

SUBJECT CODE NO:- P-32
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(EEP/EE/EEE) Examination MAY/JUNE-2016
Electrical Drives
(Revised)

[Time: Three Hours]

[Max Marks:80]

“Please check whether you have got the right question paper.”

- N.B
- 1) Q. no 1 and Q. no 6 are compulsory.
 - 2) Solve any two questions from Q.2 to Q.5 and Q.7 to Q.10.
 - 3) Assume suitable data wherever necessary.

Section A

- Q.1 a) Explain essential parts of electrical drives with block diagram and mention their functions. 06
 b) Explain in detail a four quadrant operation of a motor driving hoist load. 04
- Q.2 a) Explain current limit control in detail with block diagram. 07
 b) A drive has the following parameters: $T=150-0.1N$, Nmt. Where N is speed in rpm load torque $t_c=100N$ -mt. 08
 Initially the drive is operating in steady state. The characteristics of the load torque are changed to $T_L=100N$ -mt. Calculate initial & final equilibrium speeds.
- Q.3 a) Describe how the speed of a separately excited d.c. motor is controlled through the use of two 3-phase full converters. Discuss how two quadrant drives can be obtained from this scheme. 07
 b) Explain the operation of chopper for forward motoring control of separately excited dc motor with aid of diagrams, waveforms and speed torque curves. 08
- Q.4 a) Describe relative merits and demerits of four quadrant d.c. drives employing non-circulating and circulating current dual converters. 07
 b) Describe how the speed of a d.c. series motor can be controlled by means of a d.c. chopper. 08
- Q.5 Write short notes on the following 15
 a) Load equalization
 b) Phase locked loop control.
 c) Constant torque and constant power control.

Section-B

- Q.6 a) Explain in detail with relevant circuit diagram why cyclo converters control is suitable only for low speed drives? 05
 b) Explain state Kramer drives why has the static Kramer drive is used for low range of speed control. 05
- Q.7 a) How the operation of a synchronous motor shifts from motoring to regenerative braking? 08
 b) A 3-phase, 5kw, 440v, 50Hz, 4 pole, Y connected synchronous motor has stator winding resistance of 0.2Ω , synchronous reactance of 8Ω and a rated field current of 1A. When operating of full load the power factor is unity.
 1) Calculate the torque angle when operating at full load.
 2) Pull out torque and power.
 3) Power factor, armature current and efficiency at half the rated torque.
 4) Field current to get unity power factor at half the rated torque.

- Q.8 a) Explain the operation of current source inverter fed induction motor drive. 08
b) Explain the operations of brushless dc motor drive and its applications. 07
- Q.9 a) A 3-phase, 10kw, 440 v, 0.8 rated power factor (lagging) 50Hz. 4 pole, star – connected permanent magnet synchronous motor has negligible stator resistance & synchronous reactance of 10Ω . Motor is braked by dynamic braking. What will be the braking torque at 750rpm when braking resistance $R_s=5\Omega$? 08
b) Describe the operation of brushless d.c. motor drive. State its advantage over a low cost three phase brushless d.c. Motor drive. 07
- Q.10 Write short note on the following. 15
a) Brushless d.c. motor drives for servo applications
b) Industrial applications of AC drives.
c) Advantages of BLDC over conventional DC motor.