



National Open University of Nigeria
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja
Faculty of Science
OCTOBER, 2019_2 EXAMINATIONS

COURSE CODE: ESM 431

COURSE TITLE: ENVIRONMENTAL HEALTH AND SAFETY.

CREDIT: 2 Units

TIME ALLOWED: 2 Hours

Instruction: Attempt question number ONE (1) and any other THREE (3) questions. Question number one (1) carries 25 marks, while the other questions carry (15) marks each.

1a) Mention any eight environmental elements that we cannot do without on planet earth **(4mks)**

1b) Write notes on the following essential climatic terms **(6mks)**

- a. *Global warming*
- b. *Climate change*
- c. *Protection from radiation*

1c) In the Template of health and health and safety plan, list the stipulations for employees to adhere to **(4mks)**

1d) Using the accident summary warehouse fire in 1982, as a case study discuss the failings in technical measures **(6mks)**

CASE STUDY WAREHOUSE FIRE IN 1982

An automatic fire alarm operated in a warehouse storing various materials including oxidising materials, solvents and various other chemicals in drums. The fire alarm was transmitted to the local fire service. By the time the fire service arrived, flames were shooting through holes in the roof. An explosion then occurred which broke the glass in the site gatehouse.

15 minutes into the incident another explosion occurred in a store holding oxidising materials. This blew out a roller shutter door, which hit the wall of a building about 10m away. There was now a serious fire engulfing both the oxidising materials store and an acid pen area. Drums of solvents were beginning to explode in the intense heat. Some of these exploding drums were propelled several hundred feet into the air.

The fire also spread to the roof of a nearby building on the boundary of the site and after 30 minutes from the alarm being raised another offsite building 30m away was beginning to be endangered. Several explosions then occurred engulfing the front of this second building. A

flying, burning solvent drum also crashed through the roof in the main store area, immediately starting another fire. The off-site emergency plan was progressively implemented during the course of the incident.

The Fire Brigade was advised of the broad generic basis of the materials involved in the fire, and a print out of stored materials was obtained. This list was too detailed for the needs of the emergency services. The resulting smoke from the fire contained a cocktail of eleven different chemicals including hydrogen chloride. Approximately 3,000 residents were evacuated from their homes.

1e) Given the following case study; fatal ATV overturn (5mks)

A 14-year-old child on a work placement scheme with a company operating a commercial shoot was killed when the all-terrain vehicle (ATV) he was riding overturned. He had ridden the ATV into woods on his own to feed pheasants and was later found next to the overturned vehicle on sloping ground. He was not wearing a helmet, although this was not the cause of his death

1e) Given the following case study fatal ATV overturn

- i) State the action that was taken against the company (2mks)**
- ii) Explain three measures the company would have adopted to avert the accident (3mks)**

2a) What is an accident? **(1mk)**

2b) Itemize four questions that needs to be asked when looking at electrical safety and testing **(4mks)**

2c) Mention the essential elements of a health and safety plan **(10mks)**

3) Discuss the outline for preparation of a health and safety plan **(15mks)**

4a) Define the term environmental legislation **(2mks)**

4b) Highlight the principles of accident prevention **(4mks)**

4c) Distinguish the types of portable Fire extinguishers using the colour panel **(4mks)**

4d) Complete the following table on firefighting **(5mks)**

Fire Class	Combustible Material involved	Fire extinguishing medium
Class A	(1mark)	Water or solution with high water content. Cooling and wetting of material quenches fire
Class B	Fires involving Flammable liquids/ vapours /solvents: Transformer oil, diesel oil, solvents, liquid, chemicals, lubricating oils, paints/varnishes/thinners, greases, contained, uncontained	(1mark)
Class C	Fires involving live electrical equipment in energized state. If equipment is dead becomes class A or B	(1mark)

Class D	(1mark)	Normal extinguishing media unsuitable. Special chemicals and techniques used
Class E	Fires involving Flammable gases and fuels, hydrogen, ammonia, acetylene, LPG, petrol, Furnace oil	(1mark)

5a) Define the following terms **(5mks)**

- i. Hazard
- ii. Probability
- iii. Risk
- iv. Consequence
- v. Risk assessment

5b) List the fire extinguishing techniques **(5mks)**

5c) State the (Occupational Health and Safety) OH&S management system subset of an audit conclusion **(5mks)**