Hall Ticket Number:

Code No. : 22415

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (Mech. Engg.) II Year II-Semester Main & Backlog Examinations, May-2017

Electrical Circuits and Machines

Time: 3 hours Max. Marks: 70

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

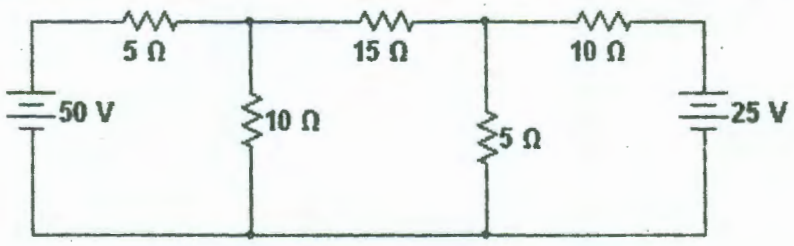
Part-A (10 × 2 = 20 Marks)

1. Define Ohm's law.
2. Define Thevenin's theorem.
3. Draw the Phasor diagram of a practical Transformer on no load.
4. What is the relationship between line and phase quantities in a 3-phase delta connected system?
5. What is the function of Commutator in a dc generator?
6. Why the generated EMF of a DC Motor is called back emf? Explain.
7. Draw the torque speed characteristics of an induction motor.
8. List out the methods of speed control of a 3 phase Induction motor.
9. What are the applications of stepper motor?
10. What are the applications of capacitor run motors?

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

11. a) Define *i)* r.m.s. value *ii)* average value *iii)* form factor of an alternating quantity.

    b) Find the current flowing in each branch using loop current method.



12. a) A balanced 3 phase star connected load has an impedance of 5+j10 ohm/phase. If a 3 phase, 415 V, 50 Hz supply is applied to the load, Find *i)* Phase current *ii)* Power absorbed by the load.

    b) Draw the equivalent circuit of transformer and indicate all the parameters on it.

13. a) Derive the e.m.f. equation of d.c. generator.

    b) A 200V, d.c. shunt generator has armature resistance of 0.1Ω and shunt field resistance of 100 Ω. It supplies a load consisting of 50 lamps of each rated at 200 V, 100 W. Find the generated e.m.f.

14. a) How 3 Φ Induction motor is self-starting? Explain.

    b) Explain the various starting methods of induction motor.

Contd... 2

15. a) Explain the construction and principle of operation of capacitor start single phase induction motor.

    b) With a neat sketch explain the basic features of a permanent magnet stepper motor.

16. a) A resistance of 20 Ω, inductance of 50mH and a capacitance of 20 μF are connected in series and fed from a 250V, 50 Hz single phase a.c. supply.

    Find *i)* impedance *ii)* current *iii)* power consumed and *iv)* power factor.

    b) A 10kVA , 2500/250 V single phase transformer gave the following test results:

O C Test:	250 V	0.8 A	50W
S.C Test:	60 V	3A	45 W

    Calculate the efficiency at full load, unity power factor.

17. Write short notes on any *two* of the following:

    a) Speed control of d.c series motor.

    b) Rotating magnetic field of 3 Φ IM.

    c) Applications of variable frequency drives.