R20 Regulation *Subject code: 3P5BB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Regular/Supplementary Examinations, February 2024

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Maximum Marks: 70 Date:17.02.2024 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.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

	Part-A	CO	Bloom Tx
All the following questions carry equal marks (10x2M=20 Marks)			
1	List the advantages of PMMC instruments	1	L1
2	Draw sketches for range extension of ammeter and voltmeter.	1	L2
3	Define ratio error and phase angle error in potential transformer.	2	L1
4	What do you mean by standardization?	2	L1
5	What is tri-vector meter? What are its applications?	3	L1
6	What are the differences between LPF & UPF wattmeters?	3	L1
7	State the conditions for AC bridge balancing	4	L1
8	Define loss angle for Schering bridge.	4	L1
9	What are true RMS meters and what are their applications?	5	L1
10	What is a thermistor? What are its applications?	5	L1
	Part-B		
Answer All the following questions. (5X10M=50Marks)			Bloom Tx level
11	a) With the help of a neat diagram, explain the working of attracted disc type voltmeter. [5M] b) Explain the working of M. I. instrument. [5M]	1	L2 L2
	OR		
12	a) By utilizing Quadrant method briefly explain the working of electrostatic voltmeter with neat diagram. [5M] b) A deflecting electrostatic voltmeter gives full scale deflection of 40 degrees with 9V applied to its terminals. Its capacitance is 10pF at zero deflection and 30 pF at 300 and varies uniformly with deflection. The moment of inertia of moving vanes is 0.02×10^{-6} kg/m^2. Calculate the undamped period of instrument. [5M]	1	L2 L3
13	a) Explain the principle and working of A.C. Potentiometer with a neat diagram and describe its standardization. [5M] b) Explain the, principle and working of current transformer. [5M]	2	L2 L2
	OR		

14	a) Discuss how AC potentiometer can be used for calibration of wattmeter. [5M] b) Explain the procedure to calibrate voltmeter and ammeter using DC potentiometer. [5M]	2	L2 L2
15	a) Explain the construction, principle and operation of single phase three element electro dynamometer type watt meter and derive its torque equation. [5M] b) If the reactance of the pressure coil circuit of a watt meter is 1 percent of its resistance, calculate the percentage error due to this cause at power factors of 0.8, 0.5 and 0.1 respectively. [5M]	3	L2 L3
	OR		
16	a) With help of a neat diagram explain the working of Single phase induction type energy meter. [5M] b) Briefly discuss about the working of LPF wattmeter with help of a neat diagram. [5M]	3	L2 L2
17	a) Derive an equation for Wien's bridge at balance with a circuit diagram and explain the measurement procedure for measuring unknown frequency using this bridge. [5M] b) Explain with neat diagram for measurement of capacitance and loss angle using Desauty's Bridge. [5M]	4	L4 L2
	OR		
18	a) Derive the bridge balance condition for the Schering bridge. [5M] b) Derive an equation for measurement of low resistance using Kelvin double bridge. [5M]	4	L4 L4
19	a) Derive an equation for gauge factor in strain gauge. [5M] b) With help of a neat diagram, explain the principle and working of LVDT. [5M]	5	L4 L2
	OR		
20	a) Explain the classification of transducers with examples and discuss the general characteristics of transducers. [5M] b) Describe with a neat sketch the principle and working of piezoelectric accelerometer and derive the expression for its output. [5M]	5	L2 L2