

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM
IV B. Tech I Semester Advanced Supplementary Examinations March 2025

INDUSTRIAL ELECTRONICS

(Open Elective)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions. **ONE** Question from **Each unit**

All Questions Carry Equal Marks

UNIT-I

1. a) Explain the concept of drift in DC amplifiers. What are the primary causes of drift, and how does it affect circuit performance? [7M]
b) Describe the construction and working of a Darlington emitter follower. How does it improve current gain, and what are its advantages and disadvantages in DC amplifier circuits? [7M]

(OR)

2. a) Discuss the importance of stabilization in DC amplifiers. What are the different techniques used to achieve stable operation in practical circuits? [7M]
b) What are operational amplifiers (Op-Amps)? Describe their basic structure, working principle, and key applications in DC amplification. [7M]

UNIT-II

3. a) Explain the block diagram of a regulated power supply. Discuss the function of each stage and how they work together to provide a stable DC output. [7M]
b) Compare and contrast series and shunt-type linear voltage regulators. Explain their working principles, advantages. [7M]

(OR)

4. a) What is a switched-mode voltage regulator (SMPS)? Explain its working principle, advantages. [7M]
b) What are 3-terminal voltage regulators? Explain their working, advantages, and common applications. [7M]

UNIT-III

5. a) Explain the working principle of a Silicon Controlled Rectifier (SCR). Discuss its static and dynamic characteristics [7M]
b) What is the importance of triggering in thyristors? Describe different methods used for triggering an SCR and their applications. [7M]

(OR)

6. a) Discuss the role of gate current and holding current in the turn-on mechanism of an SCR. How does the choice of triggering method impact circuit performance? [7M]
b) Explain the importance of triggering circuits in SCR applications. How do triggering circuits ensure reliable operation in industrial applications? [7M]

UNIT-IV

7. a) Explain the working of a static circuit breaker using an SCR. How does it provide efficient protection in power circuits? [7M]
b) An SCR-controlled static circuit breaker is used to handle a 220V, 10A load. If the SCR has a forward voltage drop of 1.5V, calculate the power loss in the SCR. [7M]

(OR)

8. a) Discuss the working of DIAC and TRIAC. How do they differ from SCRs, and where are they used in AC power control? [7M]
b) Describe the various triggering modes of TRIACs. How does phase control improve their efficiency in AC applications? [7M]

UNIT-V

9. a) Describe the different types of industrial timers. How do they improve efficiency in industrial applications? [7M]
b) Explain the working principle of RC timers and digital timers. How do they function in industrial applications? [7M]

(OR)

10. a) Explain the classification of electric welding. How is it used in industrial fabrication and manufacturing? [7M]
b) Discuss the different types and methods of resistance welding, such as spot welding, seam welding, and projection welding. [7M]
