



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER I  
SESSION 2013/2014**

COURSE NAME : SAFETY AND MAINTENANCE  
ENGINEERING

COURSE CODE : DAM 20702

EXAMINATION DATE : DISEMBER 2013 / JANUARI 2014

DURATION : 2 HOURS 30 MINUTES

INSTRUCTIONS : (I) ANSWER ALL QUESTIONS  
(II) NOT ALLOWED TO BRING  
OUT THIS QUESTION PAPER  
FROM THE EXAM HALL

THIS QUESTION PAPER CONSIST ELEVAN (11) PAGES

**PART A.**

1. Which of these is the first step to take when conducting a risk assessment?
  - A. Evaluate the risk
  - B. Identify the hazards
  - C. Review your findings
  - D. Update risk assessments
  
2. Which of these is most likely to cause an accident in a workplace?
  - A. Administration
  - B. Manual handling
  - C. Adequate lighting
  - D. Excessive noise
  
3. All of the following are examples of engineering controls EXCEPT
  - A. adjustable workstation to accommodate various employee sizes.
  - B. elimination of lead-based paint.
  - C. installation of welding curtains during hot work.
  - D. installation of sound-dampening shields on noisy equipment
  
4. Which of the following is an example of an administrative control?
  - A. Rotating jobs to minimize exposure to noise.
  - B. Enclosing loud equipment to reduce noise exposure.
  - C. Training employees to properly wear hearing protection to minimize noise exposure.
  - D. Answer A and C
  
5. Which of the following statements is true?
  - A. PPE is the lowest level of hazard control.
  - B. PPE may be used with engineering and administrative controls for the most effective control measures.
  - C. PPE is considered first when implementing hazard controls.
  - D. Answer A and B
  
6. Which of the following is an example of a preventive maintenance program?
  - A. Conducting emergency action plan training for severe weather
  - B. Regularly inspecting electrical panels to determine proper wiring
  - C. Replacing pressure relief valves on hazardous material tanks according to the manufacturer's recommendations
  - D. Answer B and C

7. Which of the following elements of an occupational health program does OSHA not require?
- A. Maintenance and confidentiality of employee medical records
  - B. Access to medical services and first aid
  - C. Health and wellness program
  - D. Medical screening for some OSHA standards
8. Some of the technique used in hazard analysis are:
- A. Hazard Identification, Risk Assessment and Risk Control (HIRARC)
  - B. Job safety analysis (JSA)
  - C. Failure Mode and Effect Analysis (FMEA)
  - D. All of the above
9. Accident classification is divided into three levels, which of the following are NOT included in the classification of accidents.
- A. Major injury
  - B. Near miss accident
  - C. Death
  - D. Damage
10. Generally, there are three main arguments that confirm why occupational safety and health should be managed, it is,
- A. Legal, economic and humanitarian arguments
  - B. Economic, humanitarian and education arguments
  - C. Education, engineering and economic arguments
  - D. Humanitarian, engineering and environment arguments
11. Which of the following is TRUE regarding the definition of an accident?
- A. Accidents can cause long-term problems (chronic). All or part of the body can be affected.
  - B. Accidents are unexpected sequence of futurity and unplanned, that occur through a combination of several reasons and result in physical injury to an individual, property damage, accidents and loss nearly.
  - C. Is such a force strong enough to cause injury or damage to property
  - D. Harm when control procedures are not followed

12. Risk of accidents due to electrical hazards depending on how and where materials or electrical wires are used. Act involved in electrical hazards are as below EXCEPT
- A. Occupational Health and Safety Act, 1994
  - B. The Factories and Machinery Act 1967
  - C. Electricity Supply Act 1990
  - D. Work Act 1955
13. What is the effect of mechanical hazard risks to safety and health?
- A. Resulting in minor injuries (such as scratches and sprains) or dire consequences (such as loss of limbs and death).
  - B. The body loses its ability to cool itself
  - C. Increased body temperature, a rapid pulse, loss of orientation, confusion, decreased blood pressure, not conscious and coma
  - D. Loss of self-control and insane
14. According to The National Safety Council is a system of machines to reduce the risk of misfortune among,
- A. Operator and employer
  - B. Workers and operators
  - C. Operator and machine
  - D. Machine and others equipment
15. There is one of the most important methods in reducing electrical hazards where it should be executed in any kind of electrical equipment there is
- A. Discharge method
  - B. Earthing method
  - C. Safety Training Methods
  - D. Method Key System
16. Wearing anti-vibration gloves means:
- A. You are completely protected against vibration
  - B. You can use machinery for extended periods of time
  - C. There's still a possibility that the vibration will affect you
  - D. You will feel absolutely no vibration
17. The workplace hazard due to excessive noise may be controlled by:
- A. Air conditioning
  - B. Ventilation
  - C. Shift work
  - D. Personal protective equipment

18. In term of priorities for hazard control, personal protective equipment should:
- A. Always be used to control hazards
  - B. Only be used if other measures to control hazards are not practicable, or if other measures have not reduced the risks sufficiently
  - C. Be the first measure adopted to control hazards or to increase protection
  - D. Be used in preference to isolating the hazard
19. What must your employer do if you have to lift a load?
- A. Be present while you lift the load
  - B. Nothing, it's your responsibility
  - C. Provide a risk assessment of the task
  - D. Make sure your supervisor watches you while you lift the load
20. Ordinary things that may contain hazardous substances include:
- A. General household cleaning products
  - B. Paint
  - C. Antiseptic
  - D. All of the above
21. The greatest danger to humans suffering from electrical shock results from .....
- A. current flow
  - B. voltage flow
  - C. defective electrical equipment
  - D. multimeter
22. Factors that contribute to stress in the workplace are:
- A. Fear of job loss
  - B. Technological change
  - C. Unpredictable working hours
  - D. All of the above
23. Lead is a hazardous substance because it is .....
- A. Toxic
  - B. Flammable
  - C. corrosive
  - D. heavy
24. Noise levels are measured in ...
- A. decimals or Db
  - B. decibel or dB
  - C. millimeters per second
  - D. dBs per second

25. The person those are responsible to investigate and report accidents under the Occupational Safety and Health (OSH) if a serious accident or injury at work site happen .....
- A. An OSH officer
  - B. Everyone at the work site
  - C. Victim
  - D. The employer
26. Below are some accidents needs to be investigated
- A. Lost time accident
  - B. Injury accident
  - C. Material and equipment damage
  - D. All of the above
27. In Occupational Safety and Health (OSH) the employer have to do the following things when an accident happens that resulting in a serious injury at his or her work site.
- A. Carry out an investigation into the circumstances surrounding the accident
  - B. Notify a Director of Inspection as to the time, place and nature of the accident
  - C. Prepare a report in accordance with the regulations
  - D. All of the above
28. Below are unsafe actions that led to the cause of the accident EXCEPT
- A. The equipment does not work properly and appropriately
  - B. Do not follow the safe work protocols
  - C. Eating, drinking and smoking during work
  - D. The maintenance of machines and equipment are not done systematically
29. Employers are responsible to complete the following form, if there are workers injured in a workplace
- A. Employer's Report of Accident
  - B. Employee's Report of Accident
  - C. Insurance Claim
  - D. All of the above
30. Following are guide to be followed when conducting an accident investigation EXCEPT
- A. Carry out an investigation a week after the incident
  - B. Obtain information from individuals involved during the incident
  - C. Protect the evidence derived
  - D. Record all information with photo, date and time completely

31. Below are things to do during the process of investigation of information
- A. Conducting interviews to all the individuals involved
  - B. Identify areas involved in accidents
  - C. Collect all samples, pictures and picture the accident
  - D. All of the above
32. Here are some reasons why accidents are not reported EXCEPT
- A. Manager not skilled to make a report in accordance with regulations set by OSHA.
  - B. A manager who does not properly manage or train or provide proper training can cause discomfort to make a report.
  - C. Manager or supervisor solves problems using identical other than OSHA regulations.
  - D. A number of accidents reported was done to maintain safety records.
33. Here is the correct action in case of accidents and prevention:
- A. Find reasonable grounds
  - B. Reviewed through the risk assessment process to ensure that no changes will be implemented.
  - C. Tight schedule for implementation established.
  - D. No further action is made.
34. A common mistake during the accident investigation, EXCEPT
- A. Often what is stated in an interview to be designed by their desire to escape or blame others, or to protect friends
  - B. Professionals involved in the OSHA needs to be equipped with specialized training, or self-study investigation techniques.
  - C. Employees who speak the truth even interviewed him guilty
  - D. Although the main goal of accident investigation is to prevent future accidents and injuries, safety and health professionals should be aware that there may be another agenda in play in the investigation of the accident.
35. Why need to carry out risk assessment in the workplace?
- I. Logical and cost-effective management of occupational safety and health (OSH)
  - II. Legal requirement
  - III. Management system standard requirement
  - IV. Employment requirement
- A. I only
  - B. I and II only
  - C. I , II and III only
  - D. All of the above





40. Safety guarding is use to prevent body part from contact with the dangerous part of machine. Types of safety guarding

- I. Fixed
- II. Interlock
- III. Adjustable
- IV. Self adjusting

- A. I only
- B. I and II only

- C. I , II and III only
- D. All of the above

**PART B.**

**Q1.** A job hazard analysis is a technique that focuses on job tasks as a way to identify hazards before the accident happen at the workplace. It focuses on the relationship between the worker, the task, the tools, and the work environment. In practical terms, a hazard often associated with a condition or activity, that uncontrolled can result in an injury or illness. Identifying hazards and eliminating or controlling them as early as possible will help prevent injuries and illnesses.

- (a) List **five (5)** technique used in hazard analysis (5 marks)
- (b) Explain the step of Job Safety Analysis (JSA) (9 marks)
- (c) Describe when and who will carry out risk assessment (6 marks)

**Q2.** Exploded gas material of 1000 litre in storage tank with the following given data:

Gas material	:	ethane $C_2H_6$
Density, ( $\rho$ )	:	$480 \text{ kg/m}^3$
Temperature, (T)	:	$27^\circ\text{C}$
Atmospheric pressure, (P)	:	1.013 bar
Efficiency of explosion, ( $\eta$ )	:	16 %
Explosion energy, ( $E_{TNT}$ )	:	4686 KJ/kg
Mass	:	C = 12 , H = 1 , N = 17 , O = 16

Find,

- (i) Equivalent mass of explosion.
- (ii) Scale value  $Z_e$  at distance of  $r = 50 \text{ m}$  from the blast.
- (iii) Estimating the structure damage from the blast at that distance.

(20 marks)

- Q3.** (a) Describe the route of toxicants enter the biological organism and explain the method for control this situations.

(12 marks)

- (b) Determine the 8-hr time weight average (TWA) worker exposure if the worker is exposed to toluene vapors as given in the table below. (The threshold limit values for toluene is 100 ppm).

Duration of exposure (hr)	Measured concentration (ppm)
2	110
2	330
4	90

(4 marks)

- (c) Determine whether the following noise level is permissible in the workplace as given in the table below. Give recommendation to the employer for the worker safety in the workplace.

Maximum Noise Level (dBA)	Duration (hr)	Allowed (hr)
85	3.6	No limit
85	3.0	4
110	0.5	0.5

(4 marks)

**END OF QUESTION**