

Code No. 3299

FACULTY OF ENGINEERING
B.E. 2/4 (CSE) (II-Semester) (Supplementary) Examination, January 2011
ELECTRICAL CIRCUITS AND MACHINES

Time : Three Hours]

[Maximum Marks : 75

Answer *ALL* questions from Part A. Answer any *FIVE* questions from Part B.

PART—A (Marks : 25)

1. What is the average value of an alternating quantity ? What is the relation between Average value and Maximum value of sinusoidal alternating current or voltage ? 3
2. Define the term Reactive Power. 2
3. In a 3-phase system what is the difference between star and delta connection ? 3
4. Write the purposes of conducting a short-circuit test on a single phase transformer. 2
5. Draw the torque speed characteristics of d.c. shunt motor. 2
6. A dc shunt motor develops 10 hp at 600 rpm when drawing a line current of 18 A at 500 volts. Find the Torque. 3
7. List various methods of starting of induction motors. 2
8. Draw the torque-slip characteristics of a 3-phase induction motor and also indicate starting and normal running region. 3
9. How do you achieve time-phase difference between the currents of main auxiliary winding in a split-phase capacitor start induction motor ? 2
10. Write the advantages of Brushless DC motor. 3

PART—B (Marks : 50)

11. (a) For the bridge circuit given in the figure 1, find the current through the $10\ \Omega$ resistor across BD by mesh analysis. 5

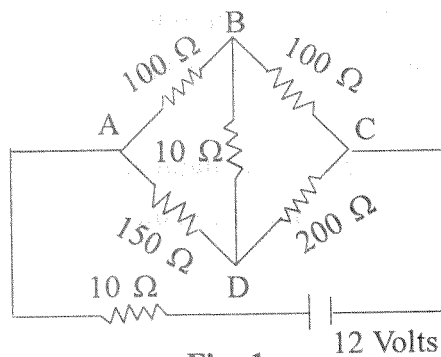


Fig. 1

(b) Find the Norton equivalent of the circuit shown in the figure below :—

5

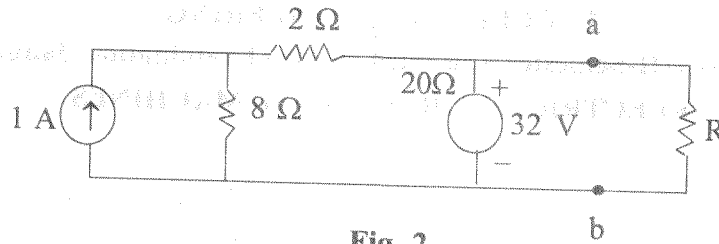


Fig. 2

12. (a) Deduce an expression for power in a 3-phase balanced circuit in terms of line voltage and line current. 5
- (b) Derive the expressions for energy stored in inductance and capacitance. 5
13. (a) Explain the principle of operation of a transformer on no-load. 5
- (b) A transformer on no-load takes 4.5 A at a power factor of 0.25 lagging when connected to a 230 V, 50 Hz supply. The number of turns of the primary winding is 250. Calculate
 - (a) the magnetising current,
 - (b) the core loss, and
 - (c) maximum value of flux in the core. 5
14. (a) Derive the emf equation of a dc generator. 5
- (b) Explain the working principle of a dc motor. 5
15. (a) Explain the production of a rotating magnetic field with a 3-phase supply and 3-phase winding. 6
- (b) Derive the torque equation of an induction motor. 4
16. (a) Explain the principle of operation of a stepper motor. 5
- (b) Explain the principle of operation of a split phase capacitor start-capacitor run motor. 5
17. Write short notes on any **THREE** of the following :— 10
 - (a) Dot convention
 - (b) Measurement of power by 2-wattmeter method
 - (c) Capacitor start and capacitor run Induction motor
 - (d) Applications of D.C. motors.