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C20-EE-302

7246

BOARD DIPLOMA EXAMINATION, (C-20)

JUNE/JULY—2022

DEEE - THIRD SEMESTER EXAMINATION

ELECTRICAL MACHINES - I (DC MACHINES)

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. State the Fleming's right hand rule.
2. Give the functions of yoke, armature core and pole core of a DC generator.
3. Define the pole pitch, commutator pitch and front pitch.
4. State any three conditions for parallel operation of DC generators.
5. List any three applications of DC shunt motor.
6. State the necessity of starter for a DC motor.
7. State any three disadvantages of speed control with the flux method.
8. What are the materials used for brushes in DC machines?
9. Define the commutation of a DC generator.
10. State any three advantages of brake test.

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PART—B

8×5=40

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

11. (a) A 4-pole DC generator having a wave wound armature conductors has 51 slots with each slot containing 20 conductors. Find e.m.f. generated when machine is driven at 1500 r.p.m assuming flux per pole to be 70 mWb.

(OR)

- (b) A 20 kw short shunt compound generator works on full load with a terminal voltage of 230 V. The armature series and shunt field resistances are 0.1 Ω, 0.05 Ω and 115 Ω respectively. Calculate the generated e.m.f.

12. (a) What do you understand from the term armature reaction? Describe the role of compensating windings in a DC generator.

(OR)

- (b) What is the commutation? How to improve the commutation in DC generator?

13. (a) Derive an equation for torque of a DC motor.

(OR)

- (b) Describe the working of DC motor.

14. (a) Describe the working of 4-point starter with legible sketch.

(OR)

- (b) Explain the necessity of speed control of a DC motors.

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15. (a) Explain the procedure with the Hopkinson's test.

(OR)

(b) Explain the procedure brake test of a DC series motor.

PART—C

10×1=10

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

16. Explain the process of voltage build up in a DC shunt generator.
