

# CBCS SCHEME

17EC32

## Third Semester B.E. Degree Examination, Dec.2019/Jan.2020 Electronic Instrumentation

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Explain the following terms briefly:
  - i) Accuracy
  - ii) Precision
  - iii) Resolution and significant errors. (07 Marks)
- b. Explain the operation of the multirange ammeter with suitable circuit. (05 Marks)
- c. Explain the operation of the RF Ammeter (Thermocouple) considering the different types with suitable diagrams. (08 Marks)

OR

- 2 a. With suitable diagrams, explain briefly the operation of the multirange voltmeter. (07 Marks)
- b. Calculate the value of the multiplier resistance on the 50V range of a dc voltmeter, that uses a  $200\mu\text{A}$  meter measurement with an internal resistance of  $100\Omega$ . (05 Marks)
- c. With block diagram approach, explain the operation of the true RMS voltmeter. (08 Marks)

### Module-2

- 3 a. Explain the operation of the ramp type digital voltmeter with voltage to time conversion waveform and block diagram. (08 Marks)
- b. Explain the operation of the  $3\frac{1}{2}$  digit display with suitable diagram. (05 Marks)
- c. With block diagram approach explain the operation of the digital phase meter. (07 Marks)

OR

- 4 a. With block diagram, approach explain the operation of the digital PH meter. (06 Marks)
- b. Explain the operation of the digital frequency meter with suitable block diagram. (07 Marks)
- c. With block diagram approach, explain the operation of the successive approximation digital voltmeter. (07 Marks)

### Module-3

- 5 a. With block diagram of oscilloscope, explain the operation of CRO. And also mention the functions of each block. (07 Marks)
- b. Explain the operation of the sweep or time base generator with suitable circuit and relevant Sawtooth output waveform. (07 Marks)
- c. Explain the operation of the conventional standard signal generator with relevant block diagram. (06 Marks)

OR

- 6 a. With block diagram approach, explain the operation of the AF sine and square wave generator. (06 Marks)
- b. Explain the operation of the function generator with relevant block diagram. (06 Marks)
- c. Briefly explain the operation of digital storage oscilloscope with relevant block diagram. (08 Marks)

**Module-4**

- 7 a. Explain the operation of the phase meter which detects the phase for the positive half and negative half using different circuits. (07 Marks)
- b. Explain the operation of the field strength meter using diode circuit. (06 Marks)
- c. A capacitance comparison bridge is used to measure a capacity impedance at a frequency of 2kHz. The bridge constants at balance are  $C_3 = 100\mu\text{F}$ ,  $R_1 = 10\text{K}\Omega$ ,  $R_2 = 50\text{K}\Omega$ ,  $R_3 = 100\text{K}\Omega$ . Find the equivalent series circuit of the unknown impedance. (07 Marks)

**OR**

- 8 a. With Maxwell's bridge circuit, explain the balance condition. And derive an expression for the  $R_x$  and  $L_x$ . (07 Marks)
- b. Find the equivalent parallel resistance and capacitance that causes a Wein bridge with the following component values  $R_1 = 3.1\text{K}\Omega$ ,  $C_1 = 5.2\mu\text{F}$ ,  $R_2 = 25\text{K}\Omega$ ,  $f = 2.5\text{K}\Omega$ ,  $R_4 = 100\text{K}\Omega$ . (07 Marks)

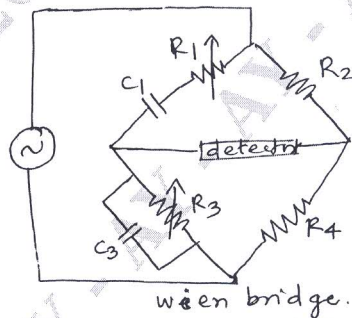


Fig.Q.8(b)

- c. Explain the operation of the basic Megger circuit with neat diagram. (06 Marks)

**Module-5**

- 9 a. Explain the different types of resistive transducers with figure. Mention the advantages and disadvantages. (07 Marks)
- b. Explain the operation of the Industrial platinum resistance thermometer with bridge circuit. (07 Marks)
- c. Explain the operation of the photo transistor with construction, symbol, output characteristics and photo transistor with relay circuit. (06 Marks)

**OR**

- 10 a. Explain the Thermistor with resistance  $V_{ss}$  temperature graph, and various configurations of thermistor. And also mention the advantages and limitations. (07 Marks)
- b. Explain the operation of the linear variable differential transducer with construction, various core position of LVDT and variation of output voltage with displacement. (07 Marks)
- c. Explain the operation of the piezoelectrical transducer with construction and equivalent circuit. (06 Marks)

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