


Name:	 UPES <small>UNIVERSITY OF TOMORROW</small>
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

Supplementary examination, May 2022

Course: Electrical System Safety and Its Design

Semester: IV

Program: B. Tech-FSE

Time : 3 hrs.

Course Code: HSFS 2006

Max. Marks: 100

SECTION A

S. No.	Answer all the questions	20 Marks	Mapped CO
Q 1	Expand the following: a. CPR b. LAB c. RCCB d. HRG e. NESC (USA)	4	CO1
Q 2	Justify the statement: “Shock severity varies with magnitude of current”.	4	CO1
Q 3	Define the following: a. LCPD b. OCPD c. AFCI d. CLF e. Fuse Factor	4	CO2
Q 4	List various types of ESDs along with their ability to ignite gases/liquids/solids.	4	CO3
Q 5	List categories of PPEs to be provided for workers in arc flash prone areas as per NFPA.	4	CO4

SECTION B

S. No	Answer all the following:	40 Marks	Mapped CO
Q 6	Define step and contact potentials. Discuss their significance with practical example for each of them.	2+8	CO1

Q 7	<p>Explain the working and operation of various types of LCPDs.</p> <p style="text-align: center;">OR</p> <p>Answer the following:</p> <p>a. MESG is _____ (Expansion)</p> <p>b. Area classification has been done as per physical state of material in NEC [T/F]</p> <p>IEC standard for HAC is _____ (standard no.) has been derived from International standard _____ and the same with little modifications has been adapted by India which is _____</p>	10	CO2,CO5
Q 8	Discuss various charge accumulation mechanisms in case of combustible dust/powder handling operations.	10	CO3
Q 9	What do you mean by IP rating? Explain its significance and various levels of IP rating as per NEMA.	10	CO5

SECTION-C

S. No	Answer any one of the following	40 Marks	Mapped
Q 10	<div data-bbox="167 1144 1252 1444" data-label="Diagram"> </div> <p>For the power system network shown in the figure, the specifications of the component are as follows:</p> <p>G1: 25 KV, 100 MVA, X=9%</p> <p>G2: 25 KV, 100 MVA, X=9%</p> <p>T1: 25 / 220 kV, 90 MVA, X=12%</p> <p>T2: 220 KV/25 kV, 90 MVA, X=12%</p> <p>Transmission Line 1: 220 KV, X=150 ohms</p>	20	CO5

	<p>Choose 25 KV as the base voltage at the generator G1 and 200 MVA as the MVA base and calculate P.U. vales for the same.</p> <p style="text-align: center;">[OR]</p> <p>Explain IEEE's methodology of Arc Fault Calculation both for low and high voltage level equipment.</p>		
Q11	<p>Explain Raphlee's methodology of Arc Flash boundary calculations and state relevant reference standard for the same.</p>	20	CO4