MOTILAL NEHRU NATIONAL INSTITUTE OF TECHNOLOGY ALLAHABAD
Department of Electronics & Communication Engineering
End-Semester Examination (Odd Sem 2017-18)
B. Tech. V Semester (EC-1506)
Course: Communication System and Networking

Max Marks: 60 **Time: 3.00 hours**

Note: Attempt any five questions

1 (a) For the signal g(t) shown in Fig. 1(a), sketch the signals (i) g(-t); (ii) g(t+6); (iii) g(3t); (iv) g(6-t). (4)

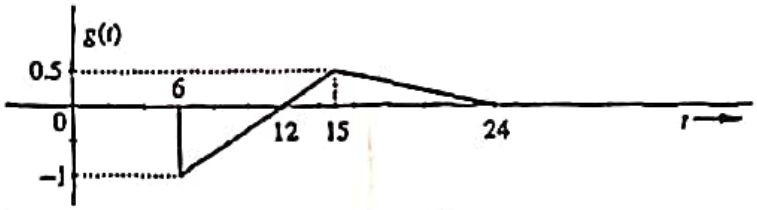

Figure 1(a)

(b) For the signal g(t) shown in Fig. 1(b), sketch (i) g(t-4); (ii) g(t/1.5); (iii) g(2t-4); (iv) g(2-t). (4)

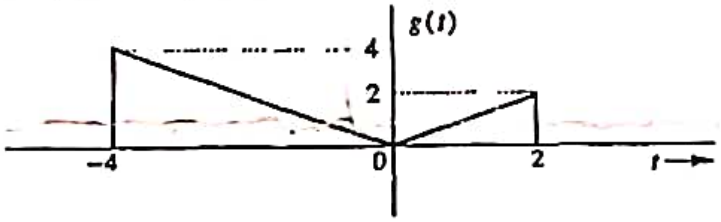

Figure 1(b)

(c) Determine the power for each of the following signals: (4)

(i) $10\cos(100t + \frac{\pi}{3})$ (ii) $10\cos 5t \cos 10t$

2 (a) Discuss Single Tone Frequency Modulation and derive expressions for Narrownband and Wideband FM in terms of Bessel's Functions. (6)

(b) An angle modulated signal with carrier frequency $w_c = 2\pi \times 10^5$ is described by the equation (6)

$\Phi_{EM}(t) = 10\cos(w_c t + 5\sin 3000t + 10\sin 2000\pi t)$. Find:

(i) Power of the modulated signal.
(ii) Frequency deviation.
(iii) Modulation index
(iv) Phase deviation
(v) Bandwidth of $\Phi_{EM}(t)$.

3 (a) Explain with suitable block diagrams, the single bit modulation and demodulation technique. Also discuss the problem arises in this technique due to fast and slow varying signals. (6)

(b) Explain each step of conversion of an analog signal to a digital signal with a suitable example. Assume a linear quantizer and any 4-bit encoder. (6)

4 (a) Explain with suitable examples various encoding schemes for digital-to-digital communication. (6)

(b) For the given binary data sequence 1001011100110101, draw waveforms using Line Coding schemes given below: (6)
(i) Unipolar
(ii) Polar NRZ-L
(iii) Polar NRZ-I
(iv) Manchester
(v) Differential Manchester
(vi) Bipolar

5 (a) What are the advantages of digital modulation over analog modulation? Explain Coherent Binary Frequency Shift Keying (FSK) modulation and demodulation with suitable block diagrams of modulator and demodulator. Also draw signal-space diagram. (6)

(b) Explain any non-coherent digital modulation scheme with suitable block diagrams of modulator and demodulator. What are the advantages and disadvantages of asynchronous over synchronous demodulation schemes? (6)

6 Write short notes on any three of the following: (12)
(a) Ethernet LAN
(b) CSMA/CD and CSMA/CA
(c) Differential Pulse Coded Modulation (DPCM)
(d) Companding