

M.Sc. 3rd Semester Examination, 2010**ELECTRONICS***(Communication Engineering)*

PAPER—EL-2103

*Full Marks : 50**Time : 2 hours*Answer **Q.No.1** and any **three** from the rest*The figures in the right-hand margin indicate marks**Candidates are required to give their answers in their own words as far as practicable**Illustrate the answers wherever necessary*1. Answer the following questions : 2 x 5

(a) Describe why PCM system is more immune to noise compare to PAM and PWM system.

(b) Derive the 'Z' transform of

$$x(n) = -b^n u(-n-1).$$

(Turn Over)

- (c) Why a message signal is needed to be modulated before Transmission ?
- (d) Discuss how you can increase bit transmission rate using QAM.
- (e) Discuss the significance of Impulse response of a system.
2. (a) Define amplitude modulation and modulation Index. Explain these phenomenon graphically.
- (b) Derive the relation between the output power of an AM Transmitter and modulation index. A 400 watt carrier is modulated to a depth of 75%. Calculate the total power of the modulated wave. (2 + 2) + (4 + 2)
3. (a) Write down the convolution theorem. Using time convolution property show that

$$\int_{-\alpha}^t g(\tau) d\tau \leftrightarrow \frac{G(f)}{j2\pi f} + \frac{1}{2} G(0) \delta(f)$$

where $g(t) \leftrightarrow G(f)$.

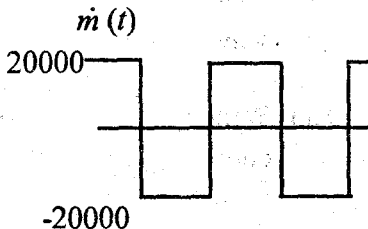
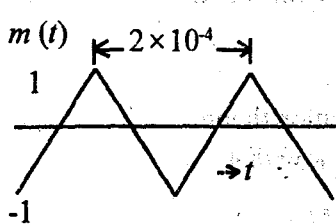
(b) Using Inverse Fourier transform show that

$$\delta(2\pi f) = \frac{1}{2\pi} \delta(f). \quad (2+4)+4$$

4. (a) Discuss how can you generate SSBSC signal using phase shift method.

(b) Write down the Carson's rule in connection with frequency modulation.

(c) Sketch FM and PM waves for the modulating signal $m(t)$ & $\dot{m}(t)$ shown below. The constants k_f and k_p are $2\pi \times 10^5$ and 10π respectively and carrier frequency f_c is 100 MHz. 4+2+4



5. (a) Discuss a PCM system with a Block Diagram.
What is quantizing noise? Why companding is needed after quantization of signal?
- (b) How can you generate a PAM signal using a transistor? Discuss with a suitable diagram. (3 + 2 + 2) + 3
6. Write short notes on any *two* of the following : 10
- (i) Super heterodyne Receiver
- (ii) Armstrong method of FM generation.
- (iii) Mobile switching centre.

[*Internal Assessment* : 10 Marks]
