

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III (New) EXAMINATION – WINTER 2018

Subject Code:2130904

Date:12/12/2018

Subject Name:DC Machines and Transformer

Time:10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks

		MARKS
Q.1	(a) Define pitch factor, coil span and distribution factor.	03
	(b) Derive the condition for maximum efficiency of single phase transformer.	04
	(c) Explain O.C. and S.C test of single phase transformer.	07
Q.2	(a) Give classification of dc generators with neat connection diagram.	03
	(b) Explain any four part of dc machine.	04
	(c) Draw and explain internal and external characteristics of dc series generator.	07
	OR	
	(c) Draw and explain performance characteristics of dc shunt motor.	07
Q.3	(a) Describe function of compensating winding.	03
	(b) Define armature reaction. Explain cross magnetizing and demagnetizing effects of armature reaction in brief.	04
	(c) A long shunt compound generator delivers a load current of 50A at 500V and has armature, series field and shut field resistances of 0.05Ω , 0.03Ω and 250Ω respectively. Calculate the generated voltage and the armature current. Allow 1 V per brush for contact drop	07
	OR	
Q.3	(a) State advantages and disadvantages of Swinburne's test.	03
	(b) Explain field control method for controlling speed of dc shunt motor.	04
	(c) The Hopkinson's test on two shunt machines gave the following results for full load: Line voltage: 250V, Current taken from supply excluding field currents: 50A, Motor armature current: 380A, field currents: 5A and 4.2A. Calculate the efficiency of the machine working as a generator. Armature resistance of each machine is 0.2Ω	07
Q.4	(a) Justify following statements: i. Transformer core is laminated. ii. CT secondary should never be kept open. iii. Transformer rating is in KVA.	03
	(b) Explain polarity test of single phase transformer.	04
	(c) A 25KVA transformer has 500 turns on the primary and 50 turns on secondary winding. The primary is connected to 3000V, 50Hz Supply. Find the full load primary and secondary currents. The secondary emf and the maximum flux in the core Neglect leakage drops and no load primary currents.	07

OR

Q.4	(a)	Differentiate between core type and shell type transformer.	03
	(b)	State cooling methods of cooling transformer. Explain any one method in brief.	04
	(c)	A 230/230V,3KVA transformer gave the following results: O.C.Test:230V,2amp,100W S.C Test:15V,13amp,120W Determine the regulation and efficiency at full load 0.8 p.f.lagging.	07
	Q.5	(a)	Define following Terms: All day efficiency, Regulation and pole pitch
	(b)	Write a short note on Auto transformer.	04
	(c)	State the necessity of starter .Explain 4 point starter with neat sketch.	07

OR

Q.5	(a) Draw connection diagrams and winding diagrams for Dd0, Yd1, and Dy11.	03
	(b) Write a short note on Off load tap changer.	04
	(c) Explain V-V connection of 3 phase transformer.	07
