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

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech. Winter 2019-20 Examination

Semester: 5 **Date: 28/11/2019**
Subject Code: 03112330 **Time: 10:30 am to 01:00pm**
Subject Name: Industrial Drives and Control **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. Define Electric Drives
2. Define Dry friction load.
3. Define Fan type load.
4. Define efficiency.
5. What is stepper motor?
6. Which part of a motor needs maximum attention for maintenance?
   A. Frame
   B. Rearing
   C. Stator Winding
   D. Rotor Winding
7. During braking, to save energy _____ braking is used?
   A. dynamic
   B. plugging
   C. regenerative
   D. all of the above
8. Full form of VVVF control
   A. variable voltage VAr frequency.
   B. VAr variable voltage frequency.
   C. variable VAr voltage frequency.
   D. variable voltage variable frequency.
9. The basic elements of a electric drive are
   A. electric motor.
   B. control system.
   C. electrical motor and control system.
   D. none of the above.
10. A four quadrant operation requires
   A. two full converters in series.
   B. two full converters connected in parallel.
   C. two full converter connected in back to back.
   D. two semi converters connected in back to back

11. In 4 quadrant operation of a hoist 3rd quadrant represents_____.

12. _____ motor is a constant speed motor.

13. Write the function of power modulator.

14. The power modulator which is used to convert fixed DC voltage to variable DC voltage _____.

15. Define Self excited dc motor.

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

A) Draw quadrant diagram of speed-torque characteristics.

B) Draw and explain series and shunt DC motor.

C) Define principle of chopper and explain class-A chopper.

D) Draw and explain basic block diagram of closed loop control system.

Q.3 A) "DC motor speed can be controlled by armature voltage, field current and armature resistance" Justify this statement with neat sketch and equation. **(07)**

B) The speed of a 10 hp, 230 V,1200 rpm separately excited dc motor is controlled by a single phase full converter. The rated armature current is 38A,armature resistance is 0.3Ω. The ac supply is 260V. The motor voltage constant is Kaø=0.182 V/rpm. Find out i) motor torque ii) Speed of the motor iii) Supply power factor **(08)**

OR

B) Develop transfer function of motor for separately excited dc motor with functional block diagram and derive equation. **(08)**

Q.4 A) Configure step up chopper derive output voltage equation for step up chopper. **(07)**

OR

A) A series-connected DC motor has an armature resistance of 0.5Ω and field winding resistance of 1.5 Ω. In driving a certain load at 1200 rpm, the current drawn by the motor is 20A from a voltage source of V_T = 220V. The rotational loss is 150W. Find the output power and efficiency. **(07)**

B) Draw and explain 3- phase semi converter with wave forms. **(08)**