Code No. : 13316

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (EEE: CBCS) III-Semester Main Examinations, December-2018
Electrical Machinery-I

Time: 3 hours

Max. Marks: **60**

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Q.No.	Stem of the question	M	L	CO	PO
	Part-A (10 × 2 = 20 Marks)				
1.	Give the examples of singly-excited electromechanical energy conversion devices.	2	1	1	1
2.	Why are magnetic field systems employed in electromechanical energy conversion devices rather than electric field systems?	2	1	1	1
3.	A winding has 10 coils connected in series. Identify the Number of conductors in a winding, if each coil has 20 turns.	2	4	2	1,2
4.	Define armature reaction in DC Machine.	2	1	2	1
5.	Name the speed control method of DC shunt motor to operate above rated speeds.	2	1	3	1
6.	A 4-pole, lap connected armature winding has 360 conductors and having armature current of 20A. Calculate armature torque, if it has 0.027wb flux per pole.	2	4	3	1,2
7.	A single phase 2200/250V, 50Hz transformer has maximum flux of 27mwb. Calculate the number of turns of Secondary.	2	4	4	2
8.	Define an auto-transformer	2	1	4	1
9.	Name suitable three-phase transformer connection preferred for low voltage and high current requirements.	2	1	5	1
10.	Draw the circuit diagram of scott connection (3-phase to 2-phase conversion).	2	1	5	1
	Part-B (5 × 8 = 40 Marks)				
11. a)	Derive the expression of force in singly-excited magnetic field system.	5	4	1	1
b)	Formulate the expression of mechanical work done by singly-excited Electro-magnetic relay under slow movement	3	6	1	1
12. a)	Explain working principle of DC generator with neat diagrams.	4	2	2	1
b)	Draw and explain internal and external characteristics of DC shunt generator.	4	1	2	1,2
13. a)	Describe field's test for DC series machines with neat diagram.	4	2	3	4
b)	A 240V, 50A, 800 rpm DC shunt motor has armature circuit resistance of 0.2 ohms. If load torque is reduced to 60% of its full-load value and a resistance of 2 ohms is inserted in series with armature circuit, find the motor speed. Armature reaction weakens the field flux by 4% at full load and by 2% at 60% of full load.	4	5	3	1,2

14.	a)	Explain principle of transformer action and derive emf equation of transformer.	4	3	4	1
	b)	Explain open circuit and short circuit tests of a single -phase transformer.	4	2	4	4
15.	a)	Discuss about three phase transformer connections with neat diagrams.	4	2	5	1
	b)	Analyze in detail about open-delta connection with neat circuit diagram.	4	4	5	1,2
16.	a)	Draw and explain the general block-diagram representation of an electromechanical energy conversion devices.	4	1	1	1
	b)	Explain commutation process in DC machine with neat diagrams.	4	3	2	1
17.		Answer any *two* of the following:				
	a)	Analyze and sketch the operating characteristics of DC Series Motor along with neat circuit diagram.	4	4	3	1,2
	b)	Define the following terms i) Efficiency & ii) Regulation	4	1	4	1
	c)	Write short notes on tertiary winding in three winding transformer.	4	2	5	1

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

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	57.50%
2	Knowledge on application and analysis (Level-3 & 4)	33.75%
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	8.75%

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