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BIEE-027

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

Term-End Examination

December, 2012

BIEE-027 : ELECTRICAL MACHINES - I

Time : 2 hours *Maximum Marks : 70*

*Note : All the questions are to be answered in **English** language only. Question No. **1** is **compulsory** and **four** questions are to be **attempted** out of question No. 2 to 8. Use of **scientific** calculator allowed.*

1. State *Yes/No or True/False :* **2x7=14**

(a) Lap, wave, single layer and double layer are the types of *FIELD* winding. (T/F)

(b) Identify that rotating and stationary parts of a DC machine are Armature, Commutator, Yoke, Brushes, field poles respectively. (T/F)

(c) Differentially compounded DC generator is suitable for electric welding. (T/F)

(d) No load and full load voltage is same in flat compounded DC generator. (T/F)

(e) Swissburne's test cannot be performed on DC series machine (T/F)

(f) Does the transformer draw any current when its secondary is open ? (Yes/No)

(g) Auto transformer is a two winding transformer. (Yes/No)

2. A 3-phase transformer has 400 turns on the primary and 40 turns on the secondary. The supply voltage is 3,300 V. Find the secondary voltage on no-load when the windings are connected in : 14

(a) star-delta

(b) delta-star

3. Derive the emf equation and Torque equation in D.C. Machine. 14

4. Draw and explain the equivalent circuit of a single phase transformer. And also draw full-load phasor diagram at lagging load. 14

5. Discuss briefly armature reaction and commutation in DC machines. 14

6. Following are the test figures for the 4 kVA, 200 V/400V, 50 Hz single phase transformer : 14

OC Test : 200 V, 0.8 A, 70 W

SC Test : 17.5 V, 9 A, 50 W

Calculate :

(a) full load efficiency at unity pf

(b) at half load at 0.8 pf.

7. (a) Explain the voltage build up process in a DC shunt generator and discuss with relevant diagrams the different methods of excitation of DC machines. **7x2=14**

(b) Derive the emf equation of transformer. Also draw the waveforms of no-load current and in rush current phenomenon.

8. Write short notes on ***any four*** : **3.5x4=14**

(a) Auto transformer

(b) Hopkin son's test of DC machine

(c) Braking of DC motors

(d) Sumpner's test on three phase transformers

(e) Principle of operation of single phase transformer

(f) Tap changing transformer