

4E1221

Roll No. _____

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B. Tech. IV-Sem. (Back) Exam., Oct.-Nov. - 2020

Electronics & Communication Engineering

4EC3 – 06 Electronics Measurement & Instrumentation

Time: 2 Hours

Maximum Marks: 82
Min. Passing Marks: 29

Instructions to Candidates:

Attempt all ten questions from Part A, four questions out of seven questions from Part B and two questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only)

[10×2=20]

All questions are compulsory

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Q.1 Describe Heterodyne wave Analyzer.

Q.2 A certain crystal has a coupling coefficient of 0.32. How much electrical energy must be applied to produce an output of 102 in. of mechanical energy?

Q.3 What do you mean by primary and secondary type transducers?

Q.4 By using ultrasonic transducer, how flow can be measured?

Q.5 How voltage measurement can be done with the help of CRO?

Q.6 Define load cell and give its working principle.

- Q.7 State the principle of a successive approximation type DVM.
- Q.8 Define accuracy & precision.
- Q.9 Give the working principle for seismic accelerometer.
- Q.10 What is meant by the term "Aquadag," "Fluorescence" & "Phosphorescence" related to CRT?

PART - B

(Analytical/Problem solving questions)

[4×8=32]

Attempt any four questions

- Q.1 Describe the working principle of Gaussian error analysis?
- Q.2 Describe in detail harmonic distortion analyzer.
- Q.3 Describe the circuit diagram and operation of true RMS reading type electronic voltmeter using thermocouples. Explain how these voltmeters are free from waveform error.
- Q.4 Explain the working principle of storage and sampling oscilloscopes.
- Q.5 Draw and explain the structure and main component of conventional cathode ray tubes?
- Q.6 A copper constantan thermocouple has $\alpha = 37.5 \mu\text{V}/^\circ\text{C}$ and $\beta = 0.0045 \mu\text{V}/^\circ\text{C}$. Determine the e.m.f. developed by the thermocouple, when its hot junction is at 200°C and cold junction is kept in ice.
- Q.7 Explain the working principle of piezoelectric transducer and draw its electrical equivalent circuit.

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PART - C

(Descriptive/Analytical/Problem Solving/Design Questions) [2×15=30]

Attempt any two questions

- Q.1 Describe the working principle of LVDT with the help of neat sketch and draw its characteristics.
- Q.2 Describe the working principle and characteristics of the following transducers –
- (a) Thermocouple
 - (b) RTD.
- Q.3 Describe the working principle of dual trace CRO with the help of a block diagram and also differentiate between Dual beam & Dual trace CRO.
- Q.4 State the advantages of a DVM over an analog meter. What are the operating and performance characteristics of a DVM?
- Q.5 Write short notes on any two of the following –
- (a) Tachogenerator
 - (b) Vector Impedance meter
 - (c) Systematic & Random errors
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