

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. THIRD SEMESTER EXAMINATION, DECEMBER 2018

SECOND YEAR [BATCH 2017-20]

ELECTRONICS [General]

Paper : III

Date : 18/12/2018

Time : 11 am – 1 pm

Full Marks : 50

Answer any five questions from the following:

[5 × 10]

1. a) Explain the working of a multi range ammeter with a schematic diagram. [5]
b) A 1mA meter movement with an internal resistance of 100Ω is to be converted into a 0-100 mA. Calculate the value of shunt resistance required. [3]
c) Calculate the sensitivity of a $200 \mu\text{A}$ meter movement which is to be used as a dc voltmeter. [2]
2. a) Define sensitivity of a voltmeter. [2]
b) Calculate sensitivity and multiplier resistance of a 50 V range DC voltmeter, that used a $200 \mu\text{A}$ meter movement with an internal resistance of 100Ω . [4]
c) Explain with a neat diagram the working principle of a thermocouple. [1+3]
3. a) Describe briefly the forms of noise to which a transistor is prone. [5]
b) Define and explain noise temperature. [2]
c) A receiver connected to an antenna whose resistance is 50Ω has an equivalent noise resistance of 30Ω . Calculate the receiver's noise figure and its equivalent noise temperature. [3]
4. a) What do you mean by signal? [1]
b) Explain why modulation and demodulation are required. [3]
c) Define modulation index. Sketch amplitude modulated signal for a modulation index of $\mu = 0.5$, where $m(t) = A \cos \omega_m t$. Explain tone modulation with a neat sketch of modulated waveform. [2+2+2]
5. a) Draw and explain the operation of envelope detector. [2+4]
b) Distinguish between FM and PM signals. [2]
c) Calculate the power developed by an AM wave in a load of 100Ω when the peak voltage of the carrier is 100 volt and modulation index in 0.6. [2]
6. a) State and explain Moore's law. [3]
b) State VLSI design steps. [3]
c) Design 2-input NAND and NOR gates using CMOS technology. [2+2]
7. Write a short notes on any four of the following: [4×2.5]
(a) CRO block diagram (b) LVDT (c) Strain gauge (d) Cleaning in VLSI
(e) Stick Diagram (f) DSB-SC (g) Phase Modulation
8. Answer any five questions from the following: [5 × 2]
a) How does a CRT operator? [2]
b) Compare double beam CRO and double trace CRO. [2]
c) Explain briefly frequency demodulation. [2]
d) What do you mean by transducers? Explain with appropriate example. [1+1]
e) State briefly any crystal growth technique. [2]
f) Mention the basic characteristics of a signal. [2]
g) Compare periodic and aperiodic signals with examples. [2]
h) For a baseband signal $m(t) = \cos 1000t$, draw the spectrum of the DSB-SC signal $m(t) \cos 10,000 t$. [2]

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