Hall Ticket Number:

Code No. : 17351 N/O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.E.E.) VII-Semester Main & Backlog Examinations, Dec.-23/Jan.-24

Switchgear and Protection

Time: **3 hours** Max. Marks: **60**

• *Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10× 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Why a shaded ring is provided in an induction disc relay?	2	4	1	1,2,5
2.	Explain the requirement of primary and back up protection in any equipment.	2	2	1	1,2,5
3.	Sketch the R-X diagram for the reactance relay.	2	3	2	1,2,5
4.	Mention the principle of operation of a distance relay.	2	2	2	1,2,5
5.	Compare different types of Generator faults.	2	4	3	1,2,5
6.	Define magnetizing in rush current.	2	1	3	1,2,5
7.	State the Slepian theory for arc interruption.	2	1	4	1,2,5
8.	Define restricking voltage and recovery voltage.	2	1	4	1,2,5
9.	What is expulsion gap lighting arrester?	2	1	5	1,2,5
10.	Why is grounding required?	2	4	5	1,2,5
	Part-B (5×8 = 40 Marks)				
11. a)	Define duality and discuss the duality between amplitude comparator and phase comparator.	4	1	1	1,2,5
b)	With the necessary sketches discuss in detail about electromagnetic attraction type relays.	4	3	1	1,2,5
12. a)	What is a directional over current relay? Describe the operating principle, constructional features and area of applications of directional over current relay.	4	2	2	1,2,5
b)	Derive universal torque equation? Using this equation draw the characteristics of (i) impedance relay (ii) reactance relay (iii) mho relay.	4	4	2	1,2,5
13. a)	Explain in detail about the Merz price voltage balanced system with a neat single line diagram.	4	2	3	1,2,5
b)	Explain in detail about Bucholtz relay with a neat sketch.	4	2	3	1,2,5

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14. a)	Define the principle of arc extinction. What are the methods of arc extinction? Describe them in detail.	4	1	4	1,2,5
b)	Explain in detail about Air blast circuit breaker with a neat circuit diagram.	4	2	4	1,2,5
15. a)	Distinguish the causes of over voltages in a power system.	4	4	5	1,2,5
b)	Demonstrate the construction, principle of operation and application of valve type lightning arrester?	4	3	5	1,2,5
16. a)	Sketch the necessary circuit diagram and explain the principle of operation of an induction disc relay. What are the advantages of induction cup relays over induction disc relays?	4	3	1	1,2,5
b)	Describe the realization of a directional impedance relay using a microprocessor with a neat diagram.	4	2	2	1,2,5
17.	Answer any ***two*** of the following:				
a)	Relate the different types of transformer faults. What are the various protective schemes available for transformers?	4	4	3	1,2,5
b)	Explain the working of a SF6 circuit breaker.	4	2	4	1,2,5
c)	Distinguish different types of earthing the neutral point of power system and also formulate an expression for the reactance of the Peterson coil in terms of capacitance of the protected line.	4	4	5	1,2,5

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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