MASTER QUESTION BANK: INDUSTRIAL SAFETY (100 Questions)

CHAPTER 1: SAFEGUARDING OF MACHINES

Q1. According to the Factories Act, 1948, which section specifically mandates the 'Fencing of Machinery' to protect workers from dangerous parts?

a) Section 19

b) Section 21

c) Section 23

d) Section 41

Q2. Which type of machine guard is considered the first choice because it provides a permanent barrier with no moving parts?

a) Interlocked Guard

b) Adjustable Guard

c) Fixed Guard

d) Trip Guard

Q3. What is the primary function of a 'Riving Knife' on a circular saw?

a) To catch sawdust

b) To sharpen the blade

c) To prevent kickback

d) To measure the cut width

Q4. On a grinding machine, what is the maximum allowable gap between the abrasive wheel and the work rest?

a) 10 mm

b) 6 mm

c) 3 mm

d) 1 mm

Q5. Which safety device is designed to ensure that an operator's hands are away from the danger zone during the hazardous part of a machine cycle?

a) Flywheel

b) Limit Switch

c) Belt Drive

d) Two-Hand Control

Q6. In the context of paper and rubber machinery, what is a 'Nip Point'?

a) The point where the machine is turned on

b) The point where two rotating rollers meet

c) The sharp edge of a cutting blade

d) The emergency stop button location

Q7. Under Section 23 of the Factories Act, who is prohibited from working on dangerous machines without adequate training and supervision?

a) Maintenance engineers

b) Adult male workers

c) Supervisors

d) Young persons

Q8. What is the main disadvantage of an 'Adjustable Guard' compared to a 'Self-Adjusting Guard'?

a) It is too expensive

b) It cannot be used on saws

c) It relies on the operator to set it correctly

d) It is made of plastic

Q9. Which device is used to feed small pieces of wood into a saw to prevent injury to the fingers?

a) Spanner

b) Push Stick

c) Interlock

d) Caliper

Q10. What is the purpose of an 'Interlock' on a machine guard?

a) To lock the guard permanently so it never opens

b) To automatically clean the machine

c) To prevent the machine from starting if the guard is open

d) To speed up the machine

CHAPTER 2: MANUAL HANDLING & STORAGE

Q11. Which section of the **Factories Act, 1948** specifically deals with "Excessive Weights" and prohibits employing any person to lift a load likely to cause injury?

a) Section 21

b) Section 34

c) Section 45

d) Section 88

Q12. According to the Model Factories Rules, what is the generally prescribed **maximum weight** that an **Adult Male** worker is allowed to lift unaided?

a) 75 kg

b) 55 kg

c) 30 kg

d) 100 kg

Q13. What is the maximum weight limit for an **Adult Female** worker for manual lifting as per standard Indian factory rules?

a) 20 kg

b) 25 kg

c) 30 kg

d) 50 kg

Q14. In the **Kinetic Method of Lifting**, what is the correct position of the back?

a) Curved and relaxed

b) Bent at a 90-degree angle

c) Straight (preserving natural spinal curves)

d) Twisted to the side

Q15. Which of the following is a key principle of the **6-Point Kinetic Lift**?

a) Keep feet together

b) Lift with the back muscles

c) Hold the load as close to the body as possible

d) Look down at the floor while lifting

Q16. What is the most common type of injury associated with improper manual handling?

a) Chemical burns

b) Musculoskeletal Disorders (MSDs)

c) Electric shock

d) Hearing loss

Q17. When stacking materials to ensure stability, the height of the stack should generally not exceed _____ times the narrower dimension of the base.

a) 2

b) 3

c) 5

d) 10

Q18. Which accessory is best suited for moving heavy machinery over a short distance on the floor?

a) Crowbar and Rollers

b) Hook

c) Rope ladder

d) Safety belt

Q19. When storing gas cylinders, which of the following practices is **unsafe**?

a) Storing them vertically

b) Securing them with chains

c) Storing Oxygen and Acetylene cylinders together in the same stack

d) Keeping the valve caps on when not in use

Q20. What is the correct way to stop a heavy drum that is rolling?

a) Place your foot in front of it

b) Grab the rim with your hands

c) Use a chock or wedge

d) Stand directly in its path to block it

CHAPTER 3: MECHANICAL HANDLING

Q21. According to Section 29 of the Factories Act, 1948, how often must a lifting machine be thoroughly examined by a competent person?

a) Once every 6 months

b) Once every 3 years

c) Once every 12 months

d) Only after a breakdown

Q22. What is the standard 'Proof Load' used for testing a lifting machine before it is taken into use?

a) 1.1 times the Safe Working Load (SWL)

b) Equal to the Safe Working Load (SWL)

c) 2.0 times the Safe Working Load (SWL)

d) 1.25 times the Safe Working Load (SWL)

Q23. When operating a forklift, what happens to the stability if the load is raised while turning a corner?

a) Stability increases

b) Stability remains unchanged

c) The forklift is more likely to tip over

d) The rear wheels lift off only if braking

Q24. In a multi-leg sling, how does the angle between the legs affect the Safe Working Load (SWL)?

a) As the angle increases, the SWL increases

b) As the angle increases, the SWL decreases

c) The angle has no effect on SWL

d) SWL is only affected by the rope thickness

Q25. Which safety device on a crane prevents the hook block from crashing into the drum/pulley?

a) Over-lower limit switch

b) Over-hoist limit switch

c) Travel limit switch

d) Dead man's handle

Q26. A crane hook should be rejected and replaced if the throat opening has increased by more than:

a) 5%

b) 10%

c) 15%

d) 25%

Q27. What is the 'Factor of Safety' (FoS) generally applied to Wire Ropes used for lifting?

a) 2:1

b) 3:1

c) 6:1

d) 10:1

Q28. Which of the following is a visual sign that a Wire Rope Sling must be discarded?

a) Surface rust that wipes off

b) The tag is slightly faded

c) Grease on the wire

d) Bird-caging (separation of strands)

Q29. When carrying a load on a ramp with a forklift, if you are driving UP the ramp, the load should face:

a) Downhill

b) Uphill

c) Sideways

d) It does not matter

Q30. What is the function of the 'Safe Load Indicator' (SLI) on a mobile crane?

a) To measure the wind speed

b) To warn if the load/radius combination is unsafe

c) To weigh the crane operator

d) To count the number of lifts

CHAPTER 4: HAND & POWER TOOLS

Q31. Which of the following describes a 'Mushroomed Head' on a cold chisel?

a) A specialized head for cutting soft wood

b) A deformation where the striking end spreads and curls over

c) A type of handle made from fungus-treated wood

d) A protective cap placed over the tool

Q32. What does the symbol of a 'Square within a Square' on a power tool indicate?

a) The tool is water-resistant

b) The tool requires a 3-pin grounded plug

c) The tool is Double Insulated

d) The tool is for wood cutting only

Q33. Why must a file never be used without a handle?

a) It will rust faster

b) The sharp 'tang' can puncture the palm of the hand

c) It makes the file too heavy

d) It decreases the cutting speed

Q34. Which material is commonly used to manufacture 'Non-Sparking Tools' for use in

explosive atmospheres?

a) High Carbon Steel

b) Cast Iron

c) Beryllium-Copper or Aluminum-Bronze

d) Stainless Steel

Q35. What is the safest way to use a wrench (spanner) to loosen a tight nut?

a) Push the wrench away from you

b) Strike the wrench handle with a hammer

c) Use a pipe extension (cheater bar) for leverage

d) Pull the wrench towards you

Q36. What is a 'Deadman Switch' on a portable power tool?

a) A switch that locks the tool in the 'ON' position

b) A switch that automatically cuts power if the operator releases pressure

c) A switch used to restart a broken tool

d) A master switch located in the main office

Q37. When using a hacksaw, when should pressure be applied?

a) On the return stroke only

b) On both the forward and return strokes

c) On the forward stroke only

d) Pressure should never be applied

Q38. What is the primary purpose of 'Dressing' a tool?

a) To paint the tool for identification

b) To grind off mushroomed heads or sharp burrs

c) To wrap the handle in tape

d) To heat the tool to change its hardness

Q39. What is a common unsafe practice when using a screwdriver?

a) Using a screwdriver with an insulated handle

b) Matching the tip size to the screw head

c) Holding the workpiece in the palm of the hand

d) Keeping the shank perpendicular to the screw head

Q40. Which system is recommended to ensure that only safe, high-quality tools are used in a factory?

a) Bring Your Own Tools (BYOT)

b) Open Storage System

c) Centralized Tool Control

d) Discard-and-Replace System

CHAPTER 5: ELECTRICAL HAZARDS

Q41. What is the standard trip rating for an ELCB or RCCB used to protect human life from electric shock?

a) 1 Amp

b) 100 mA

c) 30 mA

d) 10 mA

Q42. Which symbol on a portable power tool indicates that it is 'Double Insulated' and does not require an earth wire?

a) A square within a square

b) A triangle with an exclamation mark

c) A drop of water in a circle

d) A lightning bolt

Q43. According to safety regulations, what is the minimum vertical clearance required for High Voltage lines (> 650 V) passing above a building?

a) 1.2 meters

b) 2.5 meters

c) 3.7 meters

d) 5.0 meters

Q44. What is the primary function of an Earth Leakage Circuit Breaker (ELCB) or RCCB?

a) To protect against short circuits

b) To detect current imbalance between Phase and Neutral

c) To reduce electricity bills

d) To protect against voltage surges

Q45. According to Indian Electricity Rules (now CEA Regulations), how must 3-phase industrial motors be earthed?

a) With a single earth wire

b) Earthing is not required for motors

c) Through the neutral wire only

d) With two separate and distinct earth connections

Q46. What defines 'Flameproof' (Ex-rated) electrical equipment?

a) It is made of fire-resistant plastic

b) It can withstand an internal explosion without igniting the external atmosphere

c) It will extinguish any fire around it

d) It operates without using electricity

Q47. What is the likely physiological effect of an electric current of 50 mA to 100 mA passing through the body?

a) Slight tingling sensation

b) No effect

c) Ventricular Fibrillation (heart rhythm disruption)

d) Instant cardiac arrest (heart stops)

Q48. What is the most effective method to control the hazard of static electricity during liquid transfer?

a) Using plastic containers

b) Speeding up the transfer

c) Increasing the temperature

d) Bonding and Grounding

Q49. What is the generally accepted maximum resistance value for an earth electrode (earth pit)?

a) 5 Ohms

b) 50 Ohms

c) 100 Ohms

d) 1 Megaohm

Q50. What dangerous condition can arise from a 'Borrowed Neutral' or a broken neutral wire in a 3-phase system?

a) The circuit breaker trips immediately

b) Floating Neutral / Over-voltage (damage to equipment)

c) Reduced power consumption

d) Better earthing

CHAPTER 6: INDUSTRIAL LIGHTING

Q51. What is the standard unit used to measure Illumination (Illuminance) at a specific point?

a) Lumen

b) Candela

c) Lux

d) Watt

Q52. What is the 'Stroboscopic Effect' in industrial lighting?

a) The flickering of light that causes headaches

b) An illusion where rotating machinery appears to be stationary or moving slowly

c) The glare produced by unshielded lamps

d) The color distortion caused by sodium vapor lamps

Q53. According to Indian Standards (IS 3646), what is the recommended minimum illumination level for 'Fine Work' (e.g., precision assembly, inspection)?

a) 50 - 100 Lux

b) 150 - 200 Lux

c) 300 - 500 Lux

d) 700 - 1000 Lux

Q54. Which type of lighting system directs 90-100% of the light downwards towards the work plane?

a) Indirect Lighting

b) Direct Lighting

c) Semi-Direct Lighting

d) General Diffused Lighting

Q55. In the lighting design formula (Lumen Method), what does 'MF' stand for?

a) Multiplying Factor

b) Maintenance Factor

c) Maximum Factor

d) Manufacturing Factor

Q56. What is the primary disadvantage of High Pressure Sodium Vapor lamps?

a) Very short life

b) Poor Color Rendering (Yellow/Orange light)

c) Low efficiency

d) Immediate burnout

Q57. Which form of 'Glare' causes a reduction in the ability to see details without necessarily causing pain?

a) Discomfort Glare

b) Disability Glare

c) Reflected Glare

d) Ambient Glare

Q58. Why is 'Group Relamping' (replacing all bulbs at once) often recommended over 'Spot Relamping' in large factories?

a) It uses more electricity

b) It is cheaper in labor costs and ensures uniform lighting

c) It allows buying different colored bulbs

d) It is required by law every month

Q59. Which color is typically associated with 'Safety/First Aid' in industrial color coding?

a) Red

b) Yellow

c) Green

d) Blue

Q60. What is the recommended Lux level for Passageways and Corridors?

a) 500 Lux

b) 50 - 100 Lux

c) 10 Lux

d) 1000 Lux

CHAPTER 7: SAFETY OF PRESSURE VESSELS

Q61. Which specific Act regulates the design, registration, and inspection of 'Fired' pressure vessels (Boilers) in India?

a) The Factories Act, 1948

b) The Indian Boilers Act, 1923

c) The SMPV Rules, 2016

d) The Environment Protection Act, 1986

Q62. What is the primary function of a 'Fusible Plug' in a boiler?

a) To drain excess water

b) To extinguish the fire in case of low water level

c) To regulate steam pressure

d) To measure the temperature

Q63. During a Hydrostatic Test, to what pressure is the vessel typically pressurized?

a) Equal to the Safe Working Pressure (SWP)

b) 1.5 times the Design Pressure

c) 3 times the Design Pressure

d) 0.5 times the Design Pressure

Q64. Which of the following is an example of an 'Unfired' pressure vessel?

a) Thermal Power Plant Boiler

b) Locomotive Engine Boiler

c) Air Receiver (Compressor Tank)

d) Furnace

Q65. Why is 'Water' used for pressure testing instead of 'Compressed Air'?

a) Water is cheaper

b) Water prevents rust

c) Water is incompressible and stores less explosive energy

d) Water is easier to pump

Q66. How many independent safety valves are legally required on a boiler?

a) One

b) At least two

c) Four

d) None, if there is a pressure gauge

Q67. What is the correct immediate action if the water level in the boiler gauge glass drops out of sight?

a) Immediately pump in cold water

b) Stop firing immediately

c) Increase the steam pressure

d) Open the safety valve manually

Q68. Which NDT method is primarily used to check the 'Weld Quality' of a pressure vessel for hidden cracks?

a) Visual Inspection

b) Radiography (X-Ray)

c) Hammer Test

d) Vibration Analysis

Q69. What is the typical 'Factor of Safety' used in the design of pressure vessels?

a) 1.0 to 1.5

b) 3.5 to 4.0

c) 10.0

d) 2.0

Q70. What is the purpose of the 'Blow-down Valve' located at the bottom of the boiler?

a) To release excess steam

b) To remove sludge and sediment

c) To let air into the boiler

d) To insert fuel

CHAPTER 8: VENTILATION & HEAT CONTROL

Q71. Which instrument is specifically used to measure 'Radiant Heat' in a hot environment?

a) Wet Bulb Thermometer

b) Kata Thermometer

c) Globe Thermometer

d) Dry Bulb Thermometer

Q72. What is the correct formula for calculating the Wet Bulb Globe Temperature (WBGT) index for indoor environments (without solar load)?

a) WBGT = 0.5 NWB + 0.5 GT

b) WBGT = 0.7 NWB + 0.3 GT

c) WBGT = 0.7 NWB + 0.2 GT + 0.1 DB

d) WBGT = 0.1 NWB + 0.9 GT

Q73. In the context of 'Natural Ventilation', what is the 'Stack Effect'?

a) Using fans to stack air in layers

b) The movement of air caused by the wind blowing through windows

c) The accumulation of dust in ventilation stacks

d) The tendency of hot air to rise and escape through roof openings, drawing cool air in from below

Q74. Which component of a Local Exhaust Ventilation (LEV) system is responsible for capturing the contaminant at the source?

a) Duct

b) Fan

c) Hood

d) Air Cleaner

Q75. What is the primary physiological mechanism by which the human body loses heat in a hot industrial environment where the air temperature is higher than body temperature?

a) Radiation

b) Conduction

c) Evaporation (Sweating)

d) Convection

Q76. Dilution Ventilation (General Ventilation) should NOT be used for which type of hazard?

a) Low toxicity vapors

b) Heat removal

c) Highly toxic substances or heavy dusts

d) Nuisance odors

Q77. Which material is most effective for a shield designed to control 'Radiant Heat'?

a) Clear Glass

b) Black Rubber

c) Polished Aluminum or Tin

d) Asbestos Cloth

Q78. In the Heat Balance Equation S = M ± C ± R - E, what does 'S' stand for?

a) Sweat Rate

b) Heat Storage

c) Solar Load

d) Surface Temperature

Q79. Which instrument is used to measure low air velocities (cooling power of air) in a workplace?

a) Barometer

b) Kata Thermometer

c) Hygrometer

d) Pyrometer

Q80. What is the normal core body temperature that the body tries to maintain?

a) 35°C (95°F)

b) 40°C (104°F)

c) 37°C (98.6°F)

d) 30°C (86°F)

CHAPTER 9: MACHINE CONTROL & DISPLAYS

Q81. What is the "Natural Expectation" (population stereotype) for the movement of a switch to turn a machine "ON"?

a) Down

b) Up

c) Left

d) Pull Out

Q82. Which type of display is best suited for determining the "Rate of Change" or seeing a "Trend" (e.g., pressure rising rapidly)?

a) Digital Display

b) Analog Display (Pointer)

c) Binary Light

d) Text Screen

Q83. Why must an Emergency Stop (E-Stop) button be "Mushroom-headed"?

a) To look like a warning sign

b) To prevent accidental activation

c) To provide a large surface area for easy activation (e.g., with a palm)

d) To save space on the panel

Q84. What is the standard color combination for an Emergency Stop button?

a) Green button on Red background

b) Red button on Yellow background

c) Black button on White background

d) Yellow button on Black background

Q85. Which design feature is used to prevent accidental activation of a foot pedal?

a) Painting it red

b) Making it very small

c) Installing a protective shroud (cover) over it

d) Placing it far away from the machine

Q86. In "Check Reading" (scanning a panel), why are analog dials often preferred over digital displays?

a) They are cheaper

b) They are more precise

c) You can quickly see if the needle is in the "Safe Zone" without reading the number

d) They use less electricity

Q87. What is the primary disadvantage of using "Foot Controls"?

a) They are too expensive

b) Feet are slower and less precise than hands

c) They take up too much floor space

d) They cannot be used for heavy machinery

Q88. According to standard color coding, what does the color "Blue" typically indicate on a machine panel?

a) Danger / Stop

b) Caution / Warning

c) Mandatory Action / Information

d) Fire Safety

Q89. To prevent accidental activation, a critical push-button should be:

a) Protruding (sticking out)

b) Recessed (sunk below the surface)

c) Very large

d) Located on the floor

Q90. What is the ideal frequency range for an Audio Warning Signal to be best heard by the human ear?

a) 20 - 50 Hz

b) 500 - 3000 Hz

c) 10,000 - 15,000 Hz

d) Above 20,000 Hz

CHAPTER 10: SAFETY IN INDUSTRIES

Q91. Which occupational lung disease is specifically associated with the inhalation of cotton or jute dust in the textile industry?

a) Silicosis

b) Asbestosis

c) Byssinosis

d) Siderosis

Q92. What is the primary safety purpose of a "ROPS" on an agricultural tractor?

a) To protect the engine from rain

b) To prevent the tractor from rolling over

c) To protect the driver from crushing injuries if the tractor rolls over

d) To improve fuel efficiency

Q93. In a foundry, what is the major health risk associated with the silica sand used for molds?

a) Dermatitis

b) Silicosis

c) Metal Fume Fever

d) Heat Stroke

Q94. Which of the following is a critical hazard when entering a ship's hold in a port?

a) High noise levels

b) Oxygen deficiency or toxic gases (Confined Space)

c) Excessive light

d) Strong winds

Q95. What causes "Metal Fume Fever" in welding or foundry operations?

a) Inhaling silica dust

b) Inhaling fumes of metals like Zinc or Magnesium

c) Touching hot metal

d) Looking at the welding arc without glasses

Q96. Which industry is most prone to "Dust Explosions" due to organic dusts like grain or flour?

a) Engineering

b) Agro-Industry (Grain storage)

c) Foundry

d) Electroplating

Q97. In Port & Dock safety, what does "SWL" marked on a crane or sling stand for?

a) Standard Weight Limit

b) Safe Working Load

c) Ship Working Level

d) Steel Wire Length

Q98. Why is moisture (water) dangerous when added to a furnace containing molten metal?

a) It cools the metal too fast

b) It causes rust

c) It flashes into steam instantly, causing a violent explosion

d) It puts out the fire

Q99. Which type of PPE is most critical for a worker handling rough castings or metal sheets in an engineering workshop?

a) Respiratory mask

b) Cut-resistant gloves (Leather/Kevlar)

c) Ear plugs

d) High-visibility jacket

Q100. The Dock Workers (Safety, Health and Welfare) Regulations, 1990 apply to which sector?

a) Agriculture

b) Textile Mills

c) Mining

d) Ports and Docks

MASTER ANSWER KEY

Chapter 1 (Safeguarding)

1(b), 2(c), 3(c), 4(c), 5(d), 6(b), 7(d), 8(c), 9(b), 10(c)

Chapter 2 (Manual Handling)

11(b), 12(b), 13(c), 14(c), 15(c), 16(b), 17(b), 18(a), 19(c), 20(c)

Chapter 3 (Mechanical Handling)

21(c), 22(d), 23(c), 24(b), 25(b), 26(c), 27(c), 28(d), 29(b), 30(b)

Chapter 4 (Hand & Power Tools)

31(b), 32(c), 33(b), 34(c), 35(d), 36(b), 37(c), 38(b), 39(c), 40(c)

Chapter 5 (Electrical Hazards)

41(c), 42(a), 43(c), 44(b), 45(d), 46(b), 47(c), 48(d), 49(a), 50(b)

Chapter 6 (Lighting)

51(c), 52(b), 53(d), 54(b), 55(b), 56(b), 57(b), 58(b), 59(c), 60(b)

Chapter 7 (Pressure Vessels)

61(b), 62(b), 63(b), 64(c), 65(c), 66(b), 67(b), 68(b), 69(b), 70(b)

Chapter 8 (Ventilation & Heat)

71(c), 72(b), 73(d), 74(c), 75(c), 76(c), 77(c), 78(b), 79(b), 80(c)

Chapter 9 (Machine Control)

81(b), 82(b), 83(c), 84(b), 85(c), 86(c), 87(b), 88(c), 89(b), 90(b)

Chapter 10 (Industries)

91(c), 92(c), 93(b), 94(b), 95(b), 96(b), 97(b), 98(c), 99(b), 100(d)