

Sr. No.....

B.Tech. III SEMESTER

Electrical Measurements and Instrumentation (EE-203C)

Time: 3 Hours

Max. Marks:75

- Instructions:**
1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.
 2. Answer any four questions from Part -B in detail.
 3. Different sub-parts of a question are to be attempted adjacent to each other.

PART -A

- Q1 (a) Give a comparison between PMMC and Moving Iron instruments. (1.5)
- (b) Wheatstone bridge cannot be used for precision measurements. Why? (1.5)
- (c) What are the uses of Instrument transformers? (1.5)
- (d) Discuss constructional details and working of single phase induction type energy meter. (1.5)
- (e) What is a Harmonic Distortion Analyzer? (1.5)
- (f) What are Piezoelectric transducers? (1.5)
- (g) Discuss few applications of Maxwell's Bridge. (1.5)
- (h) Define active and reactive power. (1.5)
- (i) Discuss B-H curve of a magnetic material. (1.5)
- (j) What are thermistors? (1.5)

PART -B

- Q2 (a) Draw the circuit of a Kelvin's Double bridge used for measurement of low resistances. Derive the conditions for balance. (7.5)
- (b) Draw and explain the circuit diagram and phasor diagram of a Desauty Bridge. (7.5)
- Q3 (a) Discuss constructional details and working of single phase induction type energy meter. (7.5)
- (b) Write short note on 'Power factor meter'.
- Q4 (a) Draw the equivalent circuit and phasor diagram of a current transformer. Derive the expression for ratio and phase angle errors. (10)
- (b) A potential transformer, ratio 1000/100 volt, has the following constants (5)
- Primary resistance = 94.5 ohm, Secondary resistance = 0.86 ohm
Primary reactance = 66.2 ohm, Total equivalent reactance = 110 ohm
No load current = 0.02 A at 0.4 power factor
Calculate ratio and phase angle error at no load.
- Q5 (a) Discuss principle of working of moving iron instruments. (10)
- (b) A permanent magnet moving coil instrument has a coil of dimensions 15mm*12mm. (5)
- The flux density in the air gap is $1.8 \times 10^{-3} \text{ Wb/m}^2$ and the spring constant is $0.14 \times 10^{-6} \text{ Nm/rad}$. Determine the number of turns required to produce an angular deflection of 90 degrees when a current of 5 mA is flowing through the coil.

Q6 (a) Discuss various types of Digital Voltmeters? (7.5*2)
(b) With the help of a block diagram, discuss working of wave analyzer.

Q7 Write short note on (5*3)
i) Strain Gauge
ii) Hall effect sensors
iii) Electrodynamometer wattmeter
