

**B.Tech. VIEP - ELECTRICAL  
ENGINEERING - III (BTELVI)**

**Term-End Examination**

**December, 2013**

**BIEE-004 : ELECTRICAL MACHINE - I**

*Time : 3 hours*

*Maximum Marks : 70*

*Note : Answer any seven questions.*

1. What do you understand by demagnetisation and cross magnetisation of armature reaction in a d.c. machine ? 10
  
2. (a) Draw a neat sketch of a d.c. generator. State the functions of each part. 5  
 (b) A d.c. generator has an armature emf of 100V when the useful flux per pole is 20mWb and the speed is 800 rpm. Calculate the generated emf (a) with the same flux and a speed of 1000rpm (b) with a flux per pole of 24mWb and a speed of 900rpm. 5
  
3. Explain in detail the methods of improving commutation in D.C. machine. 10
  
4. (a) What is critical field resistance of a d.c. shunt generator ? What is its significance ? 5  
 (b) Distinguish between self excited and separately excited d.c. generators. Give their circuit diagrams. 5

5. Explain what is meant by lock emf. Explain the principle of torque production in a d.c. motor with derivation of torque equation. **10**
6. (a) Describe the operation of a single phase transformer, explaining closely the functions of the different parts. **5**
- (b) Derive an expression for the induced emf of a transformer. **5**
7. What are distinguishing features of Y-Y, Y- $\Delta$ ,  $\Delta$ -Y and  $\Delta$ - $\Delta$  3-phase connections? Compare their advantages and disadvantages. **10**
8. (a) What is an Auto transformer? State its merits and demerits over the two winding transformer. **5**
- (b) A 2200/220V transformer is rated at 15KVA as a 2-winding transformer. It is connected as an auto transformer with low voltage winding connected additively in series with the high voltage winding. The auto transformer is excited from a 2420V source. The auto transformer is located so that the rated currents of the windings are not exceeded. Find **5**
- (i) the current distribution in the windings
- (ii) KVA output
- (iii) KVA transferred conductively and inductively from input to output
- (iv) saving in conductor material required to a two-winding transformer of the same VA rating.

9. Explain with the help of connection and phasor diagrams, how scott connections are used to obtain two-phase supply from 3-phase supply mains ? 10
10. Write short notes on **any two** of the following : 10
- (a) Inrush Current Phenomenon
  - (b) Armature reaction in d.c. machines
  - (c) Starting of d.c. motors
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