



SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR

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QUESTION BANK (DESCRIPTIVE)

Subject with Code : SWITCH GEAR AND PROTECTION(16EE225) Course & Branch: B.Tech - EEE

Year & Sem: III-B.Tech & II-Sem

Regulation: R16

UNIT –I

CIRCUIT BREAKERS

1. A) What is Switch gear? Explain various switch gear components. 6M
B) Explain about Axial blast Circuit breaker. 6M
2. Explain Sliepian’s theory and energy balance theory 12M
3. (A) Explain the principal of “ARC” extinction. 6M
(B) What are the different methods of “ARC” extinction? 6M
4. For a 132kv system, the reactance and capacitance up to the location of a C.B is 3Ω . And $0.015\mu\text{F}$ respectively. Calculate the following a) The frequency of transient oscillations.
b) The Maximum value of restriking voltage. C)The max value of RRRV.
5. Explain the principle and operation of Minimum oil Circuit Breaker with diagram. 12M
6. Explain the principle and operation of Vacuum Breaker with diagram. 12M
7. Explain the principle and operation of Air Blast Circuit Breakers. 12M
8. Explain the principle and operation of SF6 circuit breaker. 12M
9. Distinguish between SF6 circuit breakers and vacuum circuit breakers. 12M
10. Write short notes on the following. 12M
 - (I) Resistance switching
 - (II) Current chopping.

UNIT – II
RELAYS

1. Distinguish between over current relays, directional relays and differential relays. 12M
2. A) Explain the construction of an induction disc relay. State its principle of operation. 6M
What are the advantages to induction relays? 6M
B) With a neat sketch, Explain the difference between over current relays by using Time current characteristics. 6M
3. A) Explain the “Differential protection”. List the various applications of differential Protection ? 6M
B) Discuss the fundamental requirements of protective Relaying. 6M
4. A) Explain various types of construction of attracted armature type relay? 6M
B) Explain the principle of impedance type distance relay and explain its characteristics on R-X planes? 6M
5. (A) Explain in detail about primary and back up protection. 6M
(B) What are the advantages of induction cup relays? What is the purpose of shading in an induction disc relay? 6M
6. Explain the construction and working of induction type Non directional over current relay with diagram. 12M
7. A) Derive the expression for torque developed in induction relay? 6M
B) What is Static relay? What are the advantages and disadvantages of static relay? 6M
8. Explain the principle of impedance type distance relay and explain its characteristics on R-X planes? 12M
9. Explain about amplitude and phase comparator? 12M
- 10 A) Explain the principle of Mho distance relay and explain its characteristics on R-X planes? 6M
B) Give the advantages and disadvantages of Microprocessor relays? 6M

UNIT – III**PROTECTION OF GENERATORS AND TRANSFORMERS**

1. Explain with a neat diagram, the application of the Mertz -price circulating current system to the protection of alternators .What precautions must be taken in installing this system? 12M
2. Explain with neat diagram the Mertz -price protection for the Transformer? 12M
3. (A) Explain scheme of protection for failure of alternator excitation? 6M
(B) Discuss about Earth fault protection for Alternator? 6M
4. A) What are the common transformer faults in a transformer? Explain them. 6M
b) Discuss Earth fault protection for transformers? 6M
5. Explain with a neat sketch, the operation of Buchholz relay? 12M
6. A 3-phase transformer rated for 33 KV/6.6KV is connected star-delta and the protecting Current transformer on the low voltage side has a ratio of 400/5. Determine the ratio of the current transformer on the HV side. 12M
7. With the help of neat sketches explain the protection of star-delta power transformer, against the following abnormal conditions. 12M
(a) Phase to phase faults.
(b) High voltage surges.
8. A 3-Phase transformer of 220/11000 line volts is connected in star/delta. The protective transformers on 220v side have a current ratio of 600/5. What should be the CT ratio on 11,000v side. 12M
9. A) Discuss the different transformer faults. 6M
B)What are the various protections schemes available for transformers. Explain any one protective scheme. 6M
10. write short note on following 12M
A) what are stator and rotor faults?
B) define earth fault?
C) define buchholtz relay?
D) what is Inter-turn fault protection?
E) define differential protection?

UNIT – IV:
PROTECTION OF FEEDER AND LINES

1. Explain Time grading protection for different feeders. 12M
2. With neat sketch Explain the Merze price voltage balance systems in 3-Phase line. 12M
3. With neat sketch Explain the Translay Scheme of protection in 3-Phase transmission line. 12M
4. With neat Diagram Explain the Three zone distance protection in 3-Phase transmission line. 12M
5. Draw the schematic diagram of the carrier current protection scheme of lines. Also explain its working principle. 10M
6. (A) What is the importance of Bus bar protection. 6M
(B) What is back-up protection of bus bar? 6M
7. Explain the zonal protection scheme for feeder. Explain the reactance relay characteristics for 3- zone protection. 12M
8. Write short notes on the following: 12M
 - i) Fault bus protection
 - ii) Tran slay scheme.
9. A) Explain the protection of Ring main feeder using over current relays. 6M
B) What are the advantages and disadvantages of carrier-current protection? 6M
10. A) what are the requirements of protection of transmission lines. 6M
b) Explain the protection of Radial feeder using over current relays. 6M

UNIT – V
PROTECTION AGAINST OVER VOLTAGES & GROUNDING

1. What are the causes of over voltages arising in a power system? Why is it necessary to protect the lines and other equipment of the power system against over voltages? 12M
2. Write short notes of the following: 12M
 - A) What is lightning? Explain the mechanism of lightning discharge.
 - B) Switching surges. 12M
3. Explain clearly how the rating of a lightning arrester is selected. 12M
4. Explain the protection of stations and sub-stations against direct lightning strokes with neat schematic diagram 12M
5. (A) Explain the construction & principle of operation of valve type lightning arrester. 6M
 - (B) What is voltage surge? Draw typical lightning voltage surge. 6M
6. A) Explain about Rod gap Arrester. And also give the advantages disadvantages. 6M
 - B) Why the surge arresters are located near the equipment? Explain. 6M
7. A) Explain about Horn gap Arrester. And also give the advantages disadvantages. 6M
 - B) Explain about Expulsion type Lightning Arrester. And also give the advantages disadvantages.
8. A) Explain about lightning absorbers and diverters. 6M
 - B) Explain about Multi gap Arrester. And also give the advantages disadvantages. 6M
9. What is Neutral grounding? Explain different types of Neutral grounding 12M
10. What is Lightning stroke? Explain Mechanism of Lightning Discharge. 12M