R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year II Semester Examinations, July - 2021
ELECTRONIC MEASURING INSTRUMENTS
(Common to CE, ME, EIE, MIE)

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

Answer any Five Questions
All Questions Carry Equal Marks
- - -

1.a)   The expected value of current through a resistor is 1330mA, but the measurement yields a current value of 1286mA. Calculate the percentage of accuracy and percentage of error.
   b)   List out the characteristics of instruments that are used to measure an unvarying process condition.   [6+9]

2.a)   An engineer wants to generate a sawtooth wave that varies in frequency from a fraction of Hertz to several hundred KiloHertz. With a neat block diagram design the device and explain its working.
   b)   Draw the block diagram that provides a sinusoidal output voltage whose frequency varies continuously over audio frequency band.   [8+7]

3.a)   Explain how an unknown resistance can be measured when it is connected in series to the D'Arsonval moment.
   b)   A CRO is set to a time base of 0.1 ms/cm with a 10cm amplitude. Sketch the display of the pulse signal waveform with a pulse repetition rate of 3000Hz and duty cycle of 30% .[9+6]

4.a)   An engineer wants to plot the instantaneous relation between two variables G = F(s). Explain how plotting of one variable against another variable is done.
   b)   Explain the working of Servo transducer and what are the applications of it?   [7+8]

5.a)   Briefly explain the working principles and measurement of force by any two nonelectric techniques?
   b)   Describe the method of measuring flow rate with a neat diagram.   [8+7]

6.a)   The accuracy of five digital voltmeters are checked by using each of them to measure a standard 2.0000V from a calibration instrument. The voltmeter readings are as follows: V1=2.001v, V2=2.002v, V3=1.999v, V4=1.998v and V5=2.0000v. Calculate the average measured voltage and the average deviation
   b)   What is the difference between pulse generator and square wave generator? Also discuss requirements of Pulse.   [8+7]

7.a) Design a multirange ammeter with ranges of 0-100 mA, 0-300 mA, 0-600 mA, 0-2 A employing individual shunts for each range. A D' Arsonval movement with an internal resistance of 600 Ω and a full scale current of 200 μA is available.

b) Draw the basic block diagram of an oscilloscope and explain the function of each block.

[6+9]

8.a) Sketch the DC signal conditioning circuit for pressure measurement using strain gauge. Justify it.

b) An ac LVDT has the following data: Input = 8.2 V, Output = 4.3 V, range ± 0.3 in. Determine (i) Calculate the output voltage Vs Core position for a core moment going from + 0.45 in. to − 0.30 in. (ii) The output voltage when the core is -0.25 in. from the centre.

[8+7]

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