NATIONAL INSTITUTE OF TECHNOLOGY
Electrical Engineering Department

Electrical & Electronic Measurements
End Semester Examination
Maximum Marks: 50

EE-213
Date of Exam: 24-11-2023
Duration : 3:00hrs

All questions are compulsory

Q.1 (a) Draw the bridge circuit of Anderson bridge and explain the working in detail with phasor diagram. Also derive the balance condition. (6)

(b) Give the details of classification of measuring instruments along with the suitable example for each type. (4)

Q.2 (a) What is D' Sauty's bridge used for give its main disadvantage and how to overcome that disadvantage by using modified D' Sauty's bridge. Also draw the bridge circuit of D' Sauty's bridge and derive the balance condition. (1+1+4)

(b) A 50 V range spring controlled electrodynamometer voltmeter having a square law response takes 0.05A on D.C for full scale deflection of 90^0. The control constant is $0.05 *10^{-6}$ Nm/degree and the initial mutual inductance of the instrument is 0.25H. Find the true potential difference across the instrument when reads 50V at 50 HZ. (4)

Q.3(a) What are the different methods of measurement of frequency in the power frequency range? Explain the working and construction of the electrical resonance type frequency meter with diagrammatic representation. (6)

(b) In a wheat stone bridge the values of various resistances are P=1000Ω, Q=100 Ω, R=2005 Ω and S=200 Ω. The battery has e.m,f of 5 volts and negligible internal resistance. The galvanometer has a current sensitivity of 10 mm/μA and internal resistance of 100 Ω. Calculate the deflection of galvanometer and sensitivity of the bridge in terms of the deflection per unit change in resistance. (4)

Q.4(a) Draw the equivalent circuit of Potential Transformer with its phasor diagram and derive the phase angle and transformation ratio. (6)

(b) An electrostatic voltmeter is constructed with six parallel semicircular fixed plates equally spaced at 4mm intervals and 5 interleaved semicircular movable plates that move in planes midway between fixed plates in air. The movement of movable plates is about an axis through the center of circles of the plates system, perpendicular to the planes of plates. The instrument is spring controlled. If the radius of the movable plate is 4cm, calculate the spring constant if 10KV corresponds to full scale deflection of 100^0. Neglect fringing and plate thickness. (4)

Q.5(a) Give the classification of loop tests to find the distance of fault location also explain (6) in detail the Murray loop test.

(b) It is desired to measure the value of current in 500 Ω resistor as shown in Figure 1 (4) by connecting a 100 Ω ammeter. Find the (a) actual value of current (b) measured value of current (c) percentage error in the measurement and accuracy.
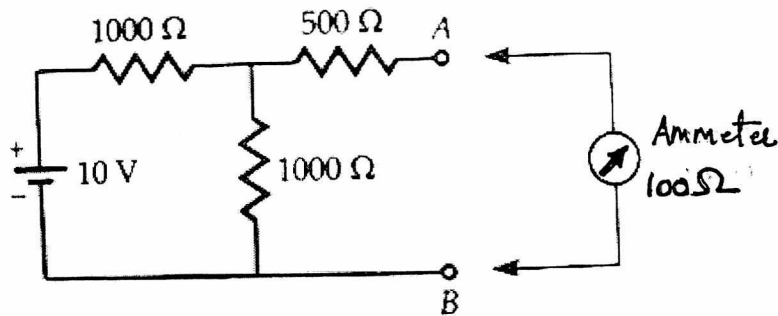

Figure 1

Best of luck