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**BE - 104**

**B.E. I & II Semester Examination, June 2014**

**Basic Electrical & Electronics Engineering**

Time : Three Hours　　　　　　　　　　　　　　　　　　Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

iv) Except numerical, Derivation, Design and Drawing etc.

**1.** a. Define voltage and current sources.

b. Distinguish between Dependent sources and Independent sources.

c. How will you obtain the current through single phase load of 2 kW with PF = 0.8 at 230 Volts. Find active power, reactive power and apparent power for the given load.

d. Establish the physical meaning of reactive power with the help of necessary derivations.

OR

Distinguish between 3 phase balanced and unbalanced supply. What is the impact of unbalanced load on the power supply.

**2.** Answer the following with reference to single phase transformer:

a. Justify with reason the constant flux in the core with variation in load connected to secondary terminal.

b. Draw phasor diagram of single phase transformer for an inductive load. What variation is observed for a capacitive load?

c. Specify the application of 'equivalent circuit'?

d. A 500 KVA transformer has 90% efficiency at full load and at 70% of full load both at upf.　　(i) separate out the transformer losses.

　　　　(ii) Determine the transformer efficiency at 80% of full load , upf.

OR

A coil wound on an iron core is excited from an ac source at voltage V(rms). Derive the expression for maximum flux in the core. Why is it independent of the core reluctance.

**3.**  a. Draw the construction of 3 phase induction machine and synchronous machine.

b. Develop the emf equation for a 3 phase induction motor.

c. Draw the torque slip characteristics of an induction motor. Develop necessary condition for maximum torque.

d. Classify DC machines and explain them briefly.

OR

A series motor runs at 600 rpm when taking a current of 110 A from a 230 volt supply. The useful flux per pole for for 110 A is 24 mWb and that for 50 A is 16 mWb. The armature resistance and series field resistance are 0.12 ohms and 0.03 ohms respectively.Calcullate the speed when the current has fallen to 50 A.

**4.**  a. Specify Different number systems used in digital electronics. What are floating numbers.

b. State De-Morgan's theorem with example.

c. Draw the truth table of JK flip-flop along with its logic diagram.

d. Explain the operation of half adder and full adder along with their logic diagram and truth table. Also deduce a full adder using EX-OR gate.

OR

Convert the following indicating the steps involved.

i   $(657)_8 = (?)_{16}$

ii  $(1D53)_{16} = (?)_{10}$

iii $(131.F2)_{16} = (?)_{10}$

**5.**  a. Which is the best transistor configuration for amplifiers and why?
b. Why Silicon is usually preferred over germanium for fabrication semiconductor devices.
c. Explain V-I characteristics and applications of Zener diode.
d. Explain the difference between avalanche multiplication and Zener breakdown.
OR
What are clipper and clamper circuits. Give one example for each. How p-n junction is used as rectifier.