

B.E. DEGREE EXAMINATIONS: APRIL / MAY 2010

Fourth Semester

MECHATRONICS ENGINEERING

U07MH403: Electrical Machines and Drives

Time: Three Hours

Maximum Marks: 100

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

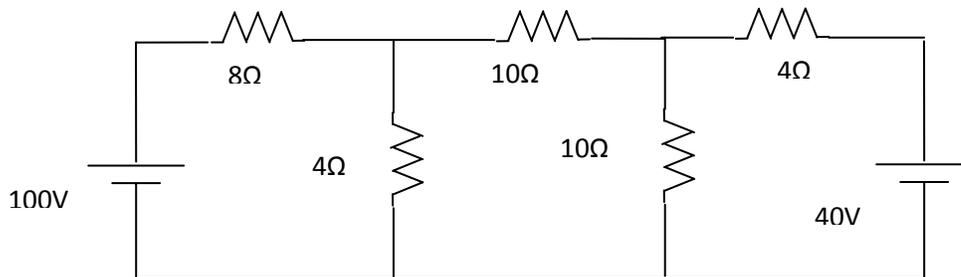
1. A transformer transforms
A. Voltage B. Current C. Voltage and Current D. Power
2. The unit of flux density is
A. Wb/m^2 B. Weber C. Wb/m D. Weber- meter
3. No load speed of which of the following motor will be the highest?
A. DC Shunt Motor B. DC Series Motor C. DC Compound Motor
D. Single Phase Induction Motor
4. The speed of the synchronous motor
A. Increases with increase in load B. Decreases as load increases C. Varies
with power factor D. Always remains constant
5. The speed of a motor falls from 1100 rpm at no load to 1050 rpm at rated speed. The speed regulation of the motor is
A. 2.36 % B. 4.76% C. 6.77% D. 8.44%
6. An induction motor is
A. Self starting with high torque. B. Self Starting with low torque. C. Self
starting with zero torque D. Non Self starting
7. In the following types of load, which one occurs at regular intervals of time?
A. Peak load B. Constant Load C. Continuous variable load D. Short time load
8. Electrical Machines are rated in terms of their
A. Input Capacity B. Output Capacity C. Both D. None of the above
9. Which of the following can be used to control the speed of a DC motor?
A. Thermistor B. Thyristor C. Thyatron D. Transistor
10. During dynamic braking of induction motor
A. Starter connection are reversed B. Motor is used as an induction generator
C. Stator winding is excited by direct current D. fictitious load is applied on motor

PART B (10 x 2 = 20 Marks)

11. State faraday's law electromagnetic induction.
12. Define Form factor and Peak factor.
13. List out the major parts in rotating machines.
14. What is the working principle of reluctance motor?
15. Why a starter is necessary for a DC motor?
16. Define Electrical Braking.
17. Define cooling time constant of a Machine.
18. Mention the types of electrical drives.
19. How are the AC Voltage regulators classified?
20. Define cumulative and differential cascading.

PART C (5 x 14 = 70 Marks)

21. (a) (i) Write the mesh equation for the network shown in figure and find the power absorbed by 8Ω resistor. (10)



- (ii) Brief about phasor representation of alternating quantity. (4)

(OR)

- (b) Explain the principle and working of 'Transformers'.

22. (a) (i) Explain about the working principle of three phase induction motor. (6)

- (ii) Explain the characteristics of DC motors. (8)

(OR)

- (b) Explain the construction and working principle of stepper motor with neat diagram.

23. (a) (i) A 500V series motor has an armature resistance of 0.4Ω and series field resistance of 0.3Ω . It takes a current of 100 A at a speed of 600 r.p.m. Find the speed of the motor if a diverter resistance 0.6Ω is connected across the field, the load torque being kept constant. (10)
- (ii) Discuss merits and de-merits of 4-point starter over with 3-point starter. (4)

(OR)

- (b) Explain the various methods of speed control in three phase induction motor.

24. (a) (i) What are the factors governing the selection of motor for the particular applications? And explain. (10)
- (ii) Compare AC and DC drives. (4)

(OR)

- (b) Explain the various classes of duty. How it affects the selection of rating of a motor for the drive?

25. (a) With neat diagrams, explain the chopper control on DC series motor.

(OR)

- (b) How the speed control of 3 phase induction motor is achieved using AC voltage regulators?
