A   Reg. No. :

Question Paper Code: 53302

B.E./B.Tech. DEGREE EXAMINATION, DEC 2021

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   CO1- R
    linking the other coil.

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

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

    (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   CO3- U
    magnetic energy is known as

    (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   CO4- R
    winding into dc voltage across the brushes in DC generator.

    (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. $V = E_b + I_a R_a$ is called _____ equation of DC   CO5- R
motor

(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 CO2-App   (16)
detail?

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)

2

53302

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 CO3 U   (8) example.

<div align="center">Or</div>

    (b) Derive the Torque equation of round rotor machine or AC CO3- Ana   (16) Machines?

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)

<div align="center">Or</div>

    (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)

<div align="center">Or</div>

    (b) Explain the method of testing DC machines by Swinburne and CO5- U   (16) Hopkinson's test.

53302

53302