Total No. of printed pages = 4

Et-401/CE-I/4th Sem/2013/M

COMMUNICATION ENGINEERING–I

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) Draw the circuit diagram of a typical class C plate modulated amplifier and explain its operation. 10

   (b) What are the advantages / disadvantages of DSB/SC systems over normal AM systems ? 4

2. (a) Explain the need for modulation in communication system. 4

   (b) Explain :

   (i) Depth of modulation in AM 2

   (ii) Modulation index in FM 2

[Turn over

(c) Deduce the following : 6

$$P_t = P_c\left[1+\frac{m_a^2}{2}\right] \text{ in case of AM signal.}$$

3. (a) A radio AM transmitter radiates 10 KW with the carrier unmodulated and 12 KW when the carrier is modulated by a sinusoidal wave. Calculate the modulation index. 7

(b) An FM wave is represented by the voltage equation $V = 10\sin\left[2\times10^8 t + 5\sin 2000t\right]$ volt. Find the carrier and modulating frequencies, the modulation index and the maximum deviation in FM. 7

4. (a) What is the function of an antenna? 3

(b) Explain the radiation mechanism of an antenna ? 5

(c) Draw the sketch of a five element Yagi Uda antenna for reception of TV signal with proper dimensions. 6

5. (a) What is the difference between a director and a reflector ? 3

(b) Explain the differences between driven and parasitic elements in an antenna array. 3

(c) Define : 8

(i) Radiation resistance

(ii) Polarization

(iii) Directivity, and

(iv) Directive gain with respect to an antenna.

6. (a) With the help of a suitable diagram, explain the layer structure of ionosphere by day and night. 6

(b) How are shortwaves propagated and what is the effect of various ionospheric layers? What is maximum usable frequency (MUF)? 6+2=8

7. (a) What are transmission lines? Classify and give a brief explanation of the different types of transmission lines.

(b) What do you understand by characteristic impedance in a transmission line?

(c) Explain what you understand by standing wave and standing wave ratio. 6+4+4=14

8. Write short notes on any *two* : $7 \times 2 = 14$

(i) Losses in transmission lines

(ii) Resonant and non-resonant antennas

(iii) Vestigeal sideband transmission

(iv) Indirect method of FM generation

(v) Radio frequency bands.