Code No: R203202B **R20** SET -1

III B. Tech II Semester Regular Examinations, July -2023
ELECTRIC DRIVES
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1. a) What are the advantages of electric drives than mechanical drives? With a neat block diagram, explain different components of an electric drive. [7M]
   b) How are load torques classified? Give an example for each type of load torque. [7M]

(OR)

2. a) Explain the term load equalization. How is it done? Derive the formula for moment of inertia of flywheel. [7M]
   b) What are the advantages of electric braking? Explain the dynamic and plugging electric braking methods. [7M]

UNIT-II

3. With the help of waveforms, explain in detail about three phase half-controlled rectifier control of DC separately excited motor in continuous and discontinuous conduction mode. [14M]

(OR)

4. A 220 V, 1500 rpm, 50 A separately excited motor with armature resistance of 0.5Ω, is fed from a 3-phase fully –controlled rectifier. Available AC source has a line voltage of 440V, 50 Hz. A star-delta connected transformer is used to feed the armature so that motor terminal voltage equals rated voltage when converter firing angle is zero. Calculate (i) Transformer turns ratio (ii) Determine the value of firing angle when motor is running at 1200 rpm and rated torque. [14M]

UNIT-III

5. With a neat waveforms and circuit diagram, explain the operation of four quadrant DC-DC converter fed separately excited DC Motor. [14M]

(OR)

6. a) Discuss the operation of two quadrant DC-DC converter fed DC motor drive. [7M]
   b) With the help of waveforms, explain in detail about two quadrant DC-DC converter fed self excited DC motor, when operating in continuous mode? [7M]

UNIT-IV

7. a) Explain VVVF control of induction motor by PWM VSI and draw the speed torque characteristics. [7M]
   b) Why stator voltage control is an inefficient method of induction motor speed control? [7M]

(OR)

8. a) What are the advantages of static rotor resistance control over conventional methods of rotor resistance control? [7M]
   b) Draw a suitable circuit diagram and explain the working of slip-power recovery scheme using static Scherbius drive. [7M]

UNIT-V

9. What are the open-loop and closed loop methods of speed control of a synchronous motor using VSI? Explain. [14M]

(OR)

10. a) Describe the merits and demerits of separate and self control operations of synchronous motor. [7M]
    b) Explain in detail the basic operation of permanent magnet synchronous motor. [7M]

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