MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

FIFTH SEMESTER B. TECH. (INSTRUMENTATION AND CONTROL ENGG.)
END SEMESTER DEGREE EXAMINATIONS, DECEMBER – 2018
SUBJECT: COMMUNICATION SYSTEMS [ICE 3103]

Time: 3 Hours   **MAX. MARKS: 50**

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. An audio frequency signal 10 sin 2π500 t is used to amplitude modulate a carrier of 50 sin 2π105t. Assume modulation index = 0.2. Determine i) sideband frequencies, ii) amplitude of each sideband frequencies, iii) bandwidth required, and iv) total power delivered into a load of 600Ω. **(2)**

1B. With a neat circuit diagram explain the working of slope detector. **(3)**

1C. Explain the operation of AM high level transmitter with block diagram. **(5)**

2A. Discuss direct FM transmitter with suitable block diagram. **(5)**

2B. In an FM system, when the audio frequency is 500 Hz and modulating voltage 2.5 V, the deviation produced is 5 kHz. If the modulating voltage is now increased to 7.5 V, calculate the new value of frequency deviation produced. If the AF voltage is raised to 10 V while the modulating frequency dropped to 250 Hz, what is the frequency deviation? Calculate the modulation index in each case. **(2)**

2C. Describe midtread and midriser quantization techniques with suitable graphs **(3)**

3A. For the given binary sequence 10100010 draw the digital waveform corresponding to: RZ polar, NRZ bipolar, NRZ Manchester and RZ unipolar. **(2)**

3B. With the help of transmitter and receiver block diagrams, explain the operating principle of DPCM technique. **(5)**

3C. Mathematically describe On-Off Keying modulation scheme with waveforms. **(3)**

4A. With the block diagrams, describe the working principle of BPSK transmitter and receiver. Also draw truth table, phasor and constellation diagrams. **(6)**

4B. How to achieve carrier recovery using Quadrature Loop? Explain. **(4)**

5A. What is M-ary encoding? Mention the minimum bandwidth required for M-ary system. **(2)**

5B. What is spread spectrum? Illustrate the baseband spread spectrum system. **(3)**

5C. Explain the principle of CDMA. **(3)**

5D. Write a note on Global System for Mobile Communications. **(2)**

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