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A21-00119

Reg.No………………..............
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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE – APRIL -2021.

DC MACHINES

(Maximum Marks : 75) [Time : 2.15 hours]

PART–A

Marks

I. Answer **any three** questions in one or two sentences. Each question carries 2 marks.

1. List the two basic essential parts of a DC Generator.
2. Name the two effects of armature magnetic field in a DC generator.
3. List one application of series and cumulatively compounded DC Generator.
4. Name the different types of starters used for series, shunt and compound motors.
5. Mention any two application of permanent magnet DC Motor. (3x2=6)

PART - B

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

1. List the main parts of a DC generator and mention the function of each part.
2. Explain the terms Front pitch, Back pitch and commutator pitch of a DC winding with fig.
3. Explain the methods used for improving commutation in a DC Generator.
4. Classify the DC Motors and draw the connection diagrams.
5. Draw the figure of a four point starter and name the parts.
6. Explain the electrical characteristics of a DC Series Motor.
7. List the different losses in a DC Motor. [4x6 =24]

PART - C

(Answer **any of the three units** from the following. Each full question carries 15 marks)

UNIT I

III (a) Explain different classifications of DC Compound generators with fig. (8)

(b) Calculate the e.m.f generated by a 4 pole lap wound armature with 80 slots and 10 conductors per slot, when driven at 1000 rpm. The flux per pole is 0.03 Webber. (7)

OR

IV (a) Explain the use of lap and wave windings with reason. (6)

(b) A 4-pole, d.c. shunt generator with a shunt field resistance of 100 Ω and an armature resistance of 1 Ω has 378 wave-connected conductors in its Armature. The flux per pole is 0.02 Wb. If a load resistance of 10 Ω is connected across the armature terminals and the generator is driven at 1000 r.p.m., calculate the power absorbed by the load. (9)

UNIT- II

V (a) Explain cross magnetising effect of armature reaction with figures. (8)

(b) Explain why shunt generator failing to build up voltage. (7)

OR

VI (a) Explain critical field resistance and critical speed. (6)

(c) Explain the necessity of equiliser-busbar for parallel operation of DC Series generators. (9)

UNIT- III

VII (a) Briefly explain the working of a DC Motor with necessary figure. (8)

(b) Explain the necessity of starters for starting DC Motors. (7)

OR

VIII (a) Derive the torque equation of a DC Motor. (6)

(b) Determine developed torque and shaft torque of 220-V, 4-pole series motor with 800 conductors wave-connected supplying a load of 8.2 kW by taking 45 A from the mains. The flux per pole is 25 m Wb and its armature circuit resistance is 0.6 Ω . (9)

UNIT – IV

IX (a) Explain the performance characteristics of Shunt Motor. (9)

(b) Derive the condition for maximum efficiency of a DC Machine. (6)

OR

X (a) List the advantageous and disadvantageous of Swinburne's test. (6)

(b) List the various applications of DC Shunt, Series and Compound Motors. (9)

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