UNIVERSITI TEKNOLOGI PETRONAS

FINAL EXAMINATION
JANUARY 2025 SEMESTER

COURSE	**:**	**CEB1032/CFB1032 - HEALTH, SAFETY AND ENVIRONMENT**
DATE	**:**	**14 APRIL 2025 (MONDAY)**
TIME	**:**	**9.00 AM - 11.00 AM (2 HOURS)**

INSTRUCTIONS TO CANDIDATES

1. Answer **ALL** questions in the OMR sheet given using **2B pencil**.
2. Choose either A, B, C or D to indicate the correct answer.
3. Select **ONE (1)** best answer for each question.
4. Exam ID and table number **MUST** be shaded properly in OMR sheet given.
5. **DO NOT** open this Question Booklet until instructed.
6. You are **NOT ALLOWED** to bring this booklet out from the Examination Hall.

Note :

i. There are **EIGHTEEN (18)** pages in this Question Booklet including the cover page.

ii. **DOUBLE-SIDED** question booklet.

1. Name one of the four key pillars of political ecology in HSE movement.

   a. Profit Maximization
   b. Grassroots democracy
   c. Technological advancements
   d. Individualism

2. The HSE movement began in ancient civilizations. Which ancient civilization developed a drainage system that led to brick-lined sewers?

   a. Indus Valley Civilization
   b. Maya Civilization
   c. Aztec Civilization
   d. Babylonian Civilization

3. The importance of accident caution theories can be described as:

   a. To justify accidents as unavoidable
   b. To focus only on immediate causes of accidents
   c. To provide frameworks for hazard identification and prevention
   d. To reduce legal liability exclusively

4. To ensure Emergency Response Plan (ERP) effectiveness, organizations should:

   a. Lessen the need for audits and reviews
   b. Conduct drills only during emergencies
   c. Avoid external collaboration
   d. Maintain response centers and update plans regularly

5. The Accident/Incident Theory contributes to the understanding of Human Factors Theory by adding the concept of:

a. Environmental conditions only
b. Ergonomic traps and decision-making errors
c. Elimination of human error as a factor
d. Simplified accident investigation techniques

6. Which of the listed below are classified as ionizing radiation?

I. Beta particle
II. Infrared radiation
III. Gamma radiation
IV. Microwave radiation

a. I and II
b. I and III
c. II and III
d. III and IV

7. The preliminary hazard list (PHL) is an analysis technique for identifying and listing potential hazards that may exist in a system. What will be the **INCORRECT** output from the PHL process?

a. Mishaps
b. Causal sources
c. Risks
d. Safety critical factors

8. All portable fire extinguishers in use today are operated in the upright position. To operate the fire extinguisher, the acronym P.A.S.S. is often used to help us to remember to:

a. Pass by the fire, activate the fire alarm, select the proper extinguisher, shoot at the base of the fire
b. Pull the alarm, alert the response team, shut down the power sources, secure the area
c. Pass by the fire, activate the sprinkler system, seal fire area from oxygen, stop unauthorized entry
d. Pull the pin, aim at the base of the fire, squeeze the handle, and sweep at the base of the fire

9. Employees need to be able to observe and recognize the symptoms of heat exhaustion in themselves and their co-workers. Which of the following symptoms are **CORRECT**?

I. Can't see properly
II. Fainting when trying to stand
III. Rapid pulse
IV. Nausea

a. I, II, III and IV
b. I, II and IV
c. II, III and IV
d. I, III and IV

10. Depending upon its depth, there are three types of burns. Which of the following statements is **NOT TRUE** about the first-degree burn?

a. The signs are redness, minor inflammation, and pain.
b. Damage extends through every layer of skin.
c. It affects the outermost layer of skin.
d. First degree burns are also known as superficial burns.

11. A construction worker named Alex is working on a scaffold 15 feet above the ground without a harness. While reaching for a tool, he loses balance and falls. Based on workplace safety regulations, what is the most significant violation in this scenario?

a. The scaffold height was too high for work.
b. The worker was not provided with fall protection at a height above 6 feet.
c. The worker did not wear gloves while working.
d. The worker should have been working in a seated position.

12. In a manufacturing facility, workers frequently slip while walking in an area where lubricants are used. The company installs anti-slip flooring, but accidents still occur. Which additional measure would best reduce the risk of slips and falls?

a. Mandating all workers to walk slower.
b. Providing non-skid footwear and enforcing good housekeeping.
c. Installing mirrors to increase visibility.
d. Replacing lubricants with a water-based solution.

13. The three major factors determining the consequences of a fall are:

a. Height, weight, and surface type
b. Velocity of impact, magnitude of deceleration, and body orientation
c. Speed, reaction time, and landing technique
d. Footwear, surface type, and height

14. The purpose of a fall arrest system is:

a. To prevent a worker from reaching an edge
b. To stop a worker's fall before hitting the ground
c. To provide comfort while working at heights
d. To eliminate fall hazards

15. A person weighing 200 pounds falls 6 feet. How much force will they hit the ground with?

a. 2,000 pounds
b. 5,000 pounds
c. 10,000 pounds
d. 15,000 pounds

16. Step and fall accidents can be described as:

a. Slipping on an oily floor
b. Foot encounters an unexpected step down
c. Falling from a ladder
d. Tripping on a rug

17. Major causes of musculoskeletal disorders (MSDs) are:

a. Sudden noise exposure
b. Repetitive movements and awkward postures
c. Exposure to extreme temperatures
d. Inhaling toxic chemicals

18. The safest lifting technique is:

a. Bending at the waist and lifting with arms
b. Twisting the torso while lifting
c. Using leg muscles and keeping the back straight
d. Carrying heavy loads alone

19. Lifting a 10 kg object while bending at the waist is equal to an exerted force of

a. 20 kg
b. 100 kg
c. 550 kg
d. 10 kg

20. A warehouse worker is responsible for manually lifting and stacking boxes that weigh approximately 20 kg each. Over time, they develop chronic lower back pain. Which ergonomic improvement would best prevent further injury?

a. Implementing a two-person lifting policy.
b. Providing lumbar support belts for workers.
c. Introducing mechanical lifting aids such as forklifts or conveyor belts.
d. Requiring workers to take more frequent breaks.

21. Sometimes team lifting is less effective than expected due to

a. People don't lift at the same time
b. Additional weight distribution inefficiencies
c. It requires more energy
d. Team lifting is always more effective

22. In a workplace setting, "noise" can be considered as

a. Any sound above 85 dB
b. Any unwanted sound
c. Sound below 20 dB
d. Music played in the workplace

23. A power tool operator develops symptoms of Hand-Arm Vibration Syndrome (HAV), including numbness and reduced grip strength. What contributed to this condition?

a. Using a tool with a low-frequency vibration system
b. Working in a warm environment
c. Prolonged use of vibrating tools without anti-vibration gloves
d. Taking frequent breaks between tool use

24. During the night shift, a machinist is exposed to noise levels averaging 95 dBA from industrial equipment for eight hours. Over several years, he begins experiencing partial hearing loss. Which noise control method would be most effective in protecting him from further damage?

a. Rotating workers to reduce exposure time
b. Providing earplugs but maintaining work conditions
c. Encouraging workers to listen to music to drown out the noise
d. Increasing the volume of warning alarms

25. In a hospital setting, nurses often complain of musculoskeletal pain due to frequent patient lifting. Which ergonomic intervention would be most effective in reducing their injury risk?

a. Requiring nurses to build more physical strength
b. Assigning at least three nurses per patient lift
c. Implementing mechanical patient-lifting devices
d. Requiring nurses to wear back braces

26. A warehouse supervisor notices that workers are bending and twisting awkwardly while assembling products on a low workbench, leading to an increase in reported back injuries. What would be the most appropriate ergonomic solution?

a. Encouraging workers to stretch before shifts
b. Replacing the workbenches with height-adjustable workstations
c. Assigning more workers to the same task
d. Requiring workers to take turns to prevent fatigue

27. A road construction crew reports frequent complaints of headaches, dizziness, and temporary hearing loss due to exposure to jackhammer noise for prolonged periods. Which intervention would be the **LEAST** effective in minimizing their risk?

a. Providing noise-canceling earmuffs
b. Implementing mandatory rest breaks
c. Increasing the number of workers to shorten exposure time
d. Using standard foam earplugs without additional noise control

28. An office worker named Sarah experiences wrist pain and tingling fingers after typing for long hours on a traditional keyboard. A workplace ergonomics assessment is conducted. What is the most appropriate recommendation to address her symptoms?

a. Limiting Sarah's typing hours to two per day
b. Providing an ergonomic keyboard and wrist support
c. Encouraging Sarah to take longer lunch breaks
d. Replacing Sarah's desk with a standing workstation

29. A truck driver experiences chronic lower back pain after years of driving long distances on rough roads. Which of the following strategies would best reduce vibration-related injuries in this scenario?

a. Reducing truck speed limits
b. Installing air suspension seats and padded flooring in the truck
c. Requiring drivers to stand and stretch every hour
d. Using high-frequency vibration exposure to desensitize the body

30. A machine operator in a manufacturing plant suffers a severe foot injury after a heavy metal component falls from a conveyor belt. The investigation finds that the worker was wearing standard running shoes instead of safety footwear. Which type of foot protection would have best prevented this injury?

a. Rubber-soled shoes to improve traction
b. Anti-slip sandals for better comfort easy foot movement to avoid falling objects
c. Steel-toe safety boots to protect against falling objects
d. Thick socks to absorb impact

31. Toxic materials have a negative effect on the health of a person or animal. Toxic materials also known as:

I. Irritants
II. Depressant
III. Asphyxiants
IV. Teratogen

a. I, II and IV
b. II, III and IV
c. I, III and IV
d. I, II, III and IV

32. Which of the following is the correct order of steps in the Hazard Identification, Risk Assessment, and Risk Control (HIRARC) process?

a. Hazard Identification → Risk Control → Risk Assessment
b. Hazard Identification → Risk Assessment → Risk Control
c. Risk Assessment → Hazard Identification → Risk Control
d. Risk Control → Risk Assessment → Hazard Identification

33. A worker has eye irritation after handling a chemical. What will be the most accurate chemical that causes the irritants?

a. Benzene
b. Ammonia
c. Carbon monoxide
d. Cyanide

34. Teratogen is the Substances that cause harm to the fetus or embryo during pregnancy. Which of the following below is the correct example of Teratogen?

a. Nicotine
b. Ethanol
c. Carbon monoxide
d. Cyanide

35. There are four entry points of toxicity. Aqueous solubility and Lipid solubility are one of the factors that will affects the toxicity rate. Which entry point options below represent this statement?

a. Injection
b. Ingestion
c. Inhalation
d. Absorption

36. Below are the factors that contribute to toxicity

I. Routes of entry
II. Volume of the chemical
III. Level of exposure
IV. Resistance of the skin to the substances

a. I and II
b. I and III
c. II and III
d. III and IV

37. Ali has been diagnosed with severe health effects, most likely due to his job handling radioactive materials over the past 20 years. What is the correct term to represent the effects of these toxic substances?

a. Chronic effects
b. Acute effects
c. Critical effects
b. Extreme effects

38. Based on OSHA standards there are some information employees right-to-know when they are involve with toxic and hazardous materials. Which of the following is the right list:

I. Employee training program
II. Hazardous product inventory
III. Contact lists of hazardous materials personnel
IV. Emergency Plan in case of an accident

a. I, II and IV
b. II, III and IV
c. I, III and IV
d. I, II, III and IV

39. There are many types of airborne contaminants. Which of the following below is the **CORRECT** statement for fumes contaminants?

a. Liquid substances release into air.
b. Liquid or solid particles so small that can remain suspended in air long enough.
c. Solid particles from re-solidification of vapor in hot process.
d. Suspended solid droplets.

40. A worker in a chemical plant is exposed to Chemical X over two days. The concentration of Chemical X varies throughout the workday. The exposure times and concentrations for each time period are as follows:

Day	Exposure Time and Concentrations
1	4 hours at a concentration of 30 ppm
	4 hours at a concentration of 50 ppm
2	4 hours at a concentration of 40 ppm
	4 hours at a concentration of 60 ppm

What is the Time Weighted Average (TWA) concentration of Chemical X for the worker over the two-day period?

a. 48 ppm
b. 45 ppm
c. 50 ppm
d. 52 ppm

41. Which of the following statements best explains the relationship between Sick Building Syndrome (SBS) and indoor air quality (IAQ), and its impact on workers' health?

a. SBS is caused solely by poor ventilation, and increasing air circulation in buildings will immediately eliminate the symptoms of SBS.
b. SBS symptoms are primarily linked to exposure to indoor pollutants such as volatile organic compounds (VOCs), but the exact cause can vary depending on building design, maintenance, and chemical exposure.
c. SBS is only associated with older buildings and does not affect newer buildings with modern ventilation systems.
d. Workers suffering from SBS can be immediately treated with medication, and no changes to the indoor environment are necessary for long-term symptom relief.

42. An Environmental Risk Assessment must be conducted to evaluate the possible impacts of releasing various levels of a particular pollutant from a chemical processing plant. As a safety officer in your company, you should focus on:

a. An outline of the beneficial properties of the products produced by the processing plant.
b. The legislative requirements related to the human health effects because of exposure to the pollutant.
c. The quantification of potential hazards to the local environment of the processing plant releasing this pollutant.
d. A detailed outline of the management processes required to reduce the health effects related to exposure to the pollutant.

43. Which of the following methods can be used to prevent Sick Building Syndrome?

I. Using ozone to eliminate the many sources, such as VOC, molds, mildews, bacteria, viruses, and even odors.
II. Use of paints, adhesives, solvents, and pesticides in well-ventilated areas and use of these pollutant sources during periods of non-occupancy.
III. Using commercial air freshener to eliminate odors.
IV. Lighting in the workplace should be designed to give individuals control and be natural when possible.

a. I, II, and III
b. I, II, and IV
c. II, III, and IV
d. I, II, III, and IV

44. Which of the following statements is **INCORRECT** regarding the general principles of Environmental Management Systems (EMS)?

a. EMS uses a bottom-up approach.
b. EMS is a process rather than a continuous event.
c. EMS is about the people and their actions, not just the words and aspirations.
d. EMS involves continual improvement for better change.

45. Which of the following combinations accurately represents the effects of water pollution on both human health and the ecosystem?

a. Radioactive materials and Thermal pollution
b. Infectious agents (bacteria, virus) and Eutrophication (P, N)
c. Inorganic chemicals (heavy metals) and Sediments (TSS)
d. Organic chemicals (TCE, PCE) and Oxygen-demanding wastes (BOD, COD)

46. Which of the following is the correct sequence of the EMS cycle and phases of continual improvement?

a. Leadership & Commitment → Policy/Goals → Planning → Implementation → Measurement & Evaluation → Continue review & Improvement
b. Leadership & Commitment → Policy/Goals → Planning → Measurement & Evaluation → Implementation → Continue review & Improvement
c. Leadership & Commitment → Planning → Policy/Goals → Measurement & Evaluation → Implementation → Continue review & Improvement
d. Policy/Goals → Planning → Leadership & Commitment → Implementation → Measurement & Evaluation → Continue review & Improvement

47. There are four main parameters to identify water pollution. Which of the following is **CORRECT**?

I. Toxicity
II. Acidity
III. Biological
IV. Chemical

a. I, II and IV
b. II, III and IV
c. I, III and IV
b. I, II, III and IV

48. Which of the following statements about water pollution abatement methods is **INCORRECT**?

a. Zero Discharge requires changes in process technology, product design, and market demand to minimize water pollution.
b. Reduction focuses on quality optimization and material selectivity to reduce water usage and pollution.
c. Reuse involves treating water for direct human contact applications, such as drinking water and cooking.
d. Recycling of treated effluent involves retreating the water until it is suitable for process consumption.

49. A manufacturing company produces leather products and generates wastewater as part of the tanning process. The wastewater contains high levels of chromium, which is harmful to both the environment and human health. The company has installed a treatment plant that uses chemical precipitation to remove the chromium from wastewater before it is discharged into the local water supply. This treatment process ensures that wastewater meets environmental regulations and does not pose a risk to the ecosystem. Which waste management priority is applied in the given case study?

a. Eliminate Generation
b. Reduce Generation
c. Treatment
d. Recycle and Reuse

50. A local beverage factory has started using a closed-loop system for water used in production. The water is filtered and reused within the production cycle, minimizing the need for new water intake and significantly reducing wastewater discharge. In addition, the company has optimized its packaging materials, used lighter materials and reduced the overall amount of packaging waste. Which waste management priorities are being applied in the given case study?

a. Reduce Generation and Recycle and Reuse
b. Eliminate Generation and Treatment
c. Recovery and Recycle and Reuse
d. Recycle and Reuse and Residual Disposal

- END OF PAPER -