Name:

Enrolment No:

UPES
UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2019

Programme: M. Tech. (Rotating Equipment) **Semester –** II
Course Name: Safety and environmental issues in industry **Max. Marks** : 100
Course Code: HSFS 7012 **Duration** : 3 Hrs
No. of page/s: 02

SECTION A

S. No.		Marks	CO
Q 1	Discuss all kinds of safety measures of compressor.	4	CO1
Q 2	Write conceptual comments: a. "Safety engineers are enough to prevent industrial accident" b. "Installation of Inherent Safe strategy during industrial operation is expansive"	4	CO3
Q 3	Describe all safety strategies while making pipework layout	4	CO2
Q 4	List Do's and Dont's of machinery safety for workers. What are the things need to be check before starting of any rotating equipment?	4	CO1
Q 5	Explain Loss control credit factor and Damage factor.	4	CO2

SECTION B

Q 6	Distinguish between product and process layout with suitable examples and diagram. Which layout is safer and how? Discuss the advantages and disadvantages of that particular layout. Write the characteristics of Fixed-position layout. Describe advantages and limitations of fixed-position layout?	10	CO3
Q 7	A gas cylinder was stored at ambient temperature (95^0F). Chlorine vapor was releasing through a leakage. Find out the CEI and HD for this particular situation. Data: molecular wt. = 35. Absolute pressure = 750 kPa; Diameter of hole = 15 mm; RPG 1 = 3 mg/m^3; ERPG 2 = 9 mg/m^3; ERPG 3 = 58 mg/m^3.	10	CO4
Q 8	Justify how workplace environment is important for safe industrial works? List all the factors associated with industrial accidents? Discuss various types of industrial accidents.	10	CO5
Q 9	Write, step by step calculation of AQ for liquid release. **OR** Draw and discuss the flowchart for calculating Airborne Quantity.	10	CO3

SECTION-C

Q 10	a. Describe any two hazard survey techniques with advantages and Disadvantages. How F&EI related to degree of hazard? b. Estimate the degree of hazard for given data regarding hazard factor and material factor: General process hazard factor = 15.9, Special process hazard factor = 0 MF_1= 15.2 (15%), MF_2= 7.9 (35%), MF_3= 10.25 (25%) and MF_4= 13.6 (remain)	**20**	**CO4, CO5**
Q 11	Which Inherent safe strategy is most useful for newly designed process industry and how? Compare it with other strategies using suitable examples. How inherent safety index is related to Industrial safety? During calculation, why maximum score of individual factors need to consider? Discuss all issues during installation of inherent safe strategy with suitable diagram. **OR** Illustrate all the safety requirements for storage of flammable and combustible liquid in indoor as well as in outdoor.	**20**	**CO3, CO4**

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SECTION A

S. No.		Marks	CO
Q 1	What are the things need to be check before starting of any rotating equipment?	**4**	**CO1**
Q 2	Define LCCF and DF.	**4**	**CO2**
Q 3	Safety measures of compressor is very essential during operation and maintenance. List various safety measures for this purpose.	**4**	**CO1**
Q 4	Discuss with proper comments: a. "Installation of Inherent Safe strategy during industrial operation is expansive" b. "Safety engineers are enough to prevent industrial accident"	**4**	**CO3**
Q 5	Describe all safety strategies while making pipework layout	**4**	**CO2**

SECTION B

Q 6	Discuss various types of industrial accidents. Justify how workplace environment is important for safe industrial works? List all the factors associated with industrial accidents?	**10**	**CO5**
Q 7	Draw and discuss the flowchart for calculating Airborne Quantity. **OR** Write, step by step calculation of Airborne Quantity for liquid release.	**10**	**CO3**
Q 8	Find out the CEI and HD for given situation: A gas cylinder was stored at ambient temperature (95^0F). Chlorine vapor was releasing through a leakage. Data: molecular wt. = 35. Absolute pressure = 750 kPa; Diameter of hole = 15 mm; RPG 1 = 3 mg/m^3; ERPG 2 = 9 mg/m^3; ERPG 3 = 58 mg/m^3.	**10**	**CO4**
Q 9	Brief the characteristics of Fixed-position layout. Describe advantages and limitations of fixed-position layout? Distinguish between product and process layout with suitable examples and diagram. Which layout is safer and how? Discuss the advantages and disadvantages of that particular layout.	**10**	**CO3**

SECTION-C			
Q 10	Discuss all issues during installation of inherent safe strategy with suitable diagram. Which Inherent safe strategy is most useful for newly designed process industry and how? Compare it with other strategies using suitable examples. How inherent safety index is related to Industrial safety? During calculation, why maximum score of individual factors need to consider?	**20**	**CO3, CO4**
Q 11	a. How F&EI related to degree of hazard? Describe any two hazard survey techniques with advantages and Disadvantages. b. Estimate the degree of hazard for given data regarding hazard factor and material factor: General process hazard factor = 15.9, Special process hazard factor = 0 MF_1= 15.2 (15%), MF_2= 7.9 (35%), MF_3= 10.25 (25%) and MF_4= 13.6 (remain) **OR** Illustrate all the safety requirements for storage of flammable and combustible liquid in indoor as well as in outdoor.	**20**	**CO4, CO5**