BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING) EXAMINATION 2019

(4th Year, **2nd** Semester)

ELECTRIC DRIVES

Time: Three Hours **Full Marks:** 100

(50 marks for each part)
Use a separate Answer-Script for each Part

PART - I

Answer any ***three*** questions.

Two marks are for neatness and well organised answer.

1.	a)	Classify electric drives according to their method of speed control. State and discuss their main features.	8
	b)	What do you mean by four quadrant operation of an electric drive? Explain. Why is it necessary? Discuss with an example.	8
2.	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
3.	a)	Draw and explain connection diagram of an automatic DC shunt motor starter using back emf 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
4.	a)	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
	b)	What are factors are to be considered for the selection of electric drive? Discuss in brief.	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, if any.	8

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Question No.	PART - II	Marks
	Answer any three Questions. Two marks are reserved for neat and well organized answer.	
1.	What are the advantages and disadvantages of D.C. drives over A.C. drives? What is constant torque and constant power drive? What are the limitations of field weakening method of speed control of D.C. motor ?	16
2	Develop the model of D.C. motor.? Sketch and explain the principle of closed loop control of a D.C. motor considering IR compensation.	16
3.	Derive the expression of torque of an induction and also show that the torque is proportion to slip frequency under constant flux operation. What are the limitation of frequency control of three phase induction motor for controlling the speed?	16
4	Sketch and explain the principle of speed control of an induction motor using slip compensation, where speed feedback is not used. Sketch and explain the principle of speed control of an induction motor in open loop mode.	16
5. (i)	Derive the relation between speed and torque of a D.C. motor fed from single phase fully controlled rectifier for continuous conduction mode of operation.	8
(ii)	What are the advantages and disadvantages of semi converter over fully controlled converter in drive application ?	8