# PARUL UNIVERSITY
## FACULTY OF ENGINEERING & TECHNOLOGY
### B.Tech. Winter 2019 - 20 Examination

Semester: 3                                          Date: 06/12/2019
Subject Code:  203112204/03106204                   Time: 02:00pm to 04:30pm
Subject Name: Electrical Machines                   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** - ( Fill in the blanks, one word answer, MCQ-not more than Five in    **(15)**
case of MCQ)  (All are compulsory)  (Each of one mark)

1. A 3-phase 440 V, 50 Hz induction motor has a 4% slip. The frequency of the rotor current will be
a)5Hz            b)25Hz            c)50Hz            d)2Hz
2. Armature of D.C machine is laminated to _____.
 a) reduce eddy current losses              b) reduce inductance
 c) reduce hysteresis losses              d) reduce mass
3. The generator may loose residual magnetism due to
 a) Heating                              b) over excitation.
 c) vibration                            d) all of these.
4. In order to reduce the hysteresis losses in transformer
  a) core may be laminated                  b) silicon steel may be used as core material
  c) core may be impregnated with varnish     d) all of the above.
5. If speed of D.C. motor increases with load torque, then it is
 a) Series motor                         b) differential compound generator
 c) Cumulative compound motor            d) all of above.
6. Running the machine at no load is inadvisable for _____ motor.
7. A d.c series motor is best suited for driving _____.
8. Open circuit test on transformer gives _____.
9. Mechanical power developed by D.C motor is maximum when _____.
10. Write an emf equation of single phase Transformer.
11. Induction Machine is _____ excited.
12. The power factor of a transformer on no load is poor due to _____.
13. Ward Leonard control is basically a _____.
14. Write an equation of  Back emf for DC Motor.
15. In _____ winding number of parallel path in dc motor is fixed.

**Q.2 Answer the following questions. (Attempt any three)**    **(15)**
A) A 4-pole 250V wave –connected shunt motor gives 10Kw when running at 1000 r.p.m. and
   drawing armature and field currents of 60A and 1A respectively It has 560 conductors. Its
   armature resistance is 0.2 Ω. Assuming a drop of 1V per brush, determine (a) total torque;
   (b) useful torque; (c) useful flux per pole (d) rotational losses; (e) efficiency.
B) 230 V DC Shunt motor has armature resistance is 0.5 Ω and field resitance is 115Ω at no
   load. Speed is 1200 rpm and armature current is 2.5A at rated load speed drops to 1120
   rpm determine line current and input power when motor deliver rated load.
C) Enlist different speed control methods of DC shunt motor. Explain any one method
D) Neatly sketch & explain the internal & external characteristics of a DC shunt generator.

**Q.3** A) Derive the expression of armature torque developed in a dc motor using fundamental    **(07)**
equation and power equation. Draw the speed-torque characteristics of shunt, series and
compound motors.
B) Explain Double Field Revolving Theory in Single Phase Induction Motor.    **(08)**
**OR**
B) Derive the equivalent circuit of a single phase transformer and show how it is useful in the    **(08)**
analysis of the performance of a transformer.

**Q.4** A) Explain Construction of Single Phase Induction Motor with neat sketch and also explain    **(07)**
equivalent circuit of single phase induction motor.
**OR**
A) Explain methods of three phase power measurement.    **(07)**
B) Explain Necessity of Starters in DC Machine and explain each of starter in detail    **(08)**