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BIEE-027

01321

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

Term-End Examination

June, 2013

BIEE-027 : ELECTRICAL MACHINES - I

Time : 2 hours *Maximum Marks : 70*

Note : *Answer in English only each question **14** marks. Question No. **1** is **compulsory.** Attempt **any four** questions from Q 2 & Q 8. Use of scientific calculator allowed.*

State True (T) or False (F) **2x7=14**

1. (a) An ideal transformer has 99. 90% efficiency. (T/F)

(b) Transformer works at a constant frequency. (T/F)

(c) Commutator in a dc machine is a rotating part of it. (T/F)

(d) High voltage and low current dc generators use LAP windings. (T/F)

(e) Maximum efficiency in a transformer occurs when iron losses are equal to copper losses. (T/F)

(f) DC series motor can be started on no - load. (T/F)

(g) The frequency of I_a in a dc generator is 50 Hz. (T/F)

2. A 10 - hp, 230 V dc shunt motor has an armature resistance of 0.5 Ω and field circuit resistance of 115 Ω. At no - load and rated (full) voltage, the speed is 1200 rpm and the armature current is 2A. If load is applied, the speed drops to 1100 rpm. Determine the armature current and the line current. **14**

3. The daily variation of load on a 100 kVA transformer is as follows : **14**

8.00 AM to 1.00 PM - 65 kW, 35 kVAR

1.00 PM to 6.00 PM - 80 kW, 50 kVAR

6.00 PM to 1.00 AM - 30 kW, 30 kVAR

1.00 AM to 8.00 AM - No load

This transformer has no - load core loss of 270 W and full load ohmic loss of 1200 W. Determine the all day energy efficiency of the transformer.

4. (a) State the various losses which take place in a transformer. On what factors do they depend ? **7**

(b) Define voltage regulation of a transformer. Deduce the expression for the voltage regulation. **7**

5. Two l - phase transformers with equal turns have impedances of (0.5+j0.3) Ω and (0.6 + j 10) Ω with respect to secondary. If they operate in parallel, determine how they will share total load of 100 kW at pf 0.8 lagging. **14**

6. (a) Discuss briefly the essential and desirable conditions to be fulfilled for operating two 3 - phase transformers in parallel. 7

(b) Explain the principle and working of Auto Transformer. 7

7. Explain characteristics and application of shunt, series and compound generators. 14

8. Write a short note on ***any four*** of the following : **3.5x4=14**

(a) Power transformer and distribution transformer.

(b) Losses in dc machine.

(c) Swin burne's test for determination of efficiency of a dc machine.

(d) Armature reaction and its remedies in dc machines.

(e) Construction of single phase transformer.

(f) Interpoles in shunt generator.