

Faculty of Engineering

End Semester Examination May 2025

EC3CO27 Communication Systems

Programme	:	B.Tech.	Branch/Specialisation	:	EC
Duration	:	3 hours	Maximum Marks	:	60

Note: All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary.
 Notations and symbols have their usual meaning.

Section 1 (Answer all question(s))

Q1. How much BW will be required in DSB-FC signal, when the modulating signal has the BW 5KHz.	Marks CO BL
	1 2 2

Rubric	Marks
10KHz	1

- 5 KHz 15 KHz
 10 KHz 20 KHz

Q2. What will be the i/p of the envelop detection technique?	1 1 1
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Rubric	Marks
AM signal with Carrier	1

Carrier signal Modulating signal
 AM signal with carrier AM Signal without carrier

Q3. Theoretically how much BW will be required to transmit the WBFM signal?	1 2 2
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Rubric	Marks
infinity	1

$2\omega_m$ $2\omega_m + 2\Delta\omega$
 0 Infinity

Q4. What will be the IF frequency in case of FM receiver?	1 1 1
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Rubric	Marks
10.7MHz	1

10.7 MHz 10.4 MHz
 10.5 MHZ 10.3 MHZ

Q5. Which of the following is the primary cause of thermal noise in a communication system?	1 1 1
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Rubric	Marks
Random motion of electrons in a conductor	1

Electromagnetic radiation from external sources Random motion of electrons in a conductor
 Nonlinearities in the amplifier Improper bandwidth allocation

Q6. What is the typical power spectral density of white noise?

1 1 1

Rubric	Marks
Uniform across all frequencies	1

- Proportional to frequency
 Uniform across all frequencies Inversely proportional to frequency
 Exponential with frequency

Q7. What will be the nature of the carrier signal in pulse modulation?

1 1 2

Rubric	Marks
Continuous Time Signal	1

- Analog signal
 Digital signal Continuous time signal
 Discrete time signal

Q8. As per Nyquist Criteria, what will be the time period of the sampling signal for 100KHz of analog signal?

1 3 3

Rubric	Marks
50msec	1

- 5msec
 5sec 5μsec
 50msec

Q9. Which of the following is a digital modulation technique?

1 1 1

Rubric	Marks
Pulse Code Modulation (PCM)	1

- Frequency Modulation (FM)
 Pulse Code Modulation (PCM) Amplitude Modulation (AM)
 Phase Reversal Multiplexing

Q10. Which modulation scheme is most resistant to noise in a digital communication system?

1 1 2

- Amplitude Shift Keying (ASK)
 Frequency Shift Keying (FSK)
 Phase Shift Keying (PSK) Quadrature Amplitude . . Modulation (QAM)

Section 2 (Answer all question(s))

Marks CO BL

Q11. What is the role of a channel in a communication system? How many types of channels are available in a communication system?

4 2 2

Rubric	Marks
Role of Channel 2 marks types of channel 2 marks.	4

Q12. (a) How FDM can be done with modulation only? Explain with suitable diagram.

6 2 2

Rubric	Marks
diagram 1 mark explanation 5 marks	6

(OR)

- (b)** The NBFM required same bandwidth as of AM. Justify this statement with mathematical expression and proper diagram.

Rubric	Marks
diagram 1 mark mathamatics 2 marks justification 3 marks	6

Section 3 (Answer all question(s))

Q13. Why the sensitivity of TRF receiver is poor?

Marks CO BL
3 2 2

Rubric	Marks
3 marks for correct reason.	3

Q14. (a) Why class B amplifier can't be used in high level of modulation system of AM transmitter?
Explain with proper diagram and justification.

7 2 2

Rubric	Marks
diagram 2 marks ans to why 2 marks justification 3 marks.	7

(OR)

- (b)** How is 99.3 MHz signal of FM achieved in FM indirect method? Explain with proper diagram and justification.

Rubric	Marks
diagram 2 marks, calculation 2 marks explanation 3 marks	7

Section 4 (Answer all question(s))

Q15. Why SNR is an important parameter in the communication system?

Marks CO BL
2 2 2

Rubric	Marks
2 marks for reason.	2

Q16. (a) Calculate figure of merit in the case of SSB system.

8 2 2

Rubric	Marks
2 marks for diagram. 4 marks for expressions of SNR. 2 marks for FOM.	8

(OR)

- (b)** In the presence of large noise in AM system, the original signal can't be recovered. Justify this statement with proper diagram and mathematical calculation.

Rubric	Marks
2 marks for diagram. 4 marks for expressions of SNR. 2 marks for justification.	8

Section 5 (Answer all question(s))

Marks CO BL

Q17. How does Adaptive Delta Modulation handle fast-changing signals more effectively than conventional delta modulation? 4 2 2

Rubric	Marks
2 marks for diagram. 2 marks for reason.	4

Q18. (a) A PCM system uses 4 bits per sample.

6 3 3

(i) How many quantization levels are available?

(ii) What will happen if the system increases the number of bits to 8 per sample?

Rubric	Marks
How many quantization levels are available - 3 marks. What will happen if the system increases the number of bits to 8 per sample - 3 marks.	6

(OR)

- (b)** A TV signal (Video & Audio) has a BW of 4.5 MHz. This signal is sampled, quantized and binary coded to obtain a PCM signal:

(i) Determine the sampling rate if the signal is to be sampled at a rate 20% above the Nyquist rate.

(ii) If the samples are quantized into 1024 levels, determine the number of binary pulses required to encode each sample.

Rubric	Marks
Determine the sampling rate if the signal is to be sampled at a rate 20% above the Nyquist rate - 3 marks. If the samples are quantized into 1024 levels, determine the number of binary pulses required to encode each sample 3marks.	6

Section 6 (Answer any 2 question(s))

Marks CO BL

Q19. Explain the basic principle, working and application of ASK.

5 2 2

Rubric	Marks
2 marks for principle. 2 marks for working. 1 marks for application.	5

Q20. Explain the basic principle, working and application of FSK.

5 2 2

Rubric	Marks
2 marks for principle. 2 marks for working. 1 marks for application.	5

Q21. Explain the basic principle, working and application of PSK.

5 2 2

Rubric	Marks
2 marks for principle. 2 marks for working. 1 marks for application.	5
