BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – B.Tech.(EE)]-2021
Course Name – Electric Drive
Course Code - PCC-EE701
(Semester VII)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Select the consideration involved in the selection of the type of electric drive for a particular application depends on

a) Speed control range and its nature
b) Starting torque
c) Environmental conditions
d) All of the above.

(ii) Select the part of an electrical drive system that is primarily responsible for controlling the motor's speed and torque.

a) Power supply
b) Motor
c) Controller
d) Load

(iii) A drive system is designed to transmit power to a load that involves both rotational and translational motion. If the system is optimized to minimize energy losses, identify parameter combination would be most critical to evaluate.

a) Torque and angular velocity
b) Force and velocity
c) Both torque-angular velocity and force-velocity products
d) Only the power transmitted to the load

(iv) A drive is required to operate in all four quadrants for a particular application. Select the kind of motor and control system would you most likely need.

a) Unidirectional motor with a simple on/off control
b) Bidirectional motor with regenerative braking capability
c) Unidirectional motor with mechanical braking
d) Bidirectional motor with manual braking

(v) Select form the following which refers to the heat generated by a motor.

a) Thermal conductivity
b) Thermal resistance
c) Power dissipation
d) Cooling coefficient

(vi) Name the component in the thermal model of a motor that primarily dictates the cooling rate is

a) Thermal capacitance
b) Thermal resistance
c) Heat source
d) Ambient temperature

(vii) If a motor's thermal resistance is halved, identify the motor's cooling rate.

a) It doubles
b) It is halved
c) It remains unchanged
d) It becomes zero

(viii) Defines the term "motor duty"?

a) The function of a motor in converting electrical energy to mechanical energy.
b) The classification of motors based on their mechanical load and operational characteristics.
c) The electrical components used in motor circuits.
d) The electrical components used in motor circuits.

(ix) If you are selecting a motor for an application that requires intermittent operation with periods of high load, Identify class of motor duty would be most appropriate.

a) Continuous Duty
b) Short-Time Duty
c) Intermittent Duty
d) S2 Duty

(x) Identify the primary factor used to determine the motor rating for continuous duty is load duration.

a) Speed
b) Torque
c) Ambient temperature
d) Load duration

(xi) Explain the power method for determining rating for fluctuating loads typically involves averaging a specific quantity.

a) Torque
b) Speed
c) Power
d) Force

(xii) Predict the most economical load for synchronous motor.

a) 1 kW
b) 10 kW
c) 20 kW
d) 100kW

(xiii) Select the purpose of motor circuit static frequency changers.

a) power factor improvement
b) improved cooling
c) reversal of direction
d) speed regulation.

(xiv) Select the primary function of a damper winding in a synchronous motor.

a) To reduce copper losses
b) To enhance the torque of the motor
c) To provide starting torque and reduce oscillations
d) To increase the speed of the motor

(xv) If the supply frequency is halved while keeping the supply voltage constant, select how much motor torque increases.

a) Torque remains constant
b) Torque doubles
c) Torque is reduced to half
d) Torque is reduced to one-fourth

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define electrical drive. (3)
3. Explain the significance of equivalent drive parameters. (3)
4. Define load equalization. (3)
5. Memorize the Starters used to start a DC motor. (3)

6. Differentiate between a synchronous motor and an induction motor in terms of operation and speed control. (3)

OR

Explain the implications of losing synchronism in a synchronous motor. (3)

Group-C
(Long Answer Type Questions) 5 x 6=30

7. Explain the speed torque characteristics of DC series motor. (5)

8. Evaluate the challenges and limitations of implementing electric drives in industrial applications. (5)
9. **Explain the speed control schemes of DC Series Motor.** (5)

10. Explain the V/f control method of AC drive with neat sketches. (5)
11. Predict the close loop control of DC drive. (5)

12. Draw the block diagram and explain the basic elements of an electric drive system. (5)

OR

Explain the four quadrant operation of motor applicable for hoist. (5)

****