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Question Paper Code : 70485

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

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) –
Electrical and Electronics Engineering – Sixth Semester (Regulations – 2014))

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write down any four functions of protective relaying scheme in power system design.

2. List out the major five components comprises in protection of power system.

3. Draw a basic circuit connection diagram of a protection relay.

4. Mention the various advantages of Electro Magnetic Relays.

5. Give the comparisons between C.T. and P.T

6. A 250 : 5, C.T is used with an ammeter. If ammeter reading is 2.7 A, Estimate the line current.

7. Outline the block diagram of a Static Relay indicating its basic elements.

8. Draw the block schematic of phase comparison method of carrier current protection.

9. Note down the factors of Arc exist in between circuit breaker contacts.

10. Write down the necessary requirements of circuit breakers in practice.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the nature and causes of faults. Discuss the consequences of faults on a power system. (13)

Or

(b) Explain what you understand by primary and back-up protection. What is the role of back-up protection? What are the various methods for providing back-up protection? (13)

12. (a) Explain with the help of neat diagram, the construction and working of non-directional induction type over current relay. (13)

Or

(b) Describe with the schematic arrangement of various elements in a relay with break type contact of protective scheme. (13)

13. (a) The neutral point of 11 kV alternator is earthed through a resistance of 12Ω, the relay is set to operate when there is out of balance current of 0.8 A. The C.T.s has a ratio of 200/5. What percentage of the winding is protected against earth faults? What must be the minimum value of earthing resistance required to give 90% of protection to each phase? (13)

Or

(b) Summarize the abnormal condition and protection circuit to be employed for induction motor. Also draw and explain the protection circuit along with its single line diagram. (13)

14. (a) The Buchholz relay is a gas operated relay used for the protection of oil immersed transformers against all the types if internal faults. Show the constructional features with its operating principles. (13)

Or

(b) Describe in detail the problems encountered in the simple differential protection of transformers. (13)

15. (a) A 50 cycles, 3 phase alternator with grounded neutral has inductance of 1.6 mH per phase and is connected to busbar through a circuit breaker. The capacitance to earth between the alternator and circuit breaker is $0.00\,3\,\mu$ F per phase. The circuit breaker opens when rms value of current is 7500 A. Determine the following : (13)

    (i) RRRV max,

    (ii) Time for RRRV max

    (iii) Frequency of oscillations.

Or

(b) List out the classification of circuit breakers, also Explain with neat sketch the construction of Air Blast Circuit Breaker. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Create and evaluate Carrier Aided Protection Scheme used for Protection of Transmission Lines.

Or

(b) Analyze the principles of operation of Double Break Oil Circuit Breaker which includes its electrical equivalent circuit, Capacitive voltage Grading and factors affecting the performance of Plain break Oil circuit breaker.

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