R20 Regulation *Subject code: 3P5BB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech V Semester Supplementary Examinations, June/July 2023

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

(Electrical and Electronics Engineering)

Maximum Marks: 70 Date:26.06.2023 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

1 Write the expression for deflecting torque in moving iron type and moving coil type instruments.
2 List the various types of errors in measuring instruments.
3 What is meant by standardization of a potentiometer?
4 Mention the applications of AC potentiometers.
5 What is the use of Tri-vector meter?
6 What is meant by phantom loading?
7 State the limitations of Wheatstone's bridge.
8 List out various bridges used for capacitance measurement and their applications.
9 What are the advantages of Electrical Transducers?
10 Define the gauge factor of a Strain Gauge.

Part-B

Answer All the following questions. (10MX 5=50Marks)

11 A. Describe the principle of PMMC meters with neat sketch. 5M
B. Explain the principle of operation of attraction type moving iron instrument. 5M

OR

12 A. Describe the principle of attracted disc type E.S. voltmeters. 5M
B. How is the current range of a PMMC instrument extended with the help of shunts? 5M

13 A. Illustrate the working of a D.C Crompton's potentiometer with neat circuit diagram. 5M
B. What is ratio error? Derive the expression for ratio error in current transformers. 5M

OR

14 A.A potential transformer, ratio 1000/100 volt, has the following constants: primary resistance = 94.5Ω, secondary resistance = 0.86Ω, primary reactance = 66.2Ω, total equivalent reactance = 110Ω, no-load current = 0.02A at 0.4 power factor. Calculate i) Phase angle error at no load. ii) Burden in VA at unity power factor at which the phase angle will be zero. 6M

B. Differentiate between CT and PT. 4M

15 A. Derive the expression for deflecting torque and controlling torque in a single-phase dynamometer type wattmeter. 5M

B. Explain how a power measurement range can be extended with a wattmeter in conjunction with an instrument transformer. 5M

OR

16 A. Explain the operation of single-phase induction type energy meter with a neat diagram. 5M

B. Describe the principle of operation of maximum demand meter. 5M

17 A. Describe the working of a Carey- Foster's bridge. 5M

B. Deduce the general equation or condition for bridge balance in AC Circuits. 5M

OR

18 A. Describe working of low voltage Schering bridge. Derive the equation of capacitance and dissipation factor. 5M

B. Sketch the circuit diagram of Anderson's bridge. Derive the equations for resistive and inductive components of the inductor to be measured. 5M

19 A. Describe the principle of operation of LVDT. 5M

B. Enumerate the differences between a PN diode and a Photo diode and briefly explain the working of Photo diode. 5M

OR

20 A. Explain the any one method of measuring torque with neat block diagram. 5M

B. Describe the principle of operation of Piezo electric transducer. 5M