GUJARAT TECHNOLOGICAL UNIVERSITY  
BE - SEMESTER–V (OLD) EXAMINATION – WINTER 2018

Subject Code: 150904 Date: 11/12/2018
Subject Name: Elements Of Electrical Design
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 mark.

Q.1  
(a) Explain the advantages & disadvantages of Lap & Wave winding. 07
(b) Explain the Direct-On-Line starter of induction motor with necessary wiring diagram. 07

Q.2  
(a) Derive the necessary equation to calculate the resistance steps for D.C.Shunt Motor. 07
(b) Explain the different types of Iron losses. 07

OR
(b) Determine the MMF required for the air gap of a machine having the following data. 
Core length=300 mm including 3 ducts of 10 mm width, pole arc=22 cm, slot pitch=6.0 cm, slot opening= 6 mm, flux per pole= 0.043 wb, length of air gap=0.5 cm, assume Carter’s co-efficient of 0.18 and 0.28 for opening/gap 1 & 2 respectively. 07

Q.3  
(a) What is the basic function of electromagnet? List out the different types of Electromagnet. 07
(b) The starter of a 400 v dc series motor has 4 resistance section and the current limits during the starting are 100 A and 150 A. The resistance of the machine is 0.2Ω and between these current limits the flux changes by 9%. Determine the resistance of each section of starter. 07

OR
Q.3  
(a) Explain the importance of dummy coil and equalizer connections in case of d.c. winding. 07
(b) Define Real & Apparent Flux Density. 07

Q.4  
(a) What are the important factors while selecting the suitable size of conductor for industrial wiring? 07
(b) List out the different types of material used in Residential wiring. 07

OR
Q.4  
(a) Explain the important basic equation in case of Electromagnet. 07
(b) Explain the design procedure of 1-phase Small Transformer. 07

Q.5  
(a) Define following with refer to D.C.Armature Winding  
(1) Front Pitch (2) Back-Pitch (3) Commutator Pitch (4) Pole-Pitch 07
(b) Explain the design steps of welding transformer. 07

OR
Q.5  
(a) Differentiate between integral and fractional slot winding & state advantages of fractional slot winding. 07
(b) Draw the Electrical wiring diagram of 7-hp induction motor considering the star-delta starter. 07

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