

Reg. No.

Question Paper Code

12085

B.E. / B.Tech - DEGREE EXAMINATIONS, APRIL / MAY 2023

Third Semester

Electrical and Electronics Engineering

20EEPC302 - DC MACHINES AND TRANSFORMERS

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | <i>Marks,
K-Level, CO</i> |
|---|-------------------------------|
| 1. List the types of magnetic material. | 2,K1,CO1 |
| 2. Define statically and dynamically induced emf. | 2,K1,CO1 |
| 3. Define pole pitch? | 2,K1,CO2 |
| 4. Compare between lap and wave winding. | 2,K2,CO2 |
| 5. What is back EMF in a motor? | 2,K1,CO3 |
| 6. What is the reason for DC shunt motor is called constant flux motor? | 2,K2,CO3 |
| 7. What is necessity of starter for a D.C. motor? | 2,K1,CO4 |
| 8. List various methods of speed control of D.C motor. | 2,K1,CO4 |
| 9. List the types of transformers. | 2,K1,CO5 |
| 10. Draw the equivalent circuit of transformer. | 2,K2,CO5 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

- | | |
|--|-----------|
| 11. a) Explain about energy stored in magnetic system. | 13,K2,CO1 |
| OR | |
| b) Explain about Hysteresis and Eddy current loss. | 13,K2,CO1 |
| 12. a) Describe Compound generator with neat diagram. | 13,K2,CO2 |
| OR | |
| b) Explain briefly about Armature reaction. | 13,K2,CO2 |
| 13. a) Derive Torque equation of a D.C. Machine. | 13,K2,CO3 |
| OR | |
| b) Explain the characteristics of DC series motors. | 13,K2,CO3 |

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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14. a) Explain about three point stator with a neat diagram. 13,K2,CO4

OR

b) Explain briefly about Hopkinson's test. 13,K2,CO4

15. a) Explain in detail about Regulation of a Transformer. 13,K2,CO5

OR

b) Explain about auto transformer and derive an expression between the weight of winding material of auto and ordinary transformer. 13,K2,CO5

PART - C (1 × 15 = 15 Marks)

16. a) A D.C. Shunt generator delivers 195A at a terminal voltage of 250V. 15,K2,CO2
Its armature resistance is 0.02Ω and shunt field resistance is 50Ω and stray losses are 950W. Find (i) generated e.m.f. (ii) Copper losses (iii) output of the prime mover (iv) mechanical, electrical and commercial Efficiencies.

OR

b) The magnetization curve of a D.C. Generator driven at 400 rpm is as follows. 15,K2,CO2

Field current (A) : 2 3 4 5 6 7 8 9

Terminal Voltage (V): 110 155 186 212 230 246 260 271

The resistance of the field winding is 34Ω . Find (i) the voltage to which the machine will excite, when running as a shunt generator at 400 rpm. (ii) the additional resistance in the field circuit to reduce the e.m.f. to 220V (iii) the value of the critical field resistance (iv) Critical speed when field circuit resistance is 34Ω .