

**Note:**

- i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40 minutes.
- ii. **Part - B and Part - C** should be answered in answer booklet.

**Time: 3 Hours****Max. Marks: 100****Part - A (20 × 1 Marks = 20 Marks)**

Answer All Questions

		Marks	BL	CO
1. Modulation index is		1	1	1
(A) $V_m/V_c$	(B) $V_c/V_m$			
(C) $V_m/I_c$	(D) $V_m/J$			
2. DSB SC Bandwidth is _____		1	2	1
(A) $2f_m$	(B) $f_m$			
(C) $f_m/2$	(D) $f_m/0.4$			
3. The power required for transmitting DSBSC wave is equal to the power of both the _____		1	2	1
(A) Sidebands	(B) Signals			
(C) Density	(D) Data			
4. If the modulation index is less than 1 then that is called _____		1	1	1
(A) over modulation	(B) no modulation			
(C) under modulation	(D) perfect modulation			
5. In Super-heterodyne receiver IF frequency is		1	1	2
(A) 900 kHz	(B) 1650 kHz			
(C) 2100 kHz	(D) 455 kHz			
6. Another name of the thermal noise is _____		1	1	2
(A) Shot noise	(B) Johnson noise			
(C) Transit-time noise	(D) Atmospheric noise			
7. Noise Factor (F) formula is		1	1	2
(A) $SNR_{input}/BW$	(B) $SNR/BW$			
(C) $SNR_{input}/SNR_{output}$	(D) $SNR_{output}/BW$			
8. The digital modulation scheme in which the step size is fixed is _____		1	1	3
(A) Delta Modulation	(B) Adaptive delta modulation			
(C) DPCM	(D) PCM			
9. Roll off factor is defined as		1	2	3
(A) Aliasing effect	(B) The performance of the filter			
(C) Bandwidth occupied beyond the Nyquist Bandwidth	(D) Noise factor			
10. Matched filters are used _____		1	2	3
(A) for signal formatting	(B) for maximizing SNR			
(C) for introducing jitter	(D) for transmission			

11. The time interval over which the received signal may be sampled without error may be explained by (A) Width of eye opening of eye pattern (B) Rate of closure of eye of eye pattern (C) no eye opening of eye pattern (D) eye close by 1/4	1	2	3
12. RZ encoding involves _____ levels of signal amplitude. (A) 1 (B) 6 (C) 4 (D) 3	1	2	3
13. Amplitude shift keying is (A) OOK (B) amplitude modulation (C) pulse amplitude modulation (D) PCM	1	1	4
14. In Binary Phase Shift Keying system, the binary symbols 1 and 0 are represented by carrier with phase shift of (A) $\pi/2$ (B) $2\pi$ (C) $\pi$ (D) 0	1	2	4
15. QPSK is a modulation scheme where each symbol consists of (A) 4 bits (B) 2 bits (C) 1 bit (D) M number of bits, depending upon the requirement	1	2	4
16. The waveform of BFSK may be viewed as the sum of (A) Two ASK spectra (B) Two PSK spectra (C) Two FSK spectra (D) Three QAM spectra	1	4	4
17. Which is better for avoiding jamming? (A) Direct sequence spread spectrum (B) Frequency hopping spread spectrum (C) Time hopping spread spectrum (D) Pulse code modulation	1	2	5
18. Original data plus correction bits form a (A) steps (B) codeword (C) companding (D) PN code	1	1	5
19. The Hamming distance between equal codewords is _____ (A) 1 (B) 4 (C) 6 (D) 0	1	4	5
20. 1 modulo-2 with 1 results _____ (A) 1 (B) 3 (C) 5 (D) 0	1	2	5

**Part - B (5 × 4 Marks = 20 Marks)**  
Answer any 5 Questions

Marks BL CO

21. Explain Frequency modulation with its types.	4	1	1
22. Discuss about Pre-emphasis and De-emphasis.	4	2	2
23. Explain slope overload and granular noise in brief.	4	3	3
24. Compare ASK, FSK and PSK modulation schemes with waveforms.	4	3	4
25. Write short notes on Shannon's Channel capacity theorem.	4	1	5
26. Explain envelope detection process with circuit diagram.	4	2	1
27. Draw Eye pattern and explain its significance.	4	2	3

**Part - C (5 × 12 Marks = 60 Marks)**

Answer All Questions

Marks BL CO

28. a. Describe the process of AM generation using Balanced modulator. (OR) b. Draw and explain Foster Seely discriminator.	12	2	1
29. a. Explain the working of Super-heterodyne receiver with diagram. (OR) b. Draw and explain AM transmitter.	12	1	2
30. a. What is matched filter? Derive the probability of error for matched filter receiver. (OR) b. Explain Pulse Code Modulation system in detail.	12	3	3
31. a. Discuss about generation, signal space diagram of QPSK. (OR) b. Derive the Probability error of FSK.	12	3	4
32. a. With a neat block diagram explain DSSS Transmitter and Receiver. (OR) b. Explain the OFDM communication.	12	1	5

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