



SE-6847

B. E. III (Sem. V) (I. T.) Examination

April / May – 2011

Communication Techniques

Time : 3 Hours]

[Total Marks : 100

Instruction :

नीचे दशांशके निशानीवाणी विगतो उत्तरवडी पर अवश्य लभवी.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
B. E. 3 (Sem. 5) (I. T.)

Name of the Subject :
Communication Techniques

Subject Code No. : 6 8 4 7 Section No. (1, 2,.....) : Nil

Seat No. :

Student's Signature

- 1 (a) Attempt the following : 10×1
- (1) The _____ signal contains information.
 - (2) The transmission without modulation is called as _____ transmission.
 - (3) The thermal noise power is given by formula _____.
 - (4) With increase in the value of resistance the thermal noise voltage will _____.
 - (5) The Bandwidth of DSB-SC is _____.
 - (6) The spectrum of SSB-SC consists of _____.
 - (7) The _____ is the example of angle modulation.
 - (8) In FM _____ is proportional to the instantaneous value of the modulating voltage.
 - (9) The FM system is _____ immune to noise than the A.M.
 - (10) The Intermediate Frequency (IF) is _____ than the frequency of input signal.
- (b) With neat schematic diagram explain the operation of basic communication system. 5
- (c) A certain transmitter radiates 10 kW with carrier unmodulated and 12 kW with the carrier is sinusoidally modulated. Calculate the modulation index. If another sine wave corresponding to 50% modulation is transmitted simultaneously determine the total radiated power. 5

- 2 (1) Derive the expression for A.M. wave and hence prove that it contains unmodulated carrier signal and two sidebands. 8
- (2) What is pre-emphasis ? Why is it used ? Sketch the circuit of pre-emphasis. Explain why de-emphasis must also be used. 7

OR

- (1) Compare FM and AM systems. 8
- (2) Explain in detail superheterodyne radio receiver and draw waveforms at various points and radio receiver. 7

3 Attempt any **three** : **3×5=15**

- (1) Explain the operation of square - law detector with waveforms.
- (2) Explain the phase shift method of SSB generation.
- (3) Explain the operation of high level collector modulator circuit.
- (4) When the modulating frequency is a FM system is 800 Hz and the modulating voltage is 4.8 V, the modulation index is 60%.
Calculate : The maximum deviation. What is the modulation index when modulating frequency is reduced to 500 Hz and the modulating voltage is simultaneously raised to 6.4 V.
- (5) Explain the operation of varactor diode modulator for the generation of F.M. wave.

4 (a) Fill in the blanks : **10**

- (1) PCM is an example of _____ conversion.
- (2) In QAM, both phase and _____ if a carrier frequency are varied.
- (3) If the baud rate is 400 for a PSK signal, the bit rate is _____ bps.

- (4) _____ encoding type always has a non-amplitude.
- (5) The EIA-232 standard specifies that 0 must be _____ volts.
- (6) X.21 eliminates many of the _____ pins found in EIA standard.
- (7) _____ multiplexing technique transmits analog signals.
- (8) _____ multiplexing technique shifts each signal to a different carrier frequency.
- (9) _____ is type of transmission impairment in which an outside source such as cross talk corrupts a signal.
- (10) In cellular telephony, a service area is divided into small regions called _____.

(b) What do you mean by bipolar encoding ? Discuss three types of bipolar encoding. Draw the encoding waveform for bit stream 1000000000010 using HDB3. Assume that the number of 1s so far is odd and the first 1 is positive. 5

(c) How does the sampling rate affect the transmitted digital signal ? List the steps that make an analog signal to PCM digital code. A signal is sampled. Each sample requires at least 12 levels of precision (+0 to +5 and -0 to -5). How many bits should be sent for each sample? 5

5 Attempt any two **12**

- (a) Compare the two methods of serial transmission. Discuss the advantages and disadvantages of both the methods.
- (b) What are the functions of DTE and DCE ? Give an example of each. English standard organizations involved in DTE_DCE interface standards. Name some popular DTE-DCE standard.
- (c) What is the relationship between the data rate and the distance that the data can reliably travel on the EIA interface ? Explain in detail mechanical, electrical and functional specifications of EIA-232 interface standard.

6 Attempt any three :

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- (a) Explain cellular telephony. What is a hand off in cellular telephony ?
 - (b) Enlist the advantages and disadvantages of optical fiber over twisted pair and co-axial cable. Discuss the modes of propagating light along optical channels.
 - (c) How do guided media differ from unguided media ? Explain three major classes of guided media.
 - (d) What are the three major multiplexing techniques ? How does FDM combine multiple signals into one and one FDM signal separated into it. Explain the purpose of a guard band.
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