



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

Department of Electrical and Electronics Engineering

ASSIGNMENT QUESTIONS

Course Name	:	SWITCH GEAR AND PROTECTION
Course Code	:	A70231
Class	:	IV B. Tech I Semester
Branch	:	Electrical and Electronics Engineering
Year	:	2018– 2019
Course Faculty	:	Mr P Shiva Kumar, Assistant Professor, EEE

OBJECTIVE:

“Switch Gear & Protection” subject gives general awareness of different Protective Equipments for Power Systems such as Relays, Circuit Breakers, and Isolators. It also explains about protective system- how it works and where it works? A different application of the relays for different elements of power system is also discussed in the subject.

S. No	Question	Blooms Taxonomy Level	Course Outcome
UNIT-I CIRCUIT BREAKERS			
Part - A (Short Answer Questions)			
1	What is a circuit breaker? Explain its functions?	Remember	1
2	Discuss the arc phenomenon in a circuit breaker.	Remember	1
3	Define the following terms as applied to circuit breakers : (i) Arc voltage (ii) Re striking voltage (iii) Recovery voltage?	Remember	1
4	Explain the phenomenon of current chopping?	Understand	1
5	What is resistance switching?	Remember	1
Part - B (Long Answer Questions)			
1	Explain the various methods of arc extinction in a circuit breaker	Remember	1
2	Explain the following terms as applied to circuit breakers : (i) Arc voltage (ii) Re striking voltage (iii) Recovery voltage	Understand	1
3	Write a short note on the rate of re-striking voltage indicating its importance in the arc extinction.	Understand	1
4	Discuss the phenomenon of (i) Current chopping (ii) Capacitive current breaking.	Remember	1
5	Write short notes on the following (i) resistance switching (ii) circuit breaker ratings (iii) circuit interruption problems.	Understand	1
UNIT - II ELECTROMAGNETIC AND STATIC RELAYS			
Part - A (Short Answer Questions)			
1	What is the difference between a fuse and a relay?	Remember	6
2	Define over current relay	Understand	6
3	Why are differential relays more sensitive than over current relays?	Understand	6
4	Explain about balanced voltage relay	Remember	6
5	What is protective relay?	Understand	6
Part - B (Long Answer Questions)			
1	With the help of neat sketch explain the principle of operation of differential relays.	Understand	6
2	Distinguish between Over current relays, Directional relays and Differential relays.	Remember	6
3	Determine the time of operation of a 4-ampere, 3-second over current relay having a current setting of 125% and a time setting multiplier of 0.4 connected to supply circuit through a 200/5 current transformer when the circuit carries a fault current of 2000 A	Understand	6

4	Explain the, “Differential protection”, state the various applications of differential protection.	Remember	6
5	What are the different types of electromagnetic relays? Discuss their field of applications	Remember	6
UNIT - III			
GENERATOR AND TRANSFORMER PROTECTION			
Part - A (Short Answer Questions)			
1	Why is overload protection not necessary for alternators?	Remember	1
2	What are the types of stator winding faults in alternator?	Remember	1
3	Mention the most commonly used protection scheme for alternators?	Remember	2
4	What are the rotor faults in alternator?	Remember	2
5	Discuss the protection employed against loss of excitation of an alternator.	Remember	2
6	(a) What do you understand by field suppression of an alternator? (b) How is it achieved?	Understand	2
7	What type of relays are required for back-up protection of alternator? Which type of relays are used in merz-price protection system for alternator?	Remember	2
8	Which type of relays are used in merz-price protection system for alternator.	Remember	3
9	Discuss the different transformer faults.	Understand	3
10	What are the various protections usually recommended for power transformers?	Remember	3
Part - B (Long Answer Questions)			
1	What type of a protective device is used for the protection of an alternator against overheating of its (i) stator (ii) rotor? Discuss them in brief	Remember	1
2	What type of a protective scheme is employed for the protection of the field winding of the alternator against ground faults?	Remember	3
3	Draw the schematic of a Merz-price circulating method of protecting an alternator .Explain the operating principle?	Remember	
4	Discuss suitable protection schemes for internal and external fault protection of an alternator protection of an alternator.	Understand	2
5	Write short notes on the following (i) Generator faults (ii) protection of alternator (iii) over-load protection of alternator (iv) self balanced protection?	Understand	2
6	Describe protection scheme of an alternator against inter-turn fault.	Remember	2
7	Explain with a neat diagram the application of Merz-Price circulating current principle for the protection of alternator?	Remember	1
8	Describe the construction and working of a Buchholz relay.	Remember	
9	Describe the Merz-Price circulating current system for the protection of transformers.	Understand	1
10	Write short notes on the following (i) combined leakage and overload protection for transformers (ii) Earth fault protection for transformer	Remember	1
UNIT - 1V			
FEEDER AND BUS-BAR PROTECTION AND GROUNDING: PROTECTION OF LINE			
Part - A (Short Answer Questions)			
1	How earth fault protection is achieved in case of feeder?	Remember	3
2	What are the protection scheme for the protection parallel feeder?	Remember	3
3	What is the Merz-Price voltage protection scheme?	Remember	3
4	What are the advantages of distance protection over other types of protection?	Remember	3
5	What is backup protection of bus bars?	Understand	3
Part - B (Long Answer Questions)			
1	Discuss the time-graded over current protection for (i) Radial feeders (ii) Parallel feeders (iii) Ring main system	Remember	3
2	Describe the differential pilot wire method of protection of feeders.	Remember	3
3	Explain the Translay protection scheme for feeders.	Remember	3
4	Discuss and compare briefly various bus-bar arrangement in a power system.	Remember	3
5	What are the different bus-bar arrangements possible in a substation? Discuss them briefly with application areas.	Remember	3
UNIT - V			
PROTECTION AGAINST OVER VOLTAGES			
Part - A (Short Answer Questions)			
1	What is a voltage surge?	Remember	7
2	What are the causes of over voltages	Remember	7

3	What is lightning?	Remember	7
4	What are the harmful effects of lightning?	Remember	7
5	What are the types of lightning stroke	Remember	7
Part - B (Long Answer Questions)			
1	What is a voltage surge? Draw a typical lightning voltage surge?	Remember	7
2	Discuss the causes of over voltages.	Remember	7
3	What is lightning? Describe the mechanism of lightning discharge?	Remember	7
4	Describe the various types of lightning stroke.	Understand	7
5	How do earthing screen and ground wires provide protection against direct lightning strokes?	Remember	7

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