

Hall Ticket Number:

Code No. : 14351 A O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD*Accredited by NAAC with A++ Grade***B.E. (E.E.E.) IV-Semester Backlog Examinations, August-2022****Electrical Machines-I**

Time: 3 hours

Max. Marks: 60

*Note: Answer all questions from Part-A and any FIVE from Part-B***Part-A (10 × 2 = 20 Marks)**

Q. No.	Stem of the question	M	L	CO	PO
1.	State Ampere's circuital law	2	1	1	1,2
2.	Draw the magnetic field created by the electromagnet excited by the dc supply.	2	4	1	1,2
3.	Draw and explain the general block diagram representation of an electromechanical energy conversion device?	2	2	2	1,2
4.	What is a single-excited magnetic system? Mention any two examples.	2	1	2	1,2
5.	Define critical field resistance.	2	1	3	1,2
6.	Write the importance of Interpoles in the DC generators.	2	1	3	1,2
7.	Draw the speed torque characteristics of DC compound motor.	2	4	4	1,2
8.	Write the any two applications of DC shunt motor and DC Series motor	2	1	4	1,2
9.	Explain what is mean by all-day efficiency, it is calculated for which type of transformers.	2	2	5	1,2
10.	Write any two advantages and drawback of auto transformer.	2	1	5	1,2
Part-B (5 × 8 = 40 Marks)					
11. a)	Explain about the biot-Savart law with neat diagram.	4	2	1	1,2
b)	An iron ring mean length of 50cm, and relative permeability 300 has an air gap of 1mm. if the ring is provided with winding of 400 turns and a current of 2.5 ampere is allowed to flow through, find the flux density across the air gap.	4	4	1	1,2
12. a)	For a singly excited magnetic system, derive the expression for the magnetic energy stored in terms of reluctance.	4	2	2	1,2
b)	Show that the field energy in a linear magnetic system can be given as $W_f = Li^2/2 = \phi I/2$	4	4	2	1,2

Contd... 2

13. a)	Write the operating principle of DC generator, derive the EMF equation of the DC generator.	4	1	3	1,2
b)	A 8 pole DC generator has per pole flux of 40 mWb and winding is connected in lap with 960 conductors. Calculate the generated EMF on open circuit when it runs at 400 rpm. If the armature is wave wound, at what speed must the machine be driven to generate the same voltage.	4	4	3	1,2
14. a)	With a neat sketch explain about Field's test to find the efficiency of the DC series motor.	4	2	4	1,2
b)	A 230 V dc Shunt motor takes 36 A at full load. Find the back emf on full load and at half load, if the resistances of motor armature and shunt field windings are 0.26 ohms and 130 ohms respectively	4	4	4	1,2
15. a)	Draw the equivalent circuit and phasor diagram of a 1-phase practical transformer with R-L load	4	4	5	1,2
b)	A single phase transformer is rated at 120 kVA, 5000/250V. The full – load copper losses are 2200W and iron losses are 1400 W. Find efficiency at i) full – load 0.8 power factor leading ii) full – load 0.6 power factor lagging	4	4	5	1,2
16. a)	Explain the terms i) MMF ii) Flux iii) Reluctance iv) Self inductance	4	2	1	1,2
b)	Draw the B-H curve for different magnetic materials and explain different terms in B-H curve.	4	4	2	1,2
17.	Answer any <i>two</i> of the following:				
a)	With a neat sketch explain about the construction of DC machine	4	2	3	1,2
b)	Explain about the armature resistance and field flux control methods of DC series motor.	4	2	4	1,2
c)	Explain about sumpner's test with a neat sketch.	4	2	5	1,2

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%
