

TED (10)–3054

Reg. No.

(REVISION—2010)

Signature

THIRD SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND
ELECTRONICS ENGINEERING—OCTOBER, 2013

DC MACHINES

[Time : 3 hours

(Maximum marks : 100)

PART—A

(Maximum marks : 10)

Marks

I Answer all questions in one or two sentences. Each question carries 2 marks.

1. Define magnetic pole.
2. Give the principle of a DC generator.
3. What is meant by commutation ?
4. What is short pitched coil ?
5. What is critical resistance ?

(5×2=10)

PART—B

(Maximum marks : 30)

II Answer *any five* of the following questions. Each question carries 6 marks.

1. How magnetic materials are classified ? Explain.
2. Compare copper and aluminium.
3. Explain armature reaction.
4. State the materials used for yoke, armature core and brush, also state the functions of yoke.
5. Describe the parallel operation of DC generators.
6. Explain the necessity of starter.
7. Explain the principle of motor.

(5×6=30)

PART—C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each question carries 15 marks.)

UNIT—I

III (a) State the properties and applications of Ferromagnetic materials. 8

(b) Explain the classification of insulating materials based on temperature. 7

OR

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|-------------------------------------|-------|
| IV (a) Explain B-H curve. | 8 |
| (b) State the properties of carbon. | 7 |

UNIT—II

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| V (a) Classify generators according to excitation. Give the connection diagram. | 8 |
| (b) A 4-pole, wave wound DC generator has 51 slots and each slot has 20 conductors. Find the generated voltage when driven at 1500 rpm, let flux per pole is 7mwb. | 7 |

OR

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| VI (a) Derive the emf equation of a DC generator. | 8 |
| (b) A long shunt compound generator delivers a load current of 50 A at 500 V and has armature, series field and shunt field resistances of 0.05Ω , 0.03Ω and 250Ω respectively. Calculate generated voltage and the armature current. | 7 |

UNIT—III

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| VII (a) Draw open circuit characteristics of a DC shunt generator and explain the method of obtaining critical resistance. | 7 |
| (b) State the methods of improving commutation. | 8 |

OR

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| VIII (a) Explain three point starter with sketch. | 7 | |
| (b) Write short notes on : | | |
| (i) Interpole | (ii) Compensating winding | 8 |

UNIT—IV

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| IX (a) Explain the construction and working of a permanent magnet dc motor. | 7 |
| (b) With neat connection diagram explain the speed control methods used in a DC series motor. | 8 |

OR

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| X (a) Draw the different performance characteristic of DC shunt motor and briefly explain. | 7 |
| (b) Derive the equation for armature torque of a dc motor. | 8 |