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BIEE-027

DIPLOMA IN ELECTRICAL ENGINEERING (DELVI) / ADVANCED LEVEL CERTIFICATE COURSE IN ELECTRICAL ENGINEERING (ACELVI)

00285

Term-End Examination

December, 2014

BIEE-027 : ELECTRICAL MACHINES – I

Time : 2 hours *Maximum Marks : 70*

Note : *Question **1** is **compulsory.** Attempt any **four** out of questions no. **2** to **8**.*

1. All parts are compulsory. *7×2=14*

(a) For a lap wound armature winding

(i) A = 2

(ii) A = P

(iii) Z = A

(iv) None of the above

(b) If the flux per pole is doubled, the e.m.f. of a d.c. machine will be

(i) doubled

(ii) half

(iii) same

(iv) zero

(c) The armature and field winding is connected in parallel in

(i) DC series generator

(ii) Induction motor

(iii) DC shunt generator

(iv) Transformer

(d) Laminations in transformer core reduce

(i) flux

(ii) induced e.m.f.

(iii) hysteresis loss

(iv) eddy current loss

(e) Transformers connected in parallel should have

(i) same secondary voltage

(ii) same frequency

(iii) both (i) and (ii)

(iv) None of the above

(f) Armature reaction in a DC machine reduces the main field. (Yes/No)

(g) DC shunt motors are used in electrical traction. (Yes/No)

2. (a) Draw the connection diagram of DC shunt and series motor with their governing equations. 7

(b) What is armature reaction in a DC machine ? What are its effects ?

3. (a) Explain the constructional features of a DC machine. 7

(b) An 8-pole DC generator has 500 armature conductors and has a useful flux per pole of 0·065 Wb. What will be the e.m.f. generated if it is lap wound and runs at 1000 rpm ? What must be the speed to produce the same e.m.f. if it is wave wound ? 7

4. (a) Derive the torque equation of a d.c. machine. 7

(b) What are the methods of speed control of a DC shunt motor below and above the rated speed ? 7

5. (a) How are eddy current and hysteresis losses separated ? 7

(b) An autotransformer supplies a load of 5 kW at 115 V and at unity power factor. If the primary voltage is 230 V, determine (i) transformer ratio (ii) power output (iii) secondary current. 7

6. (a) Explain the open delta connection for three phase transformers. 7

(b) Explain the Scott connection for three-phase to two-phase conversion. 7

7. (a) Explain the double delta connection for three-phase to six-phase conversion. 7

(b) Explain the phenomenon of inrush of magnetizing current. 7

8. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Commutation

(b) Open circuit and Short circuit test of DC shunt generator

(c) DC series motor applications

(d) Equivalent circuit of transformer

(e) Tap changing transformer

(f) Waveform of no load current

(g) Three winding transformer