

**B. TECH. SEM –III (ELECTRICAL ENGG.) 2014 COURSE)**

**(CBCS) : SUMMER - 2018**

**SUBJECT : ELECTRICAL MEASUREMENTS & INSTRUMENTATION**

Day : **Friday**  
Date : **25/05/2018**

**S-2018-2244**

Time : **02.30 PM TO 05.30 PM**  
Max. Marks : 60

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat and labeled diagrams **WHEREVER** necessary.
- 4) Assume suitable data if necessary.

**Q.1 a)** List the advantages and disadvantages of electronic instruments over electrical and mechanical instruments. **[05]**

**b)** The four impedances of an A.C. bridge are  $Z_1 = 400\Omega \angle 50^\circ$ ,  $Z_2 = 200\Omega \angle 40^\circ$ ,  $Z_3 = 800\Omega \angle 50^\circ$ ,  $Z_4 = 400\Omega \angle 20^\circ$ . Find out whether the bridge is balanced under this conditions or not. **[05]**

**OR**

**a)** A Maxwell's capacitance bridge is used to measure an unknown inductance in comparison with capacitance. The various values at balance,  $R_2 = 400\Omega$ ,  $R_3 = 600\Omega$ ,  $R_4 = 1000\Omega$ ,  $C_4 = 0.5\mu\text{F}$ . Calculate the values of  $R_1$  and  $L_1$ . **[05]**

**b)** Draw and explain the operation of Schering bridge. Also mention its balance equation. **[05]**

**Q.2** A 230V, single phase, Energy meter has a constant load of 14A passing through it for 16 hours at unity pf. If the meter disc makes 2288 revolutions during this period. What is the meter constant in revolutions / kWh? Calculate the p.f of the load, if the number of revolution made by the meter are 1484 when operating at 230V and 15A for 10 hrs. **[10]**

**OR**

A wattmeter has a current coil of  $0.04\Omega$  resistance and a pressure coil of  $8000\Omega$  resistance. Calculate the percentage error if the wattmeter is so connected that:

- i) The current coil is on the load side
- ii) The pressure coil is on the load side; if the load takes 25 A at a voltage of 230V and 0.7 pf.

**Q.3 a)** Explain the construction and working of an average reading voltmeter. **[05]**

**b)** Explain the working principle of spectrum analyzer with a neat sketch. **[05]**

**OR**

**a)** Explain the circuit diagram and operation of an Electronic voltmeter using a difference amplifier. **[05]**

**b)** Explain the terms: **[05]**  
i) Automatic meter reading  
ii) Advanced metering infrastructure  
iii) Meter reading instruments

**P.T.O.**

- Q.4** a) Explain how the magnitude and direction of displacement of core of LVDT detected? [05]
- b) Explain the working of ultrasonic sensor electrical type of level measurement technique. [05]

**OR**

- a) What is strain gauge? Mention, different types of strain gauges. Also mention its applications. [05]
- b) Mention the advantages and disadvantages of capacitive transducer. Also, state its applications. [05]
- Q.5** a) Explain the construction and working of bimetallic thermometers. Also, state its applications. [05]
- b) Explain Pirani gauge for measurement of pressure. [05]

**OR**

- a) Explain the working and construction of resistance thermometers. State the materials used for RTDs. [05]
- b) Explain ionization type vacuum for measurement of low pressure. [05]
- Q.6** a) State various methods for digital display. Also, state the resolution and sensitivity of digital meters compared with analog meters. [05]
- b) Explain the construction and working of hot wire Anemometer used for flow measurement. [05]

**OR**

- a) Explain the construction and working of strip chart recorders. [05]
- b) Explain the working of Scismic Tape Type velocity measurement method. [05]

\* \* \* \*