

Question Paper Code: 41346

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

Fourth Semester

Electronics and Instrumentation Engineering

01UEE426 - PRINCIPLES OF ELECTRICAL MACHINES

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

(8)

PART A - (10 x 2 = 20 Marks)

Answer ALL Questions.

- 1. Write an expression for voltage equation of DC motor.
- 2. What is the necessity of starters in DC motors?
- 3. Why Transformer rating is in kVA?
- 4. What is ideal transformer?
- 5. Differentiate squirrel cage and split ring induction motor.
- 6. How can the direction of rotation of 3 phase Induction motor be reversed?
- 7. What is a synchronous capacitor?
- 8. List out the different torques of a synchronous motor.
- 9. What is a universal motor?
- 10. What are the types of single phase induction motor?

PART - B (
$$5 \times 16 = 80$$
 Marks)

- 11. (a) (i) Explain the construction and operating principle of DC generator with neat sketch. (8)
 - (ii) Derive the e.m.f. equation of DC generator.

- (b) (i) Draw and explain the electrical and mechanical characteristics of DC series motor. (8)
 - (ii) Determine developed torque and shaft torque of 220 V, 4-pole series motor with 800 conductors wave-connected supplying a load of 8.2 kW by taking 45 A from mains. The flux per pole is 25 mWb and its armature circuit resistance is 0.60hm.
 (8)
- 12. (a) (i) Explain the construction, operating principle of transformer with neat sketch. (8)
 - (ii) Derive the e.m.f. equation of transformer. (8)

Or

- (b) Explain no-load and impedance tests in transformers with neat diagram. (16)
- 13. (a) With neat diagram explain the construction and operation of three phase induction motor and also derive its torque equation. (16)

Or

(b) (i) Draw the equivalent circuit of a 3 phase induction motor. (8)

(ii) Explain the starting of 3 phase induction motor using star-delta starter. (8)

14. (a) Draw and explain the vector diagram of a loaded alternator with different power factor. (16)

Or

- (b) Discuss in detail about hunting and V curves for synchronous motor. And also discuss how to prevent the hunting in synchronous motor. (16)
- 15. (a) (i) With neat sketch explain the operation of capacitor start capacitor run single phase induction motor. (8)
 - (ii) With neat diagram explain the construction and operation of universal motor. (8)

Or

- (b) (i) Discuss in detail the principle operation of Hysteresis motor. (8)
 - (ii) Discuss the construction detail and working principle of Switched Reluctance Motor.