Hall Ticket Number:

Code No. : 14513 O

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (Mech. Engg.) II Year II-Semester Old Examinations, May-2019

Electrical Circuits and Machines

Time: **3** hours Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. State and explain Kirchhoff's Voltage Law using suitable example.
2. What do you mean by phase and phase difference?
3. Define phase sequence of a three-phase system.
4. Name the constant losses taking place in a transformer.
5. On what principle does the generator operate?
6. Mention the speed control methods of DC shunt motor.
7. Give the expression of speed in terms of poles and frequency of supply.
8. Define slip of 3 φ Induction motor?
9. Why single-phase Induction motor is not self-started?
10. Give any two applications of capacitor start single phase induction motor.

Part-B (5 × 10 = 50 Marks)
(All sub-questions carry equal marks)

11. a) State and prove Thevenin's theorem with an example.
    b) A coil having a resistance of 7 ohms, and an inductance of 31.8 mH is connected to 230 V, 50Hz supply.
    Calculate (i) The circuit current (ii) Phase angle (iii) Power factor (iv) Power consumed.
12. a) Discuss two wattmeter method for power measurement in three-phase system and obtain a relation for power factor.
    b) Derive an equation for EMF induced in the windings of a transformer.
13. a) Describe the essential parts of DC machines regarding their construction.
    b) State the types DC motor and explain with help of neat sketch.
14. a) Compare the constructional features and merits and demerits of 3 phase squirrel cage and slip ring Induction motors.
    b) Why starters are necessary for starting of 3 phase Induction motors? What are the various types of starters? Explain any one of them.
15. a) How does a brushless DC motor works, explain? And also mention its advantages.
    b) What is the difference between single phase and 3φ Induction motor, why does we use two windings in single phase Induction motor?
16. a) Define RMS value and derive an expression for RMS value of an AC quantity.
    b) Show that for star connected 3 phase circuit, the line voltage is 1.732 times the phase voltage, whereas line current is equal to phase current. Also draw phasor diagrams to support the answer.
17. Answer any ***two*** of the following:
    a) Discuss various losses in DC machine.
    b) How rotating magnetic field is produced in a 3 φ Induction motor, Explain.
    c) Explain the principle of operation and construction of Stepper motor.