Total No. of Printed Pages:03

SUBJECT CODE NO:- H-347
FACULTY OF SCIENCE AND TECHNOLOGY
F.E. (All)
Basic Electrical Engineering
(REVISED)

[Time: Three Hours]   **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1. Q.5 and Q.10 are compulsory.
2. Attempt total three questions from each section.
3. Make suitable assumptions where necessary stating the same.

Section A

Q.1 a) Explain constructional features and working of Nickel Cadmium battery.   06
      b) Explain how a capacitor is charged from dc supply through a series resistance. Derive the   08
      equation of charging current. Draw its graph and define time constant for this circuit.

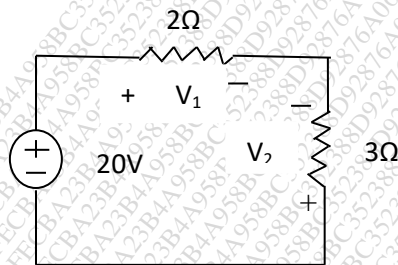Q.2 a) For the circuit in figure 1 find voltages V_1 and V_2.   06

Figure 1

      b) All resistors in figure 2. Are 1Ω each find req. across C & D   04

Figure 2

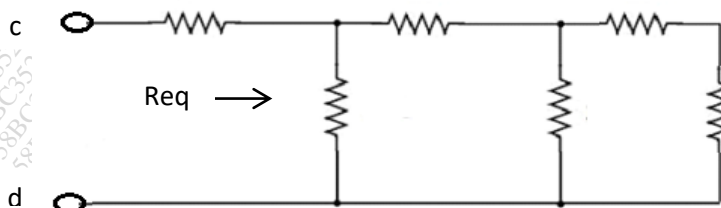   c) Obtain V_o in the circuit of figure 3.   04

Figure 3

1

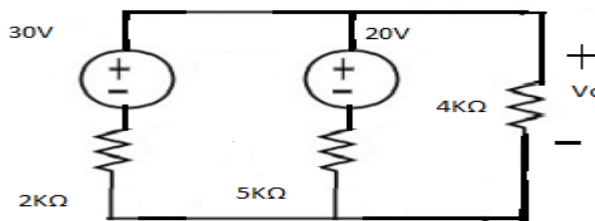Q.3   a) State and explain superposition theorem with a simple example.   04
        b) Define the following for a magnetic circuit.   06
            1) mmf
            2) Flux
            3) Reluctance
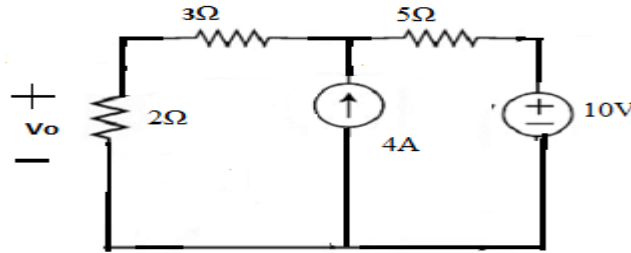   c) Using the superposition theorem find V_o in the circuit of figure 4.   04

Figure 4

Q.4   a) Compare electrical and magnetic circuits for similarities and dissimilarities. 08
        b) Derive expression for energy stored in magnetic field.   06

Q.5   Answer the following (any six)   12
        a) Write the voltage division rule and current division rule.
        b) What is time constant of a capacitor?
        c) Write types of batteries of cells.
        d) Write the application of Kirchhoff's law.
        e) Write applications of maximum power transfer.
        f) Figure 5 represents a model of solar photovoltaic panel. Given V_s=30V, R1=20Ω, i_L=1A find
            R_L

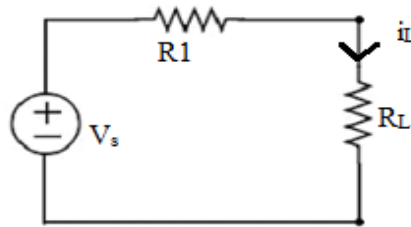Figure 5

        g) Explain the terms
            1) Self-inductance
            2) Mutual inductance
        h) State the Flemings left and right hand rule.

2

Section B

Q.6   a) With the help of proper circuit and vector diagram explain the phenomenon of resonance in   08
AC parallel circuit.

     b) A series circuit of 12Ω resistance 0.3H inductor and a variable capacitor is connected across   06
100V, 50Hz supply the capacitor is adjusted to give unity p.f. Calculate the power down by
the circuit and capacitance of capacitor.

Q.7   a) For R-L circuit prove that $I = \dfrac{V}{\sqrt{R^2 + X_L^2}}$ where $X_L = \omega L$.   05

     b) Define RMS and average value of AC quantity.   05

     c) Define active, reactive and apparent power and draw power triangle.   04

Q.8   a) With the aid of neat circuit diagram explain the method of finding efficiency of single phase   07
transformer by direct loading.

     b) Compare between resonance in series circuit and parallel circuit.   07

Q.9   a) A single phase transformer has 350 primary and 1050 secondary turns. The net cross sectional   07
area of the core is 55 cm^2. If the primary winding the connected to a 400V, 50Hz single phase
supply calculate.
       i.   The maximum value of flux density in the core and
       ii.   The voltage induced in the secondary winding.

     b) Write short note on losses in transformer.   04

     c) Draw only CFL lamp in details.   03

Q.10   Answer the following (any six)   12
     a) What is Q-factor? Write its equations.
     b) What are general two types of construction of the transformers?
     c) State why ideal transformer has no iron losses.
     d) What is the function of watt meter?
     e) What is the use of multimeter?
     f) Write the significance of earthing.
     g) List the sources of electrical power generation.
     h) What is a electronic choke?