

INDUSTRIAL SAFETY

Safety can be defined as a state of being free from danger or harm or injury or damage. It can be said to be the theory and practice of providing adequate safeguard for reducing life and property/machinery loss by accidents.

Objective and advantages of safety include:

1. To protect people
2. To protect property/machinery
3. Reduction of downtimes

4. To reduce costs due to repair of damaged equipment or medical treatment given to injured personnel/operators.

DEFINITION OF TERMS

1. **Accident:** An unplanned event that results in harm to people, damage to property or loss to process.
2. **Asphyxiant:** A vapour or gas that can either reduce the oxygen content in the air or interfere with the body's ability to use oxygen. Exposure to an asphyxiant can result in unconsciousness or death due to being unable to breathe.
3. **Dermatitis:** Inflammation of the skin.
4. **Ergonomics:** An applied science that studies the interaction

4. **Ergonomics:** An applied science that studies the interaction between people and the work environment.
5. **Fatality:** Death resulting from an accident.
6. **First Aid:** The immediate care given to a person, who is injured or ill.
7. **Fume:** Finely divided solid particles that are formed when a hot metal vapour cools and condenses.
8. **Grounding:** Electrical connection of one or more conductive objects to the earth through the use of metal grounding rods or other devices.
9. **Guarding:** Use of any device or combination of devices designed to keep any part of a worker's body out of the danger zone of a machine during its operating cycle.

- 10. Incident:** An unwanted event which, in different circumstances, could have resulted in harm to people, damage to property or loss to a process. Also known as a near miss.
- 11. Latent Period:** The time that passes between exposure to harmful substance or agent and the first sign(s) of damage or illness. Also known as incubation period.
- 12. Lockout:** A specific set of procedures for ensuring that a machine, once shut down for maintenance, repair or other reason, is secure against accidental start-up or movement of any of its parts for the length of the shutdown.
- 13. Personal Protective Equipment (PPE):** Any device worn by a worker to protect

~~or any other purpose for the length~~
of the shutdown.

13. **Personal Protective Equipment (PPE):** Any device worn by a worker to protect against hazards. Some examples are: respirators, gloves, ear plugs, hard hats, safety goggles and safety shoes.
14. **Safety:** Protection from, or not being exposed to the risk of harm or injury.
15. **Stress:** A set of physical reactions that take place in the body in response to demands that are placed on it.
16. **Unsafe Act:** An act or practice that is capable of causing an accident.
17. **Zero Energy State:** The state in which a machine has been made temporarily incapable of accidental startup or movement.

GENERAL WORKSHOP SAFETY RULES

1. Horseplay and unruly behaviour of any kind will not be tolerated at any time in the workshop.
2. Machines, tools and equipment must be used in the correct manner and never misused.
3. Approved steel toe-capped footwear must be worn at all times.
4. Protective googles must be worn in the workshop.
5. Always use a guard when working on a machine.
6. Use hand tools careful, keeping both hands behind the cutting edge.
7. Always be patient, never rush into the workshop.

8. All breakage and damage must be reported immediately.
9. All machine must be isolated and locked after use.
10. Do not lean on the machines whether in use or not.

ELECTRICAL WORKSHOP PRECAUTIONS & RULES

1. Make sure the cable/conductor used fulfil its size (rating) and having suitable insulation.
2. Make sure every electrical installation has effective earthing and avoid it from rust.
3. Any addition of circuit must be avoided unless there is permission from officer in charge.

4. Do not dismantle electric component/device used in the experiment without the knowledge of officer in charge.
5. Assistance from officer in charge must sought before testing the experiment with electrical supply.
6. After using electrical machine, it must be switch off.
7. All electrical supply must be put off after finishing the job or before leaving the workshop.
8. Before fitting plug to the socket, socket outlet switch must be in off condition.
9. Make sure environment around workplace is clean and systematic before and after work.

PROTECTIVE AIDS USED IN ELECTRICAL INSTALLATION:

Portable voltage indicator
and clamp-on meter.

Temporal safety earthen set-
portable gas and warning
notice.

~~Protective goggles, clothes
and gas masks for protection
against~~

Non conducting rubber:
boots, mats, gloves.

CLASSES OF WORKSHOP ACCIDENTS AND RELEVANT FIRST AIDS

Minor wounds and

Scratches: Wash the
wound/scratch from the
middle outwards before
applying dressing.

ELECTRICAL TOOLS AND ITS USES

1. SET OF SCREWDRIVER: Used for working in different terminals in electrical connection.
2. TERMINAL TEST SCREWDRIVER: Used for testing current flow in terminals.
3. BIG SCREW DRIVER: Used in connection of switch gears.
4. MEDIUM/BIG PLIERS: Used in joining cables of various sizes.
5. LONG NOSE PLIER: Used in picking washers, small knots in equipment like radio, television etc.

6. **SMALL/MEDIUM HAMMER:** Used for surface wiring.
7. **CUTTER INSULATED:** Used for cutting various sizes of cables.
8. **BIG HAMMER:** Used in opening walls for conduit wiring.
9. **SOLDERING IRON/LEAD:** Used for soldering/joining in and out of components in equipments.
10. **BLOW LAMP:** Used in fixing cables.

TYPES OF ELECTRICAL MACHINES

1. **WELDING MACHINE:** Used for construction of burglary proof to protect control switches.
2. **DRILLING MACHINE:** Used for drilling holes in metals.
3. **PUMPING MACHINE:** Used to pump water from the under soil tank to overhead tank to serve building.

4. WOOD WORKING

MACHINE: Used for cutting and dressing of woods for furniture making.

5. WASHING MACHINE: Used in washing clothes.

6. COMPRESSOR MACHINE: Used for polishing and pumping of tyres.

CABLES

A cable is defined as a group or bundles of wire transmitting electrical signals that are bound together and usually have shared or common insulation. A cable consists of two parts namely:

1. The conductor: The metal wire and
2. The insulator: The covering material to prevent the leakage of current away from the conductor

RESISTOR

COLOUR

CODING

A resistor is an electronic component that limits or ‘resists’ the flow of electrons in a circuit. They are one of the basic electronic components and are generally used for power control. Resistance value of most resistors is determined by the colour band painted on them. Colour coding is used to represent value and tolerance of a resistor. Four colour bands are mostly used. The

colour bands are mostly used. The first three bands give the value of the resistor while the last gives the tolerance. The table below gives the various colours and their respective codes.

COLOUR	1ST DIGIT	MULTIPLIER	TOLEI
Black	0	1	-
Brown	1	10	1%
Red	2	10^2	2%
Orange	3	10^3	-
Yellow	4	10^4	-
Green	5	10^5	0.5%
Blue	6	10^6	0.25%
Violet	7	10^7	0.1%

Gray	8	10^8	-
White	9	10^9	-
Gold	-	-	5%
Silver	-	-	10%
Colorless	-	-	20%

Resistors are of two types viz fixed resistors, which includes carbon resistors and wire wound; and variable resistors, also called potentiometer. Parameters considered when selecting a resistor are:

1. Power rating in watts- this relates to the maximum current that can pass through the resistor without overheating it. Carbon resistors are rated $1/8W$, $1/4W$, $1/2W$, $1W$, or $2W$. Wire wound have higher wattages up to $25W$ or more. The physical size of a resistor indicates its power rating.

Gold	-	-	3%*
Silver	-	-	10%
Colorless	-	-	20%

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2. Maximum voltage applied across the resistor
3. Working temperature range

WORKSHOP AND AUTOMATION AUTOMATION



Automation is the use of control systems and information technologies reducing the need for human intervention.

Common acronyms:

1. Computer-aided Design (CAD)
2. Computer-aided Engineering (CAE)

(CAE)

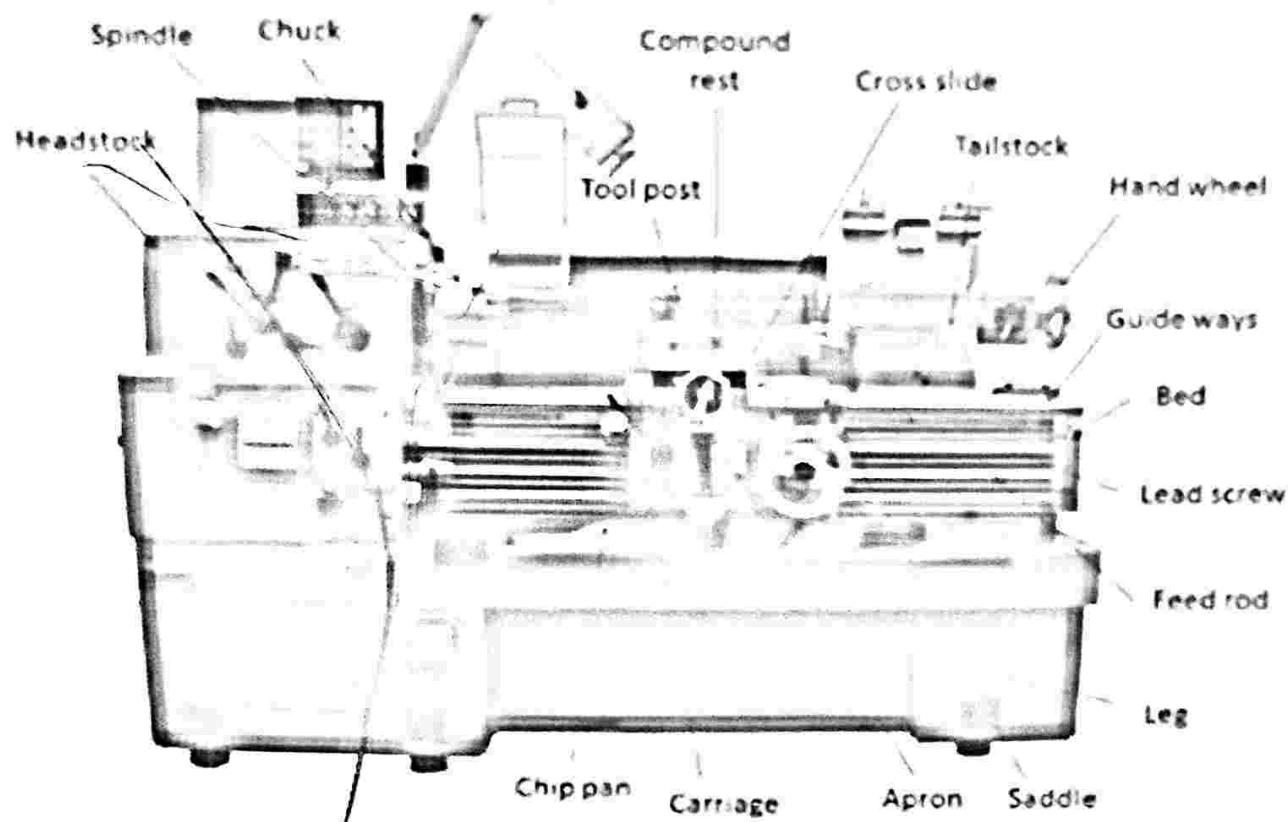
3. Computer-aided Industrial Design (CAID)
4. Computer-aided Manufacturing (CAM)
5. Computer Numerical Controlled (CNC)

Some Machines available in FUTO workshop

- a. Centre Lathe Machine
- b. The Capstan Lathe Machine
- c. The Horizontal Milling Machine
- d. Vertical Milling Machine
- e. Shaping Machine
- f. Slotting Machine
- g. Surface Grinding Machine
- h. Pillar Drilling Machine
- i. Power Saw Machine
- j. Cylindrical Grinding Machine
- k. Radial Drilling Machine
- l. Tool and Cutter Grinder
- m. Marking off/Surface Table

m. Marking off/Surface Table

Lathe Machine



The main Parts of a Centre Lathe Machine are:

Bed: Usually made of cast iron. Provides a heavy rigid frame on which all the main components are mounted.

~~Ways: Inner and outer guide rails~~

Ways: Inner and outer guide rails that are precision machined parallel to assure accuracy of movement.

Headstock: mounted in a fixed position on the inner ways, usually at the left end. Using a chuck, it rotates the work.

Gearbox: inside the headstock, providing multiple speeds with a geometric ratio by moving levers.

Spindle: Hole through the headstock to which bar stock can be fed, which allows shafts that are up to 2 times the length between lathe centers to be worked on one end at a time.

Chuck: 3-jaw (self-centering) or 4-jaw (independent) to clamp part being machined.

Chuck: allows the mounting of difficult work pieces that are not round, square or triangular.

Tailstock: Fits on the inner ways of

the bed and can slide towards any position the headstock to fit the length of the work piece. An optional taper turning attachment would be mounted to it.

Tailstock Quill: Has a Morse taper to hold a lathe center, drill bit or other tool.

Carriage: Moves on the outer ways. Used for mounting and moving most the cutting tools.

Cross Slide: Mounted on the traverse slide of the carriage, and uses a hand wheel to feed tools into the work piece.

Tool Post: To mount tool holders in which the cutting bits are clamped.

Compound Rest: Mounted to the cross slide, it pivots around the tool post.

Apron: Attached to the front of the

Apron: Attached to the front of the carriage, it has the mechanism and controls for moving the carriage and cross slide.

Feed Rod: Has a keyway, with two reversing pinion gears, either of which can be meshed with the mating bevel gear to forward or reverse the carriage using a clutch.

Lead Screw: For cutting threads.

Split Nut: When closed around the lead screw, the carriage is driven along by direct drive without using a clutch.

Quick Change Gearbox: Controls the movement of the carriage using levers.

Steady Rest: Clamped to the lathe ways, it uses adjustable fingers to contact the work piece and align it. Can be used in place of tailstock or in the middle to support long or unstable parts being machined

Follow Rest: Bolted to the lathe carriage, it uses adjustable fingers to bear against the work piece opposite the cutting tool to prevent deflection.

Some other machines and their function

MILLING MACHINE

Milling is the machining process of using rotary cutters to remove material from a work piece by advancing (or feeding) the cutter into the work piece at a certain direction. The cutter may also be held at an angle relative to the axis of the tool.

ENGRAVING MACHINE

Engraving is the practice of incising a design onto a hard, flat surface, by cutting grooves into it. This Machine

is used to put writings on surfaces of materials.

COMPUTER NUMERICAL CONTROL (CNC) MACHINES

Computer Numerical Control (CNC) is the automation of machine tools by mean of computers executing pre-programmed sequences of machine control commands. This is in contrast to machines that are manually controlled by hand wheels or levers, or mechanically automated by cams alone. We can apply CNC to a Lathe machine, Milling Machine and other Machines.

(1) Which of the following is a consequence of accident?

- (A) Pain
- (B) Hazard
- (C) Loss
- (D) Injury

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Hazard

 Hide Answer



Explanation

(2) What type of hazard is Manual handling?

- (A) Physical
- (B) Chemical
- (C) Biological

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None of the above

(3) The acronym PTD in safety stands for

- (A) Partial Total Disability**
- (B) Permanent Total Deformation**
- (C) Partial Total Deformation**
- (D) Permanent Total Disability**

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Permanent Total Disability

 Hide Answer



Explanation

(4) The cost of safety seeks to reduce include all the following EXCEPT:

- (A) Cost of replacing damaged equipment**
- (B) Cost of repairing damaged equipment**
- (C) Cost of siting an additional new factory**
- (D) Cost of medical treatment to injured operators**

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Cost of siting an additional new factory

(5) To undertake a job labeled 3D in Risk Chart, we need a

- (A) SHOC card
- (B) LTI
- (C) PTW
- (D) PTD

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PTW

 Hide Answer



Explanation

(6) Downtimes are occasioned by the following EXCEPT

- (A) LTI
- (B) Damage of pivotal machinery
- (C) Industrial action
- (D) Industrial safety

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Industrial safety

(7) Causes of accidents include the following EXCEPT

- (A) Pain
- (B) Carelessness
- (C) Lack of training
- (D) All of the above

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Lack of training

 Hide Answer



Explanation

(8) Given A=Accident, N=Near miss and I=Incident. Which of the following options is correct?

- (A) $\{N\} \cap \{A\} = \{I\}$
- (B) $\{N\} \cup \{I\} = \{A\}$
- (C) $\{A\} \cup \{N\} = \{I\}$
- (D) $\{A\} \cap \{I\} = \{N\}$

$$\{N\} \cup \{I\} = \{A\}$$

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(9) The equipment one wears or holds to protect himself from risk is called _____

- (A) personal safety device
- (B) personal risk protector
- (C) personal protective device

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personal protective equipment

 Hide Answer



Explanation

(10) In protecting against risk to health, buoyancy aids serve as

- (A) head protector
- (B) protective clothing
- (C) hand protector
- (D) foot protector

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protective clothing

(11) To guard against impact from fixed objects, the ___ is protected

- (A) eye
- (B) hand
- (C) foot
- (D) head

Industrial Safety - 2017/2018 - 11

head

 Hide Answer



Explanation

(12) ___ is the odd one out.

- (A) stop button
- (B) start button
- (C) fixed guard
- (D) stop switches

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start button

(13) The type of accident that occur with damages done only to the property/machinery is known as

- (A) major accident
- (B) dangerous occurrence
- (C) minor accident
- (D) A, B & C

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minor accident

 Hide Answer



Explanation

(14) The aim of an isolator switch is to

- (A) isolate the machine
- (B) decorate the machine
- (C) protect the operator
- (D) stop the machine in an emergency

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stop the machine in an emergency

(15) The colour blue in safety means

- (A) mandatory action
- (B) safe condition
- (C) caution
- (D) stop

Industrial Safety - 2017/2018 - 15

mandatory action

 Hide Answer



Explanation

(16) ___ does not belong to this group

- (A) escape routes
- (B) emergency showers
- (C) rescue stations

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emergency showers

(17) Automation is the use ____ and ____ reducing the need for human intervention.

- (A) control systems and industrialization
- (B) control systems and mechanization
- (C) automation and world economy
- (D) none of the above

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control systems and mechanization

 Hide Answer



Explanation

(18) Automation is a step beyond ____

- (A) industrialization
- (B) ATM
- (C) mechanization
- (D) all of the above

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mechanization

(19) In a fully automated facility, there are no _____ on the floor of production.

- (A) machines
- (B) humans
- (C) equipment
- (D) all of the above

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humans

 Hide Answer



Explanation

(20) The following are main advantages of the automated manufacturing EXCEPT;

- (A) higher consistency quality
- (B) reduced lead times
- (C) simplification of production
- (D) none of the above

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reduced lead times

(21) In automated manufacturing, CAD stands for

- (A) computer applied design
- (B) computer assisted design
- (C) computer associated design
- (D) computer aided design

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computer aided design

Hide Answer



Explanation

(22) In CAD ____ replaces the ____ and ____ traditionally used to visualize products and communicate information

- (A) computer graphics, sketches and engineering drawings
- (B) computer graphics, computer sketches and drawings
- (C) computer drawings, computer graphics and sketches
- (D) computer sketches, computer drawings and graphics

(23) CAM stands for?

- (A) computer attributed manufacturing
- (B) computer assembly manufacturing
- (C) computer assisted manufacturing

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computer aided manufacturing

 Hide Answer



Explanation

**(24) CAD is the use of computers in
converting initial idea for a product into**

- (A) detailed engineering design
- (B) exceptional engineering design
- (C) engineering drawing
- (D) engineering sketches

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detailed engineering design

(25) Typically CIM relies on ____ based on real-time, input from sensors

- (A) closed-loop control processes
- (B) open-loop control processes
- (C) semi closed-loop control processes
- (D) all of the above

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closed-loop control processes

Hide Answer



Explanation

(26) The parts labeled R and S are called

- (A) carriage and tool post
- (B) lead screw and feed rod
- (C) apron and tail stock
- (D) feed box and cross slide

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feed box and cross slide

(27) The parts labeled G and M are called

- (A) spindle and tailstock
- (B) headstock and tailstock
- (C) compound rest and bed
- (D) chuck and dead centre

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chuck and dead centre

 Hide Answer



Explanation

(28) The parts labeled H and I are

- (A) tool rest and compound post
- (B) cutting die and tool box
- (C) tool post and compound rest
- (D) cutting tool and compound post

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tool post and compound rest

(29) The parts labeled Q and X denote

- (A) apron and cross Elide
- (B) bed and chip pan
- (C) spindle and screw head
- (D) carriage and feed box

bed and chip pan

▲ Hide Answer



Explanation

(30) Which part is used to control the movement of carriage on bed?

- (A) W
- (B) X
- (C) Y

W

(31) The operations classified 1, 6 and 7 are

- (A) facing, tapping and reaming
- (B) turning, facing and booring
- (C) threading, turning and planing
- (D) knurling, turning and threading

Machinist workshop and laboratory assignments

Knurling, turning and threading

Hide Answer

Get explanation

(32) The operations represented in 4, 6 and 8 are called

- (A) drilling, reaming and booring
- (B) booring, drilling and reaming
- (C) reaming, booring and drilling

Machinist workshop and laboratory assignments

drilling, reaming and booring

(33) A cylindrical job 100 mm diameter is to be turned at a cutting speed of 25 m/min, the feed being 1.5 mm/rev. If the length of the job is 150 mm.

What is the required spindle speed for the job?

- (A) 120.00 rev/min
- (B) 90.50 rev/min
- (C) 79.55 rev/min
- (D) 70.43 rev/min)

Machine workshop and Automation - 2017/2018 - 33

79.55 rev/min

Hide Answer



Explanation

(34) A cylindrical job 100 mm diameter is to be turned at a cutting speed of 25 m/min, the feed being 1.5 mm/rev. If the length of the job is 150 mm.

What is die time required for the job?

- (A) 1.26 min
- (B) 1.50 min
- (C) 1.72 min

(35) A cylindrical job 100 mm diameter is to be turned at a cutting speed of 25 m/min, the feed being 1.5 mm/rev. If the length of the job is 150 mm.

Calculate the metal removal rate if the finished diameter is 80mm

- (A) $1250.5\text{mm}^3/\text{rev}$
- (B) $4714.3\text{mm}^3/\text{rev}$
- (C) $1725.8\text{mm}^3/\text{rev}$
- (D) $2250.5\text{mm}^3/\text{rev}$

$1725.8\text{mm}^3/\text{rev}$

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Hide Answer



Explanation

(36) Which of the following is not an element of jigs and fixtures?

- (A) The Body
- (B) Clamping Devices
- (C) Metering Devices
- (D) Locating Devices

(37) Jigs are used for the following specific machining operations except

- (A) Drilling**
- (B) Slotting**
- (C) Reaming**
- (D) Boring**

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Slotting

 Hide Answer



Explanation

(38) The most important function of jigs and fixtures for mass production process is

- (A) Accuracy**
- (B) Precision**
- (C) Cost**

Accuracy

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(39) The primary purpose in the design of a gig is to provide the following except

- (A) Repeatability**
- (B) Formability**
- (C) Accuracy**
- (D) Precision**

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Formability

Hide Answer



Explanation

(40) Which of the following is a typical example of a fixture

- (A) Vices**
- (B) Drill bits**
- (C) Shapers**
- (D) Lathe Machines**

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Vices

(41) Find the cutting speed of a 50 mm diameter bar being turned with a spindle speed of 178 rpm

- (A) 28min/sec
- (B) 27min/m
- (C) 0.28m
- (D) 28m/min

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28min/sec

 Hide Answer



Explanation

(42) The Taylor tool-life equation of a certain material was found to be $VT^n = 1190$. Find the value of the exponent n for a cutting speed of 300m/min, if the tool life is 192mins.

- (A) 0.26
- (B) 0.16
- (C) 0.42
- (D) 0.12

(43) Which of the options below is best described as a manufacturing process whereby useful products are made by material removal operations?

- (A) Cutting tools
- (B) Cutting speed
- (C) Machining
- (D) Workshop Practice

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Machining

 Hide Answer



Explanation

(44) Some of the named options are examples of cutting tools EXCEPT;

- (A) Fillings discs
- (B) Driller
- (C) Drilling pins

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Fillings discs

(45) Which of the types of wear is associated with machining by the fracture of welded local asperities?

- (A) Abrasive wear
- (B) Solid-state diffusion
- (C) Corrosion
- (D) Adhesive wear

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Abrasive wear

 Hide Answer

 Explanation

(46) The use of cutting fluids during machining helps to

- (A) improve the physical and chemical properties of the machine tool
- (B) Reduce thermal conductivity and lubricate the surface in action
- (C) Corrode the work piece and machine tool
- (D) Improve the electrical properties of the machine tool

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Reduce thermal conductivity and lubricate the surface in action

(47) The qualities of a good tool includes the following EXCEPT;

- (A) High hardness
- (B) High resistance to high temperature
- (C) High resistance to wear
- (D) High cutting speed

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High resistance to high temperature

 Hide Answer

 Explanation

(48) What spindle speed would be required to turn a 150mm diameter cast iron component using cemented-tungsten-carbide tooling at a cutting speed of 160m/min?

- (A) 340rev/min
- (B) 350rev/min
- (C) 335rev/min
- (D) 240rev/min

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340rev/min

With diameter in mm, Spindle Speed = (Cutting Speed * 1000) / ((22/7)*Diameter)

$$\text{Spindle Speed} = (160*1000)/(3.142*150)$$

$$\text{Spindle Speed} = 340\text{rev/min}$$

(49) Some of these materials are used in making cutting tools except;

- (A) Tungsten
- (B) Silicon Carbide
- (C) Polyethene
- (D) Aluminum Oxide

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Polyethene

 Hide Answer



Explanation

(50) Apart from the power stroke, the other three strokes are referred to as ____ strokes.

- (A) passive
- (B) active
- (C) idle

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passive

(51) Diesel engines operate by ___ ignition.

- (A) pressure
- (B) compression
- (C) stress
- (D) spark

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pressure

 Hide Answer



Explanation

(52) The engine consists of a fixed ___ and a moving ___

- (A) drum, barrel
- (B) piston, cylinder
- (C) cylinder, barrel
- (D) cylinder, piston

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cylinder, piston

(53) Gasoline or petrol engines operate by _____ ignition.

- (A) pressure
- (B) compression
- (C) stress
- (D) spark

spark

Hide Answer



Explanation

(54) Running the engine beyond the safe limit on the tachometer is called:

- (A) red crossing
- (B) yellow crossing
- (C) red lining
- (D) red zoning

red lining

(55) The engine and drive-train constitute the _____

- (A) power stroke
- (B) power trust
- (C) power train
- (D) power drive

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power train

 Hide Answer



Explanation

(56) The first and last processes in a four-stroke cycle engine are _____ and _____

- (A) intake, exhaust
- (B) intake, compression
- (C) combustion, compression
- (D) combustion, exhaust

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combustion, exhaust

(57) The internal diameter of the cylinder of an eight-cylinder engine is 9 cm while the distance moved by the piston between the BDC and TDC is 7.3 cm. What is the engine capacity?

- (A) 3751 cm³
- (B) 3571 cm³
- (C) 7531 cm³

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3751 cm³

Hide Answer



Explanation

(58) The rotary motion of the ___ results from the reciprocating motion of the ___:

- (A) crankshaft, piston
- (B) crankshaft, barrel
- (C) shaft, piston
- (D) wheels, wipers

crankshaft, piston

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(59) The second and third processes in a four-stroke cycle engine are _____ and _____

- (A) intake, exhaust
- (B) intake, compression
- (C) combustion, exhaust
- (D) compression, expansion

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intake, compression

 Hide Answer



Explanation

(60) A system of electric conductors, components and operators for conveying electric power from one source to the point of use is called _____

- (A) Cable
- (B) Resistor
- (C) Electric circuit
- (D) Electric wiring

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Electric circuit

(61) The whole path along which an electric current may flow is called _____

- (A) Cable
- (B) Voltage
- (C) Electric circuit
- (D) Electric wiring

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Electric circuit

 Hide Answer



Explanation

(62) A length of a conductor which is usually insulated is called

- (A) Wire
- (B) Insulator
- (C) Cable
- (D) Conductor

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Cable

(63) ____ is NOT a component of an electric circuit.

- (A) Cable
- (B) generator
- (C) switch
- (D) Current

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generator

 Hide Answer



Explanation

(64) ____ is NOT a component of a cable.

- (A) Conductor
- (B) Insulation
- (C) Outer sheath (p) Inner Sheath

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Insulation



(65) An over-current resulting from a fault is called _____

- (A) Over-current**
- (B) Isolation**
- (C) Short circuit**
- (D) High Voltage**

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Short circuit

 Hide Answer



Explanation

(66) Wires and cables are generally called

- (A) Capacitors**
- (B) Cables**
- (C) Conductors**
- (D) Insulators**

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Conductors

(67) The neutral of a single phase system is coloured __

- (A) Blue
- (B) Red
- (C) Black
- (D) Green and yellow

Black

^ Hide Answer



(68) __ protects some cables against mechanical damage.

- (A) Conductor
- (B) Outer sheath
- (C) Insulation
- (D) Cloth

(69) Which of the following is a variable resistor

- (A) Capacitor
- (B) Resistance box
- (C) Potentiometer
- (D) Voltmeter

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Resistance box

 Hide Answer



Explanation

(70) A resistor is color-coded "grey-blue-red-gold". What is the value of the resistor?

- (A) 5K6M
- (B) 8K6J
- (C) 8R5K
- (D) 70052

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8K6J

(71) When the tolerance band is not present on a resistor, what percentage of tolerance is to be assumed?

(A) $\pm 20\%$

(B) $\pm 10\%$

(C) $\pm 5\%$

± 20

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Hide Answer



Explanation

(72) In a four-band type colour code, the fourth band is known as the

(A) first digit

(B) multiplier

(C) second digit

(D) tolerance

tolerance

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(73) A 2000Ω resistor has a tolerance of $\pm 5\%$; this means that the actual value is in the range of

- (A) 1800Ω to 2200Ω
- (B) 1900Ω to 2100Ω
- (C) 1900Ω to 2200Ω
- (D) 1700Ω to 2300Ω

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1900 Ω to 2100 Ω

 Hide Answer



Explanation

(74) The letters F, G and M used as abbreviations for tolerance of a resistor represents

- (A) $\pm 1\%$, $\pm 2\%$ and $\pm 20\%$ respectively
- (B) $\pm 2\%$, $\pm 5\%$ and $\pm 10\%$ respectively
- (C) $\pm 10\%$, $\pm 2\%$ and $\pm 1\%$ respectively
- (D) $\pm 2\%$, $\pm 10\%$ and $\pm 20\%$ respectively

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$\pm 2\%$, $\pm 5\%$ and $\pm 10\%$ respectively

(75) A resistor of resistance value 3500Ω with a tolerance of $\pm 2\%$; how will this be printed on the component using standard practice?

- (A) 3M5F
- (B) 3K5G
- (C) 5F3M
- (D) 3500RG

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3500RG

 Hide Answer



Explanation