1080

Code : 9EE-31

Register Number | | | | | | | |

III Semester Diploma Examination, Nov./Dec. 2014

ELECTRICAL MACHINE-I

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

Note : (i) Section – **I** is *compulsory*.
(ii) Answer any **two** full questions from each sections – II, III & IV.

SECTION – I

1. (a) Fill in the blanks : **5 × 1 = 5**

(i) Lap winding is suitable for _____ current _____ voltage.

(ii) As the load increases the speed of a dc shunt motor _____.

(iii) _____ method is used when speed of dc shunt motor below no load speed are required.

(iv) A stepper motor may be considered as _____ converter.

(v) Voltage Regulation is negative for _____ pf load on alternator.

(b) Write a short note on Reluctance motor. **5**

SECTION – II

2. (a) Sketch the neat diagram of dc generator and label the parts and also explain the working operation. **8**

(b) State the rules of wave winding. **4**

(c) Mention the function of the following : **3**

(i) Commulator

(ii) Brushes

(iii) Armature conductors

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3. (a) With neat circuit diagram differentiate the separately excited and self excited generators. 6

(b) An 8 pole dc shunt generator with 778 wave connected armature conductor and running at 500 rpm. Supplies a load of 12.5Ω resistance and terminal voltage of 250V. The armature resistance is 0.24Ω and the field resistance is 250Ω. Find the armature current, the emf and flux/pole. 5

(c) State the rules of Lap and Wave winding. 4

4. (a) Draw the OCC of a dc shunt generator and determine the critical field resistance. 6

(b) Define armature reaction and list the effects. 4

(c) State the condition for maximum efficiency of dc generator. 5

SECTION – III

5. (a) With neat circuit diagram list the different types of DC motor and write the voltage equation of shunt and series motor. 8

(b) Define Torque, write the expression for shaft Torque and Armature Torque. 7

6. (a) Explain with neat sketch the construction and operation of 3 point starter. 6

(b) Explain with neat circuit diagram the speed control of dc shunt motor by flux control method. 5

(c) Draw the torque load characteristic curve for 4

(i) Shunt motor

(ii) Series motor

7. (a) Explain with neat sketch the construction and working operation of Brushless DC motor. 7

(b) List the application of universal motor. 4

(c) List the types of cooling agents. 4

SECTION – IV

8. (a) Distinguish between full pitch and fractional pitch working. State their advantages. **6**

   (b) Derive an emf equation of an alternator. **5**

   (c) Define the following : **4**

   (i) Distribution factor

   (ii) Pitch factor

9. (a) Draw & Explain vector diagram of alternator on load at (i) lagging p.f. (ii) leading p.f. **6**

   (b) Find the synchronous impendence and reactions of an alternator in which a field current produce an armature current of 200A on short circuit and generated emf 50 V on open circuit the armature resistance is 0.1 Ω. To what induced voltage must the alternator be excited if it delivers a head of 100 A at a pf of 0.8 leg. with terminal voltage of 200 V ? **5**

   (c) State the conditions for parallel operation of 1ϕ and 3ϕ alternator. **4**

10. (a) Explain the effect of unequal voltage on load sharing. **7**

    (b) What is meant by Heating ? How it is prevented ? **4**

    (c) List the merits of hydrogen cooling. **4**

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