[This question paper contains 4 printed pages.]

1017 *Your Roll No.* .....

B.Sc. (Hons.) / III C

ELECTRONIC SCIENCE – Paper 3.3 (XVII)

(Communication)

Time : 3 Hours *Maximum Marks : 38*

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt **five** *questions in all, including Question No.* **1** *which is compulsory. Use of Scientific calculator is allowed.*

1. Attempt any **five** of the following :

(a) If the value of the resistor creating thermal noise is doubled, what will happen to the noise power generated ? (2)

(b) A broadcast radio transmitter radiates 8 KW when the modulation percentage is 50. How much of this is carrier power ? (2)

(c) What is Pre-emphasis and De-emphasis ? (2)

P.T.O.

(d) Differentiate between uniform and Non uniform quantization. (2)

(e) What are the different types of digital filters ? (2)

(f) In monochrome TV transmission. explain the horizontal blanking time and vertical blanking time. (2)

2. (a) Compute the maximum noise power allowed at the input of a communication receiver in order to maintain a 40 dB signal to noise ratio for an input signal power equal to 20 μW. (3)

(b) Define Noise Factor F. How can the amplifier input noise be expressed in terms of F. What will be the overall Noise Factor of two amplifiers connected in cascade ? (4)

3. (a) A 75 MHz carrier having an amplitude of 50 V is modulated by a 3 KHz audio signal having an amplitude of 20 V

(i) Sketch the audio signal.

(ii) Sketch the carrier.

(iii) Construct the modulated wave.

(iv) Determine the modulation index and percent modulation.

(v) Draw the spectrum of the modulated wave.

(vi) Write the equation for the DSBFC signal. (3)

(b) Quantitatively discuss the demodulation of an AM signal using the Envelope Detector. What is negative peak clipping. (4)

4. (a) Find the frequency deviation constant for a suitably designed Reactance Modulator. (3)

(b) Discuss the detection of a Frequency modulated signal using the ratio detector. What is the basic advantage of ratio detector over Foster Seeley discriminator ? (4)

5. (a) With the help of suitable block diagrams compare the AM superheterodyne receiver with the FM superheterodyne receiver. (4)

(b) Calculate the image rejection of a receiver having an RF amplifier and an IF of 455 KHz. if the Q's of the relevant coils are 65. at an incoming frequency of (i) 1200 KHz (ii) 20 MHz. (3)

P.T.O.

6. (a) Discuss the phase shift method for generation of SSBSC. (3)

(b) Draw the RF spectrum for a standard television broadcast channel. Clearly mark the picture, sound and colour carrier and subcarrier frequencies. What is interlaced scanning? (4)

7. (a) What is the advantage of Flat top Sampling over Natural Sampling? What is aperture effect? (3)

(b) Explain the essential operations in the transmitter and receiver of a PCM system. Briefly describe the types of noise present in this system. (4)