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Code No.: 22413 AS

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**B.E. (Mech. Engg.) II Year II-Semester Advanced Supplementary Examinations, June/July-2017**

**Electrical Circuits and Machines**

Time: 3 hours

Max. Marks: 70

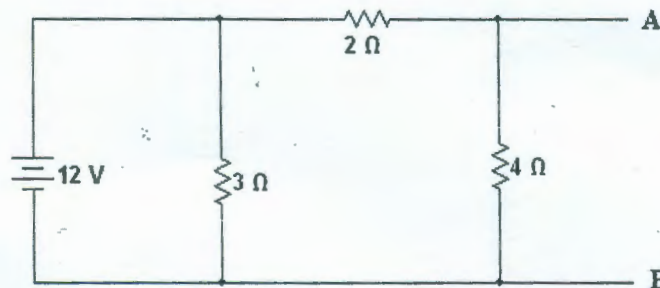
Note: Answer ALL questions in Part-A and any FIVE from Part-B

**Part-A (10 × 2 = 20 Marks)**

1. Define KCL and KVL.
2. Define Active and Reactive power.
3. What is the relationship between line and phase quantities in a 3-phase star connected system?
4. What are the two components of transformer no load current and their functions?
5. What is the difference between a self-excited and a separately excited generated?
6. What are the applications of d.c. series motor?
7. Define slip of an Induction Motor.
8. Differentiate between squirrel cage and slip ring induction motors.
9. What are the applications of capacitor start single phase motor?
10. What are the various types of stepper motors?

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

11. a) Define Thevenin's theorem and find Thevenin's voltage and Thevenin's resistance across A-B.



- b) A resistance of 50 Ω and inductance of 50 mH are connected in series and fed from 200 V, 50 Hz supply. Find i) impedance ii) current iii) power and iv) power factor.
12. a) Explain how O.C and S.C tests are conducted on a transformer with neat circuit diagrams
- b) In two watt-meter method of 3-phase power measurement the readings of the watt meters are 1200 W and 800 W respectively. Then find the power consumed and power factor of the load.
13. a) Derive the torque equation of a dc motor.
- b) A 250 V, d.c. shunt generator has an armature resistance of 0.05 Ω and shunt field resistance of 125 Ω. It supplies a load of 5 kW at 250 V. Find its efficiency if the iron and friction losses are 800W.

14. a) Explain the torque- slip characteristics of induction motor.  
b) Explain various speed control methods of  $3\Phi$  induction motor.
15. a) Explain the construction and principle of operation of capacitor run single phase induction motor.  
b) Single phase Induction motor is not self-starting, why? Explain.
16. a) Derive the equation for energy stored in an inductance.  
b) A 5kVA, 1000/250 V single phase transformer has full load copper loss of 500 W and iron loss of 200 W. Find i) efficiency at full load at u.p.f. ii) efficiency at half load, at 0.8 p.f.
17. Write short notes on any *two* of the following:
  - a) Characteristics of d.c. series motors
  - b) Star – delta starter
  - c) Brushless d.c. motor.

