Reg. No. : | | | | | | | | | | |

Question Paper Code: 44326

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

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 purpose of commutator in dc generator is to

   (a) increase output voltage (b) reduce sparking at brushes
   (c) provide smooth output (d) convert ac to dc

2. Which type of dc motor is preferred for cranes end hoists?

   (a) series motor (b) shunt motor
   (c) cumulatively compound motor (d) differential compound motor

3. Transformer cores are laminated in order to

   (a) simplify its construction (b) minimize eddy current loss
   (c) reduce cost (d) reduce hysteresis loss

4. A step up transformer increases

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

5. The principle of operation of a 3 phase induction motor is most similar to that of

   (a) synchronous motor (b) repulsion-start induction motor
   (c) transformer with a shorted secondary (d) capacitor-start, induction-run motor

6. The frequency of the rotor current in a 3Φ, 4pole, 50*Hz* induction motor at full load speed is about

   (a) 50 Hz (b) 20 Hz (c) 2 Hz (d) Zero

7. A synchronous motor has

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

8. A synchronous machine is called as doubly excited machine because

   (a) It can be over excited
   (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. Salient poles are generally used on

   (a) high speed prime movers only
   (b) medium speed prime movers only
   (c) low speed prime movers only
   (d) low and medium speed prime movers

10. When an alternator is running on no load, the power supplied by the prime mover is mainly consumed

    (a) to meet iron losses
    (b) to meet copper losses
    (c) to meet all no load losses
    (d) to produce induced emf in armature winding

PART - B (5 x 2 = 10 Marks)

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

12. Differentiate ordinary transformer and auto transformer.

13. Indicate the equation of induced emf in an alternator.

14. Define synchronous speed. How is it related to the frequency of generated emf?

15. What is the function of centrifugal switch in a single phase induction motor?

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) Explain briefly the working of three point starter and four point starters. (16)

17. (a) Analyze the equivalent circuit of a single phase transformer with the phasor diagrams for loaded conditions. (16)

Or

(b) Illustrate step by step procedure for development of equivalent circuit of transformer. (16)

18. (a) Derive the condition for maximum running torque of a 3Φ induction motor and obtain the expression for it. (16)

Or

(b) (i) Discuss briefly about cogging and crawling. (8)

(ii) Compare squirrel cage induction motor with slip ring induction motor with reference to construction, performance and application. (8)

19. (a) Describe the construction and principle of slow speed operation generator with neat diagram. (16)

Or

(b) (i) Explain the principle of operation of synchronous motor. (10)

(ii) What are the advantages & disadvantages of synchronous motor? (6)

20. (a) Explain the construction and working of a stepper motor with a neat sketch. (16)

Or

(b) Explain the construction and working of a permanent magnet synchronous motor with a neat sketch. (16)