

**1489****Code : 15EE31T**Register  
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**III Semester Diploma Examination, Nov./Dec. 2016****DC MACHINES & ALTERNATORS****Time : 3 Hours ]****[ Max. Marks : 100**

- Note :** (i) Answer any **SIX** full questions from Part-A. Each question carries **5** marks.  
(ii) Answer any **SEVEN** full questions from Part-B. Each question carries **10** marks.

**PART – A**

1. List any five main parts of DC Generator & name the materials used for them. **5**
2. Explain Demagnetising & Cross magnetising effects of Armature reaction. **5**
3. List the applications of DC Shunt Generator. **5**
4. Define Armature Torque & write expressions for Shaft Torque & Armature Torque. **5**
5. Compare DC Generator action & DC Motor action. **5**
6. Describe the working principle of Alternator. **5**
7. The stator of a 3-phase, 16-pole Alternator has 144 slots & there are 4 conductors/slot connected in two layers & the conductor of each phases are connected in series. If the speed of Alternator is 375 RPM, calculate the EMF induced/phase resultant  $\phi$  in the air gap is  $5 \times 10^{-2}$  Webers/pole sinusoidally distributed. Assume the coil span as  $150^\circ$  electrical. **5**
8. Define effective resistance, leakage reactance & synchronous reactance. **5**
9. Explain the construction & working of Universal Motor. **5**

**PART-B**

10. (a) Distinguish Full pitch & Fractional pitched windings. 5  
(b) List the merits of Hydrogen cooling. 5
11. (a) Explain the armature reaction in an Alternator with neat sketches. 5  
(b) Compute the relationship between poles, speed and frequency. 5
12. (a) Explain hunting in Alternator. 5  
(b) What do you mean by excitation ? List the types. 5
13. (a) Explain the procedure for conducting open circuit & short circuit tests on an Alternator with circuit diagram. 5  
(b) Define voltage regulation. List the methods of determining voltage regulation. 5
14. Write the applications of (a) Stepper Motor & (b) Servo Motor 10 (5 each)
15. (a) Explain the construction & operation of DC 3-point starter. 5  
(b) What is the necessity of starter in case of DC Motors ? 5
16. (a) Classify the DC Generators according to field excitation. 5  
(b) A DC Shunt Generator delivers 450 A at 230 V & the resistance of the shunt field, armature are  $50\ \Omega$  &  $0.03\ \Omega$  respectively. Calculate the generated EMF. 5
17. (a) What are the rules for Lap connected & Wave connected armature windings ? Explain with sketches. 5  
(b) Draw the open circuit characteristics of separately excited DC generator and explain. 5
18. (a) Write the causes for failure of voltage build up in DC Shunt Generator. 5  
(b) Write the applications of DC Series Motor. 5
19. (a) Write the advantages & disadvantages of armature control over flux control method of speed control. 5  
(b) Classify DC Motors & write their voltage equations. 5