

EPS

Mahatma Gandhi Mission University Aurangabad
Jawaharlal Nehru Engineering College, Aurangabad

End Semester Exam 2022

Class :F.Y. M.Tech.

Sem:I

Course Name: Energy management & audit

Subject Code:

Max Marks: 60

Duration:- 3 Hr.

Instructions to the Students :

1. All questions are compulsory. Assume the data if necessary.
2. Draw & mark diagrams correctly if any.

	Question	Marks
Q 1)	What is Energy Audit? What its need, types and explain in details the methodology and approach. OR Write Ten key steps in "Monitoring and targeting" that you will undertake as an energy manager in your plant.	10
Q 2)	What are data gathering procedures in energy management? Explain in details. OR Describe Energy Manager & EMS.	10
Q 3)	What are the Evaluation of saving opportunities and how they applied in energy management. OR What are the principles of energy management? What are the objectives of energy management?	10
Q 4)	What are the role and responsibilities of Energy Manager? and what are requirements for Energy Action Planning? OR Explain: EMS 50001, Energy Act 2001 & 2019.	10
Q 5)	Explain Anatomy of investment ?Initial investment, Return on Investment, Economic life and Basic income equations. OR Explain: Understanding Energy Costs, Bench marking, Energy performance, Matching energy usage to requirements, Maximizing system efficiency.	10
Q 6)	In Project Management explain following terms: Technical design, financing, contracting, implementation and performance monitoring. OR What is the primary aim of "energy monitoring" in the plant?	10

Name of the Program : **FY.M.TECH.EPS**

Semester : I

Course Code:

Name of the Course: **Control & Integration of**

Renewable Energy Sources

Max Marks: 60

Time: 3hrs

Instructions:

1. Q.1 is Compulsory. Solve three questions from remaining.

2. Mark to Left indicate full marks.

Q. 1. a) What are the most favorable sites for installing wind turbines? 8

b) What are major advantages and disadvantages of solar PV system? 7

OR

Q.1. a). Explain mechanism of photoconduction in a PV cell? 7

b) . How does sun tracking helps in energy collection by a flat plate solar collector? 8

Q.2. a) Comment on the future availability trend of fossil fuel in the world? 7

b) What are conventional and non-conventional energy source? 8

Q.3.a) Why would a community choose to connect to micro-grids? 8

b) What is the life of super capacitors? 7

Q.4. a) What are the main advantages of flat plate solar collector? 7

b) How do capacitors and super capacitors differ? 8

Q.5. a) What are the advantages of super capacitor modules vs flywheels? 8

b) . What is the life of super capacitors? 7

MGM University
Jawaharlal Nehru Engineering College, Aurangabad
End Semester Examination – June 2022

Course: M. Tech in Electrical Power System
 Subject Name: Digital Controllers in Power Electronics Applications
 Max Marks: 60

Sem: II
 Code: 20PEE212E
 Duration: -3 Hr.

Instructions to the Students:

1. All question should be compulsory
2. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
3. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

CO BL Marks

Q.1 Solve Any two of the following.

- (A) Differentiate PI and PID Controller
- (B) Explain P Controller
- (C) Discuss 3 phase full wave converter.

Q.2 Solve Any Two of the following.

- (A) Discuss state space model..
- (B) Explain Direct digital design techniques
- (C) Explain any one Digital controller design via classical techniques

Q.3 Solve Any Two of the following.

- (A) Discuss PWM control for single phase Converter.
- (B) How PWM is generated for Converters?
- (C) Explain Discrete PID Controller with equation.

Q.4 Solve Any two of the following.

- (A) Discuss Microcontroller based speed control of Stepper Motor.
- (B) Discuss Microcontroller based speed control of Servo Motor.
- (C) Explain basic block diagram of Microcontrollers.

Q.5 Solve Any Two of the following.

- (A) Explain B oost Converter
- (B) Explain Buck Converter

(C)	Explain Power circuit transfer function	2	1	
Q.6	Solve Any Two of the following.			10
(A)	Write a note on Neural Network Controller	2	1	
(B)	Write a note on Fuzzy Controller	2	1	
(C)	Write a note on DSP Controller	2	1	
 END.....			

June 2022 Examinations

Name of the Program – M.Tech. (Electrical Power System)

Semester - II

Course Code: 20PEE202D

Name of the Course – Power System Dynamics and control

Max. Marks: 60

Time: 3 Hrs

Instruction: All questions carry equal marks.

Q.1) Answer any two

a) Define the different states of a power system

b) Define the following terms

i) Frequency stability ii) Voltage stability iii) rotor angle stability iv) Transient stability v) small signal stability
vi) Short term stability and Long term stability.

c). Draw the single line diagram of a Single Machine Infinite Bus (SMIB) system and explain its dynamic model.

Q.2) Answer any two

a) What is voltage stability and voltage collapse? Explain with the help of example, the factors affecting these.

b) Compare voltage and angle stability. How to carry out integrated analysis of the same.

c) Give structure of power system stabilizer and explain function of each block.

Q.3) Answer any two

a) What is a dynamic compensator? Explain its two design criteria in PSS.

b) What do you mean by small signal analysis of a system? What are its advantages and limitations in comparison to simulation of a system?

c) Explain energy equilibrium theorem applied for power system stability. What is SEP and UEP explain with an example.

Q.4) Answer any two

a) Develop swing equation for two coherent and non coherent group of machines.

b) Explain simplified power system model stating the assumptions made.

c) What is SSR? Explain. What are the counter measures for SSR? Explain any one in detail.

Q.5) Answer any two

a) Explain the transient stability improvement by series capacitor insertion.

b) Explain in detail about the tuning procedure for power system stabilizer (PSS).

c) Derive the criterion for steady state stability of classical model and give your remarks based on Eigen value analysis when mechanical power ' P_m ' is varied.

Q.6) Answer any two

a) State the common assumptions in dynamic analysis of a multi machine system. Develop a simplified system model for the same.

b) Draw block diagram of SVC controller and explain the control characteristic of SVC.

c) Draw overall block diagram of SMIB & Explain how RH Criterion can be used to check stability of the system.

Program : M. Tech. EPS

Semester: I (FY)

Course Name: Energy Storage System

Course Code: 20PEE102D

Marks: 60

Duration:-3Hr.

Note:

Question 1 is compulsory. Solve any three from remaining.

Q1

- a) Draw neat sketch of fuel cell and explain design consideration of it 7 Marks
- b) Discuss flywheel construction. Angular speed of fly-wheel changes from 1000 rpm to 800 rpm, calculate energy released? 8 Marks

Q2

- a) What are the challenge in fuel cell energy storage system? How it can be handled in near future. 7 marks
- b) Design a convertor to derive 3phase 1HP motor using 72v 1000mah battery. 8 marks

Q3

- a) Discuss mathematical model of ultra capacitor and its limitation 7 marks
- b) What are various type of convertors used in energy storage system. 8 marks

Q4

- a) Which chemical reaction takes place inside a fuel cell? Describe it in detail. 7marks
- b) Battery in an electric vehicle is to be monitored and regulated. Suggest what are essential aspects of a battery management system? 8 Marks

Q5

- a) Analyze efficiency of compressed gas energy storage system. 7Marks
- b). What are important specifications of battery? List and explain them with example. 8 Marks

Mahatma Gandhi Mission University Aurangabad
Jawaharlal Nehru Engineering College, Aurangabad
End Semester Exam June-July 2022

Class :F.Y. M.Tech.

Sem:II

Course Name: Power Quality Assessment & Mitigation

Subject Code: 20PEE205E

Max Marks: 60

Duration:- 3 Hr.

Instructions to the Students :

1. All questions are compulsory. Assume the data if necessary.
2. Draw & mark diagrams correctly if any.

	Question	Marks
Q 1)	What is importance of power quality? Which are terms and definitions of power quality as per IEEE std. 1159, such as transients? OR What are Short and long voltage fluctuations, imbalance, flickers and transients?	10
Q 2)	Define Voltage sag assessment. What is influence of fault location and fault level on voltage sag? OR Describe Mitigation measures for voltage sags, such as UPS, DVR, SMEs, CVT.	10
Q 3)	Explain Definition of harmonics, inter-harmonics, sub-harmonics. Explain causes and effect of harmonics. OR How to reduce harmonic currents in loads? Give Harmonic study procedure. Describe computer tools for harmonic analysis	10
Q 4)	What is Need of power quality monitoring and explain approaches followed in power quality. OR What are Selection of power quality monitors, selection of monitoring location & Period?	10
Q 5)	Explain Harmonic monitoring , Transient monitoring, event recording and flicker monitoring OR Explain mitigation methods of DC & AC drives.	10
Q 6)	Write short note on any two i. Power Quality assessment ii. Power quality indices and standards for assessment of disturbances, iii. Power quality indices and standards for assessment of Waveform distortion, iv. Power quality state estimation, State variable model.	10

Name of the Program – M .Tech. (Electrical Power System)

Semester - I

Course Code: 20PEE103D

Name of the Course – Power System Modeling

Max. Marks: 60

Time: 3 Hrs

Instructions: 1. Attempt all Questions

2. All questions carry equal marks.

Q.1) Answer any one

a) Explain classical model of hydraulic turbine with its special characteristics and electrical analogue.

or

c) How are transmission lines classified? Draw and explain model of each type of transmission line.

Q.2) Answer any one

a) What is Park's transformation? Write the transformation and explain its significance?

or

b) Explain stator voltage equations, rotor flux linkage equations in terms of d-q-o components.

Q3 Answer any one

a) Draw and explain steady state equivalent circuit of synchronous machine. Explain procedure to calculate steady state values of synchronous machine variables.

or

b) Explain fundamental transient characteristics of synchronous machine considering three phase short circuit.

Q4. Answer any one

a) Explain components of excitation system using functional block diagram.

or

b) Explain control and protection functions in excitation system.

Q5. Answer any one

a) Explain in detail DC1A model of excitation system used for synchronous machine.

or

b) Explain AC1A model of excitation system used for synchronous machine.

Q6. Answer any one

a) Explain model of Induction motor

or

b) Draw schematic of typical SVS and explain its representation in power flow study.

MGM UNIVERSITY, AURANGABAD
Exam: 1st Sem (AY 21-22) Feb-March 22
Name of the Program: M.TECH.
Course Name: Advance Power Converters
Course Code: 20PEE101D

Time : 3 Hr

Max Marks:60

(SET 1)

Instructions:

All questions are subjective.

Each question is for 10 marks.

Figure to the right indicate gives full marks.

Use of non-programmable calculator is allowed.

Q1. Compare functional Characteristics of BJT, MOSFET and IGBT for Design of Converter.

OR

Draw and Discuss functional details of Snubber Circuit for Protection.

Q2. Draw and Explain the operational waveforms of Controlled AC to DC Converter with RL Load.

OR

Discuss the working of 12 Pulse converter with suitable diagram and waveforms.

Q3. Classify the different resonant converter Circuits

OR

Illustrate the working of Zero Current Switching DC to DC Converter.

Q4. Sketch and discuss Diode Clamped Multi level Inverter

OR

Sketch and discuss H Bridge Multi level Inverter

Q5. Explain the working of flyback converter with suitable application.

OR

Explain the working of Push pull converter with suitable application.

Q6. Discuss the working of uninterrupted power supply with suitable block diagram.

OR

Sketch and discuss simulation model of Resonant converter.

Mahatma Gandhi Mission University Aurangabad
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End Semester Exam June-July 2022

Class :F.Y. M.Tech.

Sem:II

Course Name: Advanced Power System Protection

Subject Code: 20PEE201D

Max Marks: 60

Duration:- 3 Hr.

Instructions to the Students :

1. All questions are compulsory. Assume the data if necessary.
2. Draw & mark diagrams correctly if any.

	Question	Marks
Q 1)	What are static relays? What are its advantages & limitations? OR Draw & explain each elements of basic construction of Static Protective relays.	10
Q 2)	Derive General equation for two input phase and amplitude comparators OR Describe Duality between amplitude and phase comparators.	10
Q 3)	What are Microprocessor Based Protective Relays? Explain Block diagram and flowchart of Microprocessor Based Over current relays. OR Derive Generalized mathematical expressions for Microprocessor Based distance relays. Draw its Block diagram and flowchart.	10
Q 4)	What is Phase Comparator? Draw & Explain Rectifier and Vector product type. OR Explain block spike phase comparator & techniques to measure the period of Coincidence.	10
Q 5)	What are static differential relays? Describe Analysis of Static Differential Relays. OR What are static distance relays? Describe Static impedance type in detail.	10
Q 6)	What are Multi-Input Comparators? Describe Three input amplitude comparator. OR What is Principle of out of step tripping and blocking relays? Describe effect of line and length and source impedance on distance relays.	10

MGM University
Aurangabad-431003
Second Term Exam F.Y. M.Tech. 2021-22

Program : Electrical Power Systems

Course : Power System Automation

Marks : 60

Sem -II

Course Code : 20PEE205E

Instructions to the students

1. Each question carries 10 marks.
2. All questions are compulsory
3. Illustrate your answers with neat sketches, diagram etc wherever necessary
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

Note: **Solve Any SIX.**

Q1 Describe various element used in Power system automation . What kind of sensors are used in power system automation ? Discuss their selection criteria.

Q2 What is role of teaching relay devices in power system automation? Compare various types of available relays that you can use in power system automation

Q3 Discuss and analyze in detail What are the Problems with existing distribution system?

Q4 Explain role of Supervisory Control and Data Acquisition (SCADA), Suggest a plan for –Automatic meter reading.

Q5 Justify the need for distribution automation system with reference to power system. Describe steps for automation of substation.

Q6 How power factor correction could be done intelligently? Explain with suitable diagram. What are the Problems with existing distribution system

Q7 How voltage in short transmission line can be regulated? What is the percentage voltage regulation of short transmission line if its sending end and receiving end voltages are 180 KV and 130 KV respectively?

Q8 How Supervisory Control and Data Acquisition (SCADA), Consumer Information systems (CIS), Geographical Information Systems (GIS) play vital role in Power system automation?