

BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING) EXAMINATION, 2023
(4th Year, 2nd Semester, Supplementary)

ELECTRIC DRIVES

Time : Three hours

Full Marks : 100

(50 marks for each part)
(Use separate Answer Script for each part)

PART – I

Answer any three questions.

Two marks are for well-organized answer.

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| 1. (a) | What are factors are to be considered for selection of drive? | 3 |
| (b) | Classify motors used in drive system according to the required type of duties. Draw the load-time, loss-time and the temperature rise – time curves in the case of S5 and S6 type of duties. | 8 |
| (c) | What do you mean by four quadrant operation of an electric drive? Explain. Why is it necessary? Discuss with an example. | 5 |
| 2. (a) | Draw and explain connection diagram of an automatic DC shunt motor starter using current sensing relay. | 8 |
| (b) | Draw connection diagram of DOL starter for starting a three phase induction motor with the provision for speed reversal and overload protection. | 8 |
| 3. (a) | What are different Methods available for the determination of Motor rating for Variable Load Drives? Discuss in brief. | 8 |
| (b) | Find out an expression for Temperature Rise of an electric machine with Intermittent Short Time ratings. | 8 |
| 4. (a) | Derive an expression for speed and current of a DC shunt motor during starting. | 8 |
| (b) | Derive an expression for speed and current of a DC shunt motor during counter current braking. Also draw the variation of speed and current with time. | 8 |
| 5. (a) | Draw the time-speed curve for short run and derive an expression for maximum speed of an electric train. | 8 |
| (b) | What are different types of current collector systems are used in electric traction? Discuss their advantages and disadvantages. | 8 |

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B.E. Engineering (Electrical Engineering) 4th Year 2nd Semester Supplementary Examination 2023

Full Marks: 100 Subject: Electrical Drives

(50 for each part) Part-II

Answer any three questions. Two marks are reserved for neat and well organized answer.

1. Explain why armature voltage control of D.C. motor is called constant torque and variable power drives and field control method is called constant power and variable power drives. State the disadvantages of armature voltage control and field weakening method of D.C. motor. 16
2. From the modeling of D.C. motor, derive the transfer function block diagram for the armature and field circuit. 16
3. State the advantages and disadvantages of semi-converter over fully controlled converter used for speed control of D.C. motor. Derive the relation between speed and torque of a D.C. drive fed from single phase fully controlled rectifier. 16
4. Draw the block diagram of a D.C. drive for speed control based on IaRa compensation. Also explain the operation of the scheme. 16
5. Draw the block diagram and explain the principle of solid state control of three phase induction motor drive in open loop mode. What is the disadvantage of this method of speed control. 16