



C09-EE-304

3242

BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV—2014

DEEE—THIRD SEMESTER EXAMINATION

DC MACHINES AND BATTERIES

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answer should be brief and straight to the point and shall not exceed *five* simple sentences.

1. A 4-pole DC generator having wave wound armature conductors has 51 slots with each slot containing 20 conductors. Find the EMF generated when the machine is driven at 1500 rpm assuming flux per pole to be 7.0 mWb.

2. Write about dynamically induced EMF.

3. Define commutation.

4. Draw the external and internal characteristics of a DC series generator.

5. Draw the schematic diagram of DC long-shunt motor. Also write the back EMF, current and voltage equations.

6. Explain the principle of working of DC motor.

7. List the different methods of speed control of DC shunt motor.

8. Write in brief about necessity of speed control of DC motor.

9. Define ampere-hour efficiency.

10. List the types of storage cells.

PART—B

10×5=50

- Instructions :** (1) Answer *any five* questions.
(2) Each question carries **ten** marks.
(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

- 11.** Describe the construction of a DC generator and write the functions of each part with neat sketch.
- 12.** (a) State the need for parallel operation of DC generators.
(b) State the conditions to be satisfied for parallel operation of DC generators.
- 13.** (a) Derive the cross-magnetizing AT per pole required to overcome cross-magnetizing.
(b) An 8-pole lap connected DC shunt generator delivers an output of 240 A at 500 V. The armature has 1408 conductors and 160 commutator segments. If the brushes are given a lead of 4 segments from the no-load neutral axis, estimate the demagnetizing and cross-magnetizing AT per pole.
- 14.** (a) Explain the significance of back EMF.
(b) A 230 V DC shunt motor takes a current of 40 A and runs at 1100 r.p.m. If armature and shunt field resistances are 0.25 and 230 respectively, find the torque developed by the armature.
- 15.** (a) Write briefly about the necessity of a starter to start a DC motor.
(b) Write the function of No-Volt Coil (NVC) and Over-Load Coil (OLC) in a 3-point starter.
- 16.** Explain the method of conducting brake test on DC compound motor with figure.
- 17.** (a) Explain with figure the charging of batteries by constant current method.
(b) Compare lead-acid cell with nickel-iron cell.
- 18.** (a) Write about hysteresis loss and eddy-current loss.
(b) List the applications of maintenance-free batteries.

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