QP Code: SN23BTECH231 | Reg. No | | | | | | | | | | | AY 23

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Fifth Semester - Regular) Examinations, November 2025

23BELPE35011/23BEEPE35011 - Switchgear and Protection
(EE & EEE)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions
(The figures in the right-hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. Mention the factors on which arc resistance depends.	CO1	K1
b. Classify the types of differential relay.	CO2	K2
c. Enumerate the various types of protections used in an alternator.	CO3	K1
d. How to Eliminate Arcing ground?	CO4	K3
e. Explain types of over voltages in power systems.	CO5	K2

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions	Marks	CO #	Blooms Level
2. a. Explain the phenomenon of current chopping in a circuit breaker. What measures are being taken to reduce it?	5	CO1	K2
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	5	CO1	K2
(OR)			
c. With a neat diagram, explain the construction and principle of operation of air blast circuit breaker.	5	CO1	K2
d. For a 132Kv system, the reactance and capacitance up to the location of Circuit breaker is 3 ohms and 0.015μF, respectively. Calculate the (i) The frequency of transient oscillation, (ii) The maximum value of restriking voltage crosses the contacts of the Circuit breaker and (iii) The maximum value of RRRV.	5	CO1	K3
3.a. With a neat diagram, explain the principle of operation of an Induction disc type Over Current relay.	5	CO2	K2
b. Explain balanced beam type relay. Also mention advantages of electromagnetic relay.	5	CO2	K2
(OR)			
c. Explain current differential relay.	5	CO2	K2
d. Distinguish between Static relay and Electromagnetic relay?	5	CO2	K4
4.a. Describe with neat sketch, protection against stator fault by percentage differential relay	5	CO3	K2
b. What are the faults occurring in a transformer. Explain Incipient Fault and reasons for occurrence of these faults.	5	CO3	K2

	(OR)			
c.	A 3-phase, 12MVA, 6.6KV star connected alternator has a per phase reactance of 12%. It is protected by Merz-Price circulating current principle which is set to operate for fault current not less than 180A. Calculate the value of earthing resistance to be provided in order to ensure that only 12% of the alternator winding remains unprotected.	5	CO3	K3
d.	List the various faults that occur in an alternator and how the rotor is to be protected from these faults?	5	CO3	K2
5.a.	With a neat label diagram, explain the effects of Ungrounded Neutral on system Performance and states its advantages.	5	CO4	K2
b.	Mention the methods of Neutral grounding in three phase system and state each advantage.	5	CO4	K1
	(OR)			
c.	With a neat phasor diagram, explain the operating principle of Peterson coil.	5	CO4	K2
d.	Discuss the Grounding Practices in Practical Power system.	5	CO4	K2
6.a.	With a neat diagram, explain the operation of any one type of lightning arrester.	5	CO5	K2
b.	Discuss the basic ideas of insulation coordination in the practical power system.	5	CO5	K2
	(OR)			
c.	Discuss the internal and external causes of over voltages in a power system.	5	CO5	K2
d.	Explain the details about Valve type Lightning arrestors.	5	CO5	K2

--- End of Paper ---