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Question Paper Code: 44326

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

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)

- The relative permeability of a ferromagnetic material is
 - less than one
 - more than one
 - more than 10
 - more than 100 or 1000
- The material for brushes is generally
 - mica
 - copper
 - carbon
 - cast iron
- The all day efficiency of a transformer depends primarily on
 - its copper loss
 - the amount of load
 - the duration of load
 - both amount and duration of load
- A step up transformer increases
 - Voltage
 - Current
 - Power
 - Frequency
- _____ is called Slip speed.
 - Difference of synchronous speed and rotor speed
 - Sum of synchronous and rotor speeds
 - Half of the sum of synchronous and rotor speeds
 - None of these

6. The frequency of the rotor current in a 3Φ , 4pole, $50Hz$ induction motor at full load speed is about
(a) 50 Hz (b) 20 Hz (c) 2 Hz (d) Zero
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. A hysteresis motor
(a) Is not a self-starting motor (b) Is a constant speed motor
(c) Needs DC excitation (d) Cannot be run in reverse speed

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) 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) 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) Explain about how equivalent circuit parameters can be determined for a 1Φ transformer using OC and SC tests conducted on them. (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) 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 any two types of single phase induction motors. (16)

Or

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

