a Transmission Line of length 120Km were made at frequency of 6000Hz.If Z_{OC}=520(-30deg) and Z_{SC}=640(43deg) find Z_o and P. (5M)

OR

9. a. Explain about Primary constants of transmission line. (5M)

b. The propagation constant of a lossy transmission line is 1+j2 m^{-1} and its characteristic impedance is 20+j0Ω at ω= 1rad/s. Find R,C,L,G for the Line. (5M)

Section-V

10. a. Explain the construction of smith chart. (10M)

OR

11. A transmission line of length 0.40λ has a characteristic impedance of 100Ω and is terminated in a load impedance of 200 + j180ω. Find the (10M)

(a) Voltage reflection coefficient

(b) Voltage standing wave ratio

(c) Input impedance of the line.

R22A0405

R22

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.Tech II year – II Semester Examinations, Model Paper-3

ELECTROMAGNETIC FIELDS AND TRANSMISSION LINES

Time: 3 hours **Max. Marks:60**

PART- A (10 Marks)

1.a. Wtite Differential elements in spherical coordinate system. (1M)
b. Define Electric potential. (1M)
c. State and Express Biot - Savart's Law. (1M)
d. Write down the Maxwell's equations in free space condition (1M)
e. Define Critical Angle (1M)
f. State and Express the Poynting theorem (1M)
g. Write condition for the Distortion less Line (1M)
h. Define Transmission line. (1M)
i. Define the voltage Standing Wave Ratio (1M)
j. Difference between the single stub matching and double stub matching (1M)

PART-B (5*10=50 Marks)

Section-I

2. Write short notes on rectangular, cylindrical and spherical coordinate systems. (10M)

OR

3. a. Derive the Relation Between E and V. (5M)

b. Point charges 1 mC and -2mC are located at (3,2, -1) and (-1, -1,4), respectively. Calculate the electric force on a 10nC charge located at (0,3,1) and the electric field intensity at that point. (5M)

Section-II

4. Derive an expression for magnetic field strength, H, due to a finite filamentary conductor carrying a current I and placed along Z-axis at a point 'P' on Y-axis. (10)

OR

5.a. What is the inconsistency of Ampere's Law and explain it. (5M)

b. state the maxwell's equations for magnetic fields in point form and integral form? (5M)

Section-III

6.Derive the Relation Between E & H for uniform plane wave. (10M)

OR

7. State and prove Poynting theorem. (10M)

Section-IV

8.Explain the conditions which are used for minimum attenuation in transmission lines (10M)

OR

9.. Show that for a uniform transmission line the following relations are valid (10M)

i) $Z_O=(Z_{OC}.Z_{SC})^{1/2}$

ii) $\text{Tanh}\gamma l=(Z_{SC}/Z_{OC})^{1/2}$

Section-V

10.Derive the expression for the input impedance of a transmission line of length L. (10M)

OR

11. Explain about Reflection Coefficient & VSWR. (10M)

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MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.Tech II year – II Semester Examinations, Model Paper-4

ELECTROMAGNETIC FIELDS AND TRANSMISSION LINES

Time: 3 hours **Max. Marks: 60**

PART- A (10 Marks)

1.a. State and Express the Divergence theorem (1M)

b. Define Relaxation time. (1M)

c. Write the boundary conditions for magnetic fields. (1M)

d. If a point charge is place in E&B fields, calculate 'F' on a Charge Particle. (1M)

e. Define the Good Conductor and good dielectric. (1M)

f. state Poynting theorem (1M)

g. State Ampere's Force Law (1M)

h. Differentiate attenuation & Distortion (1M)

i. Define the smith chart (1M)

j. What are Primary & Secondary Constants of transmission line. (1M)

PART-B (5*10=50 Marks)

Section-I

2. a. Define Relaxation Time and derive the expression for it.
   b. Prove the Poisson's equation for Electrostatic field

OR

3.a. Define electric potential? Derive the potential at far distance if 'Q' is Placed at Origin?
   b. Explain Different types of charge Distributions.

Section-II

4.a. State and prove Ampere's Force Law,
   b. Differentiate Magnetic Scalar and Vector Potentials.

OR

5.a. Obtain the Maxwell's equations for time varying fields.

b. In a medium of $\mu_r=2$, find E, B and displacement current density $H=25\sin(2x10^8t+6x)a_y mA/m$

Section-III

6. A perpendicularly polarized wave is incident at an angle of $\theta_i=15$degrees. It is is free propagating from medium1 to medium2. medium 1 is defined by $\varepsilon_{r1}=8.5, \mu_{r1}=1, \sigma_1=0$ and medium2 space if $E_i=1mv/m$, determine E_r, H_i, H_r.

OR

7. Derive Expression for reflection and transmission coefficients of an EM wave when it is incident normally on a dielectric.

Section-IV

8.a. Derive the attenuation constant and phase constant in terms of primary constants

b. List out the various transmission lines. Write the applications of transmission lines.

OR

9.a. Derive the characteristic impedance of a transmission line in terms of its line constants

b. At 8MHz the characteristic impedance of a transmission line as 40-j2ohms and the propagation constant 0.01+j0.18 per meter. Find the primary constant.

Section-V

10. Derive impedance of SC and OC Lines

OR

11. a. Derive the relation between reflection coefficient and characteristic impedance

b. Write short notes on smith chart.

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MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.Tech II year – II Semester Examinations, Model Paper-5

ELECTROMAGNETIC FIELDS AND TRANSMISSION LINES

Time: 3 hours **Max. Marks: 60**

PART- A (10 Marks)

1.a. Find the gradient of V=x2y+xyz	(1M)
b. Represent Del operator in different coordinate systems.	(1M)
c. State Biot - Savart's Law	(1M)
d. What are the types of Forces due to Magnetic Fields	(1M)
e. write Wave Equations for Conducting medium.	(1M)
f. Define Brewster Angle	(1M)
g. Define primary and secondary constants? Give the relation between them?	(1M)
h. Define and Explain infinite line	(1M)
i. List out the applications of Smith Chart?	(1M)
j. Define the reflection coefficient and standing wave ratio	(1M)

PART-B (5*10=50 Marks)

Section-I

2.a. State and Explain Coulomb's law.

b. Three-point charges Q1=0.5nC, Q2=0.4nC, Q3=-0.6Nc are located in free space at (0,0), (3,0) and (0,4) respectively. Determine the potential, electric field intensity and flux density at (3,4).

OR

3. a. Derive Maxwell's Equations for Electrostatic Fields.

b. Derive the relation between Electric Potential & Electric Field Intensity.

Section-II

4. Explain Ampere's Circuital Law and any one Application.

OR

5. State and explain boundary conditions between two dielectric media.

Section-III

6. Define uniform plane wave and derive the relation Between E & H for perfect dielectric.

OR

7.write short notes on a) Brewster Angle b) Critical Angle c) Total Internal Reflection

Section-IV

8. Derive Transmission Line Equations.

OR

9. Derive Expressions for Characteristics Impedance, Propagation Constant, Phase and Group Velocities.

Section-V

10. Explain the Smith Chart Applications.

OR

11.a. Derive an expression for the input impedance of a lossless line of length 'l' in terms of Z_0,β,Z_L and l when terminated by a load Z_L.

b. A lossless transmission line length 'l' with Z_0=50 is terminated by a load of ZL=50+j50.Determine the reflection coefficient "R_r" and the standing wave Ratio.