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C09–EE–304

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BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2018

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. Explain the principle of DC generator.

2. State Fleming's right-hand rule.

3. What is necessity of parallel operation of DC generators.

4. What are the reasons for sparking at brushes? Explain the methods to improve the commutation.

5. List various losses in DC motor.

6. State the uses of DC shunt motor.

7. State the advantage of speed control of a DC motor using flux control method.

8. State the function of no-volt coil in a 3-point starter.

9. Compare between primary cell and secondary cell in any three aspects.

10. List any four applications of lead-acid cell.

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 short shunt compound generator supplies a current of 200 A at a terminal voltage of 250 V. If armature, series and shunt field resistances are 0 1 , 0 02 and 50 respectively, find the generated EMF. The volt drop per brush is 1 volt.

12. *(a)* Draw the power flow diagram of a DC generator.

(b) Find the ampere-hour and watt-hour efficiency of a battery when it is charged with 36 A for 8 hours at a p.d. of 2·1 V and discharged at 22 A for 10 hours at a p.d. of 1·8 V.

13. A 4-pole lap-wound DC generator with 450 armature conductors supplies a current of 150 A. The brushes have been displaced through three angular degrees from the geometrical neutral axis. Calculate *(a)* the demagnetizing ampere turns/pole, *(b)* the cross magnetizing ampere turns/pole, and *(c)* the additional field current for neutralizing the demagnetization if the field winding has 1000 turns/pole.

14. Explain various methods to improve the commutation.

15. Explain and plot the electrical and mechanical characteristics of DC series motor.

16. Draw the neat sketch of a 3-point starter and explain.

17. Explain the method of conducting Hopkinson's test.

18. *(a)* Differentiate between maintenance battery and lead-acid battery.

(b) A secondary cell having 20 hours charge rate at 15 A current and delivers 6 A for 40 hours with a mean terminal voltage of 2 volt. The terminal voltage during charging has mean value of 2·3 V. Calculate *(i)* A-H efficiency, and *(ii)* W-H efficiency.

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