Printed Pages : 2 **EE-201**

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1250 Roll No. | | | | | | | | | | |

B. Tech.

(Semester-II) Even Semester Theory Examination, 2012-13

ELECTRICAL ENGINEERING

Time : 3 Hours] *[Total Marks : 100*

Note : Attempt questions from each Section as per instructions.

SECTION - A

Attempt *all* parts of this question. Each part carries 2 marks. 2×10=20

1. (a) How a voltage source is converted into a current source ?
   (b) What happens if the field winding of a running shunt motor suddenly breaks open ?
   (c) A series circuit has $R = 10\Omega$, $L = 0.01$ H and $C = 10\ \mu$F. Calculate Q-factor of the coil.
   (d) If the current in the armature of a d.c. series motor is reduced by 5%, what will be the torque of the motor ?
   (e) Draw the block diagram of multimeter.
   (f) What is the typical use of an autotransformer ?
   (g) Write down the application of synchronous motor.
   (h) How many Wattmeter(s) (minimum) are required to measured 3-phase, 3-wire balance power ? Give diagram.
   (i) State Superposition theorem.
   (j) What are the advantages of three phase system ?

SECTION - B

Attempt any *three* parts of this question. Each part carries 10 marks. 10×3=30

2. (a) State and explain maximum power transfer theorem. Also derive an expression of maximum power of it.
   (b) An alternating current of 1.5 A flows in a circuit when applied voltage is 300 V. The power consumed is 225 W. Find the resistance and reactance of the circuit.
   (c) Explain the methods to measure power in 3-phase circuit. In a 2-wattmeter method, power measured was 30kW at 0.7 pf lagging. Find the reading of each wattmeter.
   (d) Explain the following for single phase transformer :
      (i) Phasor diagram for inductive load
      (ii) Equivalent circuit.

(e) A 20 kW, 200V shunt generator has an armature resistance of 0.05 Ω and a shunt field resistance of 200 Ω. Calculate the power developed in the armature when it delivers rated output.

SECTION -C

Attempt *all* questions of this Section. Each question carries 10 marks. 10×5=50

3. Derive the relation between line and phase voltage for a star-connected 3-phase balance system.

Or

A balanced delta connected load of $(8 + j6)\Omega$ per phase is connected to a 3-phase 440 V supply. Find the line current.

4. Attempt any two parts of the following :
   (a) Find the average value, RMS value and form factor of half wave rectified alternating current.
   (b) Explain series resonance in R-L-C circuit. What are bandwidth and quality factor of the circuit.
   (c) A coil of resistance 40Ω and inductance 0.75 H are in a series circuit. The resonant frequency is 55Hz. If supply is 250 V, 50Hz, find (i) line current and (ii) power factor.
5. Attempt any two parts of the following :
   (a) Explain principle and the working of megger with neat diagram.
   (b) Explain principle, operation and applications of moving iron type instruments.
   (c) Explain working of single phase induction type of energy meter with neat diagram.
6. Attempt any two part of the following :
   (a) Explain magnetic and electric circuits. Give analogy between them.
   (b) An electromagnet has an air gap of 5 mm and flux density in the gap is 1.2 W/m^2. Determine the ampere turns for the gap.
   (c) What is the concept of grid ? Draw general layout of electrical power system and functions of its element.
7. Compare a 3-phase induction motor with single phase induction motor on the basic of following :
   (i) Starting torque (ii) Slip-torque characteristic
   (iii) Magnetic field (iv) Application.

Or

Why the single phase induction motor can not start ? Give the starting method and explain any one of them.

Or

Explain the working principle of alternator and synchronous motor. Write down various applications of both alternator and synchronous motor.