

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

Term-End Examination

December, 2015

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. Draw the equivalent circuit of a 1- ϕ transformer and show how the constants of primary and secondary windings may be combined to give a simplified equivalent circuit with the values of constants given in terms of the secondary winding. 14

2. (a) Explain the construction and working principle of an auto-transformer. 7

- (b) Explain the parallel operation of a single-phase transformer. 7

3. Describe the heat-run test of a 1- ϕ transformer, with the circuit diagram. What are the limitations of the test? 14
4. (a) Derive the e.m.f. equation of a d.c. generator. 7
- (b) The induced e.m.f. in a d.c. machine when running at 500 r.p.m. is 180 V. Calculate the induced e.m.f. while the machine is running at 600 r.p.m. by assuming flux to be constant. 7
5. (a) What is the function of armature winding? Explain different types of winding in d.c. machines. 7
- (b) Explain the armature reaction in a d.c. machines. 7
6. (a) Draw and explain the torque – current characteristics of shunt, series and compound motors. 7
- (b) Draw the connection diagram of two shunt generators connected in parallel and discuss their load sharing. 7

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

- (a) Commutation of d.c. machines
 - (b) Open-delta connection of 3- ϕ transformer
 - (c) Testing of 3- ϕ transformer
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