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BIEE-027

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

Term-End Examination

00253 **December, 2016**

BIEE-027 : ELECTRICAL MACHINES – I

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. Use of scientific calculator is allowed. Missing data, if any, may be suitably assumed.*

1. What is meant by 'armature reaction' ? Discuss the methods to improve commutation process in a d.c. machine in detail. *4+10=14*

2. (a) The field and armature resistances of a 220 V d.c. shunt machine are 88 Ω and 0·05 Ω, respectively. Calculate the total armature power developed when working

(i) as a generator delivering power of 22 kW, and

(ii) as a motor taking 22 kW power input. 7

(b) Discuss the conditions to be fulfilled for parallel operation of two or more d.c. shunt generators. 7

3. (a) What are the functions of a starter ? Why are small motors connected directly to the supply lines without starters ? 7

(b) Explain Swinburne's Test with neat schematic diagram. 7

4. (a) Explain the principle of operation of a single-phase transformer and also derive the e.m.f. equation of it. 7

(b) What are the various losses in a transformer ? Derive the condition for maximum efficiency. 7

5. A 10 kVA, 500/250 V, 50 Hz, single-phase transformer has the following test results :

OC : 500 V; 1·2 A; 80 W

SC : 50 V; 15 A; 90 W

Determine the regulation and efficiency of the transformer at full load and 0·8 power factor lagging. 14

6. (a) What do you understand by 'Autotransformer' ? Discuss the advantages, disadvantages and applications of an autotransformer. 7

(b) Discuss in detail, the methods for connection of a three-phase transformer. 7

7. Write technical notes on any ***two*** of the following : *2×7=14*

(a) Speed Control of DC-Motor

(b) Tap Changing Transformer

(c) Characteristics of DC Shunt and Series Generators