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Question Paper Code: U6302

B.E. / B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Sixth Semester

Electrical and Electronics Engineering

21UEE602 – PROTECTION AND SWITCHGEAR

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Outline the unprotected zone. CO1- U
(a) Transient state (b) Sub transient state (c) Steady state (d) Dead spot
2. The grounding is generally at the _____ end. CO1- U
(a) Switching (b) Supply (c) terminal (d) none of these
3. Directional relays are based on flow of CO1- U
(a) power (b) current (c) voltage wave (d) All of the above
4. The isolators used in the transmission lines are capable of breaking CO1- U
(a) Fault current (b) Shunt
(c) Cumulative Compound (d) Differential Compound
5. The core saturation current is slightly higher than the pickup value of CO1- U
current is called
(a) Inverse definite minimum time characteristics (b) definite time characteristics
(c) Very inverse relays (d) Extremely inverse relays
6. Current transformers are used _____ CO1- U
(a) to measure high value of voltages (b) to measure high value of currents
(c) to short-circuit the unwanted instruments (d) to measure low value of currents

7. The comparator which processes both magnitude and phase angle is CO1- U
 (a) Phase (b) Amplitude (c) Hybrid (d) None of the above
8. Insulation resistance of high voltage circuit breakers is more than? CO1- U
 (a) 100 mega ohms (b) 1 mega ohms (c) 500 mega ohms (d) 10 mega ohms
9. Interrupting medium in a contactor may be CO1- U
 (a) air (b) oil (c) SF6 gas (d) Any of the above.
10. The isolators used in the transmission lines are capable of breaking CO1- U
 (a) Fault current (b) No current (c) Charging current (d) Load current

PART – B (5 x 2= 10 Marks)

11. Relate “Primary Protection” with “Back-up Protection”. CO1- U
12. Illustrate the various types of electromagnetic relay. CO1- U
13. A transformer has a rated current of 1000 A. The transformer is protected by an overcurrent relay with an inverse time-current characteristic. The relay is set with a plug setting of 1.2 times the rated current, and the time multiplier setting (TMS) is set to 0.5. CO3-App
14. Summarize the general characteristics of numerical protection. CO1- U
15. Compare AC and DC circuit breaking. CO1- U

PART – C (5 x 16= 80Marks)

16. (a) Explain how a protection scheme in a power system detects and isolates faults to ensure the safety and reliability of the system and also discuss the roles of various protection devices involved in a protective scheme. CO1- U (16)
 Or
 (b) Explain the reasons leading to the general practice of earthing the neutral point and discuss the various methods of earthing. CO1- U (16)
17. (a) Design the circuit connection of a universal relay and derive its torque equation based on the interaction of voltage and current and also construct the RX diagram for the relay CO2- App (16)
 Or
 (b) Apply the concepts of Electromagnetic induction, classify the types of various relays. CO2- App (16)

18. (a) Analyze the various relaying schemes employed for the protection of a modern alternator and evaluate the effectiveness of these protection schemes in ensuring the reliable and safe operation of modern alternators in power systems. CO4- Ana (16)
- Or
- (b) Analyze the various faults in a 132 kV transmission line and conclude a suitable distance protection scheme to protect the line from those faults. CO4- Ana (16)
19. (a) Apply the suitable numerical relay when the impedance between the relay point and the fault location exceeds the Set Value. CO3- App (16)
- Or
- (b) Apply a suitable static relay which can act as a protective system when a three phase faults occurs on EHV transmission line CO3- App (16)
20. (a) Analyze the role of heavy oil Circuit breakers and low oil circuit breakers in isolating the faulty part of the power system from the rest of the system and compare their advantages over one another. CO5- Ana (16)
- Or
- (b) Analyze whether AC circuit breakers can be used for DC and validate your answer with practical difficulties. CO5- Ana (16)

