

Name:	
Enrolment No:	

## UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

**End Semester Examination, December 2018**

Programme Name: <b>B. Tech. (FSE)</b>	Semester : <b>VII</b>
Course Name : <b>Hazard Identification and HAZOP</b>	Time : <b>03 hrs</b>
Course Code : <b>FSEG421</b>	Max. Marks: <b>100</b>
Nos. of page(s) :	

**Instructions:**

### SECTION A

S. No.		Marks	CO
Q 1	Describe simplification approach in inherent safety with few examples.	4	CO2
Q 2	Draw the flow diagram of Process Safety Management.	4	
Q 3	List down all the factors associated with credit of Fire protection.	4	CO1
Q 4	What are the primary purposes of the Dow F& EI?	4	
Q 5	Fill in the blank: a. The amount of material staying in the vapor = 5*----- b. For open Storage tank, $P_g =$ ----- kPa. c. During calculation of pool size, need to assume depth. Generally depth = -----m. d. If calculated $W_t$ is less than system inventory, actual $W_t =$ -----	4	CO1

### SECTION B

Q 6	. How to prepare Hazard Checklist as per MSIHC Rules? explain with examples.	10	CO3
Q 7	Calculate Chemical Exposure Index and Hazard distance for leakage of ammonia vapor. All the data are given below: $P_g = 885$ kPa, Storage temperature = 86 °F and diameter of leakage = 16mm. ERPG-1 = 17 mg/m <sup>3</sup> , ERPG-2 = 139 mg/m <sup>3</sup> and ERPG-3 = 696 mg/m <sup>3</sup>  <p style="text-align: center;"><b>OR</b></p> 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)	10	CO5
Q 8	What is HAZOP? List down 6 guidewords and describe the deviation of parameters related with individual guideword. Draw and discuss the flow chart of	10	CO4

	HAZOP procedure.		
Q 9	Write complete procedures for calculation of CEI.	<b>10</b>	<b>CO3</b>
<b>SECTION-C</b>			
Q 10	<p><b>Part 1:</b> What is HAZCHEM Code? Describe first, second and third digits of HAZCHEM Code. Explain properties of chemicals from below mentioned HAZCHEM Code:</p> <p>a. 2 P E b. 3 Y</p> <p><b>Part 2:</b> List all codes of EPA-Compatibility for mixing two chemicals. Prepare an EPA-Compatibility matrix.</p>	<b>20</b>	<b>CO6</b>
Q 11	Describe compatibility of Chemicals. List down various types of Compatibility classification. Prepare a Hazard Checklist using a Simple Non-Compatibility Chart for Known Chemicals. Discuss basic Rules for Segregation of Unknown Chemicals for Compatibility check	<b>20</b>	<b>CO6</b>

Name:	
Enrolment No:	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, December 2018**

<b>Programme Name:</b> B. Tech. (FSE)	<b>Semester</b> : VII
<b>Course Name</b> : Hazard Identification and HAZOP	<b>Time</b> : 03 hrs
<b>Course Code</b> : FSEG421	<b>Max. Marks:</b> 100
<b>Nos. of page(s)</b> :	

**Instructions:**

**SECTION A**

S. No.		Marks	CO
Q 1	Fill in the blank: a. The amount of material staying in the vapor = 5*----- b. For open Storage tank, $P_g =$ ----- kPa. c. During calculation of pool size, need to assume depth. Generally depth = -----m. d. If calculated $W_t$ is less than system inventory, actual $W_t =$ -----	<b>4</b>	<b>CO1</b>
Q 2	Describe simplification approach in inherent safety with few examples.	<b>4</b>	<b>CO2</b>
Q 3	Draw the flow diagram of Process Safety Management.	<b>4</b>	
Q 4	List down all the factors associated with credit of Fire protection.	<b>4</b>	<b>CO1</b>
Q 5	What are the primary purposes of the Dow F& EI?	<b>4</b>	

**SECTION B**

Q 6	What is HAZOP? List down 6 guidewords and describe the deviation of parameters related with individual guideword. Draw and discuss the flow chart of HAZOP procedure.	<b>10</b>	<b>CO4</b>
Q 7	How to prepare Hazard Checklist as per MSIHC Rules? explain with examples.	<b>10</b>	<b>CO3</b>
Q 8	Calculate Chemical Exposure Index and Hazard distance for leakage of ammonia vapor. All the data are given below: $P_g = 885$ kPa, Storage temperature = 86 °F and diameter of leakage = 16mm. ERPG-1 = 17 mg/m <sup>3</sup> , ERPG-2 = 139 mg/m <sup>3</sup> and ERPG-3 = 696 mg/m <sup>3</sup>  <p style="text-align: center;"><b>OR</b></p> 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)	<b>10</b>	<b>CO5</b>

Q 9	Write complete procedures for calculation of CEI.	10	CO3
<b>SECTION-C</b>			
Q 10	Describe compatibility of Chemicals. List down various types of Compatibility classification. Prepare a Hazard Checklist using a Simple Non-Compatibility Chart for Known Chemicals. Discuss basic Rules for Segregation of Unknown Chemicals for Compatibility check	20	CO6
Q 11	<p><b>Part 1:</b>  What is HAZCHEM Code? Describe first, second and third digits of HAZCHEM Code.  Explain properties of chemicals from below mentioned HAZCHEM Code:  e. 2 P E  f. 3 Y</p> <p><b>Part 2:</b>  List all codes of EPA-Compatibility for mixing two chemicals. Prepare an EPA-Compatibility matrix.</p>	20	CO6