Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, May 2021

Course: Power System Protection & Switchgear **Semester: VI**
Program: B Tech Electrical **Time : 03 hrs**
Course Code: EPEG 3013 **Max. Marks: 100**

SECTION A

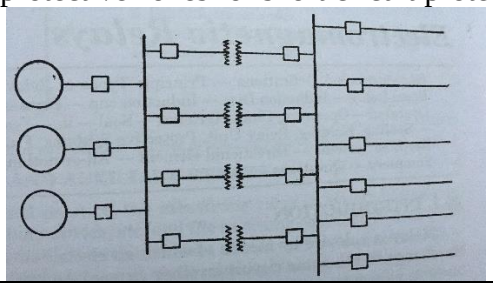
1. Each Question will carry 5 Marks
2. Instruction: Complete the statement / Select the correct answer(s)

S. No.	Question	CO
Q 1	Write down the types of faults occurs in generators (at least 5) ----------,----------,----------,---------- and ----------	**CO 1**
Q 2	Inter turn faults occurs in generators due to ----------, and ----------.	**CO 2**
Q 3	(a) Write down the two ARC extinction methods ---------- and ---------- (b) write down three factors effecting the choice of protection ----------, ---------- and ----------.	**CO 1**
Q 4	Write down 5 essential qualities of protective relaying ----------, ----------, ----------, ---------- and ----------	**CO 1**
Q 5	(a) Trip circuit consists of ----------, ----------, ---------- and ----------. (b) function of Trip circuit is ----------	**CO 1**
Q 6	Fill the 5 applications of Gas Actuated Relay ----------, ----------, ----------, ---------- and ----------	**CO 2**

SECTION B

1. Each question will carry 10 marks
2. Instruction: Write short / brief notes

Q 7	Elucidate frame leakage protection of a bus-bar with neat sketch	**CO 2**
Q 8	Following observations were achieved on a single frequency transient during short circuit test on a circuit breaker: Time to reach the peak restriking voltage= 40 micro sec. Peak restriking voltage= 100 kV Calculate (i) the average RRRV and (ii) frequency of oscillations	**CO 3**
Q 9	The neutral point of a 11 kV alternator is earthed through a resistance of 12 ohms, the relay is set to operate when there is out of balance current of 0.8 A. the C.T.s have a	**CO 3**

	ratio of 200/5. What percentage of the winding is protected against earth faults. What must be the minimum value of earthing resistance required to give 90% of protection to each phase?	
Q 10	From the given figure, draw main and backup protective zones by showing the over-lapping of neighboring protective zones for short circuit protection. 	**CO 4**
Q 11	Designate the principle and operation of MOCB with neat sketch.	**CO 2**
Section C **1. Each Question carries 20 Marks.** **2. Instruction: Write long answer.** **3. Answer any one question**		
Q 12	Enlighten the wire pilot protection. (a) Describe the circulating current scheme with neat sketch of practical scheme based on circulating current principle. [10 M] (b) Describe the balanced voltage or opposed voltage scheme with neat sketch of practical scheme of employing balanced voltage principle. [10 M]	**CO 4**
	(OR)	
	(a) Explain Merz-Price protection for Star Delta transformer [10 M] (b) A three-phase power transformer having a line voltage ratio of 400 V to 132 KV is connected in Delta-Star. The CTs on 400 V side have current ratio as 200/5. What must be the C.T. ratio on 132 kV side. Assume current on 400 V side of transformer to be 450 A. [10 M]	**CO 4**