

GANPAT UNIVERSITY
B.TECH SEM-III (ELECTRICAL)
REGULAR EXAMINATION DEC-2013
2EE304: ELECTRICAL MEASUREMENT AND MEASURING
INSTRUMENT

Time: 3 Hours

Total Marks:-70

- Instructions:** - 1. Attempt all questions.
 2. Make suitable assumptions wherever necessary.
 3. Figures to the right indicate full marks.

SECTION-I

- Q:1 (A)** Why is a deflecting torque necessary in an indicating instrument? Name the instruments which are based on different methods of producing deflecting torque. (06)
(B) Explain the constructional features of flux meter. And Show that for a flux meter $N\phi = K(\phi_2 - \phi_1)$ (06)

OR

- Q:1 (A)** A 1000/5 A, 50 Hz current transformer has 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 1.5 W at full load. The magnetizing mmf is 100 A. (06)
(B) Write a short on on PMMC. (06)

- Q:2 (A)** Derive the balance equation for De'sauty's bridge for capacitance measurement with suitable diagram. (06)
(B) A balanced 1khz bridge has the following configuration: (05)
 Arm AB: $R_1=1000\Omega$ in parallel with $C_1=0.053\mu\text{f}$; $R_2=1500\Omega$ in series with $C_2=0.53\mu\text{F}$; CD: the unknown, DA: pure capacitance= $0.265\mu\text{F}$.
 Determine R and L constants of unknown. Draw the phasor diagram of the bridge at above frequency.

OR

- Q:2 (A)** State the reason why current transformer must never be operated on open circuit. (06)
(B) Draw a connection diagram of Crompton potentiometer and bring out its salient features. (05)

- Q:3 Attempt any Two:** (12)
(A) Explain the working of single phase electrodynamicometer type power factor meter with neat diagram.
(B) Draw a connection diagram of Crompton potentiometer and bring out its salient features.
(C) Distinguish between the direct and indirect methods of measurement. Cite examples to support your answer.

SECTION-II

- Q:4 (A) Using expression for torque in single phase induction type energy meter, show that the total no of revolutions made by its disc during a particular time is proportional to the energy consumed. (06)
- (B) Three identical impedances, each of $3-j4$ ohms are connected in star across a 3-phase 400 V, 50 Hz supply. A wattmeter is connected with its current coil in line Y. calculate the wattmeter readings when the pressure coil is connected across (i) Y and R (ii) R and B. (06)

OR

- Q:4 (A) Describe the constructional details of an electro-dynamometer type wattmeter. Derive the expression for torque when the instrument is used on a.c. supply? (06)

(B) Explain the ac bridge method for measurement of iron losses. (06)

- Q:5 (A) Give the analogy between CT & PT (06)

(B) 230 V, 1-ph energy-meter to load current of a 4 A, passing through it for 5 hours at unity power factor. If the meter makes 1104 revolution during this period. What is the meter constant in rev/kwh. If the load power factor is of 0.8. What nos of revolutions the disc will make in above time. (05)

OR

- Q:5 (A) State and explain the functions of shading band and driving magnet. (06)

(B) What is potentiometer? Discuss the principle of it. (05)

- Q:6 (A) Describe Carey-Foster's slide wire bridge for the measurement of medium resistance. (06)

(B) A wattmeter with its current coil in line R and pressure coil across Y and B reads 3.2 Kw for a balanced load on 0.6 lagging p.f. the supply voltage is 400 V. determine current, power and reactive volt amp of the load. (06)

END OF PAPER
Best of Luck