

AMIETE – ET

Time: 3 Hours

JUNE 2013

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 Minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. Which of the following is not a major communication medium?

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|----------------|-----------------------|
| (A) Free space | (B) Water |
| (C) Wires | (D) Fiber optic cable |

b. The communications medium causes the signal to be:

- | | |
|----------------|---------------------|
| (A) Amplified | (B) Modulated |
| (C) Attenuated | (D) Interfered with |

c. Radio signals are made up of:

- | | |
|---------------------------|----------------------------------|
| (A) Voltages and Currents | (B) Electric and magnetic fields |
| (C) Electrons and protons | (D) Noise and data |

d. In a low level modulation system, the amplifier following the modulated stage should be:

- | | |
|----------------------------|-----------------------------|
| (A) Only linear amplifier | (B) Only harmonic generator |
| (C) Only class A amplifier | (D) None of these |

e. In commercial FM broadcasting, the maximum frequency deviation is normally:

- | | |
|------------|-------------|
| (A) 5 KHz | (B) 15 KHz |
| (C) 75 KHz | (D) 200 KHz |

f. In angle modulation, the information signal modify the:

- | | |
|------------------------------|------------------|
| (A) Phase angle | (B) Frequency |
| (C) Amplitude of the carrier | (D) All of these |

- g. A PWM signal can be generated by:
- (A) Monostable multivibrator (B) Astable multivibrator
(C) Integrating the PPM signal (D) Differentiating the PPM signal
- h. In PCM system, output S/N increases:
- (A) Linearly with bandwidth (B) Exponentially with bandwidth
(C) Inversely with bandwidth (D) None of these
- i. A superheterodyne receiver with an I.F. of 450 KHz is tuned to a signal at 1200 KHz. The image frequency is:
- (A) 750 KHz (B) 900 KHz
(C) 1650 KHz (D) 2100 KHz
- j. In the generation of modulated signal, a varactor diode can be used for:
- (A) FM generation only (B) AM generation only
(C) PM generation only (D) Both AM and PM generations

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

- Q.2** a. What do you understand by amplitude modulation? Show that the AM output contains two sidebands and the carrier frequency. (8)
- b. Show that the equivalent parallel impedance of a tuned circuit is its equivalent resistance for noise. (8)
- Q.3** a. The antenna current of an AM broadcast transmitter, modulated to depth of 40% by an audio sine wave is 11 amp. It increases to 12 amp as a result of simultaneous modulation by another audio sine wave. What is the modulation index due to this second wave. (6)
- b. Draw the block diagram of phase cancellation SSB generator and explain how the carrier and unwanted sideband are suppressed. What change is necessary to suppress the other sideband? (10)
- Q.4** a. Explain Co-channel and Adjacent channel interference in radio receivers. Also compare wideband and narrow band FM. (8)
- b. Explain Armstrong frequency modulation system with block diagram. (8)

- Q.5** a. Define and explain the meaning of standing wave ratio. What is the formula for it, if the load is purely resistive? Why is a high value of SWR often undesirable? (8)
- b. Explain how the constant intermediate frequency is achieved in the superhetrodyne receiver and also explain the term sensitivity, selectivity and image frequency. (8)
- Q.6** a. Calculate the ratio of cross section of a circular waveguide to that of a rectangular one, if each is to have same cut off wavelength for its dominant mode. (8)
- b. Compare waveguide and transmission line from the point of view of frequency limitation, attenuation, spurious radiation and power handling capacity. (8)
- Q.7** a. What are the typical frequencies, bandwidths and repeater gains and spacings in a coaxial cable system? (8)
- b. How do the three major types of INTELSAT satellite earth stations differ from each other, in general appearance and applications? (8)
- Q.8** a. What do you mean by PCM. Explain its transmitter and receiver with help of block diagram. (8)
- b. What is telegraphy? Describe briefly the system and machines used for transmitting and receiving it. (8)
- Q.9** Write short note on any **TWO**: (8×2=16)
- (i) Reactance Properties of transmission lines.
- (ii) Detection and AGC.
- (iii) Noise Figure Measurement.