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Question Paper Code : X 20498

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Seventh Semester

Electrical and Electronics Engineering
EE 6702 – PROTECTION AND SWITCH GEAR
(Regulations 2013)

(Common to PTEE 6702 – Protection and Switch gear for B.E. (Part-Time) –
Sixth Semester – Electrical and Electronics Engineering (Regulations – 2014))

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. What are the consequences of short circuit fault in power system network ?
2. Differentiate primary protection and back up protection.
3. List the desirable qualities of protective relays.
4. Classify protective relays based on their applications.
5. What are the limitations of differential protection when applied to transformer protection ?
6. What is the function of line trap used in carrier current protection ?
7. List the limitations of static relays when compared to electromagnetic relays.
8. Draw the block diagram of numerical relay.
9. Why resistance switching is required during the operation of circuit breaker ?
10. How would you explain the term recovery voltage pertaining to circuit breaker operation ?



PART – B

(5×13=65 Marks)

11. a) The current in a three phase unbalanced system are

- i) $I_R = (12 + j6) \text{ A}$,
- ii) $I_Y = (12 - j12) \text{ A}$,
- iii) $I_B = (-15 + j10) \text{ A}$.

Assume the phase is RYB. Calculate the zero, positive and negative sequence components of the currents.

(OR)

b) Discuss the following neutral grounding schemes

- i) Resistance earthing (6)
- ii) Arc suppression coil. (7)

12. a) Discuss with relevant diagram and universal torque equation, the induction type reverse power relay.

(OR)

b) How would you explain the significance of frequency relays ? Discuss the operation of under frequency relay with relevant schematic diagram.

13. a) Discuss the time graded and current graded protection for feeder protection.

(OR)

b) Explain with suitable diagram, protection scheme for transformer against magnetizing inrush current.

14. a) Explain the operation of numerical differential relay with relevant block diagram representation.

(OR)

b) Discuss in detail, the numerical relay based distance protection.

15. a) Discuss the following switching phenomena and associated transient conditions in power system network

- i) Current chopping (6)
- ii) Capacitive current interruption. (7)

(OR)

b) Discuss the operating principle of circuit breaker, arcing phenomena and arc extinction principles associated with circuit breakers.



PART – C

(1×15=15 Marks)

16. a) A three phase, 66/11 kV, star-delta transformer is protected by merz-price system. The CT on LV side have a ratio of 420/5 A. Find the CT ratio on the HV side. Draw the schematic of merz price protection and mark the current directions and current magnitude through transformer windings.

(OR)

- b) A 50 Hz, 11 kV, three phase alternator with earthed neutral has a reactance of $5\Omega/\text{ph}$ and is connected to a bus bar through a circuit breaker. The distributed capacitance upto circuit breaker between phase and neutral is $0.01\mu\text{F}$. Determine

- i) peak restriking voltage across the CB contacts, **(5)**
- ii) frequency of oscillation, **(5)**
- iii) the average RRRV upto first peak. **(5)**
