

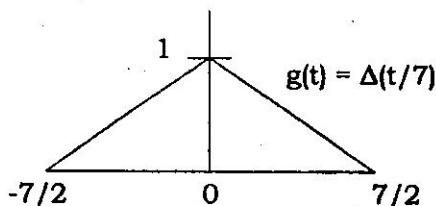
2016**M.Sc.****3rd Semester Examination****ELECTRONICS****PAPER—ELC-303***Full Marks : 50**Time : 2 Hours**The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.**Illustrate the answers wherever necessary.***(Communication Engineering)****Answer Q. No. 1 and any three questions from the rest.**

1. (a) Discuss the basic difference between pulse position modulation (PPM) and pulse width modulation (PWM).
- (b) Write down the Dirichut condition describing the existance of Fourier transform.
- (c) What is image frequencies ? How it can be removed in a super-hetero dyne receiver ?

(Turn Over)

- (d) What do you mean by the term 'companding' in a PCM system ?
- (e) What do you mean by the pre-emphasis and de-emphasis in a FM system ? 2×5

2. (a) Find the Fourier transform of $g(t) = \pi(t/\tau)$.
- (b) Prove that the Fourier transform of a function $g(t) = \text{sgn}(t)$ will be $\frac{1}{j\pi f}$.
- (c) Use time differentiation properly to find the Fourier transform of the following triangular function.



3+3+4

3. (a) Discuss the method of frequency conversion of a DSB-SC signal from an initial carrier frequency W_c to final frequency W_i .

- (b) Explain how envelope detector can be used to demodulate AM wave.
- (c) Prove that the transfer function of a low pass equalizer filter $H_0(f)$ of a VSB system is given by

$$H_0(f) = \frac{1}{H_i(f + S_c) + H_i(f - S_c)}$$

Where $H_i(f)$ is the transfer function of VSB shaping filter.

3+3+4

4. (a) An angle-modulated signal with carrier frequency $W_c (= 2\pi \times 10^5)$ is described by the following equation

$$\phi_{EM}(t) = 10 \cos \{W_c t + 5 \sin 3000t + 10 \sin 2000\pi t\}$$

Find the

- (i) power of the modulated signal
 - (ii) frequency deviation Δf
 - (iii) deviation ratio β .
- (b) Discuss the method of FM demodulation using phase locked loop.
- (c) Explain the Armstrong method of wide band FM generation. Illustrate with proper block diagram.

3+3+4

5. (a) State and prove the Nyquist sampling theorem.
- (b) Derive the interpolation formula for ideal reconstruction of the signal $g(t)$ from its uniform sample.
- (c) Write down several advantages of digital communication over analog communication. What is quantization noise ?
4+3+(2+1)
6. (a) A system has a band width of 4 kHz and a signal to noise ratio of 28 dB at the input to the receiver. Calculate the channel capacity.
- (b) Discuss the method of PWM generation using monostable multivibrator.
- (c) Write down the differences between DPCM and delta modulation.
- (d) Discuss some disadvantages of PCM systems.
2+4+2+2

(Internal Assessment : 10 Marks)
