2-1 / MeCh

Code No. : 5176/O

FACULTY OF ENGINEERING
B.E. 2/4 (M/P/AE) I Semester (Old) Examination, December 2011
ELECTRICAL CIRCUITS AND MACHINES

Time: 3 Hours] [Max. Marks: 75

Note : *Answer **all** questions from Part **A**. Answer **any five** questions from Part **B**.*

PART – A **(25 Marks)**

1. State and explain Kirchhoff's laws. 3
2. Define rms value of voltage. 2
3. Mention the advantages of 3-phase system over single phase system. 2
4. Draw no-load phasor diagram of single phase transformer and explain. 3
5. Draw speed-torque characteristics of shunt and series motors. 3
6. What are the various losses occurs in d.c. machine. 2
7. Define slip and frequency of rotor current of an 3-phase induction motor. 3
8. Mention various types of 3-phase induction motors and compare them. 2
9. Why single phase induction motors are not having self starting torque. 3
10. Mention the applications of stepper motor. 2

PART – B **(50 Marks)**

11. Explain the following theorems with circuit diagrams
    a) Thevenin's theorem
    b) Norton's theorem. 10
12. a) Explain with help of neat circuit diagram 3-phase power measurement by two wattmeter method. 5
    b) A single phase 50 Hz transformer has 30 primary turns and 300 secondary turns. The net cross sectional area of the core as 250 cm^2. If primary winding being connected to a 230 V, 50 Hz supply, calculate (i) maximum flux density of the core, (ii) voltage induced in secondary winding. 5

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13. a) Drive torque equation of a d.c. motor. 5

    b) Explain constructional details and principle operation of d.c. generator. 5

14. a) Explain in brief various methods of starting of 3-phase induction motor. 5

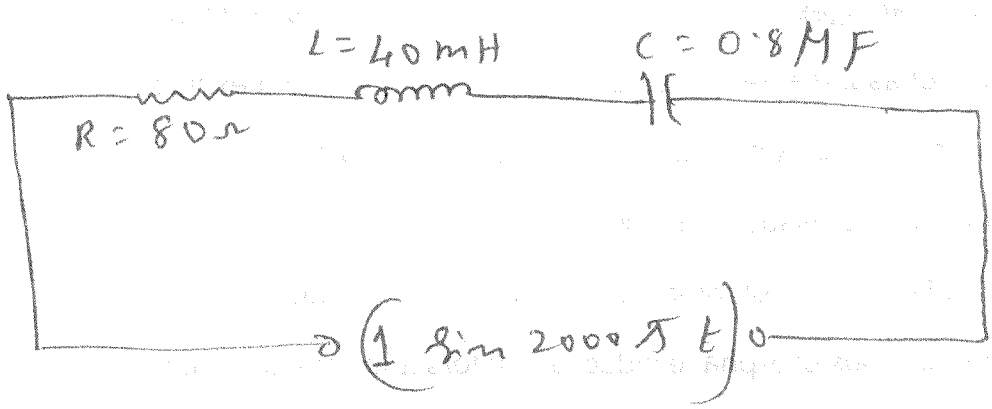
    b) Explain slip-torque characteristics of an 3-phase induction motor. 5

15. Explain the principle operation of following motors with neat diagrams.

    a) Brushless DC motor

    b) Capacitor start and run motor. 10

16. a) For the circuit shown below calculate frequency, inductive reactance, capacitive reactance and impedance. 5



    b) Explain the operation of auto-transformer with help of neat circuit diagram. 5

17. Write short notes on the following :

    a) Mutual inductance

    b) 3-phase balance circuits

    c) Regulation of transformer

    d) Phasor representation of sinusoidal quantitier. 10