PG/IIIS/EL 2103/08

2008

ELECTRONICS

PAPER—EL 2103

Full Marks : 50

Time : 2 hours

Answer **Q. No. 1** and any **three** questions 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 whenever necessary

[*University Written Examination*—40]

[*Internal Assessment*—10]

1. Answer the following questions : 2 x 5

(*a*) What is quadrature null effect ?

(*b*) What is "aliasing effect" ? How it is removed ?

(*c*) Draw the basic block diagram for generation of BPSK signal.

(*d*) What do you mean by time-invariant and time-variant system ?

(*e*) What do you mean by recursive system ?

2. Draw the block diagram of a superheterodyne receiver. What factors govern the choice of intermediate frequency ? Show with suitable diagram how can you demodulate an AM signal using envelope detector and also discuss its limitations. 2 + 3 + 3 + 2

3. Draw the circuit diagram to generate DSB-SC signals using balanced modulator and briefly discuss its operation. Calculate the transmitted power for AM signal. The total power content of AM wave is 600 W. Determine the percentage modulation of the signal if each of the sideband contains 75 W. 3 + 2 + 2 + 3

4. Briefly discuss the transmitter and receiver system of pulse code modulation with suitable block diagram. What is Delta Modulation ? How does it different from pulse code modulation ?

A PCM system uses a uniform quantizer followed by a seven bit binary encoder. The bit rate of the system is equal to 50×10^6 bits per second. What is the maximum message signal bandwidth for which the system operates satisfactorily? 5 + 1 + 1 + 3

5. (*a*) What do you mean by recursive and non-recursive system?

(*b*) Prove that the convolution of a function $x(f)$ with an unit impulse function results the function itself.

(*c*) Find the inverse z-transform:

$$H(z) = \frac{z}{2z^2 - 3z + 1} \; ; \frac{1}{2} |z| < 1 .$$

2 + 3 + 5

6. (*a*) What do you mean by Manchester code and Polar NRZ code? And also compare between them.

(*b*) Draw the following data formats for the bit stream 1011001:

(*i*) Polar NRZ

(*ii*) Manchester Code.

(*c*) Briefly explain the principle of Binary Amplitude shift-keying (BASK) with the help of suitable block diagram. 3 + 3 + 4