Code No: 137CF **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, December - 2019
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Electronics and Communication Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) Define gross errors and systematic errors. [2]
b) State specification of instruments [3]
c) Define distortion [2]
d) State the applications of pulse and square wave generators. [3]
e) How frequency can be measured using oscilloscope? [2]
f) How frequency can be measured using Lissajous figures. [3]
g) Explain the principle of piezo transducer. [2]
h) Draw Syncro diagram. [3]
i) What is meant by balancing a bridge? [2]
j) Draw the block diagram of data acquisition system. [3]

PART-B

(50 Marks)

2.a) Explain the basic principle of a shunt type ohmmeter.
b) Calculate the maximum percentage error in the sum and difference of two voltage measurements when V_1=100v ± 1% and V_2=80v ± 5%. [6+4]

OR

3.a) Define Accuracy, Precision, Resolution and Limiting error.
b) Design a range switch for an ammeter, with an internal resistance $r_m = 100\,\Omega$ and a full scale deflection of I_m=1mA. The meter is to measure in the ranges of 10mA, 100mA and 500mA. [6+4]

4.a) What are the main requirements of sine wave signal generator in instrumentation?
b) Explain with suitable block diagram how an AF sine/ square generator works. [4+6]

OR

5.a) What is wave analyzer? Explain how it analyzes the harmonics?
b) Enlist the various applications of spectrum analyzer along with the description of its working. [6+4]

6.a) State the standard specification of a sample CRO.

b) Explain the operation of a sampling oscilloscope with a neat block schematic diagram. What is its advantage over the conventional oscilloscope? [4+6]

OR

7.a) Explain the block diagram of a vertical deflection system and explain the function of each block.

b) Explain the following CRO controls.

i) Focus ii) Trigger and calibration. [6+4]

8.a) A transducer that measures force has nominal resting resistance of 300 Ω and is excited by 7.5V. When a 980 dyne force is applied, all four equal resistance bridge elements change resistance by 5.2 Ω. Find the output voltage E_o.

b) Draw the various kinds of thermocouple junctions and their sheaths and discuss the seeback effect in thermocouple. [4+6]

OR

9.a) Draw the diagram of strain gauge and explain the principle of measurement.

b) Draw the various kinds of thermometers and explain the principle of operation. [5+5]

10.a) The basic AC bridge consists of the following constants:

AB: R=400Ω, BC: R=150 Ω, CD: unknown and DA: R=100 Ω in series with L=10mH. Oscillator frequency is 1KHz. Determine the constants of arm CD.

b) What is double Kelvin bridge? Derive the expression for the unknown resistance. [4+6]

OR

11.a) Explain how LVDT is used to measure linear displacement.

b) How moisture in the air can be measured using transducers. [5+5]

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