APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER

FIRST SEMESTER M.TECH. DEGREE EXAMINATION MARCH 2021

Branch: Electrical and Electronics Engineering   **Specialization: Power Electronics**

08EE6241 Electric Drives

(Common to PE)

Time: 2 hour 15 minutes   **Max. Marks: 60**

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Q. No.	Module 1	Marks

1. a   Define load equalization. How does a flywheel tend to equalize the load on the driving motor?   **3**

Answer b or c

b   Explain in detail, with the help of a block diagram, the parts of Electrical Drives.   **6**

c   A motor equipped with a flywheel has to supply a load torque of 600 Nm for 10 sec followed by a no-load period long enough for the wheel to regain its full speed. It is desired to limit the maximum motor torque to 450 Nm and minimum motor torque to 200 Nm. Calculate the moment of inertia of the flywheel. The no load speed of the motor is 600 rpm and it has a slip of 5% at torque of 400 Nm. Assume the motor speed-torque characteristic to be a straight line in the range of operation. Motor has an inertia of 12 kg-m^2 **6**

Q. No.	Module 2	Marks

2. a   List down the differences between regenerative braking and rheostatic braking   **3**

Answer b or c

b   Perform the transient analysis of starting of separately excited motor with armature control.   **6**

c   Analyze the continuous and discontinuous modes of single phase fully controlled rectifier control of dc separately excited motor.   **6**

Q. No.	Module 3	Marks
3. a	Draw the diagram for a chopper-controlled drive. Derive the expression for duty ratio.	3

Answer b or c

b	With neat diagram, explain the closed loop speed control of electric drives.	6
c	Obtain the transfer function for a separately excited dc motor.	6

Q. No.	Module 4	Marks
4. a	Describe stator voltage control of an induction motor.	3

Answer b or c

b	Explain the operation of voltage source inverter (VSI) fed induction motor drive with neat sketch.	6
c	Discuss the stator frequency control of induction motor drives.	6

Q. No.	Module 5	Marks
5. a	Quote the methods for improving power factor.	4

Answer b or c

b	With necessary diagrams, explain the operation of a Static Scherbius drive. Also, discuss its applications.	8
c	Elaborate the sub-synchronous and super-synchronous operation of slip ring induction motor.	8

Q. No.	Module 6	Marks
6. a	Discuss about the speed control of synchronous motors.	4

Answer b or c

b	Explain adjustable frequency operation of synchronous motors.	8
c	Describe the operation of self-controlled synchronous motor drive employing load commutated thyristor inverter.	8