

Reg. No. :

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Question Paper Code : 20467

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh Semester

Electrical and Electronics Engineering

EE 6702 – PROTECTION AND SWITCHGEAR

(Regulations 2013)

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

Maximum : 100 marks

Time : Three hours

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the effects of short circuit faults on power system, if the fault remain uncleared?
2. How protective relays are classified based on their functions?
3. Differentiate time graded system and current graded system used in overcurrent protection.
4. What are the factors affecting the performance of differential relays?
5. In the event of faults in generator windings, field excitation is to be suppressed as early as possible. Why?
6. Which type of protection scheme is preferred for EHV and UHV power lines?
7. In what way the static relays are meritorious than electromagnetic relays?
8. List the electronic circuits commonly used in static relays.
9. Why the rate of rise of restriking voltage plays important role in circuit breaker operation?
10. Why oil circuit breakers are not suitable for heavy current interruption at low voltages?

11. (a) (i) What are the essential requirements of protective relaying? Justify.
 (ii) Discuss briefly about primary protection and back-up protection.

Or

- (a) Discuss the following neutral grounding schemes. Illustrate your answer with appropriate phasor diagrams, benefits and recommendations.
 (i) Resistance earthing
 (ii) Reactance earthing
 (iii) Arc suppression coil

12. (a) Explain various time-current characteristics of an overcurrent relay with relevant applications. Also comment about the technique to realize those time-current characteristics using electromagnetic relays.

Or

- (b) Discuss with relevant connection diagram and phasor diagram, the directional overcurrent relay.

13. (a) An alternator rated at 10 kV protected by the balanced circulating current system has its neutral grounded through a resistance of 10 ohms. The protective relay is set to operate when there is an out of balance current of 1.8 A in the pilot wires which are connected to the secondary windings of 1000/5 CT ratio. Determine the percentage of winding which remains unprotected and minimum value of earthing resistance required to protect 80% of the winding.

Or

- (b) Explain how a transformer can be protected against magnetizing inrush current. Illustrate with suitable diagram.

14. (a) Discuss in detail, the integrating type and instantaneous type static amplitude comparators. Illustrate your answer with appropriate circuits and waveforms.

Or

- (b) How static overcurrent relays are different from electromechanical overcurrent relays? Explain how the operation of instantaneous overcurrent relay is achieved using electronic circuits.

15. (a) Describe the constructional and operational aspects of cross blast and axial blast air circuit breakers (ACB). Also discuss the meritorious features of ACB over Oil circuit breakers.

Or

- (b) Derive the expression to find the critical value of resistance to be connected across the circuit breaker contacts.

PART C — (1 × 15 = 15 marks)

- (a) In a 132 kV, 50 Hz system, the inductance and capacitance up to the location of the circuit breaker is and $0.02 \mu F$ respectively. A resistance of 600Ω is connected across the contacts of the circuit breaker. Determine
- (i) Natural frequency of oscillations.
 - (ii) Damped frequency of oscillations and
 - (iii) Critical value of resistance which will give no transient oscillations.

Or

- (b) Consider a ring main feeder with one infeed bus and three outgoing bus. Design an overcurrent protection scheme for a short circuit fault at the middle of the feeder connecting two outgoing buses. Represent the given case as a single line diagram and illustrate your answer by indicating the location of circuit breakers, operating time of each circuit breaker for the given fault. Also mention which relay should be with a directional feature.
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Question Paper Code : 42511

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh Semester

Electrical and Electronics Engineering
EE 2402 – PROTECTION AND SWITCHGEAR
(Regulations 2008)

(Common to PTEE 2402 – Protection and Switchgear for B.E. (Part-Time)
Sixth Semester – EEE – Regulations 2009)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Define primary protection.
2. What is meant by earthing ?
3. What is electromagnetic relay ?
4. What is the principle of distance relay ?
5. Give the various generator protections.
6. Define the term burden on CT.
7. List the various arc extinction methods.
8. What is resistance switching ?
9. Classify the circuit breakers.
10. What is type test ?

PART – B

(5×16=80 Marks)

11. a) Explain in detail the essential qualities of protection.

(16)

(OR)

- b) Describe the protection scheme employed to protect from lightning and switching effects.

(16)



42511

12. a) Discuss the construction and principle of operation of non-directional induction type relay. (16)

(OR)

b) i) List the merits and demerits of static relays over electromagnetic relays. (6)

ii) Explain the construction, principle of operation of negative sequence relay. (10)

13. a) Briefly discuss the protective methods used for the protection of large Transformer.

(OR)

b) Describe the types of protective schemes employed for the protection of Busbar.

14. a) i) Discuss the various theories to explain the arc interruption. (8)

ii) Explain the DC circuit breaking. (8)

(OR)

b) Derive an expression for Restriking voltage and rate of rise of restriking voltage in a Circuit Breaker.

15. a) Describe the principle constructional features of air blast CB. Give its advantages and disadvantages. (16)

(OR)

b) Discuss different types of testing of circuit breakers. Explain in detail the synthetic testing of circuit breaker.



Reg. No. :

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Question Paper Code : 52508

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

Seventh Semester

Electrical and Electronics Engineering

EE 2402 – PROTECTION AND SWITCHGEAR

(Regulations 2008)

(Common to PTEE 2402 : Protection and Switchgear for BE (Part-Time)

Sixth Semester – EEE – Regulations 2009)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. Differentiate symmetrical and asymmetrical short circuit currents.
2. A 132 kV, 3 phase, 50 Hz, overhead line, 50 km long has a capacitance to earth for each line of $0.0157 \mu F$ per km. Determine the inductance of the arc suppression coil.
3. What is the working principle of differential protective relay ?
4. What is meant by over-run of a disc in induction disc relay ? How it can be minimized ?
5. Why the differential relay setting for transformer protection should be higher than those for alternators ?
6. What is the basis for the operation of impedance relay ?
7. What is the need for resistance switching ?
8. What is meant by recovery voltage ?
9. What is the major drawback in SF_6 at low temperature operations ?
10. Why oil circuit breakers are not suitable for heavy current interruption at low voltages ?



11. a) Draw the one line diagram of a power system and indicate different protective zones. Also discuss the essential requirement of protective relaying.

(OR)

- b) Discuss in detail, the following neutral grounding methods : (6)
- i) Resistance grounding. (4)
 - ii) Reactance grounding. (4)
 - iii) Arc suppression coil. (6)

12. a) With relevant diagrams, explain the constructional and operational aspects of directional overcurrent relay. Also discuss with appropriate phasor diagram, the 30° relay connection with a maximum torque angle of 0° .

(OR)

- b) Discuss how negative sequence relay protects the generator and motors against unbalanced loading condition. Illustrate the answer with relevant schematic diagram and phasor diagrams for positive, negative and zero sequence currents.

13. a) Discuss the following generator protection :

- i) Protection against stator faults. (10)
- ii) Protection against loss of excitation. (6)

(OR)

- b) A 3-phase, 200 kVA, 11000/400 V, transformer is connected as delta/star. The protective transformer on 400 V side have turn ratio of 500/5. What will be the CT ratios on the high voltage side ? Also obtain the circulating current when the fault current of 750 A of the following types occurs on the low voltage side :

- i) Earth fault within the protective zone.
- ii) Earth fault outside protective zone.
- iii) Phase to phase fault within the protective zone.
- iv) Phase to phase fault outside the protective zone.

14. a) Derive the expression for restriking voltage and RRRV which appears across circuit breaker contacts.

(OR)

- b) Describe how interruption of capacitive and inductive currents leads to the development of transient voltage oscillations in the system.

15. a) Discuss the constructional and operational aspects of vacuum circuit breaker.

(OR)

- b) Discuss different types of testing performed on a circuit breaker to ensure proper operation during real time conditions.

Reg. No. :

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Question Paper Code : 71785

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Seventh Semester

Electrical and Electronics Engineering

EE 6702 – PROTECTION AND SWITCHGEAR

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the types of fault.
2. Give the difference between circuit breaker and switch.
3. Why a shading ring is provide in a induction disc relay?
4. What are the difficulties of differential protection?
5. What is the need for instrument transformer?
6. What are the limitations of buchholz relay?
7. Define sampling theorem.
8. Write about numerical transformer differential protection.
9. Define restriking voltage.
10. What is rupturing capacity?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss in detail about different protection schemes.
(ii) Explain Arc suppression coil earthing with neat diagram.

Or

- (b) Explain how fault current is calculated using symmetrical components.

12. (a) Explain the construction and operating principle of impedance type distance relay with R-X-Diagram.

Or

(b) With the necessary sketches discuss in detail about electromagnetic attraction type relays relay.

13. (a) Give a detailed explanation for protection of transformer using differential protection which includes associated faults.

Or

(b) Give a detailed explanation about CT'S and PT's and its application to power system.

14. (a) Explain the block diagram of numerical relay with necessary diagram.

Or

(b) With a neat sketch discuss in detail about the synthesis of reactance relay using phase comparator.

15. (a) Write short notes on :

(i) Current chopping

(ii) Interruption of capacitive current.

Or

(b) With a neat diagram explain the construction and working principle of Air Blast circuit breaker and Vacuum circuit breaker.

11. (a) Explain different types of earthing the neutral point of the power system. Derive an expression for the reactance of the Peterson coil in terms of capacitance of the Protected line.

Or

- (b) (i) Explain the overlapping of protective zones with neat sketch. (9)
(ii) Classify the different faults in power system. Which of these are more frequent. (7)

12. (a) Explain the Principle of working of distance relays. Describe with neat sketches the following types of relays

- (i) impedance relay.
(ii) Admittance relay
(iii) Reactance relay.

Or

- (b) With neat diagram explain the construction and operation of induction type directional over current relay.

13. (a) Explain in detail the carrier current protection schema. Describe carrier phase comparison relay with neat sketches.

Or

- (b) Why is the harmonic restrained differential relay required to be used for protecting a large size transformer? Describe the construction and working of such a relay.

14. (a) Discuss in detail the different types of rating of circuit breaker bringing out clearly their physical significance.

Or

- (b) Explain the following terms in detail :

- (i) Resistance switching.
(ii) Current chopping
(iii) Interruption of capacitive current.

15. (a) Explain the construction, operating principle and application of Minimum oil circuit breakers.

Or

- (b) Describe the construction, operating principle and application of a SF₆ circuit breaker.

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Reg. No. :

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Question Paper Code : 71785

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Seventh Semester

Electrical and Electronics Engineering

EE 6702 – PROTECTION AND SWITCHGEAR

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the types of fault.
2. Give the difference between circuit breaker and switch.
3. Why a shading ring is provide in a induction disc relay?
4. What are the difficulties of differential protection?
5. What is the need for instrument transformer?
6. What are the limitations of buchholz relay?
7. Define sampling theorem.
8. Write about numerical transformer differential protection.
9. Define restriking voltage.
10. What is rupturing capacity?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss in detail about different protection schemes.
(ii) Explain Arc suppression coil earthing with neat diagram.

Or

- (b) Explain how fault current is calculated using symmetrical components.

12. (a) Explain the construction and operating principle of impedance type distance relay with R-X Diagram.

Or

- (b) With the necessary sketches discuss in detail about electromagnetic attraction type relays relay.

13. (a) Give a detailed explanation for protection of transformer using differential protection which includes associated faults.

Or

- (b) Give a detailed explanation about CTS and PT's and its application to power system.

14. (a) Explain the block diagram of numerical relay with necessary diagram.

Or

- (b) With a neat sketch discuss in detail about the synthesis of reactance relay using phase comparator.

15. (a) Write short notes on :

- (i) Current chopping
- (ii) Interruption of capacitive current.

Or

- (b) With a neat diagram explain the construction and working principle of Air Blast circuit breaker and Vacuum circuit breaker.

Reg. No. :

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Question Paper Code : 80386

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh Semester

Electrical and Electronics Engineering

EE 6702 — PROTECTION AND SWITCHGEAR

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the difference between primary and back up protection?
2. What do you mean by dead spot in zones of protection?
3. What is the significance of PSM and TSM?
4. A relay is connected to 400/5 ratio current transformer with current setting of 150%. Calculate the plug setting multiplier when circuit carries a fault current of 4000A.
5. What is over fluxing? How it affect transformer?
6. Write two protection schemes used for protection of bus-bar.
7. Write two application of static relay.
8. State the difference between conventional relay and numerical relay.
9. What is the difference between re-striking voltage and recovery voltage?
10. State the difference between D.C. and A.C. circuit breaking.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain in detail about the need and different types of earthing scheme. (10)
- (ii) A 132 KV, 3 phase, 50 cycles, overhead line, 50 Km long has a capacitance to earth for each line of $0.0157 \mu\text{F}/\text{Km}$. Determine the inductance and KVA rating of the arc suppression coil. (6)

Or

- (b) (i) Explain the essential qualities of protection and explain them in detail. (6)
- (ii) Explain the method of calculating fault current using symmetrical components. (10)
12. (a) With a neat diagram explain the working principle of a directional over current relay. Derive the torque equation and also explain about directional relay connection. (6 + 4 + 6)

Or

- (b) From the universal torque equation determine the condition of operation for impedance relay, reactance relay and admittance relay. (16)
13. (a) Draw and explain protection scheme of an A.C. induction motor. (16)

Or

- (b) (i) A generator is protected by restricted earth fault protection. The generator ratings are 13.2 KV, 10 MVA. The percentage of winding protected against phase to ground fault is 85%. The relay setting is such that it trips for 20% out of balance. Calculate the resistance to be added in the neutral to ground connection. (8)
- (ii) Explain a protection scheme for protection of transformer against incipient fault. (8)
14. (a) How will you synthesize a mho relay using static phase comparator? (16)

Or

- (b) Explain the numerical over current protection and numerical transformer differential protection. (8 + 8)

15. (a) (i) Derive the expression for restriking voltage and maximum RRRV. (8)
- (ii) In short circuit test on a 3 pole, 132 KV, circuit breaker, the following observations are made. Power factor for fault = 0.4, recovery voltage 0.9 times full line value, the breaking current symmetrical, frequency of oscillation of restriking voltage 16 KHZ. Assume neutral is grounded and fault is not grounded. Determine average RRRV. (8)

Or

- (b) (i) With a neat sketch explain the principle of vacuum circuit breaker. (8)
- (ii) Explain the phenomenon of interruption of capacitive current in a circuit breaker. (8)

PART B — (5 × 16 = 80 marks)

11. (a) (i) With neat block diagram, explain the construction and operating principle of electromagnetic relay. (8)
(ii) Describe the operation of over current relay with directional feature. (8)

Or

- (b) (i) Discuss the importance of the protective scheme employed against lightning and switching surges. (8)
(ii) Enumerate the basic ideas of insulation coordination. (8)
12. (a) (i) Explain with the help of neat diagram the construction and working of induction type directional power relay. (8)
(ii) Draw and explain the block diagram of a static relay and state its advantages. (8)

Or

- (b) What is universal torque equation? Using this equation derive the following operating characteristics.
(i) Impedance relay
(ii) Reactance relay
(iii) Mho relay. (16)
13. (a) Describe the types of protective schemes are employed for the Protection of field winding and loss excitation of alternator, (16)

Or

- (b) With aid of neat schematic diagram, describe the percentage differential protection scheme of a transformer. (16)
14. (a) Discuss in detail the different types of rating of circuit breaker bringing out clearly their physical significance.

Or

- (b) Explain the following terms in detail :
(i) Resistance switching
(ii) Current chopping
(iii) Interruption of capacitive current.
15. (a) With necessary diagrams explain the following :
(i) Vacuum Circuit breakers. (8)
(ii) Air blast C.B. (8)

Or

- (b) (i) Write the comparative merits and demerits of C.B. (8)
(ii) Give the reasons for using SF₆ in circuit breakers. (8)

Reg. No.

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Question Paper Code : 51516

B.E./ B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Seventh Semester

Electrical and Electronics Engineering

EE 2402/EE 72/10133 EE 702 –PROTECTION AND SWITCHGEAR

(Regulations 2008/2010)

(Common to PTEE 2402/10133 EE 702 Protection and Switchgear for B.E (Part-Time)

Sixth Semester Electrical and Electronics Engineering– Regulations 2009/2010)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. What is the difference between a short circuit and an overload ?
2. Why earth wire is provided in overhead transmission lines ?
3. Write the effects of arc resistance.
4. List out the applications of static relays.
5. Can current transformers secondary winding be open circuited ? Justify your answer.
6. What are the various faults that would affect an alternator ?
7. What is meant by auto-reclosing ?
8. Write the function of isolating switch.
9. Give the difference between isolator and circuit breaker.
10. State the advantages of SF₆ circuit breaker.

PART - B (5 × 16 = 80 Marks)

11. (a) Explain different types of earthing the neutral point of the power system. Derive an expression for the reactance of the Peterson coil in terms of capacitance of the protected line.

OR

- (b) (i) Explain the overlapping of protective zones with neat sketch. (9)
(ii) Classify the different faults in power system. Which of these are more frequent? (7)

12. (a) Describe the operating principle, constructional features and area of applications of directional relay. How do you implement directional feature in the over current relay? (16)

OR

- (b) Explain MHO relay characteristic on the R-X diagram. Discuss the range setting of various distance relays placed on a particular location. (10)

13. (a) (i) Describe the differential protective scheme of transformer. (10)
(ii) Enumerate the protective scheme employed for the bus bar. (10)

OR

- (b) With neat sketches, explain the different types of protective schemes for transmission lines. (10)

14. (a) (i) Derive the expression for restriking voltage. (10)
(ii) Explain about current zero interruption theories. (10)

OR

- (b) Explain : (10)
(i) Interruption of capacitive current
(ii) Current chopping

15. (a) Explain the construction, principle of operation of a minimum oil circuit breaker. What are its main advantages and disadvantages? (10)

OR

- (b) Briefly describe the testing of circuit breakers. (10)

Reg. No.

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Question Paper Code : 91455

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014

Seventh Semester

Electrical and Electronics Engineering

EE 2402/EE 72/10133 EE 702 – PROTECTION AND SWITCHGEAR

(Regulation 2008/2010)

(Common to PTEE 2402/10133 EE 702 Protection and Switchgear for B.E. (Part-Time) Sixth Semester Electrical and Electronics Engineering – Regulation 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define the term "pick up" value in a protective relay.
2. What is the necessity for earthing?
3. What is an under-frequency relay?
4. Mention any two advantages of a static relay.
5. State the methods of protection of busbars.
6. Why the secondary of current transformer should not be open in a power system?
7. Mention any two advantages of vacuum circuit breaker.
8. List the different types of circuit breakers.
9. Define the term "breaking capacity" in a circuit breaker.
10. What is meant by current chopping?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Describe the functional requirements of protective relaying. (6)
(ii) Differentiate between surge diverter and surge absorber. Also explain the characteristics of an ideal surge diverter. (10)

Or

- (b) (i) With a neat diagram explain the operation of any one type of lightning arrester. (8)
- (ii) What is a Peterson coil? Explain the protective function performed by this device with necessary diagram. (8)
12. (a) Describe the techniques used to realize various time-current characteristics using electromechanical relays. Also, compare the time-current characteristics of inverse, very inverse and extremely inverse over current relays. Discuss their applications. (16)

Or

- (b) (i) Explain in what way distance protection is superior to over current protection for the protection of transmission lines. (6)
- (ii) Write short notes on :
- (1) under frequency relays. (5)
- (2) static relays. (5)
13. (a) (i) Briefly discuss the protective devices used for the protection of a large transformer. (8)
- (ii) Explain stepped time-distance characteristic of three distance relaying units used for I, II and III zone of protection. (8)

Or

- (b) (i) Describe with a neat sketch, the percentage differential protection of a modern alternator. (10)
- (ii) Explain impedance relay characteristics on the R-X diagram. Also discuss the range setting of three impedance relays placed at a particular location. (6)
14. (a) With necessary diagrams describe the recovery rate theory and energy balance theory of arc interruption in a circuit breaker. (16)

Or

- (b) Explain the terms : restriking voltage, recovery voltage and RRRV. Derive expressions for restriking voltage and RRRV in terms of system voltage, inductance and capacitance. (16)
15. (a) What are the different methods of testing of circuit breakers? Describe the method which is more suitable for testing the large capacity circuit breakers. Also, discuss the merits and demerits of the method. (16)

Or

- (b) Describe the construction, operating principle and application of SF₆ circuit breaker, with a neat sketch. Also discuss its advantages over other types of circuit breakers. (16)

Reg. No. :

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Question Paper Code : 51450

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Seventh Semester

Electrical and Electronics Engineering

EE 2402/EE 72/10133 EE 702 — PROTECTION AND SWITCHGEAR

(Regulation 2008/2010)

(Common to PTEE 2402, Protection and Switchgear for B.E. (Part-Time)
(Sixth Semester Electrical and Electronics Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the different types of faults occurring in the power system?
2. Write the importance of ground wire.
3. List out the different types of distance relay.
4. Write the merits of static relay.
5. Enumerate the concept of ring feeder.
6. List out the applications of current transformer.
7. How do you quench an arc in a circuit breaker?
8. What are the demerits of resistance switching?
9. Write the differences between the fuse and circuit breaker.
10. Define the operating time of circuit breaker.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the importance of protective schemes employed in power system. (8)
- (ii) Write the essential qualities of protection. (8)

Or

- (b) (i) Explain the protective scheme employed to protect from lightning and switching effects. (8)
- (ii) Enumerate the basic concepts of insulation coordination. (8)

12. (a) Explain the construction and operating principle of over current relay with directional scheme. (16)

Or

- (b) Describe the principles of
- (i) Negative sequence relay.
- (ii) Under frequency relay. (8 + 8)

13. (a) With a neat schematic diagram, explain the protection of transformer with differential protection scheme. (16)

Or

- (b) Write brief notes on
- (i) Generator protection.
- (ii) Busbar protection. (8 + 8)

14. (a) (i) Explain the physics of arc phenomena and interruption. (8)
- (ii) Describe the operating principle of DC circuit breaker. (8)

Or

- (b) Write short notes on :
- (i) Current chopping.
- (ii) Interruption of capacitive current. (8 + 8)

Reg. No. :

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Question Paper Code : 71516

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Seventh Semester

Electrical and Electronics Engineering

EE 2402/EE 72/10133 EE 702 — PROTECTION AND SWITCHGEAR

(Regulation 2008/2010)

(Common to PTEE 2402/10133 EE 702 Protection and Switchgear for
B.E. (Part-Time) Sixth Semester Electrical and Electronics Engineering –
Regulation 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define protection zone.
2. What are the different types of earthing?
3. What is the principle of differential relay?
4. What are functions of protective relays?
5. Can current transformers secondary winding be open circuited? Justify your answer.
6. What are the various faults that would affect an alternator?
7. Give the two methods of arc interruption.
8. What is RRRV?
9. What are the advantages of SF₆ Circuit Breaker?
10. What are the different types of testing in Circuit breakers?

PART B — (5 × 16 = 80 marks)

11. (a) Explain :
- (i) Insulation co-ordination. (8)
 - (ii) Surge absorber. (8)

Or

- (b) Discuss in detail about Peterson Coil? List the protective functions performed by this device. (16)
12. (a) Draw and explain about differential protection of transmission lines. (16)

Or

- (b) Explain :
- (i) Static Relay (8)
 - (ii) Negative sequence relay. (8)
13. (a) Briefly explain types of stator fault protection of Alternators. (16)

Or

- (b) Explain the carrier current protection of transmission line with relevant diagrams. (16)
14. (a) (i) Derive the expression for restriking voltage. (8)
- (ii) Explain about current zero interruption theories. (8)

Or

- (b) Explain :
- (i) Interruption of capacitive current. (8)
 - (ii) Current chopping. (8)
15. (a) With necessary diagrams explain the following:
- (i) Vacuum Circuit breakers. (8)
 - (ii) Air blast C.B. (8)

Or

- (b) (i) Write the comparative merits and demerits of C.B. (8)
- (ii) Give the reasons for using SF₆ in circuit breakers. (8)

15. (a) With a help of neat block diagram, explain the construction, operating principle and advantages of SF_6 circuit breaker. (16)

Or

- (b) Briefly describe the different types of testing schemes of circuit breakers. (16)
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