Code No: 156CJ **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, February - 2023
POWER SEMICONDUCTOR DRIVES
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a) Draw the Speed – Torque Characteristics of DC series motor controlled by single phase semi converter. [2]
b) What are the advantages and dis advantages of 3-phase fully controlled converters over single phase fully converters? [3]
c) What do you mean by four quadrant operation? [2]
d) Define Chopper and what are applications of Choppers? [3]
e) How do you control the speed of an induction motor? [2]
f) Draw the closed loop operation of induction motor with block diagram. [3]
g) List out the applications of static Kramers drive. [2]
h) Explain the principle of slip power recovery used in control of induction motor. [3]
i) What is PWM based Voltage Source Inverter? [2]
j) Write the principle of self-control of synchronous motor. [3]

PART – B

(50 Marks)

2. Explain the operation of single phase semi-controlled converter connected to DC separately excited motor and obtain voltage current wave forms for continuous current operation. [10]

OR

3. Discuss the working of three phase fully-controlled converters connected to DC series motor and obtain voltage, current wave forms. [10]

4. Explain the operation of four quadrant chopper feeding to a DC separately excited motor and draw the wave forms for continuous current operation. [10]

OR

5.a) What is electric braking? Explain various types of braking.
b) Explain the operation of two quadrant dc chopper fed separately excited dc motor. [5+5]

6.a) Explain the operation of variable frequency control of induction motor by Current Source Inverter.

b) Compare Voltage Source Inverter and Current Source Inverter. [6+4]

OR

7. Explain the operation of variable frequency control of induction motor by cyclo converter with neat diagrams. [10]

8. Explain the Static Scherbius drive operation of an induction motor with a circuit diagram. [10]

OR

9. Explain about static rotor resistance control of induction motor with neat diagram and draw the speed-torque characteristics. [10]

10. Explain the closed loop operation of synchronous motor drives with neat block diagram. [10]

OR

11. Describe VSI fed synchronous motor drive in detail with a suitable block diagram. [10]

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