Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91500

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019
Seventh Semester
Electrical and Electronics Engineering
EE 6702 – PROTECTION AND SWITCHGEAR
(Regulations 2013)
(Common to : PTEE 6702 – Protection and Switchgear for B.E. (Part-Time) Sixth Semester – Electrical and Electronics and Engineering – Regulations – 2014)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. What is the significance of backup protection ?
2. Mention the necessity of providing earth wire in overhead transmission lines.
3. Classify electromagnetic relays.
4. Compare over current and under current relays.
5. How alternators are protected against over speeding ?
6. What is the role of Buchholz's relay ?
7. State the superiority of static relay over electromagnetic relay.
8. How does a numerical over current relay work ?
9. List the methods of arc interruption in circuit breaker.
10. Write specific reasons that support Minimum Oil Circuit Breaker is superior than Bulk Oil Circuit Breaker.

PART – B (5×13=65 Marks)

11. a) Explain in detail about the nature of occurrence and types of fault in the power systems.

(OR)

b) Write a detailed note on different neutral point grounding schemes of the power systems.

12. a) Describe the principle of operation of various differential relays with neat sketches.

(OR)

b) Discuss in detail about the construction and working principle of Non-directional over current relay.

13. a) Write a detailed note on various faults associated with an generator and also provide information about how Merz-Price Protection Scheme is employed for generators .

(OR)

b) Write a detailed note on different protection schemes used for motor protection.

14. a) Discuss in detail the diagram the working of numerical transformer differential protection.

(OR)

b) Describe with neat block diagram the working of static instantaneous over current protection relay.

15. a) Explain the construction, operating principle of sulphur hexafluoride circuit breakers with neat diagram.

(OR)

b) Explain with neat sketch the construction, operating principle of Bulk oil circuit breakers with its applications and merits.

PART – C (1×15=15 Marks)

16. a) The neutral point of a three phase 20MVA, 11 kV alternator is earthed through a resistance of 5 ohms, the relay is set to operate when there is an out of balance current of 1.5 A. The CT', have a ratio of 1000/5. What is the percentage of winding protected ? Also calculate the earthing resistance required to protect 90% of the winding.

(OR)

b) A 20 MVA transformer which is used to operate at 30% overload feeds a 11 kV bus bar through a circuit breaker. The transformer circuit breaker is equipped with a 1000/5 current transformer and the feeder circuit breaker with 400/5 current transformer and both the current transformers feed IDMTL relays having the following characteristics.

Plug Setting	2	3	5	10	15	20
Multiplier time (seconds)	10	6	4.1	3	2.5	2.2

The relay on the feeder circuit breaker has 125% plug setting and a 0.3 time multiplier setting. If a fault current of 5000 A flows from the transformer to the feeder, Determine

i) Operating time of feeder relay. **(10)**

ii) Suggest a suitable plug setting and time multiplier setting of the transformer relay to ensure adequate discrimination of 0.5s between the transformer relay and feeder relay. **(5)**