

Government College of Engineering, Aurangabad
(An Autonomous Institute of Government of Maharashtra)

S. E. (EEP) Examination
End Semester Examination

EE 245 : Electrical Measurement and Instrumentation

Time: Three Hours

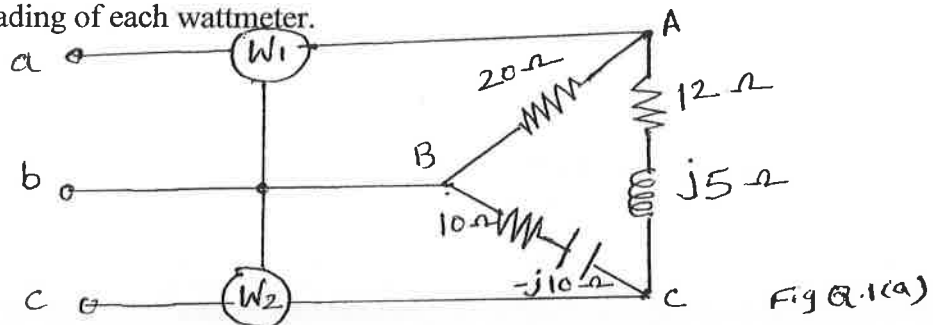
12.3.NOV.2016

Max. Marks: 60

N.B:- 1. All questions compulsory. 2. Figures to the right indicate full marks

3. Assume suitable data if necessary and state it clearly 4. Use of non-programmable calculator is allowed

- Q1 a) The unbalanced delta connected load is supplied by a balanced source as shown in fig.Q.1(a) such that $V_{ab} = 208/\sqrt{3}$ V with positive phase sequence. The current coil of wattmeter No.1 is connected in line 'a' and pressure coil is connected across line 'a' & line 'b', The current coil of wattmeter No.2 is connected in line 'c' and pressure coil is connected across line 'c' & line 'b'. Calculate the reading of each wattmeter. [06]



- b) Explain with neat diagram Anderson's bridge for measurement of inductance and draw phasor diagram [06]

- Q2 a) A capacitor is tested by a standard bridge. It forms one arm AB of the bridge. The other arms are : AD – a non reactive resistance of 100 ohm; DC – a non reactive resistance of 300 ohm shunted by a capacitor of $0.5 \mu\text{F}$; BC – a standard loss free capacitor of 100 pF, the supply frequency 50 Hz. The bridge is at balance with above components. Find out the capacitance and power factor of the capacitance under test. [06]

- b) Explain two wattmeter method for three phase power measurement under balanced condition and delta connected load. Also derive expression for power factor in terms of wattmeter readings [06]

Q3 Solve any two

- a) A cable is tested by loss of charge method using a ballistic galvanometer with the following results: discharged immediately after electrification, deflection 250 division, discharged 25 seconds after electrification (i) deflection 150 division (ii) when in parallel with a resistance of $7\text{M}\Omega$ deflection 100 divisions. Calculate the insulation resistance of the cable [06]

- b) Explain construction and working of induction type of instrument and derive torque Equation. [06]

- c) Explain with neat diagram measurement of flux and flux density. [06]

- Q4 a) Solve any two
The secondary winding burden of current transformer ,having a bar primary and 300 secondary turns,is an ammeter of resistance 1.0ohm and reactance 0.55 ohm.The resistance and reactance of secondary winding are 0.3 ohm and 0.25 ohm respectively.The core requires the equivalent of an mmf of 90 AT for magnetization and 45 AT for core losses.Determine the following (1) The primary winding current and actual transformation ratio when the ammeter in the secondary winding circuit indicates 5A. (2) The number of turns which could be reduced in the secondary winding so that the ratio error be zero for this condition. [06]
- b) Explain with block diagram digital voltmeter. [06]
- c) Write a note on field strength meter and Q-meter [06]

- Q5 Solve any two
- a) Explain with block diagram wave analyzer. [06]
- b) Explain an experimental set for humidity measurement by using instrumentation system. [06]
- c) Write a note on LED and LCD display. [06]
