



C09-EE-304

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**BOARD DIPLOMA EXAMINATION, (C-09)
OCT/NOV—2017
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) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Draw the schematic diagram of DC series generator and also write the current and voltage equation.
2. List the basic requirements for generation of EMF.
3. Write the function of equalizing ring. Where is it used?
4. Define commutation.
5. Draw the power stage diagram of DC motor.
6. Write the applications of DC motors.
7. Write any two differences between 3-point and 4-point starters.

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8. List the different methods of speed control of DC series motor.
9. List the types of storage cells.
10. List the applications of maintenance free batteries.

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. A shunt generator delivers 195A at terminal p.d. of 250 V. The armature resistance and shunt field resistance are 0.02 and 50 respectively. The iron and friction losses equal to 950 W. Find—

- (a) EMF generated;
- (b) copper losses;
- (c) output of prime mover;
- (d) electrical efficiency.

12. (a) Explain critical resistance and critical speed. 5

(b) Explain O.C.C. of a separately excited d.c. generator with circuit diagram. 5

13. Explain armature reaction with neat sketches.

14. A 4-pole DC shunt motor has a flux per pole of 0.04 Weber's and the armature is lap wound with 720 conductors. The shunt field resistance is 240 ohms and the armature resistance is 0.2 ohm. Brush contact drop is 1 V/brush. Determine the speed of the machine when running, (a) as motor taking 60 A, and (b) as generator supplying 120 A. The terminal voltage in each case is 480 V.

15. Draw the ^{*}schematic diagram of 4-point starter and explain its working.
16. (a) Draw the performance characteristics of d.c. shunt motor. 5
 (b) Draw the performance characteristics of d.c. compound motor. 5
17. (a) Explain with figure charging of batteries by constant current method. 5
 (b) Write about the indications of fully charged lead acid battery. 5
18. (a) Classify the DC generators based on excitation and draw the schematic diagrams. 5
 (b) Define (i) Ampere-hour efficiency and (ii) Watt-hour efficiency. $2\frac{1}{2}+2\frac{1}{2}$

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