

8. Discuss and compare digital communication schemes BPSK and QPSK for their baud rate. **15**

(Compulsory Question)

9. (a) Why don't broadcast stations transmit at audio frequencies ?
(b) How does single sideband differ from standard AM ?
(c) Why is it necessary to have a non-linear device in an AM transmitter ?
(d) In frequency modulated wave, modulation index m_f depends upon what factors ?
(e) What is pre-emphasis and why is it used ?
(f) An FM signal with a deviation of δ is passed through a mixer, and has its frequency reduced five fold. The deviation in the output of the mixer will be
(g) What is Nyquist rate ?
(h) Which modulation scheme AM or FM have better performance against noise and why ?
(i) How many bits are transmitted with one symbol in BPSK ?
(j) In analog to digital conversion how is resolution related to number of bits used for conversion ?

10×1.5=15

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B. Tech. EXAMINATION, 2021

Semester IV (CBCS)

COMMUNICATION ENGINEERING

EE-404

Time : 2 Hours

Maximum Marks : 60

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : Attempt *Four* questions in all, selecting *one* question from any of the Sections A, B, C and D. Q. No. **9** is compulsory.

Section A

1. Compare Frequency Modulation (FM) with Phase Modulation (PM). How can phase modulator be used to generate FM signal and frequency modulator to generate PM signal ? **15**

2. (a) Explain the need for modulation. What are the various frequency bands used for communication and what are their special features ? 7.5
- (b) In an FM system, when the audio frequency (AF) is 500 Hz and the AF voltage is 2.4 volt, the deviation is 4.8 kHz. If the AF voltage is now increased to 7.2 V, what is the new deviation ? If the AF voltage is raised to 12 V while the AF is dropped to 180 Hz, what is the deviation ? Find the modulation in each case. 7.5

Section B

3. (a) Draw the block diagram of an SSB transmitter using the filter system. Why must the filter have such sharp cutoff outside the passband ? In a transmitter, must this cutoff be equally sharp on each side of the filter's passband ? 7.5
- (b) Explain, how the constant intermediate frequency is achieved in the superheterodyne receiver. 7.5
4. (a) Explain how the message signal is recovered from double sideband suppressed carrier (DSBSC) modulated signal, while there can be phase difference between the carrier signal and the locally generated signal at the receiver. 7.5

- (b) In AM demodulation what is simple automatic gain control (AGC) ? What are its functions ? 7.5

Section C

5. (a) Draw the basic circuit and stating the essential assumptions, derive the formula for the capacitance of the RL reactance FET. 7.5
- (b) Explain the operation of the balanced slope detector, using a circuit diagram and a response characteristic. 7.5
6. (a) What are the different types of reactance modulator ? Discuss transistor reactance modulator. 7.5
- (b) With circuits, explain how, and for what reason, the ratio detector is derived from the phase discriminator, listing the properties and advantages of each circuit. 7.5

Section D

7. Explain flattop sampling. How does it lead to aperture effect distortion ? How may this distortion be minimized ? 15