

**Code: 1G281**

IV B.Tech. II Semester Advanced Supplementary Examinations June 2016

**Power Semiconductor Drives**

(Electrical &amp; Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

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1. a) Explain in detail the operation of a Single phase full- converter feeding a D.C series motor with reference to voltage and current waveforms, assuming that the motor current is a continuous one. 7M
- b) Draw and Explain the Speed-torque Characteristics at different firing angles for a Single phase full converter feeding a separately excited D.C motor. 7M
2. a) Derive the output voltage expression and Speed Torque characteristics for a three phase Half controlled rectifier fed DC Separately excited motor with neat circuit diagram and wave forms 10M
- b) Discuss the reason for the neglecting of discontinuous conduction in three phase rectifier fed motors? 4M
3. a) Define Braking? And give brief discussion on various types of braking. 4M
- b) A 220V, 1000rpm, 60A separately excited motor with armature resistance of  $0.6\Omega$  fed from a Circulating current dual converter with AC source voltage line voltage=165V. Determine converter firing angles for the following operating points:
  - i. Motoring operation at rated motor torque and 900rpm
  - ii. Braking operation at rated motor torque at 900 rpm
  - iii. Motoring operation at rated motor torque and  $-900\text{rpm}$
  - iv. Braking operation at rated motor torque at  $-900\text{rpm}$  10M
4. a) Write the voltage equations of type-A chopper during  $T_{on}$  and  $T_{off}$  period for on RLE load 4M
- b) A 230V, 1750 rpm, 74A D.C motor has an armature resistance is 0.180 ohms is driven with its armature supplied from a class A chopper and a 240 V. D.C source given rated operation on 230V. The chopping frequency is constant at 500 Hz. If the average armature current is equal to the rated value and 'ton' is at the setting that given largest harmonic content determine
  - i. The speed of motor
  - ii. The RMS armature current
  - iii. The RMS and line currents ripple factors 10M
- 5 a) Brief about various methods of controlling speed of a Induction motor from Stator side 4M
- b) A 3-phase, 50 KW, 1475 rpm, 420 V, 50 Hz, 4-pole star connected induction motor has the following data:  $R_S=0.4$  ohm,  $R_r=0.21$  ohms,  $X_S=0.95$  ohm,  $X_r=0.85$  ohm and  $X_m=32$  ohm, All quantities referred to stator side. If the frequency is increased to 58 Hz by frequency control, determine:
  - i) The slip at maximum torque.
  - ii) The speed at maximum torque.
  - iii) The break down torque 10M
6. a) Brief the concept of v/f control for the speed control of Induction motor 7M
- b) Discuss in detail about the Variable Frequency control from Voltage Source with v-f relation ,speed – torque characteristics and relevant equations 7M
7. a) Explain in detail about Static Scherbius Drive with circuit diagram, Equations and Speed – torque characteristics 10M
- b) Brief about Slip Power Recovery concept 4M
8. Describe the open-loop and closed loop methods of speed control of a synchronous motor using VSI 14M

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Hall Ticket Number :

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**R11**

**Code: 1G285**

*IV B.Tech. II Semester Advanced Supplementary Examinations June 2016*

**Principles of Power Quality**

(Electrical & Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

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1. a) Define power quality. Explain the reasons for increased concern in power quality. 7M  
b) Describe the CBEMA curves. Explain about the event described in the curve. 7M
2. a) Explain the estimating of voltage sag performance. 7M  
b) Discuss about motor starting sags. 7M
3. a) Explain the principles of over voltage protection. 7M  
b) Explain utility system lightning protection. 7M
4. a) Explain effect of harmonics in voltage verses current distortion. 7M  
b) Write about harmonic sources from commercial and industrial loads. 7M
5. a) Write the Effects of harmonics and write principles of controlling harmonics. 7M  
b) Write any two devices for controlling harmonic distortion. 7M
6. a) Explain different principles for regulating voltage. 7M  
b) Explain how capacitors can control voltage regulation flicker. 7M
7. a) Write the procedural steps for power quality benchmarking. 7M  
b) Write about the characterization of RMS voltage variation. 7M
8. a) Explain about different equipment used for the power quality monitoring. 7M  
b) Write different standards for power quality monitoring. 7M

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