



C16-EE-302

**6238**

**BOARD DIPLOMA EXAMINATION, (C-16)**

**AUGUST/SEPTEMBER—2021**

**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. Classify DC generators basing on the type of field excitation.
2. Define armature reaction of a DC generator. State its effects.
3. State the conditions to build up e.m.f. in a DC generator.
4. Draw the equivalent circuit of a DC shunt motor and write its voltage and current equations.
5. State the necessity of a starter to start a DC motor.
6. State the advantages and disadvantages of flux control method of DC shunt motor.
- \* 7. Classify electrical measuring instruments basing on their construction.
8. State the purpose the controlling torque in measuring instruments and methods of producing it.
9. List any three applications of potential transformer.
10. List the basic components of digital type electronic measuring instruments.

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## PART—B

- 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.** Explain the working of a simple loop generator with a legible sketch. 10
- 12.** A DC Shunt Generator delivers 195 A at a terminal voltage of 250 V and the resistance of shunt field and armature are 50 ohm and 0.02 ohm respectively. The stray losses are 950 W. Calculate (a) generated e.m.f, (b) copper losses, (c) prime mover output, (d) mechanical efficiency and (e) overall efficiency. 10
- 13.** Explain the electrical and mechanical characteristics of DC shunt motor with circuit diagram and graphs. 10
- 14.** (a) 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. 5  
(b) Explain the armature voltage control method of DC shunt motor with circuit diagram and graph. 5
- 15.** Explain the working of a 3-Point Starter for DC motor with legible sketch. 10
- 16.** Explain the working of attraction type moving iron measuring instrument with a legible sketch. 10
- 17.** (a) Explain the method of extending the range of a moving coil voltmeter by using multiplier with a legible sketch. 5  
(b) Explain the working of digital frequency meter with a block diagram. 5
- 18.** Explain the working of three phase digital energy meter with a block diagram. 10

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