RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. THIRD SEMESTER EXAMINATION, DECEMBER 2019

SECOND YEAR [BATCH 2018-21]

Date : 17/12/2019 **ELECTRONICS [General]**

Time : 11 am – 1 pm **Paper : III** Full Marks : 50

Answer ***any five*** questions from the following: [5 X 10]

1. a) What do you mean by modulation and demodulation? [3]
   b) Differentiate between Energy Signal & Power Signal. [3]
   c) Explain the scheme of amplitude modulation. Derive an expression for amplitude modulated signal. [1+3]

2. a) Compare DSB, SSB and SSB-SC. [3]
   b) What do you mean by overmodulation? [2]
   c) Draw the diagram and explain the operation of diode detector in detail. [5]

3. a) Draw a schematic of radio communication system and discuss its working. [3]
   b) Define depth of modulation for FM. Give an expression for the same. [2+1]
   c) Discuss how phase modulation is achieved. Also state how FM can be obtained from PM. [2+2]

4. a) State the difference between thermal diffusion and ion implantation techniques. [2]
   b) What is lithography? Mention various types of lithography used in VLSI. What is the difference between positive photoresist and negative photoresist. [1+2+2]
   c) Draw the stick diagram for a 2-input CMOS NAND. Clearly mention the dimension of each layer in λ unit. [3]

5. a) What is thermal agitation noise? Give an expression for thermal agitation noise, P_n. [2+1]
   b) If a resistor is operating at room temperature and the bandwidth of interest is 1.0 MHz, then what is the maximum noise power output of the resistor? [2]
   c) Consider several amplifiers are in cascaded form. Obtain an expression for equivalent noise resistance, R_{eq}. [5]

6. a) Draw a block diagram of a Double Beam CRO. [3]
   b) With the help of block diagram explain difference between CRT and CRO. [7]

7. a) Write working and utilisation of a (i) Thermistor and (ii) Thermocouple. [3+3]
   b) What should be the resistance of a voltmeter? Explain. How to convert an ammeter into voltmeter? [2+2]

8. Write short notes on ***any four*** of the following: [4×2½]
   (a) Shot Noise (b) Frequency Modulation (c) Digital Multimeter (d) CMOS Inverter
   (e) λ based design rule (f) Transit-time noise.

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