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Question Paper Code : 31508

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Third Semester

Information Technology

IT 2202/080250004/10144 IT 305/IT 36 — PRINCIPLES OF COMMUNICATION

(Regulation 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. If a sinusoidal signal with frequency 1 kHz and amplitude 2 V is amplitude modulated with a sinusoidal signal with frequency 1 MHz and amplitude 1 V using a modulator having sensitivity of 0.1 V^{-1} . Then calculate the modulation index of the modulated signal.
2. Draw the schematic of generating FM signal using Phase modulator.
3. If a channel has 10 kHz bandwidth and offers SNR of 1023, then calculate the capacity of channel.
4. Relate baud rate and bit rate.
5. In a PCM system the number of bits per symbol is raised from 8 to 10. Then calculate the SNR improvement in dB.
6. Define SNR and write its significance.
7. Differentiate noise and pseudo noise.
8. Source coding reduces bit rate to transfer the information. State true/false and justify.
9. What is GEO synchronous satellite? And write its importance.
10. Write the type of optical fibers used in communication.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain AM signal (single tone) characteristics in time domain and frequency domain with suitable figures. (6)
(ii) Brief with suitable figure, brief why the modulation index greater than unity is not preferred. (4)
(iii) Explain the operation Envelope detector in AM demodulation. (6)

Or

- (b) Differentiate narrowband and wideband FM. Explain any two methods of generation of wideband FM signals.

12. (a) (i) With a neat block diagram, briefly explain the generation and non-coherent detection of FSK signals. Draw the signal at input and output of each block. (12)
(ii) A source delivers a signal at a rate 10kbps. It is transmitted using FSK with centre frequency 200 kHz. Then calculate the minimum frequency deviation between the carriers in FSK signal, carrier frequencies and bandwidth. (4)

Or

- (b) (i) Draw the constellation diagrams of FSK, QPSK, 8-PSK and 16-QAM. (4)
(ii) With neat sketch explain the operation of Costas loop in carrier recovery. (12)

13. (a) (i) Draw the schematic of PCM and explain the sampling and quantization blocks in detail. (12)
(ii) A PCM scheme transmits the signal at a rate 64kbps. If it uses 8 bits/sample, calculate the sampling rate and maximum frequency that can be present in its input to reconstruct the same without any error. (4)

Or

- (b) (i) Draw the block diagram of Delta Modulation (DM) system and brief the principle of operation. (8)
(ii) Discuss on various errors present in DM and derive the condition to minimize the errors. (8)

14. (a) (i) Discuss any two properties of PN sequence. (4)
(ii) What is DSSS? Explain the operational principle of DSSS and derive the equation for processing gain. (12)

Or

- (b) Differentiate Multiplexing and Multiple Access techniques. Briefly explain the TDMA and CDMA systems with suitable diagrams.

15. (a) Draw the satellite communication link model and discuss the link budget.

Or

- (b) Discuss on various losses associated in optical communication link.