

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

Term-End Examination

June, 2017

00254

BIEE-027 : ELECTRICAL MACHINES – I

Time : 2 hours

Maximum Marks : 70

Note : Attempt any five questions. Use of scientific calculator is allowed. Assume missing data (if any) suitably.

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1. (a) What are the conditions for build-up of a DC shunt generator ? 7
 - (b) Discuss the voltage build-up process of a DC shunt generator. 7
 2. (a) Explain the parallel operation of DC series generators. 7
 - (b) The terminal voltage and the load current of a DC shunt generator are 250 V and 190 A. The field resistance and the stray load losses are 125 Ω and 800 W, respectively. Find the armature resistance if it has a full-load efficiency of 90%. Calculate the load current at maximum efficiency. 7

3. (a) What are 'interpoles' and how are they connected ? Also, discuss the factors that create difficulties in the process of commutation of a non-interpolar DC machine. 7

(b) A DC series motor running at 2000 rpm has the hysteresis and eddy current losses 500 W and 200 W, respectively. If flux remains constant, calculate the speed at which total iron losses are halved. 7

4. A 4 kVA, 400/200 V, 50 Hz single-phase transformer has the following test data :

OC : 200 V; 2 A; 90 W

SC : 20 V; 10 A; 100 W

The instruments during SC test are placed on the side opposite to that of OC test. Find the equivalent circuit referred to the primary (high-voltage) side. 14

5. (a) Draw the schematic diagram of 'Scott connection' regarding three-phase transformer and discuss. 7

(b) Explain the "heat-run" test of a single-phase transformer. 7

6. (a) How much copper can be saved in an auto-transformer in comparison to a two-winding transformer ? 7

(b) How does a transformer contribute towards the widespread popularity of AC system over DC ? Also, differentiate between the 'power transformer' and 'distribution transformer'. 7

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

(a) Conducting and reporting the test on DC machines as per Indian standard

(b) Lap and Wave windings and their applications

(c) No-load and Inrush current phenomenon of transformers
