GOVERNMENT ENGINEERING COLLEGE, DAHOD
ELECTRICAL ENGINEERING DEPARTMENT
Odd-Semester-2015
1st Semester Division: G (EC Department)
Subject: EEE [2110005] Elements of Electrical Engineering
Assignment-1_Module-1_DC Circuits

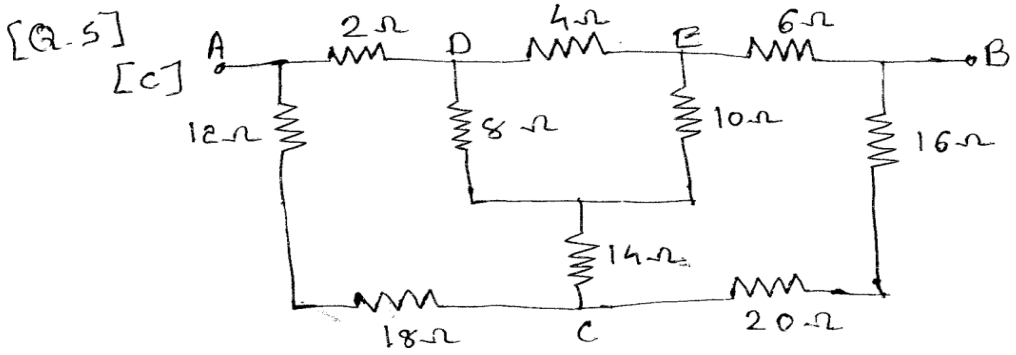
➢ ***Elementary Concepts:***

01. State and explain Kirchhoff's laws.

02. Define Temperature co-efficient of resistance. Derive & obtain the expression $\alpha_2 = 1/ (1/\alpha_1 + (t_2 - t_1))$ with usual notation.

03. The resistance of a coil embedded in a large transformer is 12 Ω at 25^0C after the transformer has been in operation for several hours, the resister of the coil found to be 13.4 Ω. Find the Temperature the transformer core. Take $\alpha_{20} = 0.00393^0C^{-1}$.

04. Find resistance between terminals AB of network shown in figure-1 using star-delta transformation,



[fig.1.]

05. Analyze Series and parallel circuit having resistors only as elements and state the results..

06. Derive the equations to translate passive electric circuits from star network to delta network configuration with diagram.

[P.T.O.]

➢ ***Electrostatics:***

01. Derive equation for energy stored in capacitor.

02. Capacitors having capacitance of 10 μF, 20 μF and 30 μF are connected in series to a 400 V dc source. Find:
    (a) Total capacitance of circuit,
    (b) Total charge stored in the circuit,
    (c) Total energy stored in the circuit.
03. State and Explain Colum's law of electrostatics.
04. A capacitor of 0.1 μF is charged from a 100 V battery through a series resistance of 1000 Ω. Find:
    (a) Time constant,
    (b) Charge received during this time,
    (c) Initial rate of charging,
    (d) The rate of charging when the charge is 63.2 % of final charge.

05. Analyze the series and parallel connection of capacitor and prove the equations. Also find out the equation for energy stored in capacitor.

➢ ***Electromagnetism:***

01. Explain Faradays law of electromagnetic induction.

02. Define co-efficient of coupling. Derive the relation between self and mutual inductance.

03. A coil has 1000 turns and carries a current of 5 Amp. The core has a length of 0.5 m and cross-sectional area of 80 cm^2, relative permeability is 1000. Calculate self inductance and self induced emf when current is switched off in 0.01 sec.

04. Give similarities and dissimilarities between electrical circuit and magnetic circuit.

05. Obtain the relation $L = (L_1L_2-M^2) / (L_1+L_2+2M)$ for equivalent inductance when two inductors are connected in parallel such that the mutual induced emf opposes the self induced emf.

06. Explain magnetic hysteresis.

07. If a coil of 150 turns is linked with a flux of 0.01 Wb, when carrying a current of 10 A. Calculate:
    (a) The inductance of the coil,
    (b) The induced emf, if this current is uniformly reversed in 0.01 second.
