Code: 9A02306

R09

B.Tech II Year I Semester (R09) Supplementary Examinations, May 2013
BASIC ELECTRICAL ENGINEERING
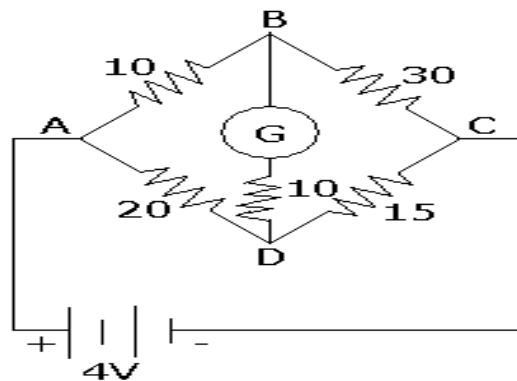(Common to CSS, IT & CSE)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1   (a)   State and explain Kirchoff's laws.
    (b)   Determine the currents in all the bridge arms of the circuit as shown in figure. Find the
          value of the current through the galvanometer, and its direction (G is galvanometer, and
          all resistance are in ohms).

Figure

2   (a)   Explain the division of current in the parallel branches.
    (b)   A circuit consists of three resistances of 12, 18 and 36 ohms respectively by joined in
          parallel and the combination is connected in series with a resistance of 12 ohms. The
          whole circuit is connected to 60 V supply. Calculate current in each branch, total current
          drawn and power dissipated in each resistor.

3   (a)   A current of 10 A flows in a circuit with a 30 degree angle of lag when the applied voltage
          is 100 V. Find the impedance, reactance and resistance of the circuit.
    (b)   Derive the expression of true power and impedance in RLC series circuit.

4   (a)   Discuss the constructional features of transformers. Draw neat diagrams.
    (b)   Calculate the flux in the core of a single-phase transformer having a primary voltage of
          230 V, at 50 Hz and 50 turns. If the flux density in the core is 1 Tesla, calculate the net
          cross – sectional area of the core.

Code: 9A02306

R09

5 (a) Explain the types of DC generators in detail.

    (b) A lap wound DC generator having 80 slots with 10 conductors per slot generates at no load emf of 400 V, when running at 1000 rpm. At what speed should it be rotated to generate a voltage of 220 V on open circuit.

6   A 200 V dc shunt motor develops an output of 16.9 KW when taking an input of 20.2 KW. The field winding resistance is 50 Ω and armature resistance is 0.06 Ω. Calculate the efficiency and power input when the output is 7.35 KW.

7   A 3-phase, 4-pole 60 Hz induction motor has a slip of 3% at no-load and 5% at full load. Find:
    (i) Synchronous speed.
    (ii) Full-load speed.
    (iii) No-load speed.
    (iv) Frequency of rotor current at stand still.
    (v) Frequency of rotor current at full load.

8   Explain the types of damping devices used in the measuring instruments in detail with neat diagrams.

*****