

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

PAPER ID : 1250

Roll No.

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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 $C = 10 \mu\text{F}$. 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 - BAttempt 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 0.05Ω and a shunt field resistance of 200Ω . 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 :

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|----------------------|---------------------------------|
| (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.