

SE ETRX Sem -IV

10/6/2014

Fundamentals of C.E.

QP Code : NP-19833

(3 Hours)

[Total Marks : 80

- N.B. : (1) Question No. 1 is **compulsory**.
(2) Solve any **three** questions from the remaining **five** questions.
(3) Assume **suitable** data if **necessary**.

1. Give brief answers to any **four** of the following :— 20
 - (a) Explain ground wave propagation of electromagnetic radiations.
 - (b) Draw the spectrum of an amplitude modulated wave and explain its components.
 - (c) Give advantages and disadvantages of SSB over full carrier DSB amplitude modulated wave.
 - (d) Discuss the factors that influence the modulation index of an FM wave.
 - (e) How is adaptive delta modulation superior to delta modulation ?

2. (a) What is a DSBSC wave ? Explain its generation using balanced modulator. 10
(b) Discuss the factors that influence the choice of IF in superheterodyne receivers. 5
(c) The maximum deviation allowed in a FM broadcast system is 75 kHz. If the modulating signal is a single tone sinusoidal of frequency 15 kHz, find the bandwidth of the FM signal. How does the bandwidth change if the modulating frequency is doubled ? 5

3. (a) How can you use a varactor diode in the generation of FM wave ? Explain in detail. 10
(b) List out the advantages and disadvantages of FM over AM. 5
(c) Calculate the thermal noise power available from any resistor at a temperature of 290 K for a bandwidth of 1 MHz. Calculate also the corresponding noise voltage if the resistance, $R = 100 \Omega$. 5

4. (a) Draw the PAM, PWM and PPM waveforms in time domain assuming a sinusoidal modulating signal. Explain them in brief. 10
(b) What do you understand by signal multiplexing ? Explain TDM and FDM with suitable examples. 10

5. (a) Explain the working of a superheterodyne receiver with the help of a neat block diagram. Show the waveforms at the output of each block. 10
(b) Compare analog and digital transmission systems. 5
(c) What is VSB ? Mention its application. 5

6. Write short notes on any **four** of the following :— 20
 - (a) Pre-emphasis and de-emphasis
 - (b) Automatic gain control
 - (c) Ratio detector
 - (d) Electromagnetic spectrum
 - (e) Noise figure.
