BACK PAPER

Registration No. :

Total number of printed pages – 4

B.Tech
BE 2102

Second Semester Examination – 2012

BASIC ELECTRICAL ENGINEERING

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2 ×10

    (a) State Norton's Theorem.

    (b) Two impedances 40 < 30° and 25 < 45° are connected in parallel. Find out the resultant impedances in rectangular form.

    (c) Three resistances 5Ω, 10Ω, 15Ω, are connected in Series across 120V, DC Source. Compute the Voltage across 10Ω resistor.

    (d) Define RMS value of an alternating quantity.

    (e) Explain various classification of transformer on the basis of placement of its core.

    (f) Define Permeability and retentivity with reference to Magnetis.

    (g) Write the emf equation of DC generator and explain each term associated with it.

   (h) Write the speed equation of a DC motor and explain each term.

P.T.O.

(i)   Write four important parts of a nuclear power station.

(j)   Write four the measuring instruments you know for electrical measurem

2. (a)   State and Explain the principle of Superposition by giving suitable exam

(b)   Applying Kirchhoff's current law, determine current I_s in the electric ci
        shown in Fig (1) below. Take V_0 =16V.
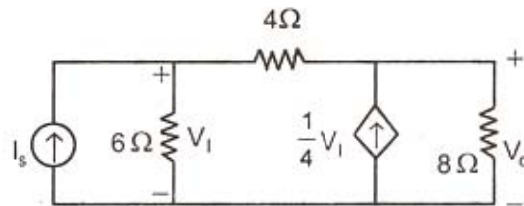
Fig(1)

3. (a)   Explain the Hysteresis loss by drawing B-H curve.

(b)   Find the current through 8 Ω resistor in the given circuit below Fig
        applying Superposition Principle.
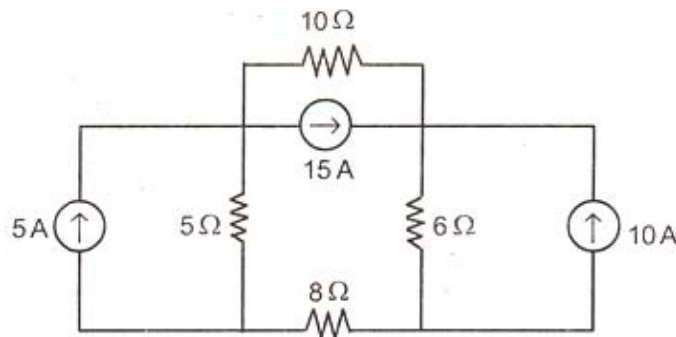
Fig(2)

4. (a)   Briefly explain few similarities between magnetic circuit and electric circ

(b) Find the number of ampere turns required to produce a flux of 0.44 milli weber in an iron ring of 100 cm mean circumference and $4cm^2$ in cross section. B versus μ_r test result for iron given in following table :

B(wb/m²)	0.8	1.0	1.1	1.2	1.4
μ_r	2300	2000	1800	1600	1000

If a saw cut of 2 mm wide is made in the above ring, how many extra ampere turns required to maintain the flux ?　　　　　　　　6

5. (a) A balanced three phase AC sinusoidal having line voltage 440V is fed to a balanced three phase star load having resistance per phase 50 Ω. What would be the

　　(i) The line Voltage & phase voltage ?

　　(ii) power factor & power consumed ?　　　　　　　　4

(b) Explain the growth of capacitor voltage in an RC series circuit when excited suddenly by a DC source. Find the time constant.　　　　　　　　6

6. (a) Explain the laws which are used to generate voltage in a DC generator.　　4

(b) The current in a circuit is given by 4+j12 when the voltage is 100+j150

　　Determine :

　　(i) The complex expression for the impedance, state whether inductive or capacitive.

　　(ii) Power factor of the circuit.

　　(iii) The real and reactive power consumed in the circuit.　　　　　　　　6

7. (a) Explain in brief the principle of operation of a three phase alternator.　　4

(b) A 4 pole DC shunt generator with lap connected armature having field and armature resistance of $50\,\Omega$ and $0.1\,\Omega$ respectively, supplying 60 Nos. of 100 W bulbs. Calculate   6

   (i) The total armature current

   (ii) The current per armature path

   (iii) The generated emf allowing a contact drop of 1V per brush.

8. Write short notes in any *two* :   5×2

   (a) Controlled Sources

   (b) Principle of maximum power transfer

   (c) Operation principle of single phase transformer

   (d) Transducers.

―――――