BE. VIII (EBSG), Electrical Engg, May -2019, 14/05/19 (01/01)

Time: 3 hours **Marks: 80**

Instructions:

- Question No: 1 is compulsory.
- Answer any three from the remaining five questions.
- Figures to the right indicate full marks.
- Answers to questions should be grouped and written together.

Q1	a)	State the main factors which decide the choice of electrical drive	20
	b)	Illustrate dynamic braking and plugging in a DC series motor	
	c)	Prove that the energy loss during stopping by plugging is $\frac{3}{2}J\omega_{ms}^2$	
	d)	How to select a motor for continuous duty?	
Q2	a)	Explain in details the components of load torque.	10
	b)	A weight of 500 kg is being lifted up at a uniform speed of 1.5 m/s by a winch driven by a motor running at a speed of 1000 rpm. The moment of inertia of motor and winch are 0.5 and 0.3 kg-m^2 respectively. Calculate the motor torque and equivalent moment of inertia referred to the motor shaft. In the absence of weight, motor develops a torque of 100 N-m when running at 1000 rpm.	10
Q3	a)	Explain the operation of closed loop speed control scheme with inner current control loop. What are the various functions of inner current control loop	10
	b)	What do you understand by steady state stability? What is the main assumption? Derive the inequality constraints for steady state stability condition.	10
Q4	a)	Define intermittent periodic duty and short time duty. Derive over loading factor in both cases.	10
	b)	How a chopper fed DC separately excited DC motor operate in motoring and regenerative braking mode. Develop ω *vs* T relation and draw speed torque characteristics	10
Q5	a)	Describe the operation dynamic braking of an induction motor	06
	b)	Illustrate with neat circuit diagram the static rotor resistance control. Also show that the effective rotor resistance increased by $0.5R(1-\delta)$	08
	c)	What are the reasons for using load equalization in an electrical drive?	06
Q6	a)	Describe the operation of stepper motor along with its driver circuit	10
	b)	What is the basic principle of Direct torque control method? Explain with block diagram.	06
	c)	Derive fundamental torque equation and mention the significance of dynamic torque	04

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