CENTRAL BHARAT SEVAK SAMAJ

NATIONAL DEVELOPMENT AGENCY, ESTABLISHED IN 1952 BY PLANNING COMMISSION, GOVT. OF INDIA

CENTRAL BOARD OF EXAMINATIONS

BSS NATIONAL VOCATIONAL EDUCATION MISSION

FSS039-POST DIPLOMA IN PETRO CHEMICAL PROCESS SAFETY & ENGINEERIN

ONE YEAR EXAMINATION NOVEMBER-2025

FSS039-01 FOUNDATIONS IN HEALTH AND SAFETY

TIME: 3 Hours **Marks: 100**

INSTRUCTIONS

* 43 questions are there in total
* Write answers to each question in proportion to the mark allotted
* During the first 15 minutes read the questions carefully

I. FILL IN THE BLANKS - ANSWER FOR ANY 10 QUESTIONS **1 x 10 = 10**

1) Why should accidents in the workplace be reported?

2) What is the most important reason for carrying out a risk assessment is to?

3) The HASAWA applies to?

4) There is a fault with the PPE, the user should?

5) What are the safe systems of work, provided by an employer, designed to do?

6) What type of training is most likely to reduce back injuries when handling materials and loads?

7) Where should information be found regarding the disposal of old chemical products?

8) What does PPE stand for?

9) What does RIDDOR stand for?

10) With reference to the HASAWA a trainee is responsible for?

11) Some ways the safety management professional can determine training needs is to: _____

12) The main goal of Worker's Compensation law is to:_____

13) The delay between exposure and observable effects is _____.

14) Dilution ventilation is used to: _____

II. DEFINE THE FOLLOWING - ANSWER FOR ANY 10 QUESTIONS **2 x 10 = 20**

1) What functional area is typically responsible for functions related to design, construction, standards, and repair?
2) Who are the customers of the occupational safety function?
3) What are the two main causes of incidents in the workplace?
4) Which analysis method is the most effective at determining potential problems in a given system?
5) The lighting system failed, causing a short, which resulted in a fire. What class of fires would this be?
6) Which is the most effective method of reducing contamination to workers?

III. WRITE BRIEF ANSWER FOR ANY 5 QUESTIONS **5 x 5 = 25**

1) Identify the factors that could contribute to the deterioration in the health and safety culture of an organisation
2) Outline the possible effects on health from exposure to high levels of noise
3) Outline the reasons why accidents should be reported and recorded within a workplace
4) Outline three reasons for maintaining high standards of health and safety in the workplace.
5) Distinguish between health, safety, welfare and environmental protection.
6) List the powers that an HSE inspector can use to investigate whether there has been a breach of health and safety law.
7) What are the implications of this issue for both the worker and the organisation?
8) How could you minimise risk to yourself when responding to a first aid 3 situation in a community services/health workplace?

IV. WRITE LONG ANSWER FOR ANY 3 QUESTIONS **15 x 3 = 45**

1) State five circumstances that might initiate a review of a risk assessment.
2) What makes health and safety such a good organising issue?
3) Compare and contrast the roles of environmental and biological monitoring in workplace assessment.
4) Describe the principles of operation and methods of use of a range of instruments for monitoring environmental pollutants.
5) Outline strategies for the control of environmental pollutants

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ONE YEAR EXAMINATION NOVEMBER-2025

FSS039-02 TOXICOLOGY & INDUSTRIAL HYGIENE

TIME: 3 Hours **Marks: 100**

INSTRUCTIONS

* 43 questions are there in total
* Write answers to each question in proportion to the mark allotted
* During the first 15 minutes read the questions carefully

I. FILL IN THE BLANKS - ANSWER FOR ANY 10 QUESTIONS **1 x 10 = 10**

1) What is Toxicology?
2) What is Toxicity?
3) What is a Toxic Symptom?
4) What is Selective Toxicity?
5) How Does Toxicity Develop?
6) What is the threshold dose?
7) What is meant by 'individual susceptibility?'
8) What is a "sensitive sub-population?"
9) Define Occupational Health.
10) Define Pneumoconiosis.

II. DEFINE THE FOLLOWING - ANSWER FOR ANY 10 QUESTIONS **2 x 10 = 20**

1) Name two analytical methods commonly used in Industrial Hygiene.
2) LD 50 is an important toxicity index used in Industrial Toxicology. What is its significance to workers handling pesticides?
3) what is meant by the term Threshold Limit Values
4) What are the units used in workplace exposure limits for quantifying the concentration of dust particles, vapours or gases and fibres?
5) What does LD 50 mean in Industrial Toxicology?
6) Define toxicology. Explain the metal LEAD and its health effects.
7) Write briefly on the toxicology and management of organaphosphorus poisoning.
8) What is PPE? Explain its principles of applications.
9) What are the safety provisions under the Factories Act, 1948?
10) Define TLV, TWA, STEL and its application in Hazard assessment.

III. WRITE BRIEF ANSWER FOR ANY 5 QUESTIONS **5 x 5 = 25**

1) Define toxicology and commonly associated terms.
2) Describe the classifications of toxic agents
3) Describe the field of toxicology and its application when assessing health effects associated with toxic agents commonly found at hazardous waste sites
4) Differentiate the sub-disciplines of toxicology
5) Understand the roles and responsibilities of various agencies
6) What about the Science of Industrial Hygiene?
7) Explain the Classification of Toxic Materials.
8) Explain about Toxicity versus Risk.

IV. WRITE LONG ANSWER FOR ANY 3 QUESTIONS **15 x 3 = 45**

1) Discuss the role of the hygienist in the assessment and control of the work environment.
2) Explain key toxicological terms such as dose, effect, response, toxico-kinetics and toxico-dynamics;
3) Demonstrate an awareness of factors influencing toxicity.
4) Outline methods of testing for toxicity
5) Outline the toxicity of specific groups of industrial chemicals.

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ONE YEAR EXAMINATION NOVEMBER-2025

FSS039-03 SOURCE MODES & TOXIC RELEASE AND DISPERSION MODE

TIME: 3 Hours **Marks: 100**

INSTRUCTIONS

* 43 questions are there in total
* Write answers to each question in proportion to the mark allotted
* During the first 15 minutes read the questions carefully

I. FILL IN THE BLANKS - ANSWER FOR ANY 10 QUESTIONS **1 x 10 = 10**

1) What is the TIH Risk?

2) What is the Toxic Release Inventory?

3) What are Off-Site Transfers?

4) What are the Benefits and uses of the TRI Data?

5) What are the Criteria for Listing a Chemical Under Section 313 of EPCRA?

6) Name one insecticide?

7) Which acid is not present in acid rain?

8) Define the term pollution?

9) Name two gases which are responsible for green house effect?

10) Which part of the atmosphere contains ozone layers?

II. DEFINE THE FOLLOWING - ANSWER FOR ANY 10 QUESTIONS **2 x 10 = 20**

1) What is full form BOD and DDT?
2) Which soil bacteria produces Bt-toxins?
3) Write any two common chemicals of photochemical smog?
4) Which can damage the great historical monument Tajmahal?
5) What is the cause of methemeglobinemia?
6) What is troposphere?
7) Name the oxide of carbon?
8) Name two herbicides?
9) List any two harmful effects of smog?
10) Write any two achievement of green chemistry?

III. WRITE BRIEF ANSWER FOR ANY 5 QUESTIONS **5 x 5 = 25**

1) Define environmental chemistry?
2) What do you mean by Biochemical oxygen demand?
3) Write the methods for management of waste material?
4) Explain tropospheric pollution?
5) What is smog? How is classical smog different from photo chemical smog?
6) What are pesticides and herbicides? Give examples
7) Write short note on a).BOD b). Photo chemical smog c).Ozone hole.
8) Define green chemistry? Explain with one example.

IV. WRITE LONG ANSWER FOR ANY 3 QUESTIONS **15 x 3 = 45**

1) What is the difference between a single dose toxicity study and an "extended" single dose toxicity study?
2) What sources other than single dose toxicity studies can be used to obtain information on acute toxicity?
3) Explain the reactions involved during the formation of photochemical smog?
4) What are harmful effects of photochemical smog and how can they be controlled?
5) What do you mean by green chemistry? How will it help in decreasing environmental pollution?

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ONE YEAR EXAMINATION NOVEMBER-2025

FSS039-04 FIRES AND EXPLOSION & DESIGNS TO PREVENT FIRES & EXPLOSIONS

TIME: 3 Hours **Marks: 100**

INSTRUCTIONS

* 43 questions are there in total
* Write answers to each question in proportion to the mark allotted
* During the first 15 minutes read the questions carefully

I. FILL IN THE BLANKS - ANSWER FOR ANY 10 QUESTIONS **1 x 10 = 10**

1) The address of the home that may still be occupied is: _____
2) The total head of a fire pump is: _____
3) The pressure produced by a column of water 1 foot high is: _____
4) Proper exit design permits everyone to leave the fire endangered area: _____
5) The intensity of the illumination of means of egress should be not less than?
6) An important limitation to consider when using pressure tanks in automatic sprinkler protection is the: _____
7) As a type of automatic fire detection device, heat detectors are the: _____
8) The first principle of good storage practice for chemicals is: _____
9) Where does FPS keep their fire trucks?
10) A passer by did not put out the fire because _____
11) Stonedust barriers are designed as _____ or _____ barriers.
12) Stonedust on fixed shelves of stonedust barriers will disperse at sufficient speed and sufficient quantity to suppress an explosion? True or false _____
13) In general about _____ kgs of stonedust needs tobe dispersed per tonne of coal mined for dust explosion mitigation.

II. DEFINE THE FOLLOWING - ANSWER FOR ANY 10 QUESTIONS **2 x 10 = 20**

1) What are the causes of fire?
2) Write a short note on fire hazards
3) Explain the difference between heat and temperature.
4) Explain the main differences between mechanical and chemical explosions.
5) List the types of containers that can be subject to mechanical explosion
6) Where would the SOLAS fire plan be located?
7) What does the acronym SOLAS stand for?

III. WRITE BRIEF ANSWER FOR ANY 5 QUESTIONS **5 x 5 = 25**

1) Describe the behaviour in fire of granite when used in the construction of buildings.
2) Describe briefly the basic principles of design of any sprinkler system.
3) Describe the changes in the protected environment that fire detectors sense and respond to during the development of a fire?
4) Describe four factors that influence how long an individual takes to exit a building when an alarm sounds.
5) Identify six factors that will influence the performance of firefighting foam.
6) Outline the main types of explosion risks associated with oil tanks.
7) Explain in details on dynamics of fire.
8) Discuss in detail on toxity associated with products of combustions fire suppressing chemicals and their minimization.

IV. WRITE LONG ANSWER FOR ANY 3 QUESTIONS **15 x 3 = 45**

1) Explain in detail on different types of fire resisting material.
2) Discuss the methods of suppression of explosion.
3) Write a short note on (i) A class fire (ii) Fire Spread.
4) Enumerate the statutory rules in fire fighting.
5) Explain in detail on different explosion parameters to be considered in connection with the safety of handling explosive material.

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ONE YEAR EXAMINATION NOVEMBER-2025

FSS039-05 RELIEFS, HAZARD IDENTIFICATION AND RISK ASSESSMENT

TIME: 3 Hours **Marks: 100**

INSTRUCTIONS

* 43 questions are there in total
* Write answers to each question in proportion to the mark allotted
* During the first 15 minutes read the questions carefully

I. FILL IN THE BLANKS - ANSWER FOR ANY 10 QUESTIONS **1 x 10 = 10**

1) The terms incidents and injuries are often used interchangeably. Actually the meanings are: _____

2) A tool that enables a team to identify, explore and graphically display the possible causes of an incident or hazardous conditions is: _____

3) The system safety method, MORT, stands for: _____

4) One method often used in system safety programs for complex systems is: _____

5) Calculate the incidences rate for a company if the recordable incidents are 40 and the total hours worked are 1, 500, 000: _____

6) What are the two main causes of incidents in the workplace?

7) According to William C. Pope, the three causal factors of an incident are: _____

8) The delay between exposure and observable effects is _____

9) What percentage of all injuries to people happens on the job?

10) Mesothelioma is associated with _____

II. DEFINE THE FOLLOWING - ANSWER FOR ANY 10 QUESTIONS **2 x 10 = 20**

1) When should hazard identification be conducted?
2) List the three (3) classification of hazardous chemical based on their health effects.
3) Define hazard
4) Discuss in detail the consequences of the accident.
5) Discuss the three (3) methods to control electrical hazard.
6) Define Hypothesis.
7) What is Risk Assessment?
8) Definition of Each Component in an Exposure Assessment
9) Prospective epidemiological studies gather information from the past. a. True b. False
10) What activities should be conducted during the hazard identification step of the risk assessment?

III. WRITE BRIEF ANSWER FOR ANY 5 QUESTIONS **5 x 5 = 25**

1) Identify the main hazards of transporting oil and gas products using tanker trucks.
2) Explain why emergency planning is required in a petrochemical plant processing unit.
3) Identify the risks to maintenance staff when carrying out maintenance works in an oil and gas operational plant.
4) Outline the benefits to an employer for conducting accident investigations
5) Give the meaning of the terms: i. Hazard ii. Risk iii. Dangerous occurrence iv. Near miss v. Ill-health
6) State the definition of a hazard and explain how to identify hazards in the workplace.
7) Determine methods for controlling hazards in the workplace.
8) What other ideas do you have for ways of grouping or identifying hazards?

IV. WRITE LONG ANSWER FOR ANY 3 QUESTIONS **15 x 3 = 45**

1) Outline the hazards to ensure the safe startup and shutdown of hydrocarbon containing equipment and process.
2) Outline the controls to ensure the safe startup and shutdown of hydrocarbon containing equipment and process.
3) Explain the importance of safe plant operation and maintenance of hydrocarbon containing equipment and process.
4) Explain the hazards relating to oil and gas arising from the extraction, storage and processing of raw materials and products.
5) Outline appropriate control measures to minimize the effects of fire and explosion in the oil and gas industry.