

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

SECOND YEAR [BATCH 2015-18]

B.A./B.Sc. FOURTH SEMESTER (January – June) 2017

Mid-Semester Examination, March 2017

Date : 18/03/2017

ELECTRONICS (General)

Time : 12 noon – 1 pm

Paper : IV

Full Marks : 25

Answer any five of the following questions :

[5×5]

1. Choose the correct one among all alternatives :

[5×1]

- a) If m_a is the modulation index of an AM wave, then for distortionless transmission,
i) $m_a > 1$ ii) $m_a \geq 1$ iii) $m_a < 1$ iv) $m_a \rightarrow \infty$
- b) The side frequencies of an AM wave are
i) greater than f_m ii) equal to f_m iii) less than f_m iv) both of (i) and (iii)
- c) If P_s is the total side-frequency power and P_C is the unmodulated carrier power in an AM wave, then
i) $P_s = P_C$ ii) $P_s > P_C$ iii) $P_s < P_C$ iv) both (i) and (ii)
- d) A frequency-modulated signal contains
i) no sidebands ii) one sidebands
iii) two sidebands iv) large number of sidebands
- e) Thermal noise is also known as
i) Johnson noise ii) Random noise iii) Flicker noise iv) Shot noise

2. Define energy signal. Compare periodic and aperiodic signals with illustrations. What do you mean by demodulation in communication technology?

[1+2+2]

3. Write short notes on any two of the following :

[2×2.5]

- a) Shot noise
b) Flicker noise
c) SNR
d) SSB

4. Derive an expression for phase modulated carrier wave.

[5]

5. For a given carrier and modulating signal, compare schematically/graphically the AM, FM and PM signals. What do you mean by (i) noise figure and (ii) noise bandwidth?

[3+2]

6. Sketch the circuit of an envelope detector and explain its operation. Compare SSB and DSB.

[4+1]

7. What are the advantages of modulation? Calculate the power developed by an AM wave in a load of 100Ω when the peak voltage of the carrier is 10 volt and the modulation factor is 0.8.

[2+3]

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