R15

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a)	Why the scale of Moving Iron instrument is calibrated non- linearly?	[2]
b)	What is the extension procedure of electrostatic voltmeter?	[3]
c)	How the D.C. potentiometer is standardized?	[2]
d)	Draw the equivalent circuit and phasor diagram of a current transformer.	[3]
e)	What is Tri-vector Meter?	[2]
f)	What is creeping in an energy meter and how it can be minimised?	[3]
g)	Mention the purpose of Desauty bridge and Schering bridge ?	[2]
h)	Derive an expression for deflection current (I_g) of an unbalanced Wheatstone's bridge.	[3]
i)	How Delayed time base system can be operated in Oscilloscope.	[2]
j)	What are active and passive transducers? Give examples.	[3]

PART - B

(50 Marks)

2.a)   With a neat diagram explain in detail the construction of PMMC instrument.
 b)   A moving coil instrument gives a full scale deflection of 10mA when the potential difference across its terminals is 150mV. Calculate
        i) The shunt resistance for a full scale deflection corresponding to 100A and 130A.
        ii) The series resistance for full scale reading with 600V. Calculate the power dissipated in each case.   [5+5]

OR

3.a)   State the basic requirement of any measuring instruments. How the various measuring instruments are classified?
 b)   Explain the working principle of moving iron instrument and write advantages.   [5+5]

4.a)   Explain how wattmeter is calibrated using D.C potentiometer
 b)   What is volt-ratio box? Design a volt ratio box with a resistance of 50Ω/Volt, and ranges 25V, 50V, 75V, 150V and 300V. The volt-ratio box is to be used with a potentiometer having a measuring range of 1.6V.   [5+5]

OR

5.a)   Explain the construction and working principle of a polar type potentiometer with a neat sketch.
 b)   Why a potentiometer does not load the voltage source whose voltage is being determined.   [6+4]

6.a) Explain the special features incorporated in an electrodynamometer type of wattmeter so that it can be used for low power factor applications.
 b) Discuss in detail about maximum demand meters. [5+5]

OR

7.a) Derive the torque equation for induction type single phase energy meter.
 b) A 50 A, 230 V, 1-phase energy meter on full load test makes 61 revolutions in 37 secs. If the normal disc speed is 520 revolutions per kwh, find the percentage error? [5+5]

8.a) Why Kelvin's bridge is preferred? Derive the bridge balance equation for the Kelvin's Bridge?
 b) Explain the construction and working principle of megger to measure high resistances. [5+5]

OR

9.a) Draw the Maxwell's bridge circuit and derive the expression for the unknown element at balance.
 b) An A.C bridge has the following elements: Arm AB: R_1 = 600Ω, G = 0.4μF. Arm BC: R_2 = 400Ω, C_2= 2μF. Elements in arm AB are in parallel. Elements In arm BC are in series. Arm CB: R_3 = 1.4KΩ. Arm AD has unknown resistance R_x with usual notation. Find the value of R_x and the frequency at which the bridge is in balance. [5+5]

10.a) What is the use of LVDT? Discuss its basic principle of operation.
  b) Explain the principle of Strain gauges and give their constructional details. [5+5]

OR

11.a) With a neat diagram, explain the working of CRT.
  b) Write short notes on Photo Diodes. [5+5]

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