

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(MID SEMESTER EXAMINATION)**

**CLASS: BE  
BRANCH: EEE**

**SEMESTER: III  
SESSION : MO/2019**

**SUBJECT : EE201 ELECTRICAL MEASUREMENT AND INSTRUMENTATION**

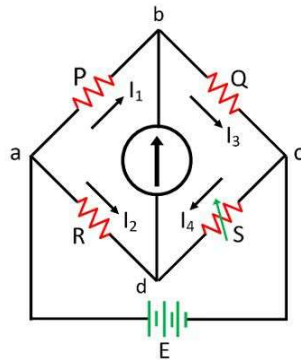
**TIME: 2 HOURS**

**FULL MARKS: 25**

**INSTRUCTIONS:**

1. The total marks of the questions are 25.
2. Candidates may attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.

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- Q1 (a) Differentiate between Accuracy and Precision with an example? [2]  
(b) Define the following terms for a measuring system. [3]  
a) Zero Drift b) Dead Zone c) Resolution
- Q2 (a) A Wattmeter having a range of 1000 W has an error of  $\pm 1\%$  of full scale deflection. If the true power is 100 W, what would be the range of readings? Suppose the error is specified as percentage of true value, what would be the range of the readings? [2]  
(b) In a lab accidentally you got shock by touching two unexcited copper strips on the panel, you try to measure it with a meter but meter has blown, now design a meter whose rating is 10 times of the older one to measure it. The internal resistance of meter is  $1800\Omega$ ? [3]
- Q3 (a) One fine morning you and your friend were measuring the same quantity with same meter in same place but both did not get the same reading. What could be the reason and explain? [2]  
(b) Derive the equation for total number of revolutions made by single phase energy meter? [3]
- Q4 (a) Draw the circuit diagram of Single Phase Electrodynamometer type power factor meter? [2]  
(b) A coil of resistance  $10\Omega$  is connected in the Q meter circuit. Resonance occurs at a frequency of 1 MHz with the tuning capacitor set at 65 pF. Calculate the percentage error in the value of Q if the distributed capacitance is 20 pF? [3]
- Q5 (a) Derive the equations for balance in case of Maxwell's Inductance capacitance bridge? [2]  
(b) In the wheat stone bridge shown in the figure, the values of resistances of various arms  $P = 1k\Omega$   $Q = 100\Omega$   $R = 2005\Omega$  and  $S = 200\Omega$ . The battery has an emf of 5V and negligible internal resistance. The galvanometer has a current sensitivity of  $10\text{mm}/\mu\text{A}$  and internal resistance of  $100\Omega$ . Calculate the deflection of galvanometer and the sensitivity of the bridge in terms of deflection per unit change of resistance? [3]



**Wheatstone Bridge**

Circuit Globe