Register Number.....

B.E. DEGREE EXAMINATIONS: APRIL / MAY 2009

Fourth Semester

MECHATRONICS ENGINEERING

U07MH 403 Electrical Machines and Drivers

Time: Three Hours **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (20 x 1 = 20 Marks)

1. The unit of Magnetic flux is
   a) Weber / m
   b) Weber
   c) Tesla
   d) None of the above
2. An Alternating voltage is any voltage that varies
   a) Both in magnitude and phase w.r.t. time
   b) Only in magnitude
   c) Both in magnitude and polarity w.r.t. time
   d) None of the above
3. The principle of operation of a transformer is based upon
   a) Self Induction
   b) Mutual Induction
   c) Static Induction
   d) Dynamic Induction
4. When a lamp rated 100 W is connected across a supply of 200 V the current drawn is
   a) 1.75 A
   b) 2 A
   c) 0.5 A
   d) 1 A
5. At Zero Slip an induction motor
   a) Runs at synchronous speed
   b) Runs as generator
   c) Does not run
   d) Slip produced is zero
6. The DC Series Motor is having
   a) High starting Torque
   b) Low starting Torque
   c) Medium starting Torque
   d) Zero starting Torque

7. With the increase of load the speed of induction motor operating in the stable region
   a) Increases
   b) Decreases
   c) Remains constant
   d) Increases then remains constant

8. The input supply given to the stepper motor is
   a) Sinusoidal
   b) DC
   c) Electrical Pulse
   d) Triangular wave

9. When the speed of a DC motor increases
   a) back emf increases and current decreases
   b) back emf as well as current drawn both decreases
   c) back emf as well as current drawn both increases.
   d) back emf decreases and current increases

10. Plugging is obtained in single phase induction motor by
   a) Voltage reversing the polarity of one of the windings
   b) current interchanging the polarity of the supply
   c) short-circuiting the capacitor used for phase splitting
   d) disconnecting the auxiliary winding

11. The no-load speed of the motor is
   a) equal to the rated speed
   b) greater than the base speed
   c) less than the nominal speed
   d) equal to synchronous speed

12. Which of the following single-phase motors has low starting torque?
   a) Capacitor-run motor
   b) Capacitor-start & Capacitor-run motor
   c) Capacitor-start motor
   d) Shaded pole induction motor

13. Group electric drive system consists of
   a) Several Motors
   b) Single Motor
   c) Two Motors
   d) Three Motors

14. Which one of the following is not an integral part of the drive system?
   a) Motor
   b) Energy Transmission Mechanism
   c) Speed governing Mechanism
   d) Generator

15. The temperature of the motor while running
    a) increases linearly
    b) decreases exponentially
    c) Increases exponentially
    d) Increases logarithmically

16. Which one of the following is a short time duty load?
    a) Pump
    b) Fan
    c) Conveyors
    d) Crane

17. A rectifier is a device which converts _____ to _____
    a) AC , DC
    b) A.C. ,Measurement
    c) Both A.C. & D.C.
    d) Frequency ,Measurement

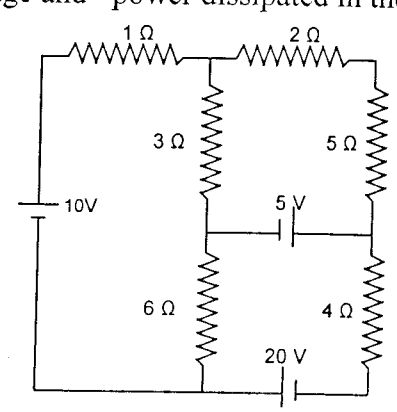
18. An SCR is a .....switch
    a) Uni directional
    b) bidirectional
    c) three directional
    d) four directional

19. In a thyristor circuit, the angle of conduction is changed by changing -------
    a) anode voltage
    b) Gate current
    c) Forward current
    d) Anode current

20. The technique used in Kramer system is
    a) Current Control
    b) Injecting EMF
    c) Frequency control
    d) Current and Frequency control

PART B (5 x 16 = 60 Marks)

21. (a)Write the mesh current equations in the circuit shown and determine the current, voltage and power dissipated in the 6Ω resistor.



(OR)

21. (b)Explain in brief of following terms

(i) Faraday's law of Electromagnetic Induction (8)
(ii) Principle & Operation of a Transformer (8)

22. (a)Draw and explain the various characteristics of DC Motors.

(OR)

22. (b)Compare the following motors in detail .

i) Universal Motor ii) Stepper Motor iii) Reluctance Motor

23. (a)What are the various speed control methods used in DC shunt motor. Explain it in detail.

(OR)

23. (b)Write short notes on the following

i) 3 Point Starter (8)
ii) Electrical Braking (8)

24. (a)Draw a typical rise-time curve and derive equation for temperature rise in an electrical drive in detail.

(OR)

24. (b)Write Short notes on the following

i) Factors influencing the selection of an drive (8)
ii) Different classes of Duty (8)

25. (a)Explain the speed control of an induction motor using Inverters with necessary diagrams.

(OR)

25. (b)Explain chopper control in DC series motor with necessary diagrams.

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