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Reg. No.

Question Paper Code

11721

B.E./B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022

Third Semester

Computer Science and Engineering

(Common to Information Technology)

20ESEC301 - COMMUNICATION ENGINEERING

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | <i>Marks,
K-Level, CO</i> |
|---|-------------------------------|
| 1. A carrier signal is frequency modulated by a sine signal of 5 Vpp and 10 KHz. If the frequency deviation constant is 1 KHz/V, determine the maximum frequency deviation and state whether the scheme is NBFM and WBFM. | 2, K2, CO2 |
| 2. Compare FM and PM. | 2, K2, CO2 |
| 3. Draw the Manchester line coding for 1100101. | 2, K1, CO3 |
| 4. How granular noise in Delta modulation is reduced? | 2, K2, CO3 |
| 5. List the effects of "M" in M-ary digital modulation technique. | 2, K2, CO4 |
| 6. State the necessity of equalizers. | 2, K1, CO4 |
| 7. State the channel coding theorem. List its objectives. | 2, K1, CO5 |
| 8. Define code rate and constraint length of convolution code. | 2, K1, CO5 |
| 9. Why is cellular concept used for mobile telephony? | 2, K2, CO6 |
| 10. Define Pseudo-Noise sequence. | 2, K1, CO6 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) (i) Explain about ratio detector. List the advantages of ratio detector over foster seeley detector. 7, K2, CO2
(ii) An angle modulated wave is described by the equation $v(t) = 10 \cos [2 \times 10^6 \pi t + 10 \cos(2000 \pi t)]$. Find a) power of modulated signal b) maximum frequency deviation c) Bandwidth. 6, K2, CO2

OR

- b) (i) Explain how FM is achieved using varactor diodes. 7, K2, CO2
(ii) Draw the circuit of reactance tube modulator and explain its Principle of operation. Derive an expression for the equivalent Capacitance in terms of the g_m of the device and circuit Components. 6, K2, CO2

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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12. a) Explain how PWM and PPM are related with neat waveforms. How can PWM and PPM be generated? 13,K2,CO3

OR

b) Summarize the types of multiplexing techniques with neat diagrams. 13,K2,CO3

13. a) With a neat diagram, explain in detail the Transmitter of 16-QAM along with a truth table, phasor diagram and constellation diagram. 13,K2,CO4

OR

b) (i) Explain how eye pattern is used to study the performance of a data transmission system. 7,K2,CO4

(ii) Write short notes on equalizer. 6,K2,CO4

14. a) Using Huffman code encode the following symbol, $S = \{0.3, 0.2, 0.25, 0.12, 0.05, 0.08\}$. Identify (i) Average code word length (ii) entropy of the source (iii) code efficiency (iv) redundancy. 13,K3,CO5

OR

b) (i) Explain the generation of (n, k) blocks codes and how block codes can be used for error control. 7,K2,CO5

(ii) Explain the syndrome decoder for cyclic codes. 6,K2,CO5

15. a) Explain cell sectoring and cell splitting in detail? 13,K2,CO6

OR

b) Describe the elements in GSM radio access network. Also mention the advantages, disadvantages & applications. 13,K2,CO6

PART - C (1 × 15 = 15 Marks)

16. a) (i) Explain the working of super heterodyne receiver with neat block diagram. 11,K2,CO1

(ii) What are the advantages of super heterodyne receiver? 4,K1,CO1

OR

b) (i) A modulating signal $30 \sin(2\pi * 10^4 t)$ is used to modulate a carrier signal $70 \sin(2\pi * 10^6 t)$. Find out (a) modulation index and percent modulation (b) frequencies of side components and their amplitudes (c) bandwidth of the modulating signal (d) draw the spectrum of AM wave. 8,K2,CO1

(ii) For an AM DSB-FC transmitter with an unmodulated carrier power $P_c = 100W$ that is modulated simultaneously by three modulating signals with the coefficients of modulation $m_1=0.3$, $m_2 =0.4$, and $m_3 =0.6$. Determine (a) total coefficient of modulation (b) upper and lower side band power (c) total transmitted power. 7,K2,CO1