PVP 14

Code: EE4T4

II B.Tech - II Semester – Regular/Supplementary Examinations
October 2020

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11 x 2 = 22 M

1.

a) Distinguish LPF and UPF watt meters.
b) What is the purpose of an instrument? And how are they classified.
c) What is spring control and gravity control?
d) Define Ratio Correction Factor.
e) What is Potential Transformer?
f) Write the working principle of Ratio Type Frequency Meter.
g) Calculate the insulation resistance of a length of cable in which voltage falls from120 to 80 Volts in 20 seconds, the capacitor being 0.0004 μF.
h) Define Quality Factor and how it is to be measured.
i) What are the specifications of digital voltmeters?
j) Differentiate between active and passive transducers.
k) State the advantages of a DVM over an analog meter.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Explain the working of Induction type single phase Energy meter with a neat diagram. 8 M

   b) Explain the different sources of errors in Induction type Energy meter and how they can be adjusted/compensated. 8 M

3. a) Derive the expressions for the ratio and phase angle errors of a current transformer with a neat phasor diagram. 8 M

   b) Calculate the i) flux in the core, ii) Ratio error at full load if the primary winding of a 1200/6A,50 Hz current transformer has a single turn. Its secondary burden consists of a non – inductor impedance of 1.6 Ω. If the iron loss in the core is 1.6 W at full load and magnetizing mmf is 80 AT. Neglect leakage reactance. 8 M

4. a) Explain the working of Dynamometer type single phase power factor meter with a neat diagram. 8 M

   b) Explain working principle and operation of Electrical resonance type frequency meter with a neat diagram. 8 M

5. a) Deduce the equations when the bridge is balanced with a help of neat diagram of the Anderson Bridge. Draw the phasor diagram of the bridge. 8 M

b) Calculate the unknown R and C if a balanced 1 KHz bridge has the following configuration:

Arm AB: $R_1 = 1000\Omega$ in parallel with $C_1 = 0.053\mu F$

BC: $R_2 = 1500\Omega$ in series with $C_2 = 0.53\mu F$

CD: the unknown

DA: Pure capacitance $C_4 = 0.265\mu F$.

Draw the phasor diagram of the above bridge under balanced condition. 8 M

6. a) Explain briefly with neat diagrams the working of integrating type DVM. 8 M

b) Find the resolution of a 3 ½ digital voltmeter which is used for measuring voltage. How would a voltage of 14.42 be displaced on 10 V range? How would be a reading 14.42 be displaced on 100 V range? 8 M