



ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE - 2008
PRINCIPLES OF COMMUNICATION ENGINEERING
SEMESTER - 4

Time : 3 Hours]

[Full Marks : 70

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10

i) A broadcast radio transmitter radiates 20 kW when the modulation percentage is 60. The carrier power will be

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|-------------|------------|
| a) 1.2 kW | b) 1.45 kW |
| c) 16.94 kW | d) 20 kW. |
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ii) In TV system, picture and sound respectively use

- | | |
|-----------|------------|
| a) AM, FM | b) FM, FM |
| c) FM, AM | d) AM, AM. |
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iii) In a narrow band FM the highest modulating frequency is f_m . The bandwidth of the system will be

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|-----------|--------------|
| a) $6f_m$ | b) f_m |
| c) $2f_m$ | d) $10f_m$. |
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iv) Recovering information from a carrier is known as

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|-------------------|----------------------|
| a) demultiplexing | b) modulation |
| c) detection | d) carrier recovery. |
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v) In an envelope detector for AM signal

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| a) only diode is used |
| b) only capacitor is used |
| c) only diode and capacitor are used |
| d) only inductor and capacitor are used. |
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**GROUP - B****(Short Answer Type Questions)**Answer any *three* of the following. $3 \times 5 = 15$

2. a) Explain briefly, why modulation is needed in communication system. 2
- b) Draw the spectrum of (i) DSB - SC (AM), (ii) SSB signal (iii) VSB signal. 3
3. Briefly explain FM demodulation scheme using PLL.
4. a) Explain what you understand by the term 'Aliasing'. 1
- b) To avoid aliasing, find the Nyquist rate of the signal $x(t) = 8 \cos 200 \pi t$. 2
- c) Encode the bit sequence 1011011 in the NRZ-polar and RZ-bipolar format. 2
5. Distinguish between ASK, FSK and PSK in terms of their performances. 5
6. Draw a diagram of A/D converter and explain its working principle. 5
7. Draw the block diagram of a satellite transponder and briefly explain the role of each block. 5

GROUP - C**(Long Answer Type Questions)**Answer any *three* questions. $3 \times 15 = 45$

8. a) 'FM and PM are basically same' — comment on the statement and justify. 3
- b) Give a block diagram of WBFM modulation for practical use (Armstrong method). Explain the principle of working. 6
- c) Define 'selectivity' and 'sensitivity' of a receiver. A superheterodyne receiver is tuned to a signal frequency of 655 kHz. The LO frequency is 1110 kHz. Find the image frequency. $3 + 3$
9. a) Discuss the relative advantages and disadvantages of 'digital communication' over 'analog communication'. 3
- b) Explain briefly with block diagrams the generation and detection processes of PCM. 5
- c) A telephone signal has a maximum frequency of 4 kHz. It is limited in voltage between $\pm 1V$. It is transmitted by using PCM. The required signal-to-quantization noise ratio is 40 dB. What is the minimum bandwidth required for transmission ? 7

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10. a) Explain the principle of detection of FM signal using balanced slope detector circuit with proper sketch. 6
- b) What is Carson's rule ? 2
- c) Derive an expression for the signal to noise ratio of DSB-SC systems. 7
11. a) Discuss the generation of time division multiplexed PAM signal. 4
- b) Write the advantages and disadvantages of TDM over FDM. 3
- c) With the help of block diagram, explain the working principles of coherent FSK generation and detection. 5
- d) What is DPSK ? Write down the DPSK format for bit pattern 1011011 considering initial bit to be 1. 3
12. a) Derive Hartley-Shanon Law. 4
- b) Explain how a single bit error differs from burst error. 3
- c) Discuss the purpose of Huffman encoding. 2
- d) Represent the block code in Matrix form. 6
13. Write short notes on any three of the following : 15
- a) Reactance Modulator
- b) Foster-Seeley Discriminator
- c) Pre-emphasis and De-emphasis
- d) MODEM
- e) Ring Modulator.

END