Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2018 – 19 Examinations

Semester: 3 **Date: 27/05/2019**
Subject Code: 03106202 **Time: 2:00 pm to 4:30 pm**
Subject Name: Electrical Machines-1 **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - **(15)**

1. The brush contact drop causes voltage drop. (True/False)
2 An electro-mechanical energy conversion device is one which converts _____
3. In a Transformer the energy is conveyed from primary to secondary through _____(Flux /Current)
4. The transformer which is more feasible to use in the distribution ends should be _____.
5. Speed of D.C shunt motors are controlled by
   i. Flux control ii. Voltage Control iii. Armature Control iv. All of these
6. Hopkinson's test of D.C. machines is conducted at _____. (half/full load condition)
7. Transformer draws current when its secondary is open. (True or False)
8. CT is a_____
   i. Measuring Device ii. Protecting Device iii. Fault Current Detection iv. All of the Above
9. Eddy current loss will depend on
   i. Frequency ii. Flux density iii. Thickness iv. All of the above
10. What is the mechanical power developed by a DC series motor is maximum
   i. Back emf is equal to half the applied voltage
   ii. Back emf is equal to applied voltage.
   iii. Back emf is equal to zero.
   iv. None of above.
11. Commutator converts AC into DC and also DC into AC. (TRUE or FALSE)
12. In D.C. generators, current to the external circuit from armature is given through_____(Commutator/Slip ring)
13. The emf induced in the dc generator armature winding is
   i. AC ii. DC iii. AC and DC iv. None of the above
14. A 400 V, 10 KVA transformer at 50 Hz, is operated at the frequency of 40 Hz, then the humming increases. (True or False)
15. Transformers are Rated in
   i. MW ii. KVA iii. KVAR iv. None of these

Q.2 Answer the following questions. (Attempt any three) **(15)**

A) With Suitable Diagram explain Singly Excited and Multi Excited Field System.
B) Explain the difference between C.T. and P.T.
C) With suitable circuit diagram explain Hopkinson's test in details.
(D) Derive the condition for maximum efficiency of transformer

Q.3 A) Draw connection diagram and vector diagram for following connection of 3-phase transformer. **(07)**
   i) Dd6
   ii) Dy1
   iii) Yz11
   iv) Dd0

B) A 100 kVA,3-phase, 50 Hz, 3,300/400 V transformer is Δ-connected on HV side and Y-connected on LV side. The resistance of the HV winding is 3.5 Ω per phase and that of the LV winding 0.02 Ω per phase. Calculate the iron losses of the transformer at normal voltage and frequency if its full-load efficiency be 95.8 % at 0.8 pf lagging. **(08)**

OR

B) A 200 V, d.c shunt machine has an armature resistance of 0.5 Ω and field resistance of 200 Ω. The machine is running at 1000 rpm as a motor drawing 31 A from the supply mains. Calculate the speed at which the machine must be driven to achieve this as generator. **(08)**

Q.4 A) What is Armature Reaction in DC Machine? Explain its Effects and methods to reduce it in details. **(07)**

OR

A) Draw and explain Construction, working principle and different application of Autotransformer. **(07)**

B) Explain Various Speed Control methods of D.C. Series motors and D.C. Shunt motors. **(08)**