UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, April 2018

Program: B Tech Electrical Engg   Semester –   VIII
Subject (Course): Advanced Protective Relaying   Max. Marks   : 100
Course Code   : ELEG 453   Duration   : 3 Hrs
No. of page/s:01

	SECTION-A	30 Marks	
	(Attempt all questions)		
1	Explain Load shedding and its requirement in power system network	[8]	CO2
2	The time-current (PSM) characteristic of an over current relay for TMS of 1 is given as follows:	[8]	CO3

PSM	2	3	5	7	10	13	15	18	20
Operating time in sec	10	6.8	4.4	3.4	2.8	2.5	2.4	2.3	2.2

	If the current plug setting is adjusted to 50% and the time multiplier is adjusted to 0.75, calculate the time of operation of the relay when the fault current is 3000 A and the relay is connected to a CT ratio 400/5.		
3	A 3-phase 11kV/33kV, Star-Delta connected power transformer is protected by differential protection. The CTs on the LV side have a current ratio of 400/5. What must be the ratio of CTs on the HV side.	[7]	CO3
4	Explain the purpose of coupling capacitor and line tuner in carrier current protection scheme.	[7]	CO2
	SECTION-B	45 Marks	
	(Attempt all questions)		
5	Explain the methodology required to avoid the mal operation of under frequency relay .with induction motor load.	[15]	CO3
6	Describe the biased differential protection required for a power transformer when considering the magnetizing inrush currents.	[15]	CO3
7	Explain the paralleled transformer protection using primary fuses with neat schematic diagram.	[15]	CO3
	SECTION-C	25 Marks	CO4
8	a) Explain the Instantaneous overcurrent static relay with detailed working of every component.		
	b) Discuss the modified Instantaneous over current relay with block diagram and detailed explanation & circuit.		

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SECTION-A   30 Marks
(Attempt all questions)

1   The current rating of an over current relay is 5A. PSM=2, TMS=0.3,   **[8]**   **CO3**
CT ratio=400/5, fault current=4000 A. determine the operating time of
the relay. At TMS=1, operating time at various PSM are:

PSM	2	4	5	8	10	20
Operating time in sec	10	5	4	3	2.8	2.4

2   Explain the purpose of drain coil and line trap in carrier current   **[7]**   **CO2**
protection scheme.

3   Discuss KF Induction-cylinder under frequency relay working and   **[8]**   **CO3**
operation

4   Discribe the stator faults and rotor faults that occur in an alternator   **[7]**   **CO2**

SECTION-B   45 Marks
(Attempt all questions)

5   Explain with neat sketch the transformer protection with primary relay   **[15]**   **CO3**
breaker by using MSOC relay.

6   Explain the improved overcurrent differential bus protection with neat   **[15]**   **CO3**
sketch.

7   Describe the working operation of synchronism check relay with neat   **[15]**   **CO3**
schematic diagram.

SECTION-C   25 Marks   CO4

8   a) Explain the Definite time over current static relay with detailed
working of every component.
b) Discuss the modifications and requirements to convert the definite
time relay to Inverse time current relay with neat sketch and
description.