

Power Semiconductor Drives
(Electrical & Electronics Engineering)

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) Explain different speed control techniques for DC motors. 7M
 b) A DC series motor has $R_a = 3\Omega$, $R_f = 3\Omega$ and $K_{af} = 0.15V\text{-sec/A-rad}$. 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 $330\sin\omega t$. 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 semi controlled converter. 7M
 b) The speed of a separately excited DC motor is controlled by means of a 3- ϕ semi converter from a 3- ϕ , 415V, 50 Hz supply. The motor constants are inductance 10mH, resistance 0.9Ω and armature constant $1.5V/\text{rad/sec}$. 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. With neat diagram, explain the operation of a DC drive in all four quadrants when fed by a single phase dual converter with necessary waveforms and characteristics. 14M
4. A 220V, 70A, DC series motor has combined resistance of armature and field is 0.12Ω running on a no load with the field winding connected to a separate source. It gave following magnetization characteristics at 600rpm.

Field Current (A)	10	20	30	40	50	60	70	80
Terminal Voltage (V)	64	118	150	170	184	194	202	210

Motor is controlled by a chopper with source voltage equal to 220V.
 Calculate (a) Motor speed for a duty ratio of 0.6 and motor current of 60A.
 (b) Torque for a speed of 400 rpm and duty ratio of 0.65. 14M
5. Explain various speed control methods of induction motor applicable for both squirrel cage and slip ring induction motors. 14M
6. a) Explain the mechanical characteristics of a three phase induction motor with stator frequency control. 10M
 b) Why the speed control of a three phase induction motor with constant supply voltage and reduced frequency is not preferred? 4M
7. A 440V, 50 Hz, 50 KW, 3- ϕ , slip ring induction motor has the following equivalent circuit parameters $R_1=0.07\Omega$, $R_2'=0.05\Omega$, $X_1+X_2'=0.2\Omega$, $X_o=20\Omega$. The speed of the motor at rated load is 1420 rpm. Determine the resistance in the chopper circuit so that the speed can be controlled in the range 1420 to 1000 rpm at constant torque. Determine the time ratio for
 (a) 1100 rpm
 (b) 750 rpm
 (c) 500 rpm 14M
8. Draw the block diagram of a closed loop synchronous motor drive fed from VSI and explain? 14M

Code : 1G285

IV B.Tech. II Semester Regular Examinations April 2015

Principles of Power Quality
(*Electrical & Electronics Engineering*)

Max. Marks: 70**Time: 03 Hours**

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) Define power quality? And explain the various types of power quality disturbances and impacts of power quality. 7M
 b) Explain the characteristics of power quality events in Short duration variations and Long duration. 7M
2. a) Explain the following causes of sags.
 (i) Voltage sag due to motor sag
 (ii) Voltage sag due to single line to ground fault. 6M
 b) Explain the various causes and effects of voltage sags. 8M
3. a) What are transient over voltages? 7M
 b) Explain the different types of transient over voltages 7M
4. a) Explain the following:
 (i) Total harmonic distortion
 (ii) Total demand distortion. 6M
 b) Explain in detail about classification of linear loads and nonlinear loads used in harmonic studies. 8M
5. a) Explain briefly about for the following harmonic filter.
 (i) Active filters
 (ii) Passive filters. 6M
 b) What are the various devices for controlling harmonic distortion? Explain briefly about it. 8M
6. a) Explain the following steady state disturbances.
 (i) Magnitude
 (ii) Unbalance
 (iii) Harmonics
 (iv) Flicker. 8M
 b) Explain about principles of operation of shunt voltage controller with neat schematic diagram. 6M
7. a) What is IEC standard? Give their philosophy and objective of these standards 7M
 b) Write short notes on various RMS voltage variation Indices. 7M
8. Bring out the significance of Power quality monitoring. What are the important power quality monitoring objectives? 14M

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IV B.Tech. II Semester Regular Examinations April 2015

Distribution of Electrical Power
(*Electrical & Electronics Engineering*)

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) What are the different types of loads? Explain their characteristics. 7M
b) Explain the importance of load curve and load duration curve in distribution systems with an example. 7M
2. a) What is meant by primary feeder loading? List out the factors affecting the same. 7M
b) With relevant equations discuss different factors affecting feeder voltage level 7M
3. a) Derive the voltage drop and power loss expressions for non-uniformly distributed load. 7M
b) How load flow solution is obtained for distribution systems? Explain the procedure. 7M
4. a) Explain the objectives of distribution system protection. 7M
b) Explain with neat sketches recloser -to fuse coordination 7M
5. a) What are the economic benefits that can be derived from capacitor installation? Explain any two of them with mathematical expressions. 7M
b) Explain the impact of shunt capacitors in distribution system with neat sketches. 7M
6. a) Explain the quality of service voltage standards of Indian distribution system 7M
b) How voltage control is carried in distribution systems? Explain. 7M
7. a) Classify the load forecasting methods and explain the same. 7M
b) Explain the present distribution planning techniques 7M
8. a) Explain Distribution automation and control functions. 7M
b) How distribution management is carried? Explain its functions. 7M

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IV B.Tech. II Semester Regular Examinations April 2015

Energy Auditing and Demand side Management

(Electrical & Electronics Engineering)

Max. Marks: 70**Time: 03 Hours**

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. Explain in brief about electrical energy consumption and conservation in India and in the world. 14M
2. Define the term energy audit and briefly explain the various types of energy auditing. 14M
3. a) Explain about the importance of energy efficient motors. 7M
b) Write short notes on voltage unbalance in the energy efficient motors. 7M
4. Define the power factor, What is the need of power factor improvement? Explain in detail the methods of improving the power factor. 14M
5. a) Explain in detail the lighting energy audit. 7M
b) Explain the principle and operation of Pyro meters with neat diagram. 7M
6. a) Explain in detail about taxes and tax credit. 7M
b) Write short notes on the pay back analysis. 7M
7. Define DSM. Explain the different techniques of DSM with suitable examples. 14M
8. a) Define load management and explain its importance. 7M
b) Write short notes on valley filling. 7M
