



R22 Regulation

Subject code:4E5BB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Regular Examinations, December 2024

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION (EEE)

Maximum Marks: 60

Date:28.12.2024

Duration: 3 hours

- Note:**
- 1.This question paper contains two parts A and B.
 2. Part A is compulsory which carries 10 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 (10X1M=10 Marks)			
1.a)	Define static and dynamic errors.		
b)	Distinguish between Moving iron & Moving coil instruments?	1	2
c)	Describe the basic principle of operation of a d.c. potentiometer.	1	1
d)	Mention the applications of CTs & PTs?	2	3
e)	What is the purpose of maximum demand meter?	2	4
f)	Mention errors in dynamometer wattmeters?	3	2
g)	What is Wagner earthing device? Why is it used in measurable by a.c bridges?	3	3
h)	Describe loss of charge method.	4	4
i)	Explain gauge sensitivity.	4	5
j)	Write the main elements of Velocity transducer.	5	2
Part-B		5	6
Answer All the following questions. (5X10M=50Marks)			
2	a) Explain the operation of electrometer type electrostatic voltmeters. [5M] b) Describe the principle of attracted disc type E.S. voltmeters. [5M]	CO	Bloom Tx
		1	3
			2
OR			
3	Explain the construction details of Repulsion – attraction type moving iron instrument. Derive the Torque equation for moving iron instrument. [10M]	1	4
4	Describe how high currents and voltages are measured with the help of instrument transformers. Draw diagrams to illustrate your answer. Describe the advantages of instrument transformers as regards extension of range of current and voltage on high voltage a.c. systems. [10M]	2	6
OR			
5	With the help of a neat circuit diagram explain Crompton's potentiometer and its working. How a true zero is obtained in a Crompton's pot? [10M]	2	5

6	What are the various types of errors in induction type energy meter? Explain the methods incorporated for their compensation [10M]	3	3
	OR		
7	a) Describe the construction of single-phase dynamometer. [5M] b) The total resistance of pressure circuit of a watt-meter is 4000Ω and the inductance of the pressure coil circuit is 6.5mH . Give the shunted capacitor method of compensating the inductance error and determine across what portion of the series resistance a $0.1\mu\text{F}$ capacitor should be shunted to effective compensation. [5M]	3	2 4
8	In Hay's bridge the four arms are arranged as under: AB is a resistance of 600Ω in series with an inductor of 0.18H , BC and DA are noninductive resistances of 1200Ω each and CD consists of a resistance R in series with a capacitor C. A potential difference of 3V at a frequency of 50Hz is applied between A and C. Determine the values of R and C. Derive the condition for bridge balance. [10M]	4	5
	OR		
9	a) Explain the principle of Owen's bridge. [5M] b) An ac bridge has in arm AB a pure capacitance of $0.2\mu\text{F}$; in arm BC, a pure resistance of 500Ω ; in arm CD, a series combination of $R=50\Omega$ and $L=0.1\text{H}$. Arm DA consists of capacitor $C=0.4\mu\text{F}$ in series with a variable resistor R_x , $\omega=5,000\text{ rad/s}$. Find the value of R_x to obtain bridge balance. [5M]	4	3 2
10	a) Explain the force transducer with neat block diagram. [5M] b) Describe the principle of operation of LVDT. [5M]	5	1 2
	OR		
11	Illustrate various methods for the measurement of acceleration and explain any one of them in detail. [10M]	5	3