Paper code: EE302	Roll No.										

B. Tech. (Branch:EE)

(SEM III) ODD SEMESTER EXAMINATION 2015-16
ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS

[Time: 3 hrs]   **[Max.Marks:100]**
Note: Answer all five questions

1. Answer any four parts   *[5X4=20]*

A). Define the term STANDARDS in measurement system .how are they classified?

B).What do you mean by the term accuracy and precision?

C). Define limiting error. Derive the expression for relative limiting error.

D).The meter constant of a single phase 240v energy meter is 400 revolutions per kWh. What is the speed of the meter disc for a current of 10 amps at 0.8 pf lagging?

E). Explain the working principle of thermocouple.

 F). How creeping-could be avoided in energy meter?

2. Answer any two parts   *[10X2=20]*

A). a 1000/5 A, 50 Hz current transformer has a secondary burden comprising a non inductive impedance of 1.6Ω.the primary winding has one turn. Calculate the flux in the core and ratio error at full load. Neglect leakage reactance and assume the iron loss in the core to be 1.5W at full load.

B).What is the sources of error in instrument transformers? Draw the equivalent circuit and phasor diagram of a potential transformer.

C).What is the different methods of measurement of frequency in power frequency range? Explain the construction and working of electro-resonance type frequency meter. Draw the phasor diagram under different power factor conditions

3. Answer any two parts   *[10X2=20]*

A). Derive the equations for balance in the case of Maxwell's inductance - Capacitance Bridge. Draw the phasor-diagram for balance condition.

B). what are the different factors which affect the precision measurement of medium resistances with wheat stone bridge? Explain how their effects are minimized. Also describe Carey foster slide wire bridge method for precise measurement of medium resistances.

C). Explain the working of Q meter. A circuit consisting of a coil, a resistance and a variable capacitor connected in series is tuned to resonance using a Q meter. If the frequency is 500 kHz, the resistance 0.5Ω and the variable capacitor set to 350pf. calculate the effective inductance and resistance of the coil, if the Q meter indicates 90.

4. Answer any two parts   [10X2=20]

A) Explain the Lloyd Fisher square for measurement of iron loss in a specimen of laminations.

B). Explain the Dry dale-Tinsley polar type AC potentiometer on the basis of its connection diagram, standardization and measurement of unknown emf.

C). In the measurement of power by a polar potentiometer the following readings were obtained

Voltage across a 0.2Ω standard resistance in series with the load= $1.46 \angle 32°$

Voltage across a 200:1 potential divider across the line= $1.37 \angle 56°V$

Estimate the current, voltage, power factor of the load.

5. Answer any two parts   [10X2=20]

A). Explain the functioning of a ramp type digital voltmeter with suitable block diagram.

B). Describe how frequency and phase angle measurement can be made with the use of a CRO. Also explain dual beam and dual trace CRO.

C). Explain with the help of block diagram, the various parts of an electronic multimeter.