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

Total Number of Pages: 02 **B.Tech.**
PCEE4204

3rd Semester Back Examination 2017-18
ELECTRICAL AND ELECTRONICS MEASUREMENT
BRANCH : AEIE, ECE, EIE, ETC, IEE, EEE, ELECTRICAL
Time: 3 Hours
Max Marks: 70
Q.CODE: B722
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) What do you understand by accuracy and precision of measurement.
b) Why an ammeter should have a low resistance value?
c) Why in D'Arsonval galvanometer, an iron core is usually used between the permanent magnet pole faces?
d) How compensation for static friction is provided in an induction type energy meter?
e) Why the secondary of a CT is never left open circuited.
f) How the errors in current transformers can be reduced while designing?
g) Explain why a true rms reading voltmeter uses two thermocouples.
h) The deflection of an electron beam on a CRT screen is 10mm.Suppose the pre-accelerating anode voltage is halved and the potential between deflecting plates is doubled. Find the deflection of the electron beam in mm.
i) Why Maxwell Bridge is limited to the measurement of medium – Q coils?
j) What do you mean by "standardisation" in slide wire potentiometer?

Q2 **a)** Derive the equation of balance of a Schering Bridge. Draw the phasor diagram undernull conditions and explain how loss angle of capacitor can be calculated. **(5)**

b) The circuit for measurement of effective resistance and self-inductance of an iron cored coil is as follows:arm *ab*,the unknown impedance;arm *bc*,a pure resistance R_3;arm*cd*,a lossless capacitor C_2; arm *da*,a capacitor C_2 in series with a resistance.Under balance conditions:R_3=10 Ω, R_2=842 Ω, C_2=0.135 μF and C_4=1 μF. **(5)**
Calculate the value of effective resistance and self-inductance at a supply frequency of 100 Hz.Derive the equations of balance and draw the phasor diagram under balanced condition.

Q3 **a)** Describe the construction & working of a ballistic galvanometer. Explain the different in constructional details of a ballistic galvanometer & a D'Arsonval galvanometer. **(5)**

b) In a dynamometer wattmeter the moving coil has 500 turns of mean diameter 3cm. Estimate the torque if the axis of the field & the moving coils are at (i)60° (ii)90° when the density in the field coil is 15 mWb/m^2,the current in the moving coil is 0.5A and the power being measured has a power factor of 0.866. **(5)**

Q4 **a)** Explain the term standardisation of a potentiometer. Describe the procedure of standardization of a d.c. potentiometer. **(5)**

b) The following readings were obtained during the measurement of a low resistance using a potentiometer. **(5)**
Voltage drop across a 0.1 Ω standard resistance=1.0235V
Voltage drop across the low resistance under test=0.4221V
Calculate the value of unknown resistance, current and power lost in it.

Q5 **a)** A potential transformer , ratio 1000/100 volt, has the following costants: **(5)**
Primary resistance= 94.5Ω, secondary resistance=0.86Ω,primary reactance=66.2 Ω, Total equivalent reactance referred to primary side=110Ω,no load current=0.02 A at 0.4 power factor.
Calculate:(i) phase angle error at no load (ii) burden in VA at unity power factor at which the phase angle will be zero.

b) Draw the phasor diagram of a CT & discuss the effect of variation of power factor of the secondary burden upon the performance. **(5)**

Q6 **a)** Describe briefly with neat sketches about true r.m.s reading voltmeter. **(5)**

b) In a CRT, the anode to cathode voltage is 2000 V. The parallel deflector plates are 1.5 cm long and spaced 5 mm. The screen is 50 cm from the centre of the deflection plates. Find the following (i) The beam speed (ii) The deflection sensitivity of the tube. **(5)**

Q7 **a)** With suitable block diagram, explain the working of Basic spectrum Analyzer. **(5)**

b) A PMMC instrument has a coil of dimensions 15mm X 12mm. The flux density in the air gap is 1.8×10^{-3} wb/m^2 and spring constant is 0.14×10^{-16} N-m/rad. Determine the number of turns required to produce angular deflection of 90^o when 5A current is flowing the coil. **(5)**

Q8 **Write short answer on any TWO:** **(5 x 2)**

a) Kelvin's double bridge

b) Power factor meter

c) Frequency Counters

d) Mutual inductance method for testing of CT