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### SAINTGITS COLLEGE OF ENGINEERING KOTTAYAM, KERALA

(AN AUTONOMOUS COLLEGE AFFILIATED TO  
APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

#### FIRST SEMESTER M.TECH. DEGREE EXAMINATION(R), MARCH 2021 (POWER SYSTEMS)

**Course Code:** 20EEPST141**Course Name:** ADVANCED RELAYING AND PROTECTION**Max. Marks:** 60**Duration:** 3 Hours

#### PART A

*(Answer all questions. Each question carries 3 marks)*

1. Compare the construction and performance of analog, digital and numerical type relays. (3)
2. Explain the principle of operation of phase comparators (3)
3. What is the importance of time setting and current setting of a relay (3)
4. Write short notes on restricted earth fault protection of alternators by differential system. (3)
5. What is meant by aliasing. Explain its effect on relaying. (3)
6. Explain the pilot wire - translay scheme. (3)
7. What are the main criteria to be followed in a good load-shedding scheme. (3)
8. Write notes on reclosing and synchronising. (3)

#### PART B

*(Answer one full question from each module, each question carries 6 marks)*

##### MODULE I

9. What is meant by zones and degree of protection with the help of neat sketches. What is the importance of overlapping zones. (6)

**OR**

10. Draw the phasor diagram of a current transformer and derive the expression for actual transformation ratio. (6)

##### MODULE II

11. Explain the concept of wavelet transform technique. How does it differ from FFT. (6)

**OR**

12. How do the coincidence type phase comparators work? Explain integrating type phase comparator with necessary sketches. (6)

##### MODULE III

13. Give a brief description of different types of overcurrent relays and overcurrent protection schemes. (6)

**OR**

# 210A3

14. The time current characteristics of an overcurrent relay for TMS=1 is given below. If the plug setting is set to 150% and the time multiplier is set to 0.75, calculate the time of operation of the relay when the fault current is 3000A and the CT ratio is 400/5. (6)

PSM	2	3	5	7	10	13	15	18	20
Time (Seconds)	10	6.8	4.4	3.4	2.8	2.5	2.4	2.3	2.2

## MODULE IV

15. Explain the protection scheme used for generators against stator inter turn faults with the help of neat sketches. (6)

**OR**

16. With neat diagram explain the percentage differential protection employed for power transformers. (6)

## MODULE V

17. Explain the importance of system grounding. What are the different schemes used for earth fault protection? (6)

**OR**

18. Explain the working of numerical directional relay with the help of block schematic diagram and program flowchart. (6)

## MODULE VI

19. Explain SCADA based protection system employed in power system with the help of a neat block diagram. (6)

**OR**

20. Give descriptions of i) frequency relaying and ii) out of step relaying. (6)

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