

Code: 1G281

IV B.Tech. II Semester Regular & Supplementary Examinations Mar/Apr 2016

Power Semiconductor Drives

(Electrical & Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) Write down the basic performance equations for a DC series motor and also sketch the characteristics of constant torque drive and constant power drive regions. 7M
- b) A DC series motor has $R_a = 3$, $R_f = 3$ and $K_{af} = 0.15\text{V-sec/A-rad}$. The motor speed is varied by a Single phase Fully controlled bridge. The firing angle is 45° and the average speed of the motor is 1450 rpm. The applied ac voltage to the bridge is $330 \sin t$. Assuming, continuous motor current, find the steady state average motor current and torque. 7M
2. a) Explain the speed torque characteristics of a separately excited DC motor connected to a three phase Fully controlled converter. 7M
- b) The speed of a separately excited DC motor is controlled by means of a 3- ϕ Fully controlled converter from a 3- ϕ , 415V, 50 Hz supply. The motor constants are inductance 10mH, resistance 0.9 and armature constant 1.5V/rad/sec. Calculate speed of the motor at a torques of 50N-m, when the converter is fired at 45° . Neglect losses in the converter. 7M
3. Explain dynamic braking, regenerative braking and plugging of DC separately excited motor with neat circuit diagrams & Speed - Torque characteristics. 14M
4. A DC supply of 200V supplied to separately excited dc motor via a class-A thyristor chopper. The motor has an armature circuit resistance of 0.33 and inductance of 11mH. The chopper is fully on at the rated motor speed 1200 rpm when the armature current is 20A. If the speed is to be reduced to 800 rpm with the load torque constant, calculate the necessary duty cycle. If the chopper frequency is 500 Hz, is the current continuous? 14M
5. a) Starting from fundamentals prove that torque developed by the Induction motor is proportional to square of the supply voltage 7M
- b) A 440V, 3 phase, 50 Hz 6 pole 945 rpm delta connected induction motor has the following parameters referred to the stator. $R_s = 2.0$, $R_r = 2.0$, $X_s = 3$, $X_r = 4$. When driving a fan load at rated voltage it runs at rated speed. The motor speed is controlled by stator voltage control. Determine motor terminal voltage, current and torque at 800 rpm. 7M
6. Explain in detail the speed control scheme for a three phase induction motor using PWM inverter. 14M
7. A 3-Phase, 400V, 50 Hz, 4pole, 1400 rpm, star connected wound rotor induction motor has the following parameters referred to the stator. $R_1 = 2$, $R_2 = 3$, $X_1 = X_2' = 3.5$. The stator to rotor turns ratio is 2. The motor speed is controlled by static scherbius drive. The inverter is directly connected to the source. Determine.
 - (a) The speed range of the drive when $\alpha_{max} = 165^\circ$.
 - (b) The firing angle for 0.4 times the rated motor torque and speed of 1200 rpm.
 - (c) Torque for a speed of 1050 rpm and firing angle of 95° . 14M
8. Describe separate controlled mode and self- controlled mode of operation of a Synchronous motor drive in detail and compare them. 14M

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R11

Code: 1G282

IV B.Tech. II Semester Regular & Supplementary Examinations Mar/Apr 2016

Distribution of Electrical Power

(Electrical & Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) How load modeling is done in distribution systems? Explain their characteristics. 7M
b) Derive the relationship between loss and load factors. 7M
2. a) Explain the design practice of secondary distribution systems. 7M
b) What are the different type's radial feeders available? Explain any two of them with relevant sketches. 7M
3. a) Derive the expression for voltage drop and power loss in 3-phase primary feeders. 7M
b) How manual method of solution of load flow for radial system is obtained? Explain the procedure. 7M
4. a) Explain the principle of operation of circuit reclosers and line sectionalizers with neat sketches. 7M
b) What is meant by coordination of protective devices? Explain the procedure involved. 7M
5. a) How power factor correction is carried in Distribution systems? Explain with sketches. 7M
b) Explain the procedure to determine the optimum capacitor allocation. 7M
6. a) Why voltage fluctuation come into picture and how they are controlled? Explain. 7M
b) Explain line drop compensation. 7M
7. a) How distribution system planning is carried? What are the factors affecting the same. 7M
b) List out methods followed in substation expansion. 7M
8. a) What is the need for distribution automation? Explain. 7M
b) Explain distribution automation and management functionalities. 7M

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R11

Code: 1G285

IV B.Tech. II Semester Regular & Supplementary Examinations Mar/Apr 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)

1. a) Explain
 - i. Short duration voltage variation
 - ii. Long duration voltage variation7M
- b) Explain CBEMA and ITI curves. 7M
2. a) Explain different Sources of sags and interruptions. 7M
- b) Explain about fundamental principles of protection. 7M
3. a) Explain the devices for over voltage protection. 7M
- b) Explain about capacitor switching transients. 7M
4. a) Briefly describe harmonic distortion. 7M
- b) Write about harmonic sources from commercial and industrial loads. 7M
5. a) Explain principles of controlling harmonic distortion. 7M
- b) Explain the devices used for controlling harmonic distortion. 7M
6. a) Explain the devices for voltage regulation. 7M
- b) Explain how capacitors can control voltage regulation flicker. 7M
7. a) Explain power quality benchmarking method of RMS voltage variation indices. 7M
- b) Explain harmonic indices and power quality contracts. 7M
8. a) Explain power quality measurement equipment. 7M
- b) Write different standards for power quality monitoring. 7M

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R11

Code: 1G287

IV B.Tech. II Semester Regular & Supplementary Examinations Mar/Apr 2016

Energy Auditing and Demand Side Management

(Electrical & Electronics Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. Explain in detail about how to conserve electrical energy and explain some of the means to conserve the energy. 14M
2. Explain in detail Pie charts and Sankey diagrams 14M
3. a) Discuss the factors that affect the efficiency of energy efficient motors. 7M
b) Draw and explain the characteristics of energy efficient motors. 7M
4. a) What is the effect of harmonics on the power factor? 7M
b) How will you locate the capacitors to improve the power factor? Explain. 7M
5. a) Explain in detail the good lighting system design and practice. 7M
b) Explain the principle and operation of Lux meters with neat diagram. 7M
6. a) Explain in detail about time value of money concept. 7M
b) Explain the concept of depreciation in the energy economic analysis. 7M
7. a) Define DSM and explain the importance of it. 7M
b) Write short notes on multi utility power exchange model. 7M
8. a) Explain in detail about strategic conservation. 7M
b) Explain in detail about load priority technique. 7M
