Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech**

PET4I103

4th Semester Regular / Back Examination 2018-19

ELECTRICAL AND ELECTRONICS MEASUREMENT

BRANCH : ECE, ETC

Time : 3 Hours

Max Marks : 100

Q.CODE : F835

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Only Short Answer Type Questions (Answer All-10) **(2 x 10)**

a) How the IEEE standard is different from other standards?

b) Draw a graph to distinguish between low accuracy & high precision

c) Name two null detectors for ac bridges.

d) Name the bridge circuit that measures unknown inductance in terms of a known capacitance. Draw the circuit.

e) How is Wagnor ground connection useful?

f) Write down important applications of D.C POT (at least 4).

g) Compare ballistic galvanometer and vibration galvanometer.

h) Distinguish between CT and PT.

i) Why is the FET input D.C voltmeter is required?

j) How are digital voltmeters broadly classified?

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) **(6 x 8)**

a) Explain all the static characteristics of measurement.

b) Classify different standards based on their use.

c) Develop the equation of balance for the bridge used for measurement of inductance for high Q-coil.

d) If Z_1 = 450 Ω, Z_2 = (300-j600) Ω, Z_3 = (200+j100) Ω, then find out the value of Z_4, so that, the bridge is balanced.

e) Deduce the equation of balance for the Anderson bridge with a neat diagram. Explain its usefulness for measurement of self-inductance. Draw the phasor diagram when the bridge is at balance.

f) Derive the expression for deflection torque of PMMC instruments.

g) A Crompton's potentiometer consists of a resistance dial having 15 steps of 10 ohm each and a series connected slide wire of 10 Ω which is divided into 100 divisions. If the working current of potentiometer is 10 mA and each division of slide wire can be read accurately upto 1/5 th of its span, calculate the resolution of the potentiometer in volts.

h) A dynamometer wattmeter reading correctly on D.C is used to measure power in circuit of resistance of 2 Ω and inductance of 0.25 H. The supply is 200 V at 50 Hz and the pressure coil circuit of wattmeter has a resistance of 1000 Ω and inductance of 5.6 mH. Calculate the actual reading of the wattmeter. Neglect the impedance of the current coil circuit. Assume the pressure coil is connected on load side of the instrument.

i) What is power factor? Explain the construction and operation of crossed coil power factor meter.

j) Explain the working of true rms responding voltmeter with suitable block diagram.

k) Explain in detail the operation of digital storage oscilloscope with suitable block diagram.

l) What are the functions of time base in frequency counter?

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 **a)** Explain the constructional difference between Wheatstone and Kelvin double bridge. **(16)**

b) Derive the equation of balance for the Kelvin Double bridge

c) The ratio arms of Kelvin bridge are 200Ω each. The Galvanometer has an internal resistance of 500 Ω & a current sensitivity of 200mm/μA. The unknown resistance Rx=0.1002 Ω and standard resistance is set at 0.1 Ω. A DC current of 10 A is passed through the standard & the unknown from a 2.2 V battery in series with a rheostat. The resistance of the yoke is neglected. Calculate i) the deflection of the galvanometer .ii) the resistance unbalance required to produce a galvanometer deflection of 1 mm?

Q4 **a)** Describe the principle of working of a moving iron instrument. How are they classified? **(16)**

b) Show that this type of instrument can be used for both D.C and A.C measurements.

c) Illustrate the errors involved in both types of measurement.

Q5 **a)** How the principle of operation of A.C. potentiometers differs from D.C. potentiometers and what are the factors that must be considered for operation of A.C. potentiometers? **(16)**

b) Explain about standardization and classification of A.C. potentiometers.

c) Compare the operation of Drysdale-Tinsley & Gall-Tinsley Potentiometer.

Q6 **a)** What is the use of Q-meter? Describe basic Q-meter circuit. **(16)**

b) What are the methods used for connecting unknown components to the test terminal of Q-meter? Explain all the methods in details.