

ANURAG Engineering College
(An Autonomous Institution)
II B.Tech. I Semester Regular Examinations, Jan/Feb-2024
ELECTRICAL MACHINES – I
(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours

Max. Marks: 60

Section – A (Short Answer type questions)**(10 Marks)****Answer All Questions**

	Course Outcome	B.T Level	Marks
1. What is the difference between lap and wave winding?	CO1	L1	1M
2. Draw the magnetisation characteristics of DC Shunt generator.	CO1	L2	1M
3. Why the starting current in dc motor is very high?	CO2	L2	1M
4. Write the condition for maximum efficiency.	CO2	L1	1M
5. What are the limitations of field's test?	CO3	L2	1M
6. Why Hopkinson's test is called regenerative test?	CO3	L2	1M
7. What is the effect of variation of supply voltage on iron losses?	CO4	L2	1M
8. Why transformer rating is expressed in terms of kVA?	CO4	L2	1M
9. What is an auto transformer?	CO5	L1	1M
10. What are the advantages of Sumpner's test over OC and SC tests?	CO5	L1	1M

Section B (Essay Questions)**Answer all questions, each question carries equal marks.****(5 X 10M = 50M)**

11. A) In a DC compound generator the armature, shunt-field winding and series field winding resistances are given by 0.6 ohm, 150 ohms and 0.3 ohms respectively. The machine is connected to a load of 15 kW, 200 V. Find the i) EMF generated ii) armature current and iii) power generated by armature when the machine is connected in Long shunt mode.
- OR**
- B) i) Derive e.m.f equation of d.c generator. CO1 L3 6M
ii) Explain the concept of Armature reaction and how it overcomes. CO1 L2 4M
12. A) i) Explain the principle of operation of DC motor in detail CO2 L2 5M
ii) A 200V DC shunt motor runs at 600 rpm when the armature current is 30A. Calculate the speed if the torque is doubled. Given that $R_a = 0.18\Omega$. CO2 L3 5M
- OR**
- B) i) Draw and explain the characteristics of series motors. CO2 L3 5M
ii) A dc shunt motor takes 1.5A on no-load when connected to 250V mains with an armature resistance of 1.0Ω when the field current is 0.5A. Determine the load current corresponding to maximum efficiency. CO2 L3 5M
13. A) Explain the procedure to separate the stray losses in a DC Motor. CO3 L3 10M
- OR**
- B) With the help of neat sketch, explain the Hopkinson's test. CO3 L3 10M

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| 14. A) i) “Core losses remains constant in the core irrespective of status of load across the secondary”, Justify your answer in brief. Draw necessary diagram. | CO4 | L3 | 5M |
| ii) Define efficiency and regulation of a transformer. Show how the power factor affects both of them. | CO4 | L2 | 5M |
| OR | | | |
| B) Obtain the equivalent circuit parameters of 200/400V, 50 Hz, 1-phase transformer from the following test data.
OC test: 200V, 0.7A, 70W.
SC test: 15V, 10A, 85W (with LV Short circuit). | CO4 | L3 | 10M |
| 15. A) With the help of neat sketch, explain in detail about parallel operation of single phase transformers. | CO5 | L3 | 10M |
| OR | | | |
| B) What is the significance of Y-Y, Y-delta and Delta-Y, Delta-Delta connections in 3-phase transformers? | CO5 | L2 | 10M |