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Question Paper Code : 60457

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Fifth Semester

Electrical and Electronics Engineering

EC 2311/EE 54/10144 EE 501 – COMMUNICATION ENGINEERING

(Regulations 2008/2010)

(Common to PTEC 2311 – Communication Engineering for B.E. (Part-Time) Fifth Semester – Electrical and Electronics Engineering – Regulations 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Assume that a carrier $50 \sin 9800 \pi t$ is modulated using a single tone message $m(t) = 15 \cos 600 \pi t$. Plot the spectrum of
 - (a) AM
 - (b) DSB-SC.
2. Mention the differences between the Narrow band FM and Wide band FM.
3. State sampling theorem.
4. What is the principle of delta modulation?
5. Define entropy.
6. Draw the NRZ and RZ waveforms for the pulse stream 10101011.
7. What is FDMA?
8. Mention the significance of CDMA techniques.
9. Define apogee, perigee and geocenter.
10. Why is single mode propagation impossible with graded index fibers?

PART B — (5 × 16 = 80 marks)

11. (a) (i) With a neat diagram derive the expressions for frequency spectrum of AM wave. (10)
- (ii) Calculate the power relationship between the AM, DSB-SC, SSB-SC. Mention its % of power saving. (6)

Or

- (b) (i) Using a suitable mathematical analysis, show that FM modulation produces infinite sidebands. Also derive an expression for the frequency modulated output and its spectrum. (12)
- (ii) What is the relationship between FM and PM? (4)
12. (a) (i) Discuss the generation method of PWM. Explain how you will convert PWM to PPM with diagram. (6)
- (ii) Explain a pulse code modulation system with its block diagram. (10)

Or

- (b) (i) Explain frequency shift Keying method with equations. (8)
- (ii) Discuss the method of modulation and demodulation in MSK with equations and block diagram. (8)
13. (a) Discuss in detail binary symmetric channel and binary erasure channel. Find the Shannon-Fano code for the following seven messages with probabilities indicated. $\left[\begin{array}{cccccc} S_1 & S_2 & S_3 & S_4 & S_5 & S_6 & S_7 \\ 0.05 & 0.15 & 0.2 & 0.05 & 0.15 & 0.3 & 0.1 \end{array} \right]$.

Or

- (b) Explain the concept of block codes and coding efficiency. Find the Huffman code for the following seven messages with probabilities as indicated. $\left[\begin{array}{cccccc} S_1 & S_2 & S_3 & S_4 & S_5 & S_6 & S_7 \\ 0.05 & 0.15 & 0.2 & 0.05 & 0.15 & 0.3 & 0.1 \end{array} \right]$.
14. (a) Discuss in detail about TDMA and FDMA techniques. (16)

Or

- (b) Discuss in detail about CDMA technique and compare its performance with TDMA and FDMA. (16)

15. (a) (i) Explain Kepler's law and how they relate to satellite communication. (8)
- (ii) Describe significance of satellite link budgets and how they are calculated. (8)

Or

- (b) (i) Explain the operation of an injection laser diodes and mention its characteristics. (8)
- (ii) Discuss power line carrier communication with suitable example and diagram. (8)
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