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**Question Paper Code: 41336**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Third Semester

Electronics and Communication Engineering

14UEE323 - ELECTRICAL MACHINES

(Common to ICE and Mechanical Engineering)

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- Commutators in DC machines have a role of which converts
  - AC to DC
  - both AC to DC and DC to AC
  - high voltage DC to low voltage DC
  - none of these
- In DC generator, lap winding is used in
  - High current and low voltage applications
  - High voltage and low current applications
  - Where constant speed is required
  - Where greater load is connected
- If  $V_1 = E_1$  and  $V_2 = E_2$  then the transformer is said to be
  - a step up transformer
  - an Ideal transformer
  - an auto transformer
  - a step down transformer
- The short circuit test on a transformer is conducted to obtain
  - Copper losses
  - Core losses only
  - Eddy current loss
  - Hysteresis loss

5. Slip speed is the
- (a) difference of synchronous speed and actual rotor speed
  - (b) difference of actual rotor speed and synchronous speed
  - (c) sum of synchronous and rotor speeds
  - (d) half of the sum of synchronous and rotor speeds
6. In a 3 -  $\Phi$  induction motor, the maximum torque is
- (a) Varies as rotor resistance
  - (b) Varies as the square of rotor resistance
  - (c) Varies inversely as rotor resistance
  - (d) Independent rotor resistance
7. A synchronous machine
- (a) can operate at unity power factor
  - (b) can operate at leading power factor
  - (c) can operate at lagging power factor
  - (d) can operate at any power factor
8. In alternator, the rotary part is
- (a) Armature
  - (b) Core
  - (c) Magnetic field poles
  - (d) None of these
9. Type of single phase motor having highest power factor at full load is
- (a) shaded pole type
  - (b) capacitor start
  - (c) capacitor run
  - (d) split phase
10. The electric motor used in domestic mixers is
- (a) Universal motor
  - (b) Shaded pole motor
  - (c) Capacitor starts motor
  - (d) Hysteresis motor

PART - B (5 x 2 = 10 Marks)

11. Why dc series motor should never be started on no load?
12. Define all day efficiency.
13. Define slip of a three phase induction motor.
14. What is meant by hunting in synchronous motor?
15. Is single phase induction motor self starting? Why?

PART - C (5 x 16 = 80 Marks)

16. (a) Draw the performance characteristics of different types of dc generators and explain them briefly. (16)

Or

- (b) (i) Derive the torque equation of the DC motor. (8)  
(ii) What is back EMF and explain the significance of Back EMF. (8)

17. (a) Describe the construction and operating principle of single phase transformer. (16)

Or

- (b) Draw the equivalent circuit of a transformer and derive the components with respect to primary and secondary side. (16)

18. (a) Discuss the various starting methods of 3 phase induction motors. (16)

Or

- (b) (i) Derive the torque equation of a three phase induction motor. (8)  
(ii) Derive the equation for torque at running condition and the condition for maximum torque. (8)

19. (a) Explain the constructional details and working principle of synchronous generator. (16)

Or

- (b) (i) Discuss about the various starting methods of synchronous motor. (8)  
(ii) Explain the procedure to obtain the V and inverted V curves of a synchronous motor. (8)

20. (a) Draw the constructional diagram of the stepper motor. Explain its different modes of working. (16)

Or

- (b) (i) Describe the construction and principle of operation of capacitor start and run single phase induction motor. (8)  
(ii) Explain the construction and working principle of switched reluctance motor with diagrams. (8)

