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FACULTY OF ENGINEERING

S.E(EEP/EE/EEE) Year Examination – MAY-2015

Electrical Measurement & Techniques

(Revised)

[Time: Three *Hours*] **[Max. Marks: 80]**

"Please check whether you have got the right question paper."

N.B i) Q.1 and Q.6 are compulsory.
ii) Attempt any two questions from remaining questions of each section.
ii) Assume suitable data wherever necessary.

SECTION -A

Q.1 Solve any five questions. 10

a) Define the term linearity and dead zone.
b) What do you mean by zero drift, span drift and zonal drift?
c) What are limiting errors?
d) What is main function of the instruments:
i) Recording function ii) Controlling function.
e) A meter reads 136.6v and the true value of the voltage is 136.52v. determine static error & static correction for this instrument.
f) What are different types of detectors used in A.C bridges?
g) Give the classification of measurement resistance with range of resistance.
h) What are advantages of poly phase watt meter?

Q.2 A) Drive the equation of balance for an Schering bridge. Draw the phase diagram for balance condition. 08

B) The following data relate to the bridge as 07

Arm AB: $R_1 = 200\Omega$
Arm BC: $R_2 = 200\Omega$, in series $C_2 = 5\ \mu F$
Arm AD: $R_3 = 500\Omega$ in series $C_3 = 0.2\mu$ F
Arm CD: constants of zx
Find the value Zx impedance.

Q.3 A) Derive the expression for torque for a moving iron instrument. 08

B) The resistance of a moving coil voltmeter is 12000Ω, the moving coil has 100 turns & is 4cm×3cm wide. The flux density in air gap is 6×10^{-2} tesla. Find the deflection produced by 300volts. If the spring control gives deflection of one degree for a torque of 25×10^{-7}Nm. 07

Q.4 A) Explain the extension of range of ammeter and voltmeter using shunt and multiplies. 08

B) Derive the power equation for 3ϕ system unbalanced load using three watt meter method. 07

Q.5 A) Explain the earth tester for measurement of earth resistance. 08

B) Phasor voltage and current of a star connected inductive load is 150v & 25A. p.f of load is 0.707 lag. Assuming the system is 3-wine of power measurement by 2-watt meter. Find the reading of watt meter. 07

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SECTION- B

Q.6 Solve any five questions. 10

a) What is function of focus & intensity in CRO?
b) What are different types of amplifiers used in CRO?
c) What is the effect of shaded band on energy meter?
d) How does the PT differs from power transformer?
e) A 5A, 230v meter on full load unity p.f test makes 60 revolution is 360 secs. off the normal Disc speed 620 rev/kwh .what the percentage error?
f) Define the terms applied to instrument transforms.
i) Turn ratio ii) Nominal transformation ratio.
g) What is a strain gauage?
h) What is the principle on which a resistive transducer works?

Q.7 A) Explain with block diagram the operation of electronic energy meter. 08

B) A 230v, 1ϕ, watt hour meter has a constant load of 4 amp passing through it for 6 hours at unity power factor. If the meter disc makes 2208 evolutions during this period determine the meter constant in revolution per kwh. Calculate the power factor of the load if the numbers of revolution made by the meter are 1472 when operating at 230volt & 5amp for 4 hours. 07

Q.8 A) List the advantage and disadvantages of electrical transducers. 08

B) Explain the method for frequency measurement by lissojous pattern. 07

Q.9 A) What are errors and their compensation in watt meter? 08

B) Explain working & construction of 3ϕ energy meter. How we can correct if it is fast moving? 07

Q.10 A) Explain how the insulation resistance is measured when power is on. 07

B) What is ratio and phase angle error of IT? On which factors does it depends? 08