Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.

Re-Examination December 2019
(As per Academic Book 2017-18)

Max. Marks: **100** Duration: **03 Hours**
Class: **B.TECH** Semester: **VIII** Program: **B.TECH (Electrical)**
Name of the Course: **Electrical Drives and Control** Course Code : **BTE-426**

Instructions:

- Solve any five questions
- Answers to all sub questions should be grouped together
- Figures to the right indicates full mark
- Assume suitable data if required and justify the same.

Ques. No	Description of Question	Max. Marks
Q.1 a)	What are the different types of drives? Discuss the advantages of electric drive over other drives?	10
b)	What is the function of power modulator employed in drives?	10
Q.2 a)	Discuss the multi quadrant operation of the drive.	10
b)	Derive the expression for the Moment of Inertia of the flywheel used for Load Equalisation.	10
Q.3 a)	Derive the condition for the steady state stability of the operating point. Discuss the significance of the "stability of the operating point".	10
b)	What is the purpose of the plugging type of braking employed for separately excited DC shunt motor. Draw the suitable circuit and the torque speed characteristics of motor during plugging.	10
Q.4 a)	What do you understand by load equalization? Derive the expression for moment of inertia of flywheel.	10
b)	A 440 V, 3-Ph, 50Hz, 6 pole, 945 rpm delta connected induction motor has following parameters referred to stator: $R_s = 2\ \Omega$, $R_r' = 2\ \Omega$, $X_s = 3$, $X_r' = 4.0\ \Omega$. When driving the fan load at rated voltage it runs at rated speed. The motor speed is controlled by stator voltage control determine: (i) Motor terminal voltage, current and torque at 800 rpm (ii) Motor speed, current and torque for terminal voltage of 280 V.	10
Q.5 a)	Explain the operation of induction motor with unbalanced source voltages.	10
b)	A 3-ph, 440 V, 50 Hz, 6-pole, Y-connected induction motor has	

	following parameters, R_S=0.5 Ω, R_r=0.6 Ω, X_s=X_r=1.0 Ω. Stator to rotor turns ratio is 2. If the motor is used for regenerative braking determine: (i) Maximum overhauling torque it can hold and the range of the speed in which it can safely operate. (ii) The speed at which it will hold a load with a load torque of 160 Nm.	10
Q.6 a)	Explain the V/F control operation of induction motor drive for the following. (i) Low frequency operation (ii) Medium frequency operation (iii) Frequency above F_{rated} operation	14
b)	Compare ac drive and dc drive.	06
Q.7a)	Draw the block diagram of closed loop V/F control of three phase induction motor.	10
b)	Explain the stator voltage control method for controlling the speed of three phase induction motor. Give the suitable loads for which stator voltage control is provided to three phase induction motor.	10