

Hall Ticket Number:

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Code No. : 14367 N/O

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD**

Accredited by NAAC with A++ Grade

**B.E. (E.E.E.) IV-Semester Main & Backlog Examinations, July-2023**

**DC Machines and Transformers**

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/	Write the applications of the singly excited and doubly excited magnetic system.	2	1	1	1,2,3
2.	What conditions are necessary for a magnetic field to produce a force on a conductor?	2	1	1	1,2,3
3.	Why armature core is laminated in DC machines?	2	1	2	1,2,3
4.	State the conditions under which a DC shunt generator fails to excite.	2	2	2	1,2,3
5.	Why DC Series motor is called a Variable speed motor?	2	1	3	1,2,3
6.	Explain why the DC series motor should not start at no-load condition.	2	2	3	1,2,3
7.	Draw the vector diagram of an ideal transformer with R-L load.	2	3	4	1,2,3
8.	Why transformer rating is expressed in kVA?	2	1	4	1,2,3
9.	Draw Scott connection of a transformer.	2	3	5	1,2,3
10.	Write the advantages and disadvantages of an auto-transformer as compared to a two-winding transformer.	2	1	5	1,2,3
<b>Part-B (5 × 8 = 40 Marks)</b>					
11. a)	A coil of 1000 turns carrying a current of 5 Amps produces a flux of 2 mWb. Calculate the self-inductance of the coil.	4	4	1	1,2,3
b)	Give the expressions for Hysteresis losses and Eddy current losses and illustrate the various ways to minimize them	4	2	1	1,2,3
12. a)	Explain the Armature Reaction in D.C machine.	4	2	2	1,2,3
b)	Two Shunt generators are connected in parallel to supply a load of 5000 A. Each machine has a armature resistance of 0.03 ohm and field resistance of 60 ohm. EMF on one machine is 600V and in other machine is 640V. What power does each machine supply?	4	4	2	1,2,3

Contd... 2

13. a)	Draw and explain various speed control methods of DC shunt motor.	4	3	3	1,2,3
b)	A 440 V DC shunt motor takes 4A at no load. Its armature and field resistances are 0.4 ohms and 220 ohms respectively. Estimate the kW output when the motor takes 40A on full load.	4	4	3	1,2,3
14. a)	Derive an expression for the emf of an ideal transformer.	4	3	4	1,2,3
b)	Obtain the approximate equivalent circuit of a given 200/2000 V 1-phase, 30kVA transformer having following test results OC test: 200V, 6.2A, 360W on LV side SC test: 70V, 15A, 600W on HV side	4	4	4	1,2,3
15. a)	Explain why the open-delta transformer connection is limited to supplying 57.7 percent of a normal delta - delta transformer bank load.	4	2	5	1,2,3
b)	Why auto-transformers can handle more power than conventional transformers of the same size? Explain with suitable example	4	2	5	1,2,3
16. a)	Draw the magnetic field created by the electro magnet and permanent magnet.	4	3	1	1,2,3
b)	Explain the function of interpoles and compensating windings.	4	2	2	1,2,3
17.	Answer any <i>two</i> of the following:				
a)	Explain the working, operation of the Swinburne's test on DC Motor in detail.	4	2	3	1,2,3
b)	What is sumpner's test? Explain in brief with circuit diagram.	4	1	4	1,2,3
c)	Draw the different vector group connections of 3-Phase transformers and write applications of each group.	4	3	5	1,2,3

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

i)	Blooms Taxonomy Level - 1	20%
ii)	Blooms Taxonomy Level - 2	35%
iii)	Blooms Taxonomy Level - 3 & 4	45%

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