

Roll No: \_\_\_\_\_

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination – December, 2017**

**Program/course: M.tech HSE, HSE-DM**

**Subject: Behavior Based Safety**

**Code : MEEG736**

**No. of page/s:**



**Semester – 1**  
**Max. Marks : 100**  
**Duration : 3 Hrs**

**Section A- Answer all Questions**

**(4\*5= 20 marks)**

1. Write Short notes on key elements of HSE Management system.
2. Give 4 examples for the following
  - a) Partial Permanent Disablement
  - b) Partial Temporary disablement
  - c) Total Permanent Disablement
  - d) Total Temporary Disablement
3. Explain the orders related to registration and renewal of licence of boilers according to Boilers act.
4. a) Mention the maximum quantity in Kilogram /Number of cylinder that can be possessed without obtaining license from statutory authorities as per Gas cylinder rules for various type gases.  
b) 50 Gas cylinders was designed, approved and manufactured for filling with LPG. Due to the customer request, instead of filling the empty cylinder with LPG, the company has to fill with another flammable gas. Can the conversion of Gas cylinder is possible? If yes from whom Approval is needed. For what gases you don't need approval  
c) What are the various impurities removed or kept low while storing Methane gas in cylinders. What is the maximum moisture content allowed as per Gas cylinder rules.  
(3+1+1 marks)

**Section B- Answer all Questions**

**(4\*10= 40 marks)**

5. A) Rico Pharmaceutical Company limited invented the following four new Chemicals. Those chemicals are going to be stored in a cylinder. As a safety officer of the company, what will be the color you suggest for cylinder and neck band.

Chemical name	Toxicity	Flammability
W	Yes	No
X	Yes	Yes
Y	No	No
Z	No	Yes

Apart from this Acetylene, Hydrogen , chlorine, Oxygen, Carbon Monoxide, Carbon dioxide are also stored. Mention the colour for storing those cylinders? (3 marks)  
 B) Define various Mechanical Hazards that may be arising from various machines. Also provide an example machine for respective Mechanical hazards. (7 marks)

6. A) Explain Underlying cause, immediate cause and root cause of an Accident with an Example.  
 B) Explain why why Analysis used during Accident investigation with an Example  
 C) Define Safety Culture? Assuming that you are appointed as a Safety officer of a reputed Construction company, Mention six initiatives that will be taken by you to improve the safety culture (4+3+3 marks)
7. Write short notes on Safety Sampling, Safety tour, Safety Inspection and Safety Survey. Define Active and Reactive monitoring. Mention various lagging and leading indicators to measure the safety performance of a company. (6+2+2 marks)
8. a) Mention the 14 elements of process safety Management (4 marks)  
 b) Explain Doctrine of Notional Extension with an Example (3 marks)  
 c) You are appointed as a Safety Supervisor in Toshiba laptop warehouse where humans handle the laptops manually. What are the instruction you give to the material handling workers to avoid back injury to them. (3 marks)

**Section C- Answer the following Question (2\*20 marks = 40)**

9. A) Below here is the list of employees working in Sun Industries for the year 2015. Number of working days per year are 300. Average working hours for any employee are 8 hours .

Time period- 2015	Morning Shift	Night Shift
January to April	100	1000
May to August	2000	1000
September to December	600	2000

The following are the injury statistics of the company of year 2015,

- a) Total number of accidents happened in the year 2015 - 12 Reportable Accidents
- b) Number of fatalities - 3
- c) Number of first Aid injuries- 15
- d) One got injured in leg and taken to hospital, given treatment and returned back in same shift of his work
- e) One lost both of the his hand permanently
- f) Two lost index finger only
- g) One got facial disfigurement

- h) Amputation through hip and loss of four fingers in hand - two person
- i) Three fractured their leg on 30<sup>th</sup> November 2015 and returned to work on 15 December 2015

Calculate the Accident rate, reportable lost time Injury Frequency rate, reportable Severity rate and reportable Incidence rate. (6 marks)

- B. Ram Singh is working in a Textile Industry. His age is 55. As a result of an Accident, his both legs got fractured. He legs became well after 12 months. What will be the amount of Compensation given to him per month? His monthly Salary is 12000. (2 marks)
- C. Ill-fated Ravi aged 25 met an accident and passed away. His monthly Salary is 10000. What will be the amount of Compensation given to his dependent? The relevant factor for his age is 200. (2 marks)
- D. Explain the factors to be considered while calculating Compensation (2 marks)
- E. List out the steps involved in investigation of an Accident. (4 marks)
- F. What are the reasons to do accident investigation? (4 marks)

10. What is BBS Programme? Explain the steps involved in implementation of BBS Programme in an organization? (15 marks)

B) Explain the category of explosives according to the risk involved. Assuming that a 1000 kg of explosives are stored in warehouse. What are the necessary action to be taken to avoid accident due to lightning and thunderstorm. (3+2 marks)

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**Section B- Answer all Questions**

**(4\*10= 40 marks)**

5. Define the following with an example
  - a) Incident with an example
  - b) Accident with an example
  - c) Near miss with an example
  - d) Safety
  - e) Hazard with an example
  - f) Lost time injury with an example
  - g) Reportable Accident with an example
  - h) Dangerous Occurrence with an example
  - i) Hazardous processes with an example

j) Notifiable disease with an example

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