1168

Code : 15EE-31T

Register Number | | | | | | | |

III Semester Diploma Examination, April/May-2017

D.C. MACHINES AND ALTERNATORS

Time : 3 Hours] **[Max. Marks : 100**

Note : (i) Answer any **six** questions from Part-**A**. Each question carries **5** marks.

(ii) Answer any **seven** questions from Part-**B**. Each question carries **10** marks.

PART – A

1. Deduce e.m.f. equation of D.C. generator. **5**

2. Explain with sketch, resistance commutation. **5**

3. What is armature reaction ? List it's effects. **2 + 3**

4. Illustrate the significance of back emf. **5**

5. Explain speed-load characteristics of shunt motor. **5**

6. Explain hunting in alternators. **5**

7. Differentiate full pitch and fractional pitch windings of alternator. **5**

8. A 3-phase star-connected alternator on open-circuit is required to generate a line voltage of 3600 volt at 50 Hz, when driven at 500 rpm. The stator has 3 slots/pole/phase and 10 conductors/slot. Calculate :

   (i) number of poles

   (ii) useful flux/pole

   Assume full pitch winding. **3 + 2**

9. Explain construction and working of universal motor. **3 + 2**

[Turn over

PART – B

1. (a) A 4 pole lap wound D.C. shunt generator has a useful flux/pole of 0.07 Wb. The armature winding consists of 220 turns, each of 0.04 Ω resistance. Calculate the terminal voltage when running at 900 rpm, if armature current is 50 A. **6**
   (b) Explain demagnetising and cross-magnetising effects of armature reaction. **2 + 2**

2. (a) Explain the process of voltage build up of D.C. shunt generator. Also define critical resistance. **4 + 2**
   (b) List causes for the failure of voltage build up in D.C. generator. **4**

3. (a) Explain speed control of shunt motor by field control method with the help of a neat circuit arrangement. **6**
   (b) Explain necessity of starter for D.C. motor. **4**

4. (a) Explain external characteristics of D.C. shunt generator. **5**
   (b) List the applications of :
   (i) Shunt generator
   (ii) Series generator **5**

5. (a) Draw the vector diagrams of loaded alternator at different power factors such as **6**
   (i) UPF
   (ii) Lag
   (iii) Lead
   (b) State the conditions for parallel operation of alternators. **4**

6. (a) Explain the effects of armature reaction on terminal voltage of alternator. **5**
   (b) Explain construction of non-salient pole rotor. **5**

7. (a) Explain emf method of finding voltage regulation for an alternator. **6**
   (b) Explain effect of un-equal voltage on load sharing of alternators connected in parallel. **4**

8. (a) Explain parallel operation of 3-phase alternators using synchroscope method. **6**
   (b) Define voltage regulation and list different methods to find regulation of alternators. **4**

9. (a) Explain static excitation system. **6**
   (b) Explain necessity of cooling of alternator. **4**

10. (a) Explain construction and working of permanent magnet stepper motor. **5**
    (b) Explain construction and working of A.C. servo motor. **5**