

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

**CLASS: B.TECH
BRANCH: CSE/IT/EEE/ECE**

**SEMESTER: II
SESSION : SP/2019**

SUBJECT : EE101 BASICS OF ELECTRICAL ENGINEERING

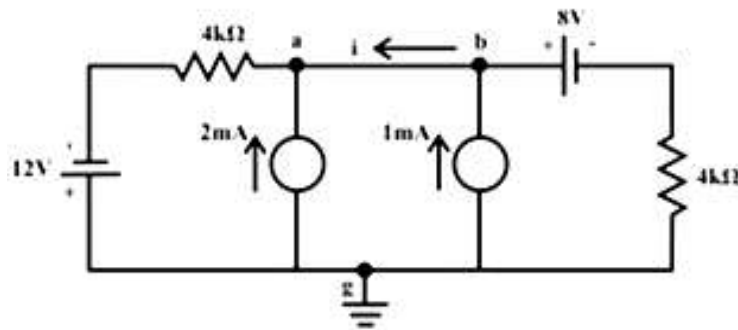
TIME: 2 HOURS

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) Define (i) unilateral and bilateral elements with example; Draw (ii) the q-v characteristic of a linear and nonlinear capacitor. [2]
- (b) A $50 \mu\text{F}$ capacitor is charged from a 200V supply. After being disconnected it is immediately connected in parallel with a $30 \mu\text{F}$ capacitor which is initially uncharged. Find: [3]
- a) the potential difference across the combination
 - b) the electrostatic energies before and after the capacitors are connected in parallel.
- Q2 (a) Find the inductance of a coil in which a current [2]
- a) 0.1A yields an energy storage of 0.05J
 - b) increases linearly from zero to 0.1A in 0.2sec producing a voltage of 5V.
- (b) A coil of 200 turns is wound uniformly over a wooden ring having a mean circumference of 600 mm and a uniform cross-sectional area of 500mm^2 . If the current through the coil is 4.0 A, calculate a) magnetic field strength, b) the flux density, c) the total flux. [3]
- Q3 (a) Define r.m.s. value and average value of a waveform. An alternating current of sinusoidal waveform has an r.m.s. value of 10.0 A. What are the peak values of this current over one cycle? [2]
- (b) Determine the current ifrom node b to a using node-voltage method applying voltage to current source conversion, supply voltages being 12V and 8V dc. [3]



- Q4 (a) Discuss line and phase relation for star and delta connected load. [2]
- (b) Define reactance and susceptance. Draw an admittance triangle. [3]
- The admittance of a circuit is $(0.05-j0.08)$ S. Find the values of the resistance and the inductive reactance of the circuit if they are
- a) in parallel; and b) in series;
- Q5 (a) “An RLC series circuit at resonance is called an acceptor circuit.” Justify whether the statement is true or false. [2]
- (b) In a series parallel circuit, the two parallel branches A and B are in series with C. the impedances are $Z_A=7+j9$, $Z_B=5-j8$ and $Z_C=3.23-j3.35$ and the voltage across the entire circuit is $400+j0$ V. Evaluate the current I_A , I_B and I_C . [3]