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

Question Paper Code: 53302

B.E./B.Tech. DEGREE EXAMINATION, NOV 2018

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. _____ is defined as flux per unit area at right angles to the flux. CO1- R

   (a) Magnetic flux density (b) Electric flux density

   (c) Electric field intensity (d) Magnetic field intensity

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. Two identical transformers can be tested with the help of CO2- U

   (a) Sumpner's test (b) Polarity test (c) Load test (d) None of these

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 ratio of phasor sum of induced emfs per coil to the arithmetic sum of induced emfs per coil is known as _____ CO3- R

(a) Pitch factor (b) Coil span factor (c) Chording factor (d) Any one of these

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. The effect of armature flux on the main flux is called CO4- R

(a) Chain reaction (b) Field reaction (c) Armature reaction (d) 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. _____ starter is used to start DC series motor CO5- R

(a) Two point (b) Three point (c) Four point (d) None of these

PART – B (5 x 2= 10Marks)

11. What are the different types of induced emfs? Give examples. CO1- R

12. Write the emf equation of transformer. CO2- R

13. Draw the block diagram of electromechanical energy conversion device. CO3- R

14. Classify the types of DC generators. CO4- R

15. What are the speed control methods employed for DC shunt motor? CO5- R

PART – C (5 x 16= 80Marks)

16. (a) (i) Explain the operation of typical magnetic circuit with air – gap. Also mention about leakage flux and fringing. CO1- U (8)

(ii) Explain in detail about hysteresis and eddy current losses. CO1- U (8)

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)	Obtain the exact equivalent circuit of transformer and draw its phasor diagrams.	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)
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)	Elaborate MMF space wave of one phase of a distributed winding.	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 the methods of excitation and operating characteristics of DC generators.	CO4- U	(16)
20.	(a)	Explain the characteristics of DC shunt and series motors.	CO5- U	(16)
		Or		
	(b)	Explain the method of testing DC machines by Swinburne and Hopkinson's test.	CO5- U	(16)