ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

(A Unit of Alva's Education Foundation)

Shobhavana Campus, Mijar--574227, Moodbidri , D.K

(Accredited by NAAC with A+ Grade)

(Affiliated to VTU Belagavi, Approved by AICTE, New Delhi, Recognized by Govt. of Karnataka)

INTERNAL ASSESSMENT ANSWER BOOK

Branch : CSE

Test	Date	Signature of the invigilator	Maximum Marks 30 / Marks Obtained	Signature of the Student with Date	Signature of the Teacher with Date
I	27/10/23		30	27/10/23	27/10
II	04/12/23		28	4/12/23	08/12
III	03/01/24		30	03/1/24	08/1
			Total Marks 088		
			Average Marks 29		
			Average of Assignment/ Quiz/Seminar etc 10		
			Grand Total 039		
Marks in words			Thirty Nine		

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Sem. & Section : VII th - C Section

Course Name / Code : Industrial Safety (18ME753)

Name of the Faculty : Prof. Kiran C.H

Internal Assessment Marks 039

Max Marks 40

08/01/24

Signature of the Faculty

08/01

Signature of the HoD

Dept. Of Mechanical Engineering
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

VISION OF THE INSTITUTE

Transformative education by pursuing excellence in Engineering and Mangement through enhancing skills to meet the evolving needs of the community

MISSION OF THE INSTITUTE

* To bestow quality technical education to imbide knowledge creativity and ethos to students community
* To inculcate the best engineering practices through transformative education
* To develop a knowledgeable individual for a dynamic industrial scenario
* To inculcate research entrepreneurial skills and human values in order to cater the needs of the society

VISION OF THE DEPARTMENT

"Engendering competent, excellent professionals by transforming the knowledge and computing skills to individuals through modern innovative tools and techniques"

MISSION OF THE DEPARTMENT

M1: To produce skilled, creative software developers through rigorous training.

M2: To conduct specific technical courses to keep abreast to the latest technological development and transformations in the domain.

M3: To establish industry-institute interaction programs to enhance the skills of employ ability.

M4: To implement the ideas of research and innovations in interdisciplinary domains

Ist - Internals

PART - A

2a Unsafe act :- The act which is mainly caused by the human being because of lack of knowledge, carelessness, lethargic behaviour in the workplace.

- Unsafe act is hazardous which may cause huge loss or damage.
- About 88% of the Accidents are caused because of unsafe Act.
- The unsafe act examples are :-
  1) Not using PPE (personal protective kit)
  2) Lack of knowledge, skills of the working domain.
  3) overconfidence
  4) Not taking safety measures.
  5) Not learning from the previous mistakes.
  6) NO proper house keeping.
  7) Not wearing healmets, gloves.
  8) climbing on the broken ladder.
  9) touching the non-insulated wires with bare hands
  10) Not using goggles while soldering metal
  11) walking on the oil filled floor.
  12) carrying heavy load while climbing ladder.
  13) 2 person walking together into the incube labs
  14) taking pills without prescription or the ingredients

Unsafe conditions :- The condition in which the accident takes place due to the environment or surrounding conditions.

- About 10% of the Accidents takes place due to unsafe conditions.
- The unsafe conditions will lead to Accident or damage or loss or injury.
- Not properly ventilated.
- No sign boards or hazards or safety board
- No proper house keeping

ex:- Keeping the ladder on the water spiled floor is unsafe condition but the person climbing the ladder without proper support is unsafe Act

(2) electrical wires which are outdoor from the electric pipes are unsafe condition And if a person treating it with bare hands without proper insulation is unsafe Act.

(3) If a person standing below the heavy load is unsafe Act, but unsafe condition is heavy load lifted

(4) the ladder on the table is unsafe condition if the person climbs is unsafe act

(5) the pills Are away from package in open exposed to Air is unsafe condition the peisons consuming it is unsafe act

2b) The main objectives of the Industrial Safety are as follows:

- Industrial safety Rules And Regulations were implemented in order to keep the workplace hazard free environment.
- Industrial safety is a crutial thing in order to overcome the accidents, damage or loss of human or any machinery.
- Industry safety was implemented in the year 1948 February and came into on 19th August 1978
- Industry safety objective is to Avoid compensation, And the cost of Accident unnecessarily.
- Industry safety was implemented in order to keep the good and health Relationship between the employee and worker for high standard living
- Industry safety includes the wholesum Approach to be free from
  - physical hazards (fall, injury, Accident)
  - chemical hazards (chemical And toxic gases)
  - biological hazards (health Related)
  - physiological hazards (Pill treatment/harashment)
  - ergonomic hazards (workplace hazard)
- Industrial safety is directly proportional to the productivity of the industry.

- As the industries care more safer are less prone to the accidents injuries And loss.
- It helps the basic safety terms, international standards, to identify the hazards, Risk analyses and the sign boards around the work and environment (hazard prevention)
- Implementing extinguisher for prevention and control of catching fire (Alarms, fire detectors)
- It provides a way to understand the mechanical hazards that occurs in the workplace workshop And machine shops, along with the prevention And control them (using PPE)
- Use of premium and top notch secured, trusted, authorized, pretested, labeled electrical devices which are well insulated to Avoid electrical hazard that occur in work environment, along with how to control And prevent them
- To provide the better and safe environment for usage of chemical with proper gloves masks, eye protectors And the adequate environment temperature in order to avoid the chemical Reaction which may leads to burn. some time damage of skin permenantly
- proper knowledge And skills to workers Regarding their domain And to upskill for high productivity

PART-B

3a). OSHA is abbreviated as occupational health and safety Act which was enacted in the year 1970 the main intention to pass the OSHA Act was to ensure the safety measures in the workplace.

The significance of OSHA in Industrial Safety is as follows:

- To Avoid loss, damage and Accidents, injuries unnecessarily.
- To avoid compensation, Accident cost
- better workplace moral values for peaceful life
- To increase the standards of both employers and workers lifestyle.

Some of the Rights of employees and workers which was come to force under Industrial safety Are as follows:

Rights of employees:

- The employeer must be fair with All the workers and should treat both men and workers the same
- employeer must Report to the supervisor or manager Regularly Regarding the workplace.
- employeer must provide a hazard free, Risk free environment to the workers.
- employeer must provide basic first aid kit and PPE with NO cost.

- Employeer must ensure the worker proper knowledge regarding machinary use, fire extingu And chemical hazards, equipment usage and pre In the worker prefered language.
- employeer need to ensure to use premium quality safety equipment which is with ISI marks or the instrumental standards. And checked
- the electrical goods must be properly insulated. And verified before use
- should ensure free medical checkup Regularly with proper maintance of each worker health Report safely and separately.
- should provide proper leaves whenever, health issues.
- make sure to keep Regular workshops for upskilling and upgrading worker to the current trends.
- should provide compensation or insurance if any fatality or injury or death happens.

- Rights for workers :-

1) file a confidential complaint with OSHA and ask to come for inspection.
2) know the basic fundamental Rights of workers, knowledge of equipments, PPE, machinery that they use regularly. In the language of workers knows or the worker preferred language.
3) Give a Request to get the Report of common health checkup in the workplace Regularly
4) Get the report of diseases from the workplace by previous records And reports.
5) Get the Report of medical checkup report Regularly.
6) know About the Rights of the workers in workplace, morals and ethics in workplace. Access to PPE kits and compensation if any loss and the four behaviour.
8) participate in the inspection And talk personally with the inspector for more details.

3b) The safety measures to be followed by while using ladder are as follows.

- Always use the ladder which is in the good conditions.
- Always place the ladder to the support of the strong obstacle (preferably building)
- The bottom of the ladder and the supporting system must be placed 1/4th of the length of ladder.
- Do not use ladder as a scaffold platform
- while Ascending/Descending from the ladder place your hands on the rungs to lift up do not use rails for going up.
- Do not carry heavy objects or equipment while using ladder.

- Always climb the ladder. 2 hands and 1 foot. 2 feet and 1 hand.
- Make sure that the ladder you use is not greesy, oily.
- Do not use the ladder ~~with~~ made of metal or Aluminium near the electrical equipment.
- Do not Allow a person to climb same ladder at a time., make sure only one person climbs
- Do not keep the ladder supporting angle too extreme, which may Result in fall or injury.
- Make sure No obstackles is Around the ladder
- Do not place the ladder in front of the door. If necessary please place the safety boards, and hazard precaution.
- Always place or face opposite to ladder while climbing use rungs to climb and not railings
- Do not keep the 2 ladders side by side because if the peson from ladder 1, also make ladder 2 to fall.
- Make sure the ladder is checked before climbing and look for all rungs to be present.
- Do not use ladder near swimming pool.
- Do not use ladder on top of box, table, chair In order to Reach farthest height.

Part B

II nd Internals

PART-B

3a). PPE is abbreviated as personal protective equipment

- The major use of PPE kits in Industries is to maintain Safety And Security.
- And to Avoid hazards.
- PPE includes covering to the whole body.
- The various PPE classifications are as follows.
  - i) head And face.
  - ii) Respiratory.
  - iii) hearing Aids
  - iv) hand and elbow.
  - v) body.
  - vi. leg And feet.

i) head and face - It mainly includes.

head - helmets and skull Guards which are a major in order to be protected from Any heavy objects falling on head.

- As we Know head is the cerebral part to protect it we use helmets.

face - we use face shield, which is transparent In order to be visible to the eyes.

- use of goggles makes things visible Along with protection to eyes to avoid Metal particles And dust in entering the eyes which may cause eye infection or permanent damage and loss of vision

ii) Respiratory :- The gases And the hazardous fumes Released by the chemical in the industry may serious Affect And causes Respiratory diseases or severe damange to the Respiratory track. diseases like Asthma, bronchithes, Alveolar diseases

✓ In order to avoid use use: Gas Mask, Respiratory Inhalers, And based on the level of hazardness we use various masks based on the type of gases.

iii) hearing Aids :- ear muffs And ear plugs

✓ ear muffs is fully covering the ears. from particles entering.

✓ ear plugs Are made up of Rubber And fibre with plastic which cuts down the high sound Created in the industry.

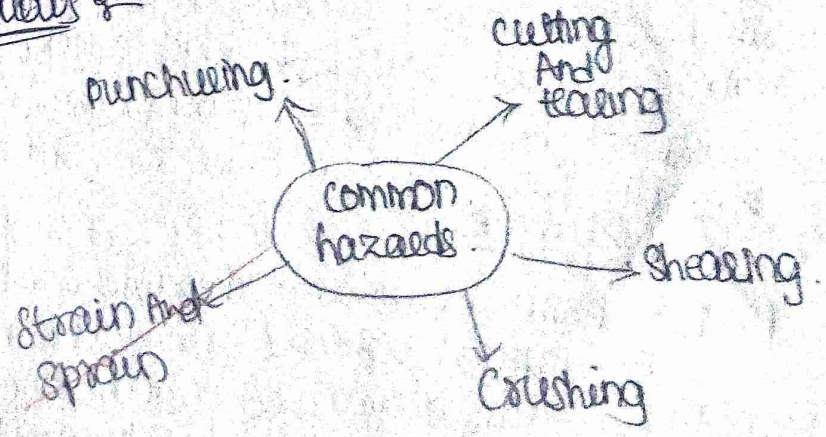
✓ Sometimes loud sound may cause permanent deafness so while drilling or Any sound of sound producing Acts uses earplugs, which Allows only low decibel voices.

iv) hand And elbow :- hand. we use hand Gloves. elbowpads. In Order to be safeguard from harsh Chemicals And machineery Usage

v) body :- we use PPE kits which is made up of silicon And its deriviatives. It include Jackets, Metal Vests, body covering suits to protect various orgaens And skin of the body.

vi) leg And foot :- legs we use leggings or long Pants in order to avoid exposure And knee pads, And boots in order to Acts As insulator for electricity And shoes for contact. which usually are made up of Rubber.

3b) Some of the Safety precautions while working with the Milling Machine are as follows :-



Above are some of hazards in industry

- Proper usage of PPE kits.
- Usage ~~of~~ of the machinery knowledge.
- checking And testing of machinery before usage
- Usage of premium Quality Machine
- proper house keeping
- ventilation And lighting
- No bare hands.
- No obstacles in between the passage should be clear And spacious.
- Metal detective Alarms And fire Alarms.

1) proper usage of PPE kits

As we all know milling machine produce lots of noise so earplugs is must, face shield And mask in order to Avoid the small metal particles to hit or enter the body. And body suit bcz for safety. Googles is compulsory to avoid the small chunks to enter eyes.

- Should not be negligible towards the usage of PPE kits. Use boots in order to foot on metal chips.

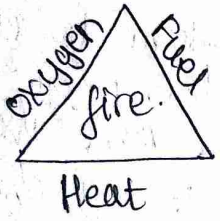
2). proper prior knowledge Regarding machinery the labour whoever using the machine should be well advanced with the knowledge how to use or handle with proper fixings.

3). before usage do have a proper testing of the machine.

- It is important to check the wheel position And the Angle.
- Screw fittings And the lubricant of the machine if by chance the machine has Any Requirement or emergency do it needfull.
- Do Not use the corroded machinery.
- Use the Stainless Steel or the Necessary metal.
- Always use insulation on the switch to which machine is connected.
- ventilation should be proper And the Room or the industry should be luminated with lighting so that no damage occurs to the person by stepping on the metal chips or Accidently hands on the machine.
- Do Not touch with bare hands.
- the passage should be wide And spacious
- precautionary measure are taken in order to be Away from crushing, cutting tearing, shearing, punching, strain And sprain.

PART-A

2a)



fire is the disaster process which is formed when the oxygen fuel and heat comes all together with the Appropriate proportion.

- The fire is caused when it Reaches its fire point (probably low ignition temperature)
- Fire mainly requires oxygen which is 21%, fuel includes 2 types :
  1) Solid fuel : such as wood, paper, cloth, plastic burn completely to produce Ash with No Remains
  2) liquid fuel : solvents, liquid fuels, petrol, kerosene, solvents, etc.,
  3) Gaseous fuel : carbondioxide, And other gases with low ignition temperatures. LPG, Natural gas
- heat is usually the spark.

the fire extinguishing process.

- detection of fire
- check which fire class the fire belong to
- Apply of right fire extinguisher class
- Usage of safety measures and devices.
- fire extinguisher.

- detection of fire early on in the initial stage helps in precautionary measures.
- the fire extinguisher usage And tips is as follows:

It mainly follows PASS technique.

i) pull
ii) Aim
iii) Squeeze
iv) Sweep.

i) push the extinguisher And pull the pin of the extinguisher.

ii) Always Aim At the base of the fire which should be upto the level of the fire.

iii) Squeeze the nozzle in order to discard the contents of

the extinguisher to the fire when is active.

- Squeeze the sufficient Amount of the mixture As required.
- At the exact place of fire until the fire washes out or fire stops. or dissepeares

iv) Sweep the Residue After squeezing the leftover.

9b) the Matrix on classification of fire are as follows.

i) class A fire
ii) class B fire
iii) class C fire
iv) class D fire
v) class K fire.

i) class A fire:- class A fire Includes the commonly Available combustible sub stances such as wood, paper, plastic, cloth which burns completely And leaves Ash As final product upon combustion.

- Denoted by Green color
- extinguisher shape Triangle

ii) class B fire:- This class mainly includes liquid combustible, solvents. such as petroleum, tars, paint, Kerosene, varnish, oils etc.

- Denoted by Red color
- extinguish shape square

iii) class C fire:- It mainly includes electrical substances such as fuse, switches, wire, which are caused by shortcircuits And usage of wires (Revisage of low Quality wires)

- Denoted by blue color
- extinguisher shape circle

iv) class D fire:- Caused by the metals such as Sodium, Potasium, titanium Alluminium, these include metal names ending with Ium

- Denoted by yellow color
- extinguisher shape Star

v) class K fire:- these are mainly used in cooking Industries. such as vegetable oil, cooking oils And edible fats.

type of fire extinguishers technique for each type

Q. fire are as follows :-

1) water based extinguisher
2) dry chemical extinguisher
3) wet chemical extinguisher
4) foam based extinguisher
5) carbondioxide extinguisher

1) water based extinguisher :-
these are used for class A fire in which these extinguishers stops fire and materials from burning. never use for all kind fire class 'B' fire.

2) dry chemical extinguisher :-
Used for class 'A' and 'B' to avoid ashes and rapid fire.

3) wet chemical extinguisher :-
used for class 'k' in order to stop the fire of kitchen cooking oils and edible fats.

4) foam based extinguisher :-
Used for class 'B' fires and class 'A' fire

never ever use foam for class 'C' fires which cause intense and large catch of fire on liquid fuels and gases

5) carbondioxide extinguisher :-
Used for class A, C and D

08/1/24.

III^rd Internals

46. The safety precautions using CNG and LPG are as follows:

- CNG is abbrevated Compressed Natural Gas. LPG as Liquified petroleum Gas.

Precautions for LPG:

- LPG is Liquified petroleum Gas and is highly volatile and explosive in Nature. hence stored in Gas cylinders.
- LPG Gas cylinders should always be stored in cylinders with upright position
- Room should be ventilated properly.
- Regular checks need to be performed.
- usage of standard and high quality checked knobs.
- while transportation, need to be ensure safety And filled cylinders should not be thrown while loading and unloading vehicle may lead to explosion.
- cylinders must be bit far away from electric plugs, switches wires bcz easily can catch fire.
- make sure the cylinder is majorly placed close of the home with electric And fire hazard symbol And Also danger signs. And sign boards

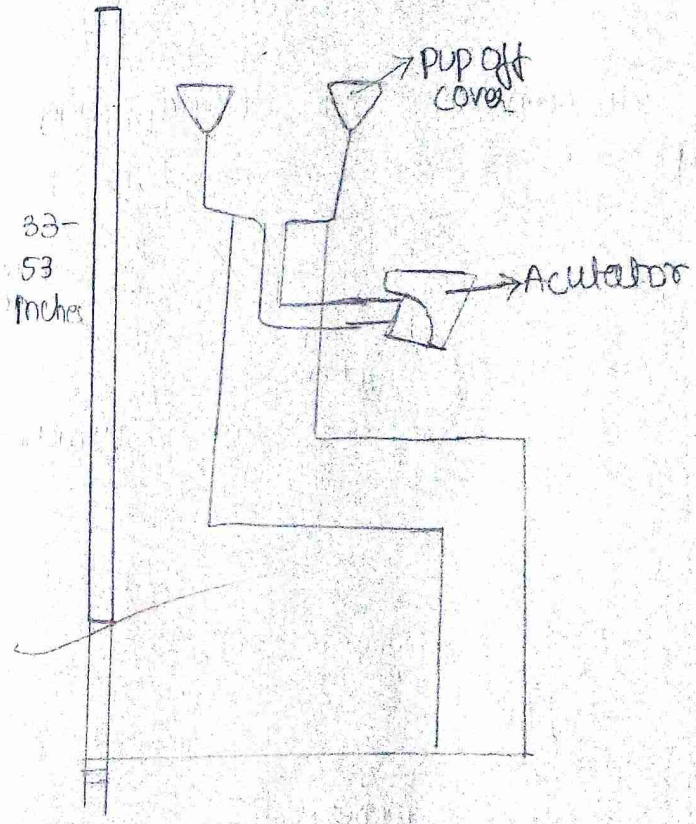
- All the members should be known with proper knowledge of fire hazard, prevention And control
- When LPG Gas Leaks should make sure that No electrical Appliences, Shwitches are touched and make sure to ventilate the Room and Call the Authority And inform Regarding It
- LPG cylinders must Not to be exposed to extreme heat or cold temperature. extreme high lead to explosion And extreme low leads to below ignition temperature.

* Preventive safety precaution of CNG

- CNG is usually the methane which is released from hydrocarbons. And derivatives.
- CNG should be highly Standardized and Authorization certificate is must.
- CNG should be tested before use and should have prerequisite knowledge of CNG usage.
- Always use high Quality And certified And safety checked product.
- Before CNG have a petrol drive.
- CNG should be transported properly with following All the safety measures And precautions

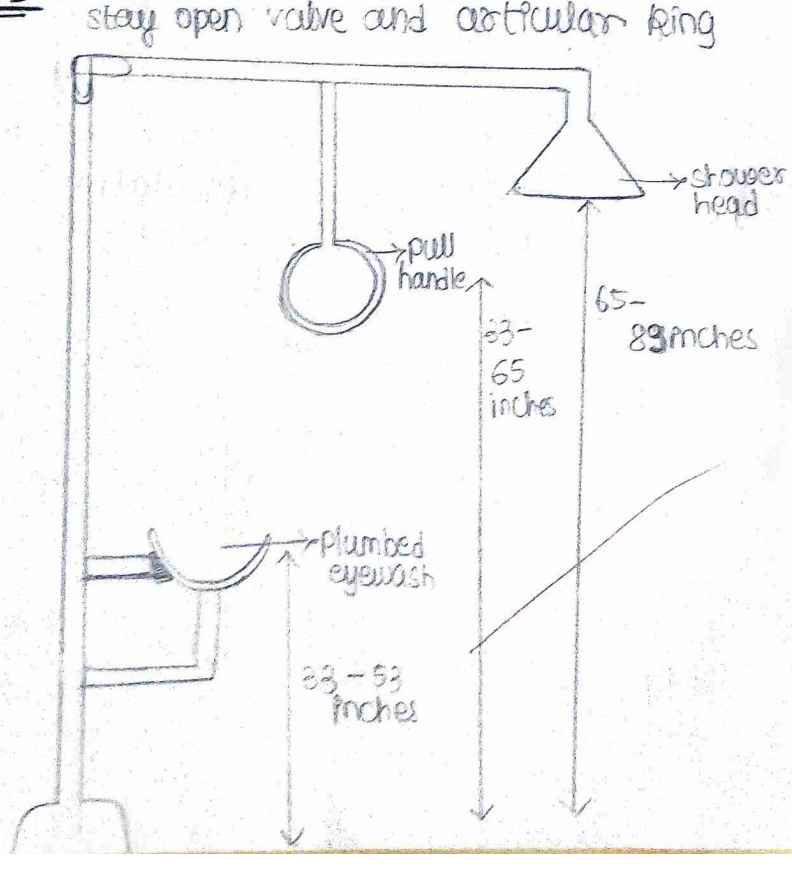
- CNG cylinders Should be tested Regularly.
- do not outsource the CNG cylinders from UnAuthorized sources
- Do not outsource the cylinder And knob and pump Separately. because some times leaks.

4a) eye washers :-



- eyewashers should be constructed in such a way that it is applycable to all the heights and can be adjusted.
- The eyewashers are usually 33-53 inches.
- eyewashers need to provide water not too hot or not too cold it should be normal water temperature considerably 18°c
- eyewashers should be comfortably placed.
- eyewashers should be everywhere where the chemical industries or chemical labs or needed as preferably.

- **showers :-**



- The showers should be well maintained with proper housekeeping.
- The shower should be with proper height from the ground ranging between 65-89 inches and the person should feel not too height or too low.
- The shower is circulated by a pull handle besisde it. with the height ranging from 33-65 inches from the ground.
- shower should be circulated with stay open valve and a articular ring
- The shower should be well mounted well maintained plumbed eyewash with proper cold or not hot water the temperature of the water should be normal ranging 18°C.
- The showers should be well cleaned and ready enough to use it
- should be located as required
- water supply should be 24x7 hours.
- The plumbed eyewash should be 33 to 53 inches from ground.
- shower area is to be well ventilated
- The plumbed eyewash should be supported to wall

1b effect of electric current on human body is explain by below table.

Voltage.	described effect.
1 mA	Perception level, tangling sensation
5 mA	Slightly shock, Not painful "let go" can be Negligible.
6-16 mA.	painfull, loss of muscular control And bit painfull but Not extreme effect
17-99 mA	extreme pain, Respiratory Arrest, difficult to breathe, some times ventricular fibrosis.
100-2000 mA	Ventricular fibrogen, blockage of veins cardiac pressure, high bp, heart beat extremely Almost Neede to damage of major organs.
>2000 mA.	cardiac Affect, Affects major internal organs And high damage Permanently injunctional, death

- Based on the Above range the effects can be minor or severe.
- If Any electric current come in contact with human body the body exposed to current becomes a part of electricity.
- Respiratory problem patients are easily prone to death because of Respiratory Arrest, when difficult to breathe.
- once internal damage to the major organs of the body cannot be easily Recovered. highly prone to risk of death or malfunctions
- painful, ventricular fibrogen and blockage of veins some times leads to stroke. Also.
- Ventricular fibrogen leads to cardiac pressure heat beats extreme highly Or Not at all
- once the organs are effected needs lot of time to Recovery.
- Due to shock some times the patient may fall and cause other organ damage or get spasm or breakage of skull or disjoint of bone or muscular dystrophy.

1a PPE is abbrevated as personal protective equipment.

- major usage of PPE kits is to Avoid hazards And maintain Safety

I) Head and face.
II) eyes.
III) hand and elbow.
IV) body
V) leg and feet.
VI) electric fire Alarms

⇒ hand and face & It mainly includes.
head & helmets and skull Guards which are the major organ to be protected from fall during shocks.

- As we consider head a cretical organ
- face mask in order to avoid from electric fumes.
- face googles, in order to Avoid electric spark entering the eyes may Result to loss of vision
- hand should be with Gloves which are electric protective should be make of Insulating material to Avoid electricity direct contact
- Body vests or Body coveling make of insulating material preferably Rubber Avoid metal Items
- Use smoke and fire detective Alarms As a precautionary measuring

- Use Insulating equipment
- Use electric insulators.
- Anti electric insulating boots or shoes.

INTERNAL ASSESSMENT MARKS ENTRY

Q.No's		I.A -I			I.A -II			I.A -III		
		Max Marks	Marks obtained	Co's	Max Marks	Marks obtained	Co's	Max Marks	Marks obtained	Co's
1	a	8		1	8		2	8	8	4
	b	7		1	7		2	7	7	4
	c									
				OR						
2	a	8	8	1	8	6	2	8		4
	b	7	7	1	7	7	2	7		4
	c									
3	a	8	8	1	8	8	3	8		5
	b	7	7	1	7	7	3	7		5
	c									
				OR						
4	a	8		1	8		3	8	8	5
	b	7		1	7		3	7	7	5
	c									
TOTAL		30	30	---	30	28	---	30	30	---

COURSE OUTCOMES	
CO 1	student able identify and analyse problems related to hazards and can arrive at conclusions
CO 2	Student will be able to Judge and impact of hazard on society and environment.
CO 3	student could asses societal health and mechanical safety issues.
CO 4	Student could assess societal health and electrical safety issues.
CO 5	students will be able to judge the impact of hazards on society and environment.
CO 6	

PROGRAM OUTCOMES (POs)	
PO1	**Engineering Knowledge** : Apply the knowledge of mathematics, science, Engineering fundamentals and an engineering specialization to the solution of complex engineering problems
PO2	**Problem analysis** : Identify formulate review research literature and analize complex engineering problems reaching substantiated conclusion using first principles of mathematics natural sciences and engineering sciences
PO3	**Design / development of solutions** : Design solution for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations
PO4	**Conduct investigations of complex problems** : Use research based knowledge and research methods including design of experiments alalysis and interpretation of data and synthesis of the information to provide valid conclusions
PO5	**Modern tool usage** : Create select and apply appropriate techniques resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
PO6	**The engineer and society** : Apply reasoning informed by the contextual knowledge to assess societal health safety legal and cultural issues and the consequent responsibilities relevent to the professional engineering practice
PO7	**Environment and sustainability** : Understand the impact of the professionals engineering solution in scoietal and environmental contexts and demonstrate the knowledge of and need for sustainable development
PO8	**Ethics** : Apply ethical principles and commit to professionals ethics and responsibilities and norms of the engineering prctice
PO9	**Individual and team work** : Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings
PO10	**Communication** : communicate effectively on complex engineering activities with the engineering community and with society at large such as being able to comprehend and write effective reports and design documentation make effective presentations and give and receive clear instructions
PO11	**Project management and finance** : Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary enviroments
PO12	**Life long learning** : Recognize the need for and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change

PROGRAM SPECIFIC OUTCOMES (PSOS)	
PSO1	Professional skills: The ability to understand and implement the computer programs in
PSO2	Problem-solving skills: The ability to solve real world problems
PSO3	by the suitable mathematical model with strong technology concepts
PSO4	

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)	
PEO1	exhibit the knowledge and skillset to adopt to the dynamic technological transitional
PEO2	Get adapted to a corporate working environment to chag evaluated tasks.
PEO3	Get engaged in an innovative career to exploit new ideas for gaining social and economic
PEO4	value or pursue higher studies in the field of research