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

Question Paper Code: 41346

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

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 relative permeability of a ferromagnetic material is

   (a) less than one (b) more than one
   (c) more than 10 (d) more than 100 or 1000

2. The material for brushes is generally

   (a) mica (b) copper (c) carbon (d) cast iron

3. 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

4. When a 400 Hz transformer is operated at 50Hz its kVA rating is

   (a) reduced to 1/8 (b) increased 8 times
   (c) unaffected (d) increased 64 times

5. The frame of an induction motor is usually made of _____

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

6. The stator of a 3-phase induction motor produces _____ magnetic field.

(a) steady (b rotating (c) alternating (d) constant

7. The purpose of starting winding in a single phase induction motor is to _____

(a) reduce losses
(b) limit temperature rise of the machine
(c) produce rotating flux in conjunction with main winding
(d) increase the efficiency

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. 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. Differentiate eddy current loss and frictional loss.

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

PART - C (5 x 16 = 80 Marks)

16. (a) Enumerate all the parts of a DC machine with the aid of neat sketch and explain the principle of operation of DC generator. (16)

Or

(b) A 4 pole, dc shunt generator with a shunt field resistance of 100Ω and an armature resistance of 1 Ω has 378 wave connected conductors in its armature. The flux per pole is 0.02 *Wb*. If a load resistance of 10 Ω is connected across the armature terminals and the generator is driven at 1000 *rpm*, calculate the power absorbed by the load. (16)

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

Or

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

18. (a) Illustrate the construction of squirrel cage induction motor. (16)

Or

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

19. (a) Illustrate the construction of a synchronous generator and explain its working. (16)

Or

(b) Enumerate the damper winding based starting method of a synchronous machine with necessary sketches. (16)

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)

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