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

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Electrical & Electronics Engineering **Duration: 3 hrs.**
Course Code: 22EE5PCPSP **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.

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.

		UNIT - I	*CO*	*PO*	Marks
1	a)	Explain the cut-off characteristics and time-current characteristics of a fuse.	*CO1*	*PO1*	**06**
	b)	Draw and explain the working of HRC fuse.	*CO1*	*PO1*	**06**
	c)	A 50 cycles, 3 phase alternator with grounded neutral has inductance of 1.6mH per phase and is connected to busbar through a circuit breaker. The capacitance to earth between the alternator and the C.B is 0.003 µFper phase. The C.B opens when rms Value of current is 7500A. Determine i) R.R.R.V ii) Max RRRV ii) Time for max RRRV iii) Frequency of oscillation Neglect first pole to clear factor.	*CO1*	*PO2*	**08**
		OR			
2	a)	With neat sketch, explain different zones of protection in power system.	*CO1*	*PO1*	**06**
	b)	Discuss the recovery rate and energy balance theory of arc interruption in AC circuits.	*CO1*	*PO1*	**06**
	c)	For a 132kV system, the reactance and capacitance upto the location of circuit breaker is 3Ω and 0.015µF respectively. Calculate the following: i) The Frequency of oscillation. ii) The maximum value of Restriking Voltage across the contacts of the Circuit breaker. iii) The maximum value of RRRV.	CO1	PO2	**08**
		UNIT - II			
3	a)	Derive the torque equation of electromagnetic relay.	*CO2*	*PO2*	**10**
	b)	With neat sketch, explain the construction and working of SF_6 breaker.	*CO2*	*PO1*	**10**
		OR			

	4	a)	With neat sketch, explain the construction and working principal of directional electromagnetic relay.	*CO2*	*PO1*	**10**
		b)	With neat sketch, explain the construction and working of plain oil circuit breaker.	*CO2*	*PO1*	**10**
			UNIT - III			
	5	a)	With a help of general equation derive the expression of a phase (cosine) comparator.	*CO2*	*PO2*	**10**
		b)	Explain the block diagram of a static relay.	*CO2*	*PO1*	**10**
			OR			
	6	a)	With the help of Basic principles derive the general equation of a static relay	*CO2*	*PO2*	**10**
		b)	Explain briefly the principle of duality as applied to static relay. With the help of block diagram and waveform, explain the working of co-incidence of two sinusoidal input type phase comparator	*CO2*	*PO2*	**10**
			UNIT - IV			
	7	a)	Explain the working of gas operated Buchholz relay used for the protection of transformers. State its limitations and advantages.	*CO3*	*PO1*	**10**
		b)	Illustrate with neat diagram, working of a Merz-Price biased differential scheme for generator protection.	*CO3*	*PO1*	**10**
			OR			
	8	a)	With the help of diagram, explain the basic operation, torque equation and operating characteristics of an Impedance relay.	*CO3*	*PO2*	**10**
		b)	Mention various types of faults in a transformer and explain briefly	*CO3*	*PO2*	**10**
			UNIT - V			
	9	a)	List the merits and demerits of digital relay.	*CO4*	*PO1*	**10**
		b)	With neat block diagram, explain digital relay.	*CO4*	*PO1*	**10**
			OR			
	10	a)	Explain i) Adaptive relaying ii) tripping mechanism of relay.	*CO4*	*PO2*	**10**
		b)	What are the different relay algorithms? Explain pure sinusoidal relaying signal algorithm.	*CO4*	*PO2*	**10**

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