Reg. No. :

Question Paper Code: 53038

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

Third Semester

Mechanical Engineering

15UEE323 - ELECTRICAL MACHINES

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which of the following law/rule can he used to determine the direction of rotation of D.C. motor?

    (a) Lenz's law   (b) Faraday's law
    (c) Coloumb's law   (d) Fleming's left-hand rule

2. The current drawn by a 120 - V D.C motor of armature resistance 0.5 Ω and back E.M.F 110 V is_____ ampere.

    (a) 5   (b) 20   (c) 220   (d) 240

3. Which of the following does not change in a three phase transformer?

    (a) frequency   (b) current   (c) voltage   (d) all the above

4. The no-load current drawn by transformer is usually what per cent of the full-load current?

    (a) 0.2 to 0.5 %   (b) 2 to 5 %   (c) 12 to 15 %   (d) 20 to 30 %

5. Which of the following induction motor has the highest starting torque?

    (a) Squirrel cage induction motor   (b) Slip ring induction motor
    (c) Same in both induction motors   (d) None of these

6. A 4 pole 50Hz induction motor is running at 1470 rpm. What is the slip value?

    (a) 0.2   (b) 0.02   (c) 0.04   (d) 0.4

7. The current from the stator of an alternator is taken out to the external load circuit through

    (a) Slip rings   (b) Commutator segments
    (c) Solid connections   (d) Carbon brushes

8. The field system of an alternator is usually excited

    (a) 3-phase, 50 Hz 400 V   (b) 230 V AC
    (c) 110 / 220 V AC   (d) 240 / 240 V DC

9. A capacitor start single phase induction motor will usually have a power factor of

    (a) Unity   (b) 0..8 leading
    (c) 0.6 leading   (d) 0.6 lagging

10. In a split-phase motor, the running winding should have

    (a) Low resistance as well as low inductance
    (b) Low resistance and high Inductance
    (c) High resistance as well as high inductance
    (d) High resistance and low inductance

PART - B (5 x 2 = 10 Marks)

11. What is the purpose of yoke in DC machine?

12. What are the advantages of shell type transformer over core type transformers?

13. Why Induction motor is called rotating transformer?

14. What are the types of rotors used in alternators?

15. List out the applications of Brushless DC motor.

PART - C (5 x 16 = 80 Marks)

16. (a) What are the various starting methods of DC motor? Explain any one method in detail. (16)

Or

(b) Explain in detail multiple exited field system and derive the torque equation. (16)

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17. (a) Explain in detail construction and working principle of single phase transformer. (16)

Or

(b) A 20KVA, 2000/200V, 50 Hz transformer is operated at no load on rated voltage, the input being 150W at 0.12 p.f. When its operated at rated load, the voltage drops in the total leakage reactance and the total resistance are , respectively , 2 % and 1% of the rated voltage. Determine the input power and power factor when the transformers delivers 10KW at 200V at 0.8 p.f lagging to a load on the LV side.

(16)

18. (a) Explain the process of speed control of 3 phase induction motors. (16)

Or

(b) With neat sketches explain the construction and working principle of 3 phase induction motors. (16)

19. (a) Derive an expression for EMF generated in an Alternator. (16)

Or

(b) Explain in detail about the starting methods of Synchronous motors. (16)

20. (a) With sketches explain the construction and principle of operation of single phase induction motor. (16)

Or

(b) Derive an expression for torque of Permanent Magnet Brushless Motors. (16)

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