Code No.: EC402PC | R20 | H.T.No. | | | 8 | R | | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–II–Semester End Examinations (Supply) - July - 2024
ANALOG AND DIGITAL COMMUNICATIONS
(ECE)

[Time: 3 Hours] [Max. Marks: 70]

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1. a) Give comparison of AM Techniques. [2M]
   b) What is the need for modulation? [2M]
   c) Explain how PM can be generated from FM [2M]
   d) What is carson's rule? [2M]
   e) List the functions of RF amplifier in the receiver. [2M]
   f) Mention the Characteristics of receiver. [2M]
   g) What are the disadvantages of Delta modulation [2M]
   h) Compare the performance of PCM and DM system. [2M]
   i) Draw ASK output for the data 11001100. [2M]
   j) What are the advantages of digital communication? [2M]

PART-B **(50 Marks)**

2. a) Derive the time domain equation of a single tone modulation of AM system and also explain power relations. [5M]
   b) A modulating signal of $2\cos 5000\pi t$ is amplitude modulated over a carrier signal of $5\cos 20000\pi t$. Derive expressions for the modulation index, LSB and VSB frequencies, Bandwidth and the ratio of side band power in the total power of AM wave. [5M]

OR

3. a) What is SSB Modulation and what are its advantages? Draw the block diagram for SSB generation using Phase discrimination method and explain its operation. [5M]
   b) An amplitude modulated voltage is given by $V = 50(1 + 0.2\cos 100\pi t + 0.001\cos 3500\pi t)\cos 10^6\pi t$. State all frequency components present in the voltage, and find modulation index for each modulating voltage term. What is the effective modulation index of V? [5M]
4. a) What are the different demodulation techniques of FM? Explain the demodulation of F.M signal with the help of PLL. [5M]
   b) Show that Narrowband FM is equivalent to AM with respect to transmission bandwidth. [5M]

OR

5. a) Formulate the equation for FM wave. Define modulation index, maximum deviation and band width of a FM signal. [5M]
   b) Explain the principle of direct method of generation of FM signal using relevant diagram. [5M]

6. a)Draw block diagram of Super-heterodyne AM receiver and explain function of each block. [5M]
b) Explain IF amplifier circuit and its purpose in receiver. [5M]

OR

7. a)For a broadcast Super-heterodyne AM receiver having no RF amplifier, the loaded Quality factor of the antenna coupling circuit is 100.Now, if the intermediate frequency is 455kHz; determine the image frequency and its rejection ratio at an incoming frequency of 1000kHz. [5M]
b) Explain the operation of Tuned radio frequency (TRF) receiver with the block diagram and mention its advantages and disadvantages. [5M]

8. a)Draw the block diagram of a PCM transmitter and receiver and explain the function of each block. [5M]
b) Compare PAM, PWM and PPM? [5M]

OR

9. a)Explain with a neat block diagram PPM generation and detection. [5M]
b)Discuss the draw backs of delta modulation and explain the significance of adaptive delta modulator. [5M]

10. a)Draw FSK Transmitter and explain. Describe its Bandwidth Considerations. [5M]

b)Calculate probability of error of FSK. [5M]

OR

11. a)Explain the process of detection of BPSK signals. [5M]

b) Explain the non-coherent detection of BFSK signal? [5M]

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