Reg. No. : | | | | | | | | | | | | |

Question Paper Code: R3302

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Third Semester

Electrical and Electronics Engineering

R21UEE302 – ELECTRICAL MACHINES - I

(Regulations R2021)

Duration: Three hours Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. While comparing magnetic and electric circuits, the flux of magnetic circuit is compared with which parameter of electrical circuit? CO1- U

   a) E.m.f. b) Current c) Current density d) Conductivity

2. An electro-mechanical energy conversion device is one which converts ___ CO1 - U

   a) Electrical energy to mechanical energy only

   b) Mechanical energy to electrical energy only

   c) All of the above

   d) None of the mentioned

3. Which of the following application requires high starting torque? CO1 - U

   (a) Armature Resistance control (b) Flux control

   (a) Both (a) & (b) (b) None of the above

4. What is the condition for Maximum Power in DC Motor CO1 - U

   (a) E_b=V/2 (b) E_b=V (a)E_b= V-2 (b) E_b=V+2

5. Which motor is suitable for Electric Traction? CO1 - U

   a) DC Series Motor b) DC Shunt Motor c) DC Compound Motor d) None of the above

6. Field test will be conducted on CO1 - U

a) DC series motor b) DC shunt motor c) DC Compound motor d) None of the above

7. A common method of cooling of a Power Transformer CO1 - U

a) Natural Air Cooling b) Air blast Cooling c) Oil Cooling d) Any of the above

8. What will happen? If the secondary of short circuited transformer is opened during testing. CO1 - U

a) Winding burned b) No effect c) Eddy current increased d) Current reduced

9. The efficiency of two identical transformers under load conditions can be determined by CO1 - U

a) SC Test b) Back to Back Test c) OC Test d) BDV Test

10. In an Auto Transformer, The Primary and Secondary are_____Coupled CO1 - U

a) Only Electrically b) Only Magnetically

c) Magnetically as well as Electrically d) None of the above

PART – B (5 x 2= 10Marks)

11. What do you mean by co- energy? CO1 -U

12. Write an important parts of DC motor CO1 - U

13. Define copper loss. CO1 - U

14. What happens if DC supply is applied to the transformer? CO1 - U

15. List the advantages and applications of Sumpner's test. CO1 - U

PART – C (5 x 16= 80Marks)

16. (a) Explain the different methods of excitation and characteristics of DC Generators with suitable diagram. CO1-U (16)

Or

(b) With neat sketch explain the following constructional components of DC Machine and its principle (i) Magnetic Frame or Yoke (ii) Pole Core (iii) Field Coils (iv) Armature (v) Armature Winding (vi) Commutator(vii) Brushes and Bearings. CO1-U (16)

17. (a) Analyze various methods of speed control technique and choose the appropriate method to obtain below and above rated speed in dc shunt motors. CO2-Ana (16)

Or

(b) Explain the Conduction of field test on DC series motor and Find the Efficiency. CO2-Ana (16)

18.	(a)	When a running on no-load 400V,DC shunt generator takes 5A.Armature resistance is 0.5 ohms and field resistance 200 ohm. Find output and efficiency when motor running	CO3-App	(16)
		Or		
	(b)	With help of neat diagram, explain Hopkinson test and derive the efficiency (Both motor and Generator)	CO3-App	(16)
19.	(a)	A 40 KVA transformer has iron loss of 450W and full load copper loss of 850W. If the power factor of the load is 0.8 lagging, Calculate (i) full load efficiency (ii) the load at which maximum efficiency occurs and (iii) the maximum efficiency.	CO4-App	(16)
		Or		
	(b)	Derive the EMF equation of transformer and write formula of efficiency and voltage regulation of transformer.	CO4-App	(16)
20.	(a)	A 5KVA, 200/400V 50 Hz single phase transformer from the following test data.O.C. test: 200V applied to primary Side, Power absorbed 72W.S.C. test: 8V applied to primary circulated Full load current in short circuited secondary. Calculate the efficiency at (i) full load at 0.9 pf lagging(ii) half load at 0.9 p.f. lagging.	CO5-App	(16)
		Or		
	(b)	With a circuit explain how to obtain equivalent circuit by conducting OC and SC test in single phase transformer.	CO5-App	(16)