B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E.   **Semester: V**

Branch: Electrical and Electronics Engineering   **Duration: 3 hrs.**

Course Code: 23EE5PCPSP   **Max Marks: 100**

Course: Power System Protection

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

			UNIT - I	CO	PO	Marks
1	a)		Define Fuse law. Explain the typical time-current characteristic of fuse.	CO1	PO1	**06**
	b)		Explain the two theories to explain the zero current interruption of the arc.	CO1	PO1	**08**
	c)		Derive the expression for RRRV as applied to Circuit Breakers	CO1	PO2	**06**
			OR			
2	a)		Give an outline of types of fuses used in power system protection	CO1	PO1	**06**
	b)		For 132kV system, the reactance and capacitance up to location of circuit breaker is 3 ohms and 0.015 micro farad respectively. Solve for frequency of transient oscillation, max. value of restriking voltage across the contacts of the circuit breaker, max. value of RRRV.	CO1	PO2	**08**
	c)		Explain the zones of protection in protective relays.	CO1	PO1	**06**
			UNIT - II			
3	a)		Give an outline on classification of circuit breakers based on different criteria.	CO2	PO2	**06**
	b)		With the help of a neat diagram, explain the operation of SF_6 Circuit Breaker.	CO2	PO1	**08**
	c)		Explain the constructional features of directional electromagnetic overcurrent relay with a neat sketch.	CO2	PO1	**06**
			OR			

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

	4	a)	Explain briefly physical and Electrical properties of SF6 Gas.	CO2	PO2	**06**
		b)	Explain vacuum circuit breaker with neat a sketch.	CO2	PO1	**08**
		c)	Derive the torque equation of an electromechanical relay.	CO3	PO2	**06**
			UNIT - III			
	5	a)	Elaborate the basic construction of static protective relay with neat block diagram.	CO3	PO1	**10**
		b)	Explain the i) basic coincidence circuit ii) Direct Block Spike Circuit for phase comparator type static relays.	CO3	PO1	**10**
			OR			
	6	a)	Explain the application of Replica Impedance and Mixing Transformer in static relay.	CO3	PO2	**10**
		b)	Derive the expression for the phase comparator with relevant equations.	CO3	PO2	**10**
			UNIT - IV			
	7	a)	With the help of a neat diagram explain the working of Merz Price protection for generators. list its advantages, disadvantages and application.	CO3	PO2	**10**
		b)	With the help of a neat diagram explain the basic operation, torque equation and operating characteristics of an Impedance relay.	CO3	PO2	**10**
			OR			
	8	a)	With the help of a neat diagram explain the working of Buchholz relay. List its advantages, disadvantages and application.	CO3	PO2	**10**
		b)	Elaborate restricted earth fault protection scheme with neat sketch.	CO3	PO2	**10**
			UNIT - V			
	9	a)	Explain any Three merits and Three demerits of digital relays.	CO4	PO1	**06**
		b)	Elaborate LINKNET structure with flowchart.	CO4	PO2	**08**
		c)	Explain power circuit and control circuit of operating mechanism of relay with neat sketch.	CO4	PO2	**06**
			OR			
	10	a)	Explain the algorithm assuming pure sinusoidal relaying signal.	CO4	PO2	**06**
		b)	Explain the basic block diagram of digital relay.	CO4	PO2	**08**
		c)	Give an outline and explain use of adaptive relaying.	CO4	PO1	**06**

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