**A** **Reg. No. :** | | | | | | | | | | |

# Question Paper Code: 53302

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Third Semester

Electrical and Electronics Engineering

15UEE302 - DC MACHINES AND TRANSFORMERS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Now a day's Magnets are made of CO1- R

   (a) Iron (b) Steel (c) both a and b (d) Copper

2. _____ is defined as fraction of the total flux produced by one coil linking the other coil. CO1- R

   (a) Flux coupling (b) Electric coupling (c) Magnetic coupling (d) link coupling

3. The principle of operation of transformer is based on _____ electromagnetic induction. CO2-U

   (a) Ohm's Law (b) Faraday's Law (c) Ampere's Law (d) Tesla

4. The transformer ratings are usually expressed in CO2- U

   (a) Volts (b) Amperes (c) Kw (d) KVA

5. The electrical energy given to the coil is stored in the form of magnetic energy is known as CO3- U

   (a) Electrical energy (b) Co energy (c) Magnetic energy (d) Field energy

6. The distance between the centers of two adjacent poles CO3- R

   (a) Pole pitch (b) Chording (c) Chording angle (d) All of above

7. _____converts the alternating emf generated in the armature winding into dc voltage across the brushes in DC generator. CO4- R

   (a) Rectifier (b) Commutator (c) Converter (d) None of these

8. An exciter for a turbo generator is a CO4- R

(a) Separately excited generator (b) Shunt generator

(c) Series generator (d) Compound generator

9. $V= E_b + I_aR_a$ is called _____ equation of DC motor CO5- R

(a) Voltage (b) Current (c) Power (d) None of these

10. What will happen, with the increase in speed of a DC motor? CO5- R

(a) Back emf increase but line current falls.

(b) Back emf falls and line current increase.

(c) Both back emf as well as line current increase.

(d) Both back emf as well as line current fall

PART – B (5 x 2= 10Marks)

11. State Faradays law of electromagnetic induction. CO1- R

12. Distinguish Power Transformers and Distribution Transformers? CO2- R

13. What is the significance of Co Energy? CO3- R

14. What is the purpose of yoke in D.C machine? CO4- R

15. What is Back EMF in D.C. motor? CO5- R

PART – C (5 x 16= 80Marks)

16. (a) Explain the core loss that occurs in magnetic circuits in detail. CO1- U (16)

Or

(b) (i) Brief about magnetic materials and their properties. CO1- U (10)

(ii) Write a brief note on permanent magnets. CO1- U (6)

17. (a) Explain the working and construction of Auto Transformer in detail? CO2-App (16)

Or

(b) Brief the following topics relevant to transformer:

(i) Polarity test CO2-U (4)

(ii) Open circuit and short circuit test CO2-U (6)

(iii) Parallel operation of transformer CO2-U (6)

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| 18. | (a) | (i) Derive an expression for field energy and mechanical force. | CO3 U | (8) |
| | | (ii) Brief about multiply excited magnetic field systems with an example. | CO3 U | (8) |
| | | Or | | |
| | (b) | Derive the Torque equation of round rotor machine or AC Machines? | CO3- Ana | (16) |
| 19. | (a) | (i) Derive the emf equation for DC generator. | CO4- App | (4) |
| | | (ii) Describe the process of commutation in DC generator. | CO4- U | (12) |
| | | Or | | |
| | (b) | Explain in about detail about commutation of D.C machines? | CO4- U | (16) |
| 20. | (a) | Explain in detail about the Characteristics of DC motors. | CO5- U | (16) |
| | | Or | | |
| | (b) | Explain the method of testing DC machines by Swinburne and Hopkinson's test. | CO5- U | (16) |