

B.E. DEGREE EXAMINATIONS: NOV/DEC 2010

Fourth Semester

MECHATRONICS ENGINEERING

U07MH403: Electrical Machines and Drives

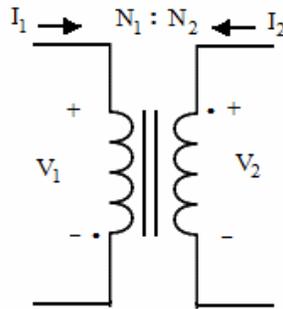
Time: Three Hours

Maximum Marks: 100

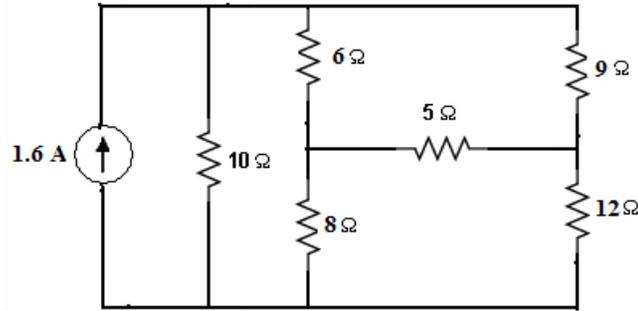
Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. A quantity that contains all the power information in a given load is the
a) power factor b) apparent power c) reactive power d) complex power
2. For the ideal transformer shown, if the turns ratio, $N_2/N_1 = 10$, then the ratio V_2/V_1 is



- a) 10 b) 0.1 c) -10 d) -0.1
3. Synchronous motors run at
a) variable speed b) constant speed
c) high speed greater than the rated d) very low speed as it lacks starting torque
4. Which of the following best suits the characteristics of dc shunt motor?
a) Torque increases as square of armature current b) Speed is nearly constant
c) Torque decreases as armature current increases d) Increase in armature current increases speed
5. The braking which occurs due to dissipation of kinetic energy is
a) dynamic braking b) regenerative braking c) reverse current braking d) plugging
6. The type of starter suitable for slip ring induction motor is

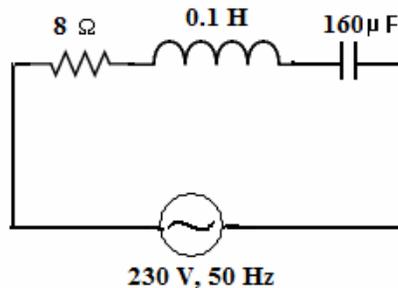


(ii) Explain mutual and self inductance of a coil. (6)

(OR)

b) (i) Explain the constructional details and principle of operation of a simple transformer with a neat sketch. (9)

(ii) A coil of resistance 8Ω and inductance 0.1 H is connected in series with a condenser of $160\ \mu\text{F}$ capacitance across a 230 V , 50 Hz supply. Calculate a) the inductive reactance, b) the capacitive reactance, c) the circuit impedance, current and the pf. (5)



22. a) (i) Explain the speed – torque characteristics of a dc shunt motor with suitable graph and equations. (8)

(ii) Write short note on reluctance motor. (6)

(OR)

b) What are the various types of single phase induction motor? Explain any two types in detail.

23. a) Explain the various starting methods of three phase induction motors.

(OR)

b) (i) Explain the methods of plugging and regenerative braking as applied to induction motors with neat diagram. (10)

(ii) A 200 V dc shunt motor running at 1000 rpm takes an armature current of 18 A. It is required to reduce the speed of the motor to 600 rpm. What must be the value of resistance to be inserted in the armature circuit if the original armature resistance is 0.4Ω ? Assume the armature current to be constant during the process. (4)

24. a) (i) Explain the types of electric drives. List their advantages and disadvantages. (9)

(ii) Find the rating of a 100 kW motor which operates on a duty cycle where it is clutched to its load for 18 min and declutched to run on no-load for 30 min. The heating and cooling time constants of the motor are 90 and 120 min respectively. Assume that the losses are proportional to square of load current. (5)

(OR)

b) Discuss the different classes of duty of motors and explain the method of determining power rating.

25. a) With schematic diagram, explain slip power recovery scheme for three phase induction motor.

(OR)

b) Explain the V/f control method of ac drive with neat sketch.
