Registration No. : | | | | | | | | | | |

Total number of printed pages – 4

B. Tech
BE 2102

Second Semester (Regular) Examination – 2014

BASIC ELECTRICAL ENGINEERING

BRANCH(S) : ALL

QUESTION CODE : F 463

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) Explain how voltage source with a source resistance can be converted into an equivalent current source.

   (b) State the advantages of sinusoidal alternating quantity.

   (c) List any two advantages of 3-phase system over 1-phase system.

   (d) Does transformer draw any current when secondary is open ? Why ?

   (e) Why the armature core in d.c machines is constructed with laminated steel sheets instead of solid steel sheets ?

   (f) What is the function of capacitor in a single phase induction motor ?

   (g) A stereo amplifier is producing 50 W of output power. How much power

input is required if the amplifier is 30 percent efficient ?

(h) What do you mean by magnetism and magnetic field ?

(i) Why do electric lines of force never cross ?

(j) If a capacitor of 0.05mfd in series circuit provides a resonant frequency of 833 kHz, what is the value of the inductance ?

2. (a) A mild steel ring has a mean diameter of 160 mm and cross section area of 300 mm^2. Calculate the mmf required to produce a flux of 333 μ Wb, reluctance and relative permeability. 5

The B-H data given below :

B(T)	0.9	1.1	1.2	1.3
H(AT/m)	260	450	600	820

(b) Explain the working principle of A/D conversion. 5

3. (a) A transformer with 40 turns on the high voltage winding is used to step down the voltage from 240V to 120V. Find the number of turns in the low voltage winding. 5

(b) Derive the expression for series resonance. 5

4. Write short notes on any **two** of the followings : 5×2

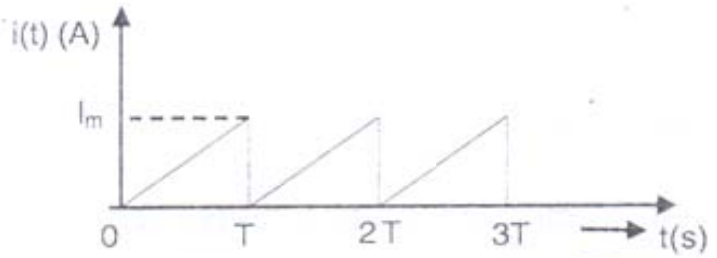
(a) Power factor

(b) Alternator

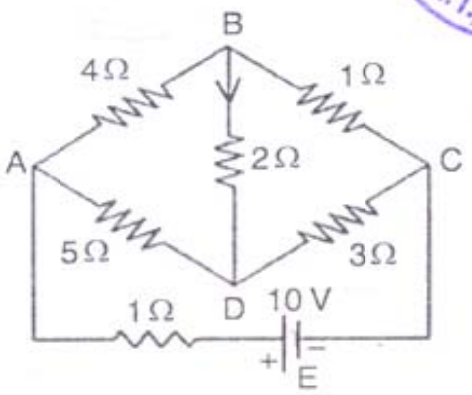
(c) Thevenin's theorem

(d) Maximum power transfer

5. What do you mean by average and rms value of a signal ? Determine the rms value and average value of the signal shown in the figure below : 10

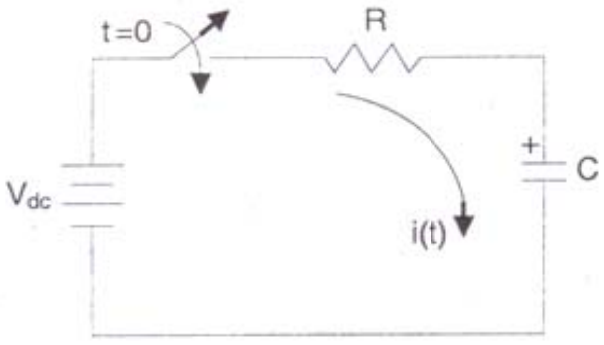


6. (a) In the circuit shown, determine the current through the 2 ohm resistor and the total current delivered by the battery. Use Kirchhoff's laws. 7



(b) What are the conditions to be fulfilled by for a dc shunt generator to build back emf ? 3

7. (a) Derive the expression for the capacitor voltage in the circuit given below : 5



(b) Explain the principle of operation of DC Motor. 5

8. (a) A 400V is applied to three star connected identical impedances each consisting of a 40 ohms resistance in series with 3 ohm inductance reactance. Find

(i) line current

(ii) Total power supplied. 5

(b) A three phase electric oven has a phase resistance of 10 ohm and is connected at three phase 440 V AC. Compute 5

(i) The current flowing through the resistors in wye and delta connections.

(ii) The power of the oven in wye and delta connections.