7246

C20-EE–302

7246

BOARD DIPLOMA EXAMINATION, (C-20)

FEBRUARY/MARCH — 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. List any three losses in a DC generator.

2. State the functions of armature core, commutator and pole core in a DC generator.

3. Compare with any three aspects, progressive and retrogressive winding.

4. Define the critical field resistance.

5. List any three applications of DC compound motor.

6. State any three disadvantages of speed control with the armature resistance method.

7. State the factors which affect the speed of a DC motor.

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

9. List any three applications of a DC compound generator.

10. State any three advantages of Swinburne's test.

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 wave wound armature conductors has 520 conductors. Find emf generated when machine is driven at 1500 rpm assuming flux per pole to be 30 mWb.

(OR)

(b) A 10 kW 250 V DC shunt generator has total stray losses of 600 W. Its armature and shunt field resistances are 0.5 Ω and 125 Ω respectively. Calculate *(i)* efficiency at rated load and *(ii)* maximum efficiency.

12. *(a)* What is the commutation? How to improve the commutation in DC generator?

(OR)

(b) Explain the procedure for internal characteristics of a DC series generator.

13. *(a)* Explain the various power stages which take place in a DC motor.

(OR)

(b) Explain the significance of back emf in DC motor.

14. *(a)* Describe the working of 3-point starter with legible sketch.

(OR)

(b) Explain the procedure of DC shunt motor with the field method for speed control.

15. *(a)* Explain the procedure for brake test on a DC series motor with legible circuit.

(OR)

(b) Explain the procedure of Swinburne's test on a DC shunt motor.

PART—C

10×1=10

Instructions : (1) Answer the following question.

(2) Question carries **ten** marks.

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

16. Will a DC shunt motor run on an AC supply? Discuss it.

★ ★ ★