

## FACULTY OF ENGINEERING

B.E. 2/4 (ECE) I – Semester (Main) Examination, November / December 2012

Subject: Electrical Technology

Time: 3 Hours

Max.Marks : 75

**Note: Answer all questions from Part – A. Answer any five questions from Part – B.****PART – A (25 Marks)**

1. What do you understand by commutation in DC machines? (3)
2. Draw the torque-speed characteristic of DC shunt motor. (2)
3. The readings of two watt meters of 3-phase power measurement are 50 W and 100 W respectively. Calculate power factor. (3)
4. Define synchronous impedance of an alternator. (2)
5. Mention the application of auto-transformer. (2)
6. Define regulation and efficiency of transformer (3)
7. Define the term slip in induction motor. (2)
8. Explain why single-phase induction motors are not self starting. (3)
9. What are the advantages of a non-conventional generating system over conventional generating system? (3)
10. What are the applications of DC series motors? (2)

**PART – B (50 Marks)**

- 11.(a) Derive the torque equation of a DC motor. (5)
- (b) The armature of a 6-pole DC generator has a wave winding containing 664 conductors. Calculate the generated emf when flux per pole is 0.06 weber and speed is 250 rpm. At what speed must the armature be driven to generator on emf of 250 V if the flux per pole is reduced to 0.058 weber. (5)
- 12.(a) Draw Star-Delta connections of a 3-phase system and derive line and phase voltage for both star and Delta connections. (5)
- (b) Determine voltage regulation by the synchronous impedance method. (5)
- 13.(a) Explain how the efficiency of a transformer may be estimated from the open circuit and short circuit tests. (5)
- (b) Discuss the principle of operation and application of single phase auto transformer. (5)
- 14.(a) Explain the principle of rotating magnetic field and hence prove it is of constant magnitude and rotates at synchronous speed. (7)
- (b) What is slip in 3-phase induction motor? (3)
15. Explain nuclear power station with neat diagram. (10)
- 16.(a) Explain various method of speed control of DC shunt motor. (5)
- (b) Derive the torque-slip equation for a 3-phase induction motor and also the equation for slip at which maximum torque occurs. (5)
- 17.(a) A 3-phase star connected alternator is rated at 1600 KVA, 13000 V. The armature resistance and synchronous reactance are 1.5 and 30 respectively per phase. Calculate percentage voltage regulation for a load of 1280 KW at power factor of 0.8 lagging. (5)
- (b) Explain about 3-point starter in DC motor. (5)