



**ADAMAS UNIVERSITY**  
**SCHOOL OF ENGINEERING AND TECHNOLOGY**  
**END SEMESTER EXAMINATION (JULY 2020)**

**Name of the Program:** M.Tech

**Semester:** II

**Course Name:** Power System Dynamics and Control

**Course Code:** EEE61102

**Maximum Marks:** 40

**Time duration:** 3 Hours

**Total No of questions:** 12

**Total No of Pages:** 2

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**Instruction to the Candidate:**

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
  2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
  3. Assumptions made if any, should be stated clearly at the beginning of your answer.
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**GROUP –A**

**1. Answer all the *five* questions of the following:**

**5 x 1 = 5**

- i) Explain the effect of change of real power.
- ii) Explain different advantage of inter connected system.
- iii) Explain how integral control can estimate static frequency drop.
- iv) What are the advantage of interconnected operation of power system?
- v) What are the different filter use for harmonics?

**GROUP –B**

**(Short Answer Type Questions)**

Answer *any three* of the following

**3x5 = 15**

2. What are the main parts of single area ALFC? What is advantage of AVR and ALFC loop?  
(2+3)

3. Explain state variable model of ALFC loop. How can static load frequency drop be eliminated? (2+3)
4. What is shunt compensator? Why it is necessary? (2+3)
5. What is the difference between large and small signal analysis? What is Advantage of Inter control? (2+3)

**GROUP –C**

**(Long Answer Type Questions)**

Answer *any two* of the following      **2x10=20**

6. Discuss the need of system interconnection. Different between inter connection and non-interconnection system.
7. Draw a block diagram with illustrative transfer function of single area load frequency control.
8. A single area system has the following data: area capacity= 4000 MW, operating load= rated area capacity,  $f = 50$  Hz,  $H=5$ sec,  $R=2.5\%$  , 1% change in frequency. Find frequency response and frequency error in absence of secondary loop if step increase of 80 MW in load occurs.

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**(END)**



**ADAMAS UNIVERSITY**  
**SCHOOL OF ENGINEERING AND TECHNOLOGY**  
**END SEMESTER EXAMINATION (JUNE 2020)**

**Name of the Program:** M.Tech

**Course Name:** Power Electronics in Power System

**Maximum Marks:** 40

**Total No of questions:** 12

**Semester:** II

**Course Code:** EEE61104

**Time duration:** 3 Hours

**Total No of Pages:** 2

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**Instruction to the Candidate:**

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**GROUP –A**

**1. Answer all the *five* questions of the following:**

**5 x 1 = 5**

- (i) What is holding current of a thyristor?
- (ii) Classify different converters used for power modulation.
- (iii) Write the expression for average output voltage of a single phase half wave rectifier with RL load.
- (iv) What are the different thyristor protection techniques?
- (v) Classify different types of inverter.

**GROUP –B**

**(Short Answer Type Questions)**

Answer *any three* of the following

**3x5 = 15**

2. What is a cyclo-converter? Explain.
3. Discuss the most common power quality problems in details.
4. Explain the working principle of on-off control method of an AC voltage controller.
5. With proper circuit, explain the working of a half bridge inverter circuit.

**GROUP –C**  
**(Long Answer Type Questions)**  
Answer *any two* of the following

**2x10=10**

6. Write a short note on phase angle control of AC voltage controller.
7. Explain the working of a Matrix converter with proper circuit diagram.
8. a) What is a Microgrid? [2+4+4]  
b) Classify Microgrid.  
c) Mention a few applications of Microgrid.

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**(END)**



**ADAMAS UNIVERSITY**  
**END-SEMESTER EXAMINATION: JULY 2020**

**Name of the Program:** M. Tech. in Power and Energy Systems      **Semester:** II

**Stream:** EE

**PAPER TITLE:** FACTS

**Maximum Marks:** 40

**Total No of questions:** 08

**PAPER CODE:** EEE61106

**Time duration:** 3 Hours

**Total No of Pages:** 02

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**Instruction to the Candidate:**

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***Answer all the Groups***

**Group A**

Answer all the questions in the following

**$5 \times 1 = 5$**

1.    a) Why a reactor is placed in series with a bidirectional thyristor valve in Thyristor Switched Capacitor (TSC)?  
      b) What is the use of Static Var Compensator (SVC)?  
      c) What do you meant by dynamic stability of a power system?  
      d) How does the power angle curve look like?  
      e) What is the full form of STACOM?

**GROUP –B**

**(Short Answer Type Questions)**

Answer *any three* of the following

**$3 \times 5 = 15$**

2.    (a) Consider a two machine power system with an ideal mid-point reactive compensator and draw its circuit diagram. (1)  
      (b) Derive the expression for real power transmission, as a function of power angle  $\delta$ . (2)  
      (c) Derive the expression for reactive power as well, as a function of power angle  $\delta$ . (2)
3.    What are the differences between STATCOM and Static Synchronous Generator (SSG)?
4.    Explain in detail the operation of pulse-width modulation (PWM) converter, with circuit diagram and waveforms.
5.    What are the differences between self-commutated and line commutated current-source converters?

**GROUP –C**  
**(Long Answer Type Questions)**  
Answer *any two* of the following

**2 × 10 = 20**

6. (a) Draw circuit diagram of a Thyristor Controlled Reactor (TCR) device and derive the expression for the fundamental component of current flowing through the TCR. (3)  
(b) Plot the variation of the fundamental component of TCR current with triggering angle  $\alpha$ . (2)  
(c) Derive the expression for the odd harmonic component of current flowing through the TCR. (5)
7. (a) Explain the effect of series compensation in transient stability margin for a simple two-machine system. Draw the power swing curve for (i) without series compensation and (ii) with a series capacitor. (5)  
(b) Write down the differences between shunt compensation and series compensation. (5)
8. (a) Draw Thyristor Switched Capacitor (TSC) circuit and its associated current and voltage waveforms. (3)  
(b) Derive the expression for current flowing through the TSC. (4)  
(c) Explain how series compensation affects voltage stability. Draw the variation of transmittable power and voltage stability limit as a function of series capacitive compensation. (3)
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# ADAMAS UNIVERSITY

## SCHOOL OF ENGINEERING AND TECHNOLOGY

### END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: M. Tech

Semester: II

Stream: EE

PAPER TITLE: Sensor and Actuators

PAPER CODE: EEE61114

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 08

Total No of Pages: 01

**Instruction for the Candidate:**

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*Answer all the Groups***Group A**

Answer all the questions of the following

**5 × 1 = 5**

1. a) What is the operating frequency range of thermocouple instruments?  
 b) Which physical quantity can be measured with a thermistor?  
 c) Why the heater wire of a thermocouple instrument is made of thin wire?  
 d) A pyrometer is calibrated between 200<sup>o</sup> – 1000<sup>o</sup> centigrade. What is its working span?  
 e) What is the non-linearity factor for the variable permittivity dielectric capacitive sensor?

**GROUP –B****(Short Answer Type Questions)**Answer *any three* of the following**3 × 5 = 15**

2. How is a differential output taken from an inductive transducer? Explain the advantage of the inductive transducers is used in push-pull configuration. (3+3)
3. State working principle of Thermocouple. Mention name along with their temperature range and composition of two commonly used thermos-couple. (3+2)
4. Define the Gauge factor. What is the gauge factor of strain gauge? (2+3)
5. What are the widely used piezoelectric materials? What are the essential properties of a piezoelectric sensor? (3+2)

**GROUP –C****(Long Answer Type Questions)**Answer *any two* of the following**2 × 10 = 20**

6. Describe the basic principle of a Hall Device. Show how it can be used for a magnetic field sensor. How is the performance of a hall sensor evaluated? What are its Primary and Secondary sensitivities? (3+2+3+2)
7. What type of radiation can be detected by a Geiger counter? Describe the working principle of the Geiger counter with a neat diagram. What are the gases in these tubes and the pressure range at which they operate? (3+5+2)
8. Write short notes on: (i) Geiger Counters (ii) Accuracy and Precision (5+5)



# ADAMAS UNIVERSITY

## SCHOOL OF ENGINEERING AND TECHNOLOGY

### END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: M. Tech

Semester: II

Stream: EE

PAPER TITLE: Digital Protection of Power System

PAPER CODE: EEE61118

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 08

Total No of Pages: 01

**Instruction for the Candidate:**

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3. Assumptions made if any, should be stated clearly at the beginning of your answer.

**Answer all the Groups****Group A**

Answer all the questions of the following

**5 × 1 = 5**

1. a) What is self-checking and reliability for computer relays?  
b) What is the typical input of an ADC?  
c) What is the function of a Circuit Breaker during fault condition?  
d) What is the function of a distance relay?  
e) Define the convolution theorem in Fourier transform.

**GROUP –B****(Short Answer Type Questions)**Answer *any three* of the following**3 × 5 = 15**

2. What is the procedure of successive approximation of ADC?
3. State the function of the following: Magnitude relay, Directional relay, Ratio relay, Differential relay, and Pilot relay.
4. Describe the performance of the current transformer as a protection scheme.
5. What are electronic Voltage transformer and Rogowski coil?

**GROUP –C****(Long Answer Type Questions)**Answer *any two* of the following**2 × 10 = 20**

6. a) Find the Fourier Transform of the function

$$f(x) = \begin{cases} 1 - x^2, & |x| \leq 1 \\ 0, & |x| > 1 \end{cases} \quad (5+5)$$

$$\text{b) Prove that } \lim_{s \rightarrow \infty} \int_0^T \frac{\sin sv}{v} dv = \frac{\pi}{2}$$

7. What are the current derived restraints and gaps in inrush current based restraint functions in the power transformer algorithm? (6+4)

8. What are the measures that can be adopted for generator protection? What are the different motor protection schemes adopted based on different motor ratings? (5+5)