

**1228****Code : 15EE31T**Register  
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**III Semester Diploma Examination, Nov./Dec. 2017****DC MACHINES AND ALTERNATORS****Time : 3 Hours ]****[ Max. Marks : 100**

- Note :** (i) Answer any **six** questions from Part – A. Each question carries **5** marks each.  
(ii) Answer any **seven** full questions from Part – B. Each questions carries **10** marks.

**PART – A**

1. List the types of DC generators. **5**
2. Draw the circuit diagram of a DC shunt generator and write the equations for voltage and currents. **5**
3. List the losses in DC generator. **5**
4. Explain the working principle of a DC motor. **5**
5. Define torque and write the torque equation of a DC motor. **5**
6. Draw a neat diagram of an alternator and label the parts. **5**
7. List the advantages of fractional pitch windings in alternator. **5**
8. State the conditions for parallel operation of 3 phase alternator. **5**
9. List the applications of universal motors and servo motors. **5**

**PART – B**

10. Draw a neat diagram of a DC generator and explain its construction. **10**
11. (a) Derive EMF equation of a DC generator. **5**  
(b) Name the materials used for the following parts of a DC generator **5**
  - (i) Yoke
  - (ii) Armature
  - (iii) Commutator
  - (iv) Brushes
  - (v) Field poles

12. (a) Define : 4  
(i) Efficiency  
(ii) Voltage regulation  
(b) A 230 V shunt generator has a full load current of 150 A. Its armature resistance is  $0.1 \Omega$  and field resistance is  $230 \Omega$ . The stray losses are 1500 W. Determine the efficiency of the generator. 6
13. Explain armature control and field control methods of controlling speed of a DC motor. 10
14. (a) Explain the necessity of starters in DC motors. 4  
(b) Draw a neat diagram of a DC 3 point starter and label the parts. 6
15. (a) Write the expression for EMF generated in an alternator. 3  
(b) A 3 phase 16 pole alternator has a star connected winding with 144 slots and 10 conductors per slot. The flux per pole is 0.04 Weber and is sinusoidally distributed. The speed is 375 rpm.  
Find :  
(i) Frequency  
(ii) Phase emf  
Assume the breadth factor as 0.95 and the pitch factor as 0.98. 7
16. (a) Distinguish between salient and non-salient type alternators. 5  
(b) Explain 'hunting' in alternators. 5
17. (a) With a neat circuit diagram explain the parallel operation of 3 phase alternators using synchroscope. 7  
(b) List the causes of voltage drop in alternators on load. 3
18. Explain O.C. test and S.C. test on alternator with the help of a neat circuit diagrams. 10
19. (a) List the various types of special motors. 4  
(b) Explain the construction and working of a universal motor with a neat diagram. 6



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