
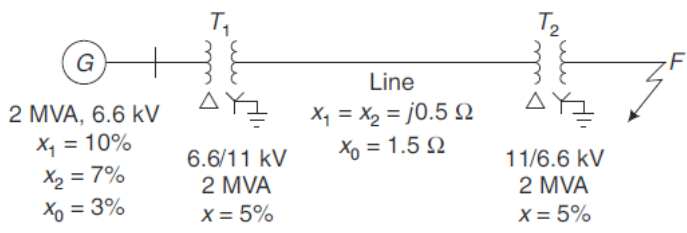


Name:			
Enrolment No:			
<b>UNIVERSITY OF PETROLEUM AND ENERGY STUDIES</b> <b>End Semester Examination, May 2022</b>			
<b>Course: Switchgear &amp; Protection</b> <b>Program: B.tech. Electrical</b> <b>Course Code: EPEG 3013</b>		<b>Semester: VI</b> <b>Time : 03 hrs.</b> <b>Max. Marks: 100</b>	
<b>Instructions:</b>			
<b>SECTION A</b> <b>(5Qx4M=20Marks)</b>			
S. No.		Marks	CO
Q.1	What are the different types of faults? Which type of fault is most dangerous?	4	CO2
Q.2	Brief the role of protective relays in a modern power system.	4	CO1
Q.3	Explain what you understand by pick-up and reset value of the actuating quantity.	4	CO1
Q.4	Describe CT burden. How is it specified?	4	CO2
Q.5	An earth-fault starting relay has a setting of 30%, and a current rating of 5 A. It is connected to a CT of ratio 500/5. Calculate pick-up current in primary for which the earth fault relay operates.	4	CO3
<b>SECTION B</b> <b>(4Qx10M= 40 Marks)</b>			
Q.6	What do you understand Arc Voltage? Derive an expression for restriking voltage.	10	CO5
Q.7	Draw a neat sketch of an induction disc relay and discuss its operating principle.	10	CO2
Q.8	Show that Merc-Price differential protection scheme can eliminate the drawback of simple differential protection scheme for unidentical CTs and external faults.	10	CO3
Q.9	A 20 MVA, 11 kV, 3-phase generator having a transient reactance of 0.2 pu feeds a 20 MVA, 11 kV, 3-phase synchronous motor having a transient reactance of 0.5 pu through a short line. The line has a reactance of 0.30 ohm. A three-phase fault occurs at the motor terminals when the motor is taking an input of 15 MW at unity p.f. The line voltage across motor terminals at the time of fault is 10.5 kV. Find the total current supplied by the generator and motor to the fault.	10	CO4
<b>SECTION-C</b> <b>(2Qx20M=40 Marks)</b>			

<p>Q.10</p>	<p>The one-line diagram of a system is shown in figure. The ratings of the generator and transformers are given on the diagram. Fault occurs at point F. Determine the fault current for</p> <p>(i) 3-phase symmetrical fault  (ii) L-G fault  (iii) L-L fault</p> 	<p>20</p>	<p>CO5</p>
<p>Q.11</p>	<p>Discuss the principle of symmetrical components. Derive the necessary equations to convert phase quantities into symmetrical components, and vice versa.</p> <p style="text-align: center;"><b>OR</b></p> <p>Analyze the interconnection of sequence networks for L-G type of fault. Also derive the necessary equations involved in the process.</p>	<p>20</p>	<p>CO4</p>