

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, MAY 2014

SECOND YEAR

ELECTRONICS (General)

Date : 29/05/2014

Time : 11 am – 1 pm

Paper : IV

Full Marks : 50

Group – A

(Answer Question No. 1(a or b) and any two from the rest)

1. a) Choose the correct answer (any five) : [5×1]
- i) The signal $f(t) = e^{-2t}u(t)$ is—
 - a) Power signal
 - b) Neither power nor energy signal
 - c) Energy signal
 - d) Both power and energy signal
 - ii) The reason why FM is preferred over AM is/are—
 - a) Band width
 - b) Noise
 - c) Both (a) and (b)
 - d) Complexity
 - iii) Power spectral density of thermal noise is independent of—
 - a) Bandwidth
 - b) Temperature
 - c) Frequency
 - d) Boltzmann Constant
 - iv) A carrier is amplitude modulated to a depth of 40%. The increase in power is—
 - a) 40%
 - b) 20%
 - c) 16%
 - d) 8%
 - v) The number of bits per sample in a PCM system is increased from 8 to 16. The Bandwidth of the system will increase—
 - a) 2^3 times
 - b) 2 times
 - c) 2^4 times
 - d) 2^8 times
 - vi) In which of the following, 'Envelope detection' mechanism is used for demodulation—
 - a) AM
 - b) FM
 - c) PCM
 - d) PM

Or

- b) What are the basic characteristics of a signal? What are periodic and aperiodic signal? In practice, does a signal contains infinite energy, explain your answer. [2+1+2]
2. What is modulation? Why is it needed in the transmission of a message signal? For which purpose AM is more preferable than FM, if any? Define modulation index in AM. [2+3+3+2]
3. In which way PM & FM are similar? Describe of process of AM with the help of equations and illustration. Explain how demodulation of AM wave is performed using Envelope Detection method. [2+4+4]
4. Distinguish between FM and PM. With requisite block schematic describe a method to produce a FM signal. An FM signal is modulated to a depth of 8, generates a bandwidth of 180 kHz, calculate the frequency deviation. [2+4+4]
5. Describe the process of PAM with the help of proper diagram. What is companding? Define average power of a signal. Show that a signal having finite energy has zero average power. [5+2+1+2]

Group – B

(Answer Question No. 6(a or b) and any two from the rest)

6. a) Choose the correct answer (any five) : [5×1]
- i) The conversion efficiency of a bridge type full wave rectifier is nearly,
 - a) 40%
 - b) 50%
 - c) 81%
 - d) 90%
 - ii) The sharpness of the CRO display is controlled by adjusting—
 - a) The grid voltage
 - b) Final anode voltage
 - c) The accelerating anode voltage
 - d) The focussing electrode voltage

- iii) The voltage regulation of a rectifier improves with the load resistance—
 - a) Increasing
 - b) Decreasing
 - c) Remaining same
 - d) Being equal to the diode resistance
- iv) The deflection factor of a CRD varies—
 - a) Directly with the deflecting voltage
 - b) Directly with the final anode voltage
 - c) Inversely with the deflecting voltage
 - d) Inversely with the final anode voltage
- v) The sweep voltage is applied in which of the following—
 - a) Horizontal plates
 - b) Vertical plates
 - c) Focussing plates
 - d) Triggering circuit

Or

- b) With necessary diagrams, explains how you will measure the frequency and phase difference (w.r.t. another signal) using CRO. [2½+2½]
- 7. Explain the display principle of CRO with proper diagram. What is the function of trigger pulse? What is 'aqua dag' in CRO and what is its function? [6+2+2]
- 8. What is a regulated power supply unit? Describe using the relevant circuit diagram the functions of different portions of a $\pm 12V$ d.c regulated power supply system using zener diode for regulation purpose. What is the post-acceleration electrode in a CRT? What is its function? What should be the special properties of the coating material on the display screen? [1+5+1+1+2]
- 9. What should be the ideal value of voltage regulation? What are the reasons behind the observed deviation from the ideal value? What are series and shunt regulator? Explain using relevant diagram the principle of operation of any one of them. What is ripple factor of a rectifier? [1+2+1+4+2]
- 10. With circuit or proper diagram describe the following—
 - a) Sweep Generator circuit
 - b) Horizontal and Vertical plate system. [5+5]

