B.E. (EE) Part-II 4th Semester Examination, 2010
Electrical Measurements-II
(EE-401)

Time : 3 **hours** **Full Marks** : 70

Use *separate answerscript for each half.*
Answer SIX questions, taking THREE from each half.
Two marks are reserved for neatness in each half.

FIRST HALF

1. a) What are the types of errors in instrumentation systems? Explain each type of error, the source of error, effects of error and way to reduce or eliminate these effects.

   b) The volume of a cube was calculated from the edges of the cube. The edges of the cube were measured as 0.60 metre. The possible error in measurement was $\pm 1\%$. Determine the volume in m^3 and the maximum possible absolute and percent error. **|(l+4+l+l+l)+(l+l+l)l**

2. a) With a neat labelled sketch, explain the principle of operation with phasor diagrams, of an electrical resonance frequency meter.

   b) What are the conditions that must be fulfilled before connecting an incoming alternator to a running alternator?

   c) What is the function of lamp in synchroscope? [(2+**4**)+2+3)

3. a) Explain with connection diagram and vector diagram how the reactive volt-ampere-hours can be determined for a balanced three-phase load circuit.

   b) Draw the figure of Wright Maximum Demand Indicator.

   c) Supposing the following readings are obtained for one month of 30 days, find out the average monthly load factor and power factor. RKuah meter advance $= 83,830$ Kvah reactive, Kwh metre advance $= 291,940$ Kwh, Demand indicator $= 1,400$ kW. I(I+2+3)+2+(I'/JX2)J

4. a) (i) What is D Arsonval type galvanometer?

(ii)   Write down the instrinsic constants of the ballistic galvanometer.

(iii) For the solution of equation of motion of ballistic galvanometer, particular integral and complementary function are considered, what responses they indicate?

b)   The following test results are obtained on a sample of sheet steel stampings at a frequency of **50** Hz,

Volts	**4.5**	**69.3**	**91.8**	**100.5**	**110.5**	**118.0**
Amperes	**0.2**	**0.3**	**0.46**	**0.52**	**0.64**	**0.77**
Watts	**9.5**	**16.8**	**27.5**	**32.5**	**39.0**	**44.8**

Mean width of plates **3** cm, mean thickness **0.0489** cm, number of plates **5**1, total weight 1**1** kg, number of magnetising turns on coil **600.** Allowing **3** watts for copper loss in the magnetising winding, calculate the iron loss in watts per kg. at a maximum flux density of 1 wb/m^2 and a frequency of **50** Hz.

[<2+2+2)+5]

5.   Write short notes on : |3K+314+**4**|
a)   X-Y Recorder,
b)   Hall coefficient of material,
c)   Grassot Flux Meter.

SECOND HALF

6.   a) How the inductance of a coil having Q value **5.5** is measured using a.c. bridge? Draw the modified bridge for the above measurement when the'Q value of the coil becomes **55.**

b) Discuss the influences of frequency of the source in the above measurement.

I(5+3)+31

7.   a)   How the value of unknown loss-less capacitor is measured by a.c. bridge when R$_a$ and R^ are the variable non inductive resistances, C$_s$ is the value of standard capacitor used in the bridge.
What modification of the above bridge is required if the capacitors are considered are considered imperfect.

b)   A bridge is in balanced with the following constants :
Arm   PQ -> R = **450O**
QR -> R = **300 n** in series with C = **0.265** uF
SP -» R = **200O** in series with L = **15.9** mH
Find the constants in SR-arm when source having frequency **1** kHz is connected across QS.   l(5+2)+**4**|

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8. a)   Compare (i)   d.c. potentiometer with a.c. potentiometer.

                   (ii) polar type potentiometer with co-ordinate type potentiometer.

    b)   Describe Crompton's d.c. potentiometer for the measurement of e.m.f. highlighting the necessary precautions taken. |6+5|

9. a)   What are the major blocks of the oscilloscope and how is the vertical axis of an oscilloscope deflected?

    b)   How the frequency is measured by Lissajous method using CRO. |6+5|

10. Write sort notes on :

    a)   Drysdale phase shifting transformer,

    b)   Application of potentiometer for measurement of Resistance.