Total No. of printed pages = 3

ECE-3201/CE/6th Sem/2013/M

COMMUNICATION ENGINEERING

Full Marks – 100

Pass Marks – 30

Time – Three hours

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

Answer any *five* questions.

1. (a) Find the Fourier transform of the following :

(i) u(t) (ii) t u(t) (iii) R(t) 3×3=9

(b) State and prove convolution theorem. 6

(c) Define auto correlation function and state any three properties of auto correlation function. 5

2. (a) Explain the working of a balanced modulator. 8

[Turn over

(b) An AM signal is given as $S(t) =$

Determine

(i) Carrier frequency

(ii) Midulation index

(iii) Modulation frequency

(iv) Carrier power. 8

(c) Find the relation between PM and FM signals. 4

3. (a) Differentiate between PAM and PPM. 4

(b) Explain the ISB system. 8

(c) Explain the principle of superheterodyne receiver. 8

4. (a) Explain space wave propagation. Why it is called line of sight propagation ? 8

(b) Define the terms : MUF, critical frequency, skip distance, virtual height. 8

(c) Why surface wave and sky wave propagation is not suitable for very high frequency applications ? 4

5. (a) What is an electromagnetic wave ? Derive the equation of an electromagnetic wave in free space starting from Maxwell's equations. 10

(b) Explain the EM spectrum. 10

6. (a) What is an antenna ? Define the terms : gain, directivity, radiation pattern and beam width of an antenna. 10

(b) Explain the radiation mechanism of an antenna. 6

(c) If for an antenna, radiation resistance and loss resistance are 72Ω and 8Ω respectively, then find the antenna efficiency. Also find directivity for a gain of 100. 4

7. Write short notes on : 10×2=20

(a) Pre-emphasis and de-emphasis

(b) Pulse modulation techniques.