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C09–EE–304

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BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2012

DEEE—THIRD SEMESTER EXAMINATION

DC MACHINES AND BATTERIES

Time : 3 hours] [*Total Marks* : 80

PART—A

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. Write the principle of working of a DC generator.

2. Draw the schematic diagram of separately excited DC generator. Also write the current and voltage equations.

3. Draw the external and internal characteristics of a DC shunt generator.

4. List the advantages of parallel operation.

5. Plot the characteristics of long shunt compound motor.

6. Draw the schematic diagram of DC series motor. Also write the back e.m.f., current and voltage equations.

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7. Write any two differences between 3-point and 4-point starters.

8. List the different methods of speed control of DC series motor.

9. List the applications of maintenance-free batteries.

10. List the types of storage cells.

PART—B

Instructions : (1) Answer *any* **five** questions.

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

(3) Answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

11. Classify the generators based on excitation. Draw the figure and write the current, voltage equation for each configuration.

12. Explain armature reaction with neat sketches.

13. *(a)* Write about e.m.f. commutation with neat figure.

(b) List the advantages and disadvantages of carbon brushes.

14. *(a)* Draw the power stage diagram of DC motor.

(b) A 250 V DC shunt motor runs at 1500 r.p.m. and takes an armature current of 50 A. The armature and field resistances are $0 \cdot 2\ \Omega$ and $250\ \Omega$ respectively. Calculate the torque developed in the armature.

15. *(a)* Why is starter required for starting a DC motor?

(b) Write the function of No Volt Coil (NVC) and Over Load Coil (OLC) in a 3-point starter.

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16. Explain the method of conducting brake test on DC compound motor with neat diagram.

17. *(a)* Explain with figure charging of batteries by constant current method.

    (b) Write about the indications of fully charged lead-acid battery.

18. *(a)* Draw the power flow diagram and write about various efficiencies.

    (b) Define the following :

    (i) Ampere-hour efficiency

    (ii) Watt-hour efficiency

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