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<p>B. Tech. (Sem. III) (Main & Back) Examination, January - 2013 Electronic Ins. & Control Engineering 3E14 Electrical Measurements</p>		

Time : 3 Hours]

[Total Marks : 80

[Min. Passing Marks : 24

Attempt overall five questions in all.

Selecting one question from each unit. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitable be assumed and stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No. 205)

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UNIT-I

1 (a) Describe the functions of the following in a single phase induction type energy meter :

- (a) Shunt and series magnets
- (b) Moving disc
- (c) Permanent magnet
- (d) Registering mechanism
- (e) Shading bands
- (f) Holes in disc.

8

(b) Explain how power can be measured in a 3-phase circuit with the help of two wattmeters. Illustrate your answer with the help of a phaser diagram for a balanced star connected load.

8

OR



- 1 • (a) Discuss the following types of error in moving iron instrument
- (a) Hysteresis error
 - (b) Temperature error
 - (c) Error on account of stray magnetic field
 - (d) Error on account of a change of frequency

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- (b) Two wattmeters connected to measure the input to a balanced 3-phase circuit indicates 2000 watt and 500 watt respectively. Find the power factor of circuit :

- (a) When both the readings are positive, and
- (b) When the later reading is obtained after reversing the connection to the current coil of first instrument.

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UNIT-II

- 2 (a) Describe the following types of Oscilloscopes :

- (a) Dual trace type
- (b) Dual beam type.

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- (b) Describe how the following measurements can be made with the use of a CRO :

- (a) Frequency
- (b) Phase angle.

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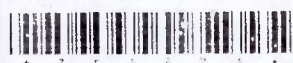
OR

- 2 (a) Describe the principle of working and circuit diagram of a digital oscilloscope.

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- (b) A CRT has an anode voltage of 2000V and parallel deflecting plates 2 cm long and 5 mm apart. The screen is 30 cm from the centre of the plates. Find the input voltage required to deflect the beam through 3 cm. The input voltage is applied to the deflecting plates through amplifiers having an overall gain of 100.

8



UNIT-III

- 3 (a) Draw the circuit of a Kelvin's Double Bridge used for measurement of low resistance. Also derive the conditions for balance. 8
- (b) Explain the loss of charge method for measurements of insulation resistance of cables. 8

OR

- 3 (a) Draw the circuit of a wheatstone bridge and derive the conditions of balance. 8
- (b) What is the importance of the value of earth resistance. What are the factors which influence its value. 8

UNIT-IV

- 4 (a) Derive the equations for balance in the case of Maxwell's inductance capacitance bridge. Draw the phaser diagram for balance conditions. 8
- (b) Describe how an unknown capacitance can be measured with the help of D'Sauty's bridge. 8

OR

- 4 Explain how Wein's bridge can be used for experimental determination of frequency. Derive the expression for frequency in terms of bridge parameters. 16



UNIT-V

- 5 Describe the construction and working of a polar type potentiometer. How it is standardized ? What are the functions of the transfer instrument and the phase shifting transformer.

16 .

OR

- 5 Explain the reasons why D.C. potentiometers can not be used for A.C. measurements straightway. Explain the modifications that are needed in a D.C. potentiometer to be used for A.C. applications.

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