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 **Reg. No. :**

**Question Paper Code: 44030**

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

Fourth Semester

Electronics and Instrumentation Engineering

14UEE426 - PRINCIPLES OF ELECTRICAL MACHINES

 (Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The direction of rotation of the dc motor will be reversed when

 (a) Either field terminals are reversed or armature terminals are reversed

 (b) Only armature terminals are reversed

 (c) Only field terminals are reversed

 (d) None of the above

2. The material for brushes is generally

(a) Mica (b) Copper (c) Carbon (d) Cast iron

3. Short circuit test on transformer is conducted to determine

 (a) Core loss (b) Copper loss (c) Hysteresis loss (d) Eddy current loss

4. The all day efficiency of a transformer depends primarily on

 (a) its copper loss (b) the amount of load

 (c) the duration of load (d) both amount and duration of load

5. A step up transformer increases

 (a) Voltage (b) Current (c) Power (d) Frequency

6. The frame of an induction motor is usually made of \_\_\_\_\_\_\_\_\_

 (a) silicon steel  (b) cast iron  (c) aluminum (d) bronze

7. A synchronous motor has

 (a) High starting torque (b) Low starting torque (c) No starting torque (d) Low starting current

8. A capacitor start, capacitor run single phase induction motor is basically a

 (a) ac series motor (b) dc series motor (c) 2 phase induction motor (d) 3 phase induction motor

9. Which motors are preferred for refrigeration and air conditioning in smaller units?

 (a) Induction motors (b) Universal motors (c) Reluctance motors (d) Stepper motors

10. The starting winding of a single-phase motor is placed in the

 (a) Rotor (b) Stator (c) Armature (d) Field

PART - B (5 x 2 = 10 Marks)

11. Mention the function of yoke and commutator in dc generator.

12. The efficiency of a transformer is always higher than that of rotating electrical machines. Why?

13. List out the applications of slip ring induction motor.

14. What are the starting methods employed for synchronous motor?

15. Give the classification of stepper motor based on rotor construction.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Derive an expression for the electromagnetic torque developed in a DC

motor. (8)

 (ii) Explain the operation of three point starter used in DC shunt motor. (8)

Or

(b) Enumerate all the parts of a DC machine with the aid of neat sketch and explain

 the principle of operation of DC generator. (16)

17. (a) Illustrate the constructional details of core type transformer. (16)

Or

(b) (i) Differentiate shell type and core type transformer? (8)

 (ii) Derive the emf equation of a transformer. (8)

18. (a) Explain about the method of production of rotating magnetic field in the stator of

a 3Φ AC machines with the aid of mathematical derivation. (16)

Or

(b) Develop the equivalent circuit model of a three phase induction machine. (16)

19. (a) (i) Distinguish between salient and non-salient pole rotors of an alternator. (8)

 (ii) What do you meant by hunting of an alternator? How it can be suppressed? (8)

Or

(b) Explain the principle of operation of synchronous motor. (16)

20. (a) With neat diagram, explain the operation of variable reluctance stepper motor. (16)

Or

(b) Discuss the construction and various modes of excitation of variable reluctance stepper motor. (16)