



C16-EE-302

6238

BOARD DIPLOMA EXAMINATION, (C-16)

JANUARY/FEBRUARY—2022

DEEE - THIRD SEMESTER EXAMINATION

DC MACHINES AND MEASURING INSTRUMENTS

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 functions of any six parts of a DC Generator.
2. Draw the equivalent circuit of a DC Short Shunt Compound Generator and write its voltage and current equations.
3. State the conditions to run DC Generators in parallel.
4. What is the significance of Back E.M.F. in a DC Motor? State its formula.
5. List the types of starters used for DC Motors.
- \* 6. State any three factors which control the speed of a DC Motor.
7. Define (a) accuracy, (b) precision and (c) error related to measuring instruments.

8. State the precautions to be taken while working with Current Transformer.
9. State the purpose of controlling torque in measuring instruments.
10. List any three advantages of digital electronic measuring instrument over analog electronic measuring instrument.

### PART—B

10×5=50

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

11. A DC Short Shunt Compound Generator delivers 100 A at a terminal voltage of 220 V and the resistance of shunt field, series field and armature are 50 ohm, 0.025 ohm and 0.05 ohm respectively. The stray losses are 1 KW. Calculate (a) generated EMF, (b) copper losses, (c) prime mover output, (d) electrical efficiency and (e) overall efficiency.
12. Explain the open circuit and load characteristics of separately excited DC Generator with circuit diagrams and characteristic curves.
13. (a) Derive the equation for Torque of a DC Motor.  
(b) Explain the Field Control method of DC Shunt Motor with circuit diagram.
14. A 4-pole, 250 V, lap-wound DC Shunt Motor has 960 armature conductors. The flux per pole is 20 mWb. The resistance of armature and shunt field are 0.1 ohm and 125 ohm respectively. The rotational losses are 810 W. If the motor takes a current of 25 A, find (a) Speed, (b) Shaft torque and (c) efficiency.
15. Explain the construction and working of a 3-Point Starter for DC Motor with legible sketch.

- 16.** Explain the construction and working of Permanent Magnet Moving Coil measuring instrument with a legible sketch.
- 17.** Explain the working of Digital Multimeter with a block diagram.
- 18.** (a) Explain the working of Rectifier type Ammeter with a legible sketch.  
(b) State any five common errors occurred in Single Phase Induction type Energy meter and their remedies.

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