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Question Paper Code: 41303

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Third Semester

Electronics and Communication Engineering

14UEE323 - ELECTRICAL MACHINES

(Common to Instrumentation and Control Engineering 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 an induction motor, what is the ratio of copper loss and rotor input?
- (a) S
 - (b) $(1 - S)$
 - (c) $1/S$
 - (d) $S/(1 - S)$
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. Name the different starters used for DC motors.
12. Define voltage regulation of transformer.
13. Define slip of induction of motor.
14. Compare salient pole rotor and cylindrical rotor of a synchronous generator.
15. Which type of 1-phase induction motor would be used for Ceiling fan and Wet grinder?

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) What is back EMF and explain the significance of Back EMF. (16)

17. (a) Derive the EMF equation of a transformer. (16)

Or

- (b) Describe the construction and operating principle of single phase transformer. (16)

18. (a) Draw and explain the equivalent circuit of 3 phase induction motor. (16)

Or

- (b) With neat sketch, explain the principle and construction of 3 phase induction motors. (16)

19. (a) Explain the constructional details of three phase alternator with neat sketch. (16)

Or

- (b) Explain the constructional details and working principle of synchronous generator. (16)

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

Or

- (b) Describe the construction and principle of operation of capacitor start and run single phase induction motor. (16)
