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Question Paper Code: 50306

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

Fourth Semester

Electronics and Communication Engineering

15UEE426 - PRINCIPLES OF ELECTRICAL MACHINES

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The critical resistance of the DC generator is the resistance of
 - (a) armature
 - (b) field
 - (c) load
 - (d) brushes
2. The speed of a DC motor can be controlled by varying
 - (a) its flux per pole
 - (b) resistance of armature circuit
 - (c) applied voltage
 - (d) all the above
3. The all-day efficiency of a transformer depends primarily on
 - (a) its copper loss
 - (b) the amount of load
 - (c) the duration of the load
 - (d) both (b) & (c)
4. Transformer cores are laminated in order to
 - (a) simplify its construction
 - (b) minimize eddy current loss
 - (c) reduce cost
 - (d) reduce hysteresis loss
5. The principle of operation of a 3-phase induction motor is most similar to that of a
 - (a) synchronous motor
 - (b) repulsion-start induction motor
 - (c) transformer with a shorted secondary
 - (d) capacitor-start, induction-run motor

6. The effect of increasing the length of air-gap in an induction motor will be to increase the
- (a) Power factor (b) speed
(c) magnetizing current (d) air-gap flux
7. The direction of rotation of a synchronous motor can be reversed by reversing
- (a) current to the field winding (b) supply phase sequence
(c) polarity of rotor poles (d) none of these
8. A synchronous machine is called a doubly excited machine because
- (a) it can be overexcited
(b) it has two sets of rotor poles
(c) both its rotor and stator are excited
(d) it needs twice the normal exciting current
9. A stepping motor is a _____ device.
- (a) mechanical (b) electrical
(c) analogue (d) incremental
10. Which of the following motor would suit applications where constant speed is absolutely essential to ensure a consistent product?
- (a) brushless dc motor (b) disk motor
(c) permanent-magnet synchronous motor (d) stepper motor

PART - B (5 x 2 = 10 Marks)

11. Why commutator is employed in DC machines?
12. Draw the exact equivalent circuit of a transformer.
13. Define slip of an induction motor.
14. What does hunting of synchronous motor mean?
15. Why the single phase induction motors are not self starting one?

PART - C (5 x 16 = 80 Marks)

16. (a) Explain the construction of DC machine in detail and derive the EMF equation of DC generator. (16)

Or

- (b) (i) With neat diagram explain the working of 3 point starter. (8)

(ii) Discuss the open circuit and load characteristics of DC shunt generator. (8)

17. (a) Explain the construction details and working of core type and shell type transformer with neat sketches. (16)

Or

(b) Deduce the equivalent circuit of transformer starting from the basic. (16)

18. (a) (i) Explain with neat diagram, the construction details and working principle of a 3Φ induction motor. (8)

(ii) Deduce and discuss the equivalent circuit of 3Φ induction motor. (8)

Or

(b) (i) Why starters are necessary for starting 3 Phases induction motors? Also list the various types of starters. (8)

(ii) Explain star-delta type starter in detail. (8)

19. (a) With neat sketches describe the construction and principle of operation of salient pole alternator. (16)

Or

(b) Describe the various starting methods of synchronous motor. (16)

20. (a) Write a short notes on its operation: (i) Stepper motor (ii) Repulsion type motor. (16)

Or

(b) Explain the construction details and working of brushless DC motor with neat sketches. (16)

