Reg. No. : | | | | | | | | | | | | |

Question Paper Code : X 60506

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Sixth Semester
Electrical and Electronics Engineering
EE 2352/EE 62/10133 EE 602 – SOLID STATE DRIVES
(Regulations 2008/2010)
(Common to PTEE 2352/10133 EE 602 – Solid State Drives for B.E. (Part-Time) Sixth Semester Electrical and Electronics Engineering – Regulations 2009/2010)

Time : Three Hours Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. What is dynamic torque ?
2. Draw the load torque characteristics of constant power loads.
3. Write down the speed-torque relation for single phase fully controlled converter fed dc motor in continuous conduction mode.
4. What is CLC in chopper fed drives ?
5. What is field weakening mode control ?
6. Name any four simulation software packages that can be used for electrical drives.
7. Why stator voltage control is suitable for speed control of induction motors in fan and pump drives ?
8. Compare static Krammer and Scherbius system.
9. Mention the different types of Permanent Magnet Synchronous Motor.
10. Why self controlled synchronous motor is free from hunting operations ?

PART – B **(5×16=80 Marks)**

11. a) i) Drive the fundamental torque equations for a motor-load system. **(6)**

ii) Explain in detail about steady state stability of equilibrium point in electrical drive. **(10)**

(OR)

b) i) Classify the electrical loads according to the speed-torque characteristic and explain with examples. **(8)**

ii) Explain in detail about four quadrant operation of a hoist load. **(8)**

12. a) Describe the steady state analysis of single phase fully controlled converter fed separately excited dc motor drive in continuous and discontinuous conduction modes. **(16)**

(OR)

b) i) Explain the operation of four quadrant chopper fed dc drives. **(8)**

ii) A chopper used to control the speed of a separately excited dc motor, has supply voltage of 230 V, T_{on} = 15ms, T_{off} = 5ms. Assuming continuous conduction of motor current, calculate the average load current when the motor speed is 3000 rpm. Assume voltage constant K_v = 0.5V/rad/sec and Ra = 4Ω. **(8)**

13. a) Derive the transfer function of separately excited dc motor with armature voltage control. **(16)**

(OR)

b) Design the speed controller of converter fed separately excited dc motor with inner current control and outer speed control loops. **(16)**

14. a) i) Why a cycloconverter fed induction motor drive is preferred over inverter controlled synchronous motor drive for low speed applications ? **(6)**

ii) Explain the principle of vector control of induction motor drive. **(10)**

(OR)

b) Explain the four modes of operation of a static Scherbius drive. **(16)**

15. a) i) Explain the self controlled mode of operation of synchronous motor. **(8)**

ii) Explain margin angle control in synchronous motor. **(8)**

(OR)

b) i) Briefly explain the types of Permanent Magnet Synchronous Motors. **(8)**

ii) Explain the vector control of sinusoidal SPM in constant torque region. **(8)**

———————