BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester,

End Sem. Examination

Course Code: ELE1101 **Time: 2 Hour**

Course Name: Construction Electrician **Max. Marks: 50**

Instruction: Answer all questions from each and every section. Section A, each question carries one mark, section B, each question carries four marks and in section C, each question carries six marks. Scientific calculator is allowed.

Section – A

10X01 = 10 Marks

1. The AC stands for _____.
   a) Direct Current
   b) Alternating Current
   c) Either (a) and (b)
   d) None of these
2. What is the unit of voltage?
   a) Ampere
   b) Watt
   c) Volt
   d) None of these
3. The 6 amperes fuse will be blown at ____ current.
   a) 4 A
   b) 14 A
   c) Both (a) and (b)
   d) None of these
4. The heart convulsions usually fatal on the level of _____ current.
   a) 10 mA
   b) 50 mA
   c) Either (a) or (b)
   d) None of these
5. The earth tester works on the principle of _____ method.
   a) the fall of potential method
   b) the fall of current method
   c) Both (a) and (b)
   d) None of these
6. What is the resistance of dry skin?
   a) 100,000 ohms
   b) 1000 ohms
   c) ∞ ohms
   d) None of these
7. The 12 units of electrical energy is equal to_____?
   b) 12 mwh
   b) 12 kwh
   c) 12 wh
   d) None of these
8. The SPST stands for _____ as electrical switch.
   a) Signal Power Signal Transmission
   b) Single Pole Single Terminal
   c) Single Pole Single Throw
   d) None of these
9. Which type of plug and socket used in India?
   a) Type D
   b) Type C
   c) Type A
   d) Type M

Set - A

8. Generally, the diameter of drill bits is measured in _____.

a) mm
b) cm
c) Both (a) and (b)
d) None of these

Section – B

04X04 = 16 Marks

1. Describe any four hand tools used in the electrical works with their uses.
2. Differentiate the casing-capping electrical wiring and conduit wiring.
3. Explain the fuse and MCB as protection in electrical circuit in detail.
4. Calculate the electricity bill amount for a month of 31 days, if 3 bulbs of 40W for 6 hours, 4 tube lights of 50W for 8 hours, A T.V. of 120W for 6 hours are used per day. The rate of electricity is Rs. 2.50 per unit.

Section – C

04X06 = 24 Marks

1. What is the earthing? Explain the pipe electrode type earthing.
2. Explain the earth resistance tester with its construction and working.
3. Describe any 3 types of plug and sockets in detail.
4. Describe the following terminologies:

(i) Dead
(ii) Earth
(iii) Earth Electrode

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester,

End Sem. Examination

Course Code: ELE1101 **Time: 2 Hour**

Course Name: Construction Electrician **Max. Marks: 50**

Instruction: Answer all questions from each and every section. Section A, each question carries one mark, section B, each question carries four marks and in section C, each question carries six marks. Scientific calculator is allowed.

Answer Key

Section – A

10X01 = 10 Marks

1. (b) Alternating Current
2. (c) Volt
3. (b) 14 A
4. (b) 50 mA
5. (a) the fall of potential method
6. (a) 100,000 ohms
7. (b) 12 kwh
8. (c) Single Pole Single Throw
9. (a) Type D
10. (a) mm

Section – B

04X04 = 16 Marks

1. <u>Hand tools:</u>

1. Combination Plier: Combination pliers are multi-purpose pliers, combining gripping jaws with wire cutters. They can be used for gripping, compressing, bending, twisting, extracting and cutting various materials. The material used for pliers is steel alloys with additives such as vanadium and chromium.

2. Long Nose Plier: long-nose pliers are a versatile tool that has long, tapering jaws with a pointed tip. Among their many uses are gripping, bending, and cutting small-gauge wire. They can reach into tight places that are inaccessible to other types of pliers. The material used for pliers is steel alloys with additives such as vanadium and chromium.

3. **Side Cutting Plier:** Diagonal pliers (or wire cutters or diagonal cutting pliers or diagonal cutters or side cutting pliers) are pliers intended for the cutting of wire (they are generally not used to grab or turn anything). The material used for pliers is steel alloys with additives such as vanadium and chromium.

4. **Adjustable Wrench/Spanner:** An adjustable wrench, also called an adjustable spanner is a tool, which can be used to loosen or tighten a nut or bolt. It has a "jaw" (the part where the nut or bolt fits), which is of adjustable size. Open the adjustable wrench by turning the screw mechanism. The range of this wrench is 0 to 24 mm.

2. Wirings:

Casing and Capping Wiring: It was quite popular in the past but it is considered obsolete these days due to the popularity of the conduit and sheathed wiring system. The cables used in this electric wiring were PVC, VIR or any other approved insulated cables. The cables were carried through the wooden casing enclosures, where the casing was made of a strip of wood with parallel grooves cut lengthwise for accommodating the cables.

Conduit Wiring: There are two types of conduit wiring according to pipe installation:

Surface Conduit Wiring When GI or PVC conduits are installed on walls or roof, it is known as surface conduit wiring. The conduits are attached to the walls with a 2-hole strap and base clip at regular distances. Electrical wires are laid inside the conduits.

Concealed Conduit Wiring When the conduits are hidden inside the wall slots or chiseled brick wall, it is called concealed conduit wiring. Electrical wires are laid inside the conduits. This is popular since it is stronger and more aesthetically appealing.

3. Fuse:

A fuse is a type of low resistance resistor that acts as a sacrificial device to provide over current protection, of either the load or short circuit.

Working Principle:

- The power consumed in an electrical circuit is reflected as the heat generated.
- The fuse wire is made of zinc, copper, silver, aluminium, or alloys. In general it is an alloy of tin(Sn) and lead (Pb) having composition 63% Sn and 37% Pb.
- Resistance of the wire is constant. If current in the circuit exceeds more than the rated current, then the heat generated also exceeds and which causes the meltdown of fuse wire.
- Fuse is connected in series in a circuit.

MCB:

A MCB is a manually or automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuit.

Working of MCB:

An MCB functions by interrupting the continuity of electrical flow through the circuit once a fault is detected.

There are two contacts one is fixed and the other moveable. When the current exceeds the predefined limit a solenoid forces the moveable contact to open (i.e., disconnect from the fixed contact) and the MCB turns off thereby stopping the current to flow in the circuit.

In order to restart the flow of current the MCB is manually turned on. This mechanism is used to protect from the faults arising due to over current or over load.

4. It has been given that the following devices are used as specified- 3 bulbs of 40W for 6 hours, 4tube lights of 50W for 8 hours and a T.V. of 120W for 6 hours.

Total power the three bulbs consume in a day is given by,

$40W \times 3 = 120Wh$

$= 0.12kWh$

Electrical units for one day = $0.12 \times 6 = 0.72$ units.

Electrical units for 31 days = $0.72 \times 31 = 22.32$ units.

Total power the four tube lights consume in a day is given by,

50W×4=200Wh

=0.2kWh

Electrical units for one day = 0.2×8=1.6 units.

Electrical units for 31 days = 1.6×31=49.60 units.

Total power the television consumes in a day is given by,

120W6=720Wh

=0.72kWh

Electrical units for one day = 0.72×6=4.32 units.

Electrical units for 31 days = 4.32×31=133.92 units.

Thus, from the above calculations, we can calculate the total electrical units consumed in a month of 31 days.

Total units consumed= Electrical units consumed by bulbs for 31 days + Electrical units consumed by tube lights for 31 days + Electrical units consumed by the television for 31 days.

Thus, the total units consumed= 22.32+49.60+133.92=205.84 units.

It has been given, that the rate of electricity is Rs. 2.50 per unit.

Then the total amount the bill amounts to is given by multiplying the total number of units with the rate of electricity per unit.

Thus, we get the total bill 205.84×2.50=514.60.

Hence, the electricity bill amount for a month of 31 days' amounts to **Rs. 514.60.**

Section – C

04X06 = 24 Marks

1. Earthing: Connecting the non-conductive metal body/parts of an electrical equipment and system to the earth through a low resistance conductor is called as earthing.

Earthing of an electrical installation can be brought under two major categories.

- System earthing
- Equipment earthing

Pipe Electrode earthing: These electrodes shall be made of metal rod or pipe having a clean surface not covered by paint, enamel or other poorly conducting material.

Rod electrodes of steel or galvanized iron shall be at least 16 mm in diameter, and those of copper shall be at least 12.5 mm in diameter.

Pipe electrodes shall not be smaller than 38 mm internal diameter, if made of galvanized iron or steel, and 100 mm internal diameter if made of cast iron.

Electrodes shall, as far as practicable, be embedded in earth below the permanent moisture level.

The length of the rod and pipe electrodes shall not be less than 2.5 m.

Except where rock is encountered, pipes and rods shall be driven to a depth of at least 2.5 m. Where rock is encountered at a depth of less than 2.5 m, the electrodes may be buried, inclined to the vertical. In this case too, the length of the electrodes shall be at least 2.5 m, and the inclination not more than 300 from the vertical.

Deeply driven pipes and rods are, however, effective where the soil resistivity decreases with depth or where a sub-stratum of low resistivity occurs at a depth greater than those to which rods and pipes are normally driven.

Pipes or rods, as far as possible, shall be of one piece.

For deeply driven rods, joints between sections shall be made by means of a screwed coupling, which should not be of a greater diameter than that of the rods which it connects together.

2. Earth Resistance Tester:

It is an electrical measuring instrument used to measure the resistance between any two points of the earth. It is also called as earth tester.

Construction and working:

The earth tester essentially consists of a hand drive generator which supplies the testing current and a direct reading ohmmeter (Fig 2).

The ohmmeter section of this instrument consists of two coils (potential and current coils) kept at 90o to each other and mounted on the same spindle. The pointer is attached to the spindle. The current coil carries a current proportional to the current in the test circuit whereas the potential coil carries a current proportional to the potential across the resistance under test. Thus the current coil of the instrument acts as an ammeter in the fall of potential method and the pressure coil acts as the voltmeter. Since the deflection of the ohmmeter needle is proportional to the ratio of the current in the two coils, the meter gives resistance readings directly.

3. Types of plug and sockets:

Type A:

- It is mainly used in the USA, Canada, Mexico & Japan.
- 2 pins
- not grounded
- 15 A
- almost always 100 – 127 V
- socket compatible with plug type A

Type B:

- It is mainly used in the USA, Canada, Mexico & Japan.
- 3 pins
- grounded
- 15 A
- almost always 100 – 127 V
- socket compatible with plug types A & B

Type C:

- It is commonly used in Europe, South America & Asia.
- 2 pins
- not grounded
- 2.5 A

- almost always 220 – 240 V
- socket compatible with plug type C

4. Terminologies:

1. Dead: Dead' means at or about earth potential and disconnected from any live system.

2. Earth: A connection to the general mass of earth by means of an earth electrode. An object is said to be `earthed' when it is electrically connected to an earth electrode; and a conductor is said to be `solidly earthed' when it is electrically connected to an earth electrode.

3. Earth electrode: A metal plate, pipe or other conductor electrically connected to the general mass of the earth.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester,

End Sem. Examination

Course Code: ELE1101 **Time: 2 Hour**

Course Name: Construction Electrician **Max. Marks: 50**

Instruction: Answer all questions from each and every section. Section A, each question carries one mark, section B, each question carries four marks and in section C, each question carries six marks. Scientific calculator is allowed.

Section – A

10X01 = 10 Marks

1. The DC stands for _____.
   a) Direct Current
   b) Alternating Current
   c) Either (a) and (b)
   d) None of these
2. What is the unit of current?
   a) Ampere
   b) Watt
   c) Volt
   d) None of these
3. The 16 amperes fuse will be blown at ____ current.
   a) 4 A
   b) 14 A
   c) Both (a) and (b)
   d) None of these
4. A person usually feel the painful shock on the level of _____ current.
   a) 20 mA
   b) 50 mA
   c) Either (a) or (b)
   d) None of these
5. The megger is used to measure _____.
   a) Kilo-ohms
   b) Mega-ohms
   c) Both (a) and (b)
   d) None of these
6. What is the resistance of wet skin?
   a) 100,000 ohms
   b) 1000 ohms
   c) ∞ ohms
   d) None of these
7. The 72 units of electrical energy is equal to_____?
   a) 72 mwh
   b) 72 kwh
   c) 72 wh
   d) None of these
8. The DPDT stands for _____ as electrical switch.
   a) Direct Power Direct Transmission
   b) Double Pole Double Terminal
   c) Double Pole Double Throw
   d) None of these
9. Which type of plug and socket used in Australia?
   a) Type I
   b) Type H
   c) Type F
   d) Type G

Set B

5. The mallet is made of _____.

a) Wood
b) Metal
c) Plastic
d) None of these

Section – B

04X04 = 16 Marks

1. Describe any four electrical accessories used in the electrical works with their uses.
2. Differentiate the conductor and insulator with the examples.
3. Explain the voltage operated and current operated ELCB as protection in electrical circuit in detail.
4. Calculate the electricity bill amount for a month of April, if 4 bulbs of 40 W for 5 h, 4 tube lights of 60 W for 5 h, a TV of 100 W for 6 h, a washing machine of 400 W for 3 h are used per day. The cost per unit is Rs 1.80.

Section – C

04X06 = 24 Marks

1. What is the earthing? Explain the plate electrode type earthing.
2. Explain the megger with its working principle.
3. Describe any 3 types of wire joints in detail.
4. Describe the following terminologies:

(i) Leakage Current
(ii) Step Potential
(iii) Touch Potential

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester,

End Sem. Examination

Course Code: ELE1101 **Time: 2 Hour**

Course Name: Construction Electrician **Max. Marks: 50**

Instruction: Answer all questions from each and every section. Section A, each question carries one mark, section B, each question carries four marks and in section C, each question carries six marks. Scientific calculator is allowed.

Answer Key

Section – A

10X01 = 10 Marks

1. (a) Direct Current
2. (a) Ampere
3. (d) None of these
4. (a) 20 mA
5. (c) Both (a) and (b)
6. (b) 1000 ohms
7. (b) 72 kwh
8. (c) Double Pole Double Throw
9. (a) Type I
10. (a) Wood

Section – B

04X04 = 16 Marks

1. <u>Electrical Accessories:</u>

1. Casing Capping: This is one of the simple forms of electric wiring systems. This is little bit old/conventional wiring system. Now days we very often use this cashing capping electric wiring system. As the name referred in this wiring, PVC insulated wires are placed in plastic cashing and covered with cap. The casing is of rectangular cross section as shown.
The color of cashing channel and cap are normally white or grey. The cashing channel and cap are normally made of either plastic or wood. The channels and caps are available in the market in standard length. The commonly available standard lengths are 1 meter, 10 feet and 6.5 feet etc.
We can fit the channels in both vertical and horizontal alignment. In corners and junctions we can use elbow joint and tee joints respectively.
2. Junction box and Glands: A junction box is used to make junction of electrical connections in building or house that provides protection and a safety barrier for electrical connections. These boxes are made from plastic and form part of your home or other building's electrical wiring system.

3. Ceiling rose: Ceiling rose helps in that one live wire that is needed for ceiling light or fan to go in continuation. Wiring Ceiling Roses and the lighting circuit. In house wiring the celling rose is used at different places for creating junction points for branching the wirings.

Conduit and Elbows: An electrical conduit is a tube used to protect and route electrical wiring in a building or structure. Electrical conduit may be made of metal, plastic, fiber. Most conduit is rigid, but flexible conduit is used for some purposes.

Advantages:

Allows adding new wiring to an existing building without removing or cutting holes into the drywall, lath and plaster, concrete, or other wall finish.

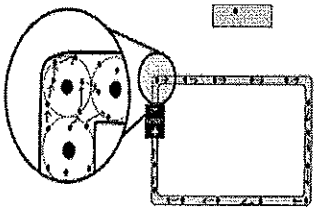
Allows circuits to be easily locatable and accessible for future changes, thus enabling minimum effort upgrades.

Disadvantages:

Appearance may not be acceptable to all observers.

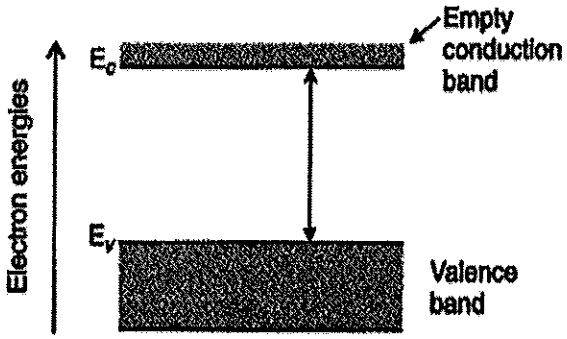
2. Conductor:

A conductor is an object or type of material that allows the flow of an electrical current by using free electron of conductors. Materials which made of metal are common electrical conductors.



Some common conductors are copper, aluminium, gold, silver and iron.

Insulator: Non-metallic solids are said to be good insulators, having extremely high resistance to the flow of charge through them. Most atoms hold on to their electrons tightly are called insulators.



Some common insulators are glass, air, plastic, rubber, and wood.

3. Voltage operated ELCB:

An ELCB is a specific type of latching relay that has a incoming mains power associated through its switching contacts so that the circuit breaker detaches the power in an unsafe condition.

The ELCB notices fault currents of human or animal to the earth wire in the connection it guards.

If ample voltage seems across the ELCB's sense coil, it will turn off the power, and remain off until manually rearrange.

A single-phase voltage ELCB includes 6-terminals namely line in, line out, neutral in, neutral out, Earth and fault. The metal body of the load is associated with the fault terminal of the ELCB & Earth terminal is associated with the ground.

usual working, the voltage across the trip coil is '0', as the Load's body is isolated from the supply line. When an Earth fault happens on the load due to the interaction of line wire to the metal body, a current will run through fault to the ground. The flow of current will set up a voltage across the trip coil, which is associated between E & F.

Current operated ELCB:

It has three winding transformer, that has two primary windings and also one secondary winding. Neutral & line wires work as the two main windings. A wire wound coil is the minor winding. The flow of current through the minor winding is "0" in the stable condition. In this condition, the flux induced by current in the phase wire will be deactivated by the current through the neutral wire, meanwhile the current, that flows from the phase will be refunded to the neutral.

When an error occurs, a slight current will run into the ground also. This creates a confuse between line and neutral current and that makes an unstable magnetic field. This encourages a current flow through the minor winding, which is associated with the sensing circuit. This will detect the outflow and direct signal to tripping system.

4. Electricity Bill calculation:

Electric energy consumed per day by 4 bulbs = 4x40 x5 = 800Wh
Electric energy consumed per day by 4 lights = 4x60x5 =1200 Wh
Electric energy consumed per day by TV = 100x6 = 600 Wh
Electric energy consumed per day by washing machine = 400x3 =1200 Wh
.'. Total electric energy consumed by all electric appliances = (800+ 1200 + 600+ 1200) Wh
= 3800 Wh = 3.8 kWh =3.8 units
Total electric energy consumed in the month of April (30 days) = 3.8 x 30 = 114units
Cost of one unit = Rs. 1.80
Cost of 114 units = 114 x 1.80 = X 205.20.:. Electricity bill amount = **Rs 205.20**

Section – C

04X06 = 24 Marks

1. Earthing: Connecting the non-conductive metal body/parts of an electrical equipment and system to the earth through a low resistance conductor is called as earthing.

Earthing of an electrical installation can be brought under two major categories.

- System earthing
- Equipment earthing

Plate electrodes: Plate electrodes, when made of galvanized iron or steel, shall not be less than 6.3 mm in thickness. Plate electrodes of copper shall be not less than 3.15 mm in thickness. Plate electrodes shall be of a size, at least 60 cm by 60 cm.

Plate electrodes shall be buried such that the top edge is at a depth not less than 1.5 m from the surface of the ground.

Where the resistance of one plate electrode is higher than the required value, two or more plates shall be used in parallel. In such a case, the two plates shall be separated from each other by not less than 8.0 m.

Plates shall preferably be set vertically.

Use of plate electrodes is recommended only where the current-carrying capacity is the prime consideration; for example, in generating stations and substations.

If necessary, plate electrodes shall have a galvanized iron water pipe buried vertically and adjacent to the electrode. One end of the pipe shall be at least 5 cm above the surface of the ground, and it need not be more than 10 cm. The internal diameter of the pipe shall be at least 5 cm and need not be more than 10 cm. The length of pipe, if under the earth's surface, shall

such that it should be able to reach the center of the plate. In no case, however, shall it be more than the depth of the bottom edge of the plate.

2. Megger:

It is an electrical measuring instrument generally used to measure the insulation resistance of an installation/ equipment etc in terms of Megaohms.

Working principle:

The permanent magnets supply the flux for both the generator and the metering device. The voltage coils are connected in series across the generator terminals. The current coil is arranged so that it will be in series with the resistance to be measured. The unknown resistance is connected between the terminals L and E.

When the armature of the magnet is rotated, an emf is produced. This causes the current to flow through the current coil and the resistance being measured. The amount of current is determined by the value of the resistance and the output voltage of the generator.

The torque exerted on the meter movement is proportional to the value of current flowing through the current coil.

The current through the current coil, which is under the influence of the permanent magnet, develops a clockwise torque. The flux produced by the voltage coils reacts with the main field flux, and the voltage coils develop a counter-clockwise torque.

For a given armature speed, the current through the voltage coils is constant, and the strength of the current coil varies inversely with the value of resistance being measured.

As the voltage coils rotate counter-clockwise, they move away from the iron core and produce less torque.

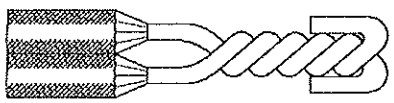
A point is reached for each value of resistance at which the torques of the current and voltage coils balance, providing an accurate measurement of the resistance. Since the instrument does not have a controlling torque to bring the pointer to zero, when the meter is not in use, the position of the pointer may be anywhere on the scale.

The speed at which the armature rotates does not affect the accuracy of the meter, because the current through both the circuits changes to the same extent for a given change in voltage. However, it is recommended to rotate the handle at the slip speed to obtain steady voltage.

Because megohmmeters are designed to measure very high values of resistance, they are frequently used for insulation tests.

3. Types of plug and sockets:

Pig-tail/Rat-tail/Twisted joint: This joint is suitable for pieces where there is no mechanical stress on the conductors, as found in the junction box or conduit accessories box. However, the joint should maintain good electrical conductivity.



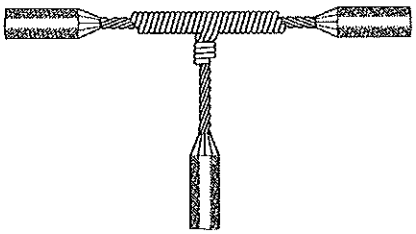
RAT TAIL JOINT

Married joint: A married joint is used in places where appreciable electrical conductivity is required, along with compactness.

As the mechanical strength is less, this joint could be used at places where the tensile stress is not too great.

MARRIED JOINT

Tee joint: This joint could be used in overhead distribution lines where the electrical energy is to be tapped for service connections.



TEE JOINT

4. Terminologies:

1. Leakage current: A current of relatively small value, which passes through the insulation of conductive parts/wire.

2. Step potential: The maximum value of the potential difference possible of being shunted by a human body between two accessible points on the ground separated by the distance of one step, which may be assumed to be one meter.

3. Touch potential: The maximum value of potential difference between a point on the ground and a point touched by a person.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester,

End Sem. Examination

Course Code: ELE1102 **Time: 2 Hour**

Course Name: Electrical Drawing **Max. Marks: 50**

Instruction: Answer all questions from each and every section. Section A, each question carries one mark, section B, each question carries four marks and in section C, each question carries six marks. Scientific calculator is allowed.

Section – A

10X01 = 10 Marks

1. Which symbol is used for diameter in the electrical drawing?
   a) ⌀ b) R
   c) σ d) None of these
2. CAD stands for_____.
   a) Computer All Drawing b) Computer Aided Design
   c) Common Aided Design d) None of these
3. Which relation is the right between R (radius) and D (diameter) of a circle?
   a) D=R/2 b) D=2R
   c) D=R d) None of these
4. What do you understand by "mega" prefix used with the units in the drawings?
   a) 10^3 b) 10^5
   c) 10^6 d) 10^{12}
5. Which command is used to hide the ribbon of commands palettes in the AutoCAD?
   a) Ribbon b) Ribbon Close
   c) Either (a) and (b) d) None of these
6. Which command is used to draw the lines at the right angle (90 degree) in the AutoCAD?
   a) Object Snap b) Ortho Mode
   c) Dynamic Input d) Polar Tracking
7. Which keyboard button is used to jump from length to width value of a rectangle for assigning the values in the AutoCAD?
   a) Enter b) Tab
   c) Escape d) Space
8. What is the size of A1 sheet in mm x mm?
   a) 594 x 841 b) 297 x 420
   c) 148 x 210 d) None of these
9. What is background colour of the blueprints on the sheet?
   a) Blue b) White
   c) Yellow d) Red

Set A

Which method is right to draw a circle in the AutoCAD?

a) 2 Points
b) 3 Points
c) Center, Radius
d) All of these

Section – B

04X04 = 16 Marks

1. Differentiate between continuous thick line and thin line in the electrical drawing.
2. Describe the cost and estimation of a drawing.
3. What is the computer aided drawing? Also explain the benefits of CAD.
4. Explain the general practices should be followed when using electric tools.

Section – C

04X06 = 24 Marks

1. What is the title block in the electrical drawing. Explain the steps for making a title block.
2. Explain line, Circle and Polygon draw commands of AutoCAD with the steps of command.
3. Explain move, mirror and trim modify commands of AutoCAD with the steps of command.
4. Explain the dimensioning in the electrical drawing with the precautions followed while dimensioning a drawing.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester,

End Sem. Examination

Course Code: ELE1102 **Time: 2 Hour**

Course Name: Electrical Drawing **Max. Marks: 50**

Instruction: Answer all questions from each and every section. Section A, each question carries one mark, section B, each question carries four marks and in section C, each question carries six marks. Scientific calculator is allowed.

Answer Key

Section – A

10X01 = 16 Marks

1. (a) ৎ
2. (b) Computer Aided Design
3. (b) D=2R
4. (c) 10^6
5. (b) Ribbon Close
6. (b) Ortho Mode
7. (b) Tab
8. (a) 594 x 841
9. (a) Blue
10. (d) All of these

Section – B

04X04 = 16 Marks

1. Lines:

Continuous Thick line:

Continuous Thick Lines are used to indicate visible outlines. In Drawing Lines are with dark it is representing the actual image of drawing

Continuous Thin line:

Continuous Thin lines are used for the Dimensions line, Leader lines, Fictitious line, hatching lines (Hatching lines when drafting of model drawing to show as a sectioning) and also for the Imaginary intersection of surfaces, Revolved sections, Adjacent parts

2. Cost and Estimation:

The following points shall be noted particularly in respect of domestic dwellings:

Before starting the wiring installation, information should be exchanged between the owner of the building or architect and the local supply authority in respect of tariffs applicable, types of apparatus

that may be connected under each tariff, requirement of space for installing meters, switches, service lines etc. and for the total load requirement of lights, fans and power.

While planning an installation, consideration should be given to the anticipated increase in the use of electricity for lighting, general purpose socket-outlet, kitchen, heating etc. Otherwise, the householder may be tempted to carry out extension of the installation himself or to rely upon the use of multi-plug adaptors and long flexible cords, both of which are against the electric supply rules. Fundamentally safe installation may be rendered dangerous, if extended in this way.

Hence the National Electricity Code suggests the following schedule.

3. CAD:

Computer Aided Drawing /Drafting is a process of preparing a drawing of an object on the screen of a computer.
There are various types of drawings required in different fields of engineering and science.

- In the field of mechanical engineering the drawing of machine components and layouts are prepared.
- In the field of civil engineering plans and layouts of buildings are prepared.
- In all other fields of engineering use of computer is made for drawing and drafting.

Benefits of CAD:

- Improved productivity in drafting.
- Shorter preparation time for drawing.
- Reduced manpower requirements.
- Customer modifications in drawing are easier.
- More efficient operation in drafting.
- Low wastage in drawing.
- Minimized transcription errors in drawing.
- Improved accuracy of drawing.
- Assistance in preparation of documentation
- Better designs can be evolved.

4. Electrical Tools:

The following general practices should be followed when using electric tools:

- Electric tools should be operated within their design limitations.
- Gloves and safety footwear are recommended during use of electric tools.
- When not in use, tools should be stored in a dry place.
- Electric tools should not be used in damp or wet locations.
- Work areas should be well lighted.
- Frayed cords are required to be taken out of service and replaced.
- Electric cords shall be inspected periodically and kept in good condition. Heavy-duty plugs that clamp to the cord should be used to prevent strain on the current-carrying parts, if the cord is accidentally pulled.
- Although no guards are available for drill bits, some protection is afforded if drill bits are carefully chosen for the work to be done, such as being no longer than necessary to do the work.
- Where the operator must guide the drill by hand, the drill is required to be equipped with a sleeve that fits over the drill bit. Oversized bits shall not be ground down to fit small electric drills; instead, an adapter should be used that will fit the large bit and provide extra power through a speed reduction gear; however this again is an indication of improper drill size. When drills are used, the pieces of work are to be clamped or anchored to prevent whipping.
- Electric saws are usually well guarded by the manufacturer, but employees must be trained to use the guard as intended. The guard should be checked frequently to be sure that it operates freely and encloses the teeth completely when it is cutting.

Circular saws shall not be jammed or crowded into the work. The saw is to be started and stopped outside the work.

Section – C

04X06 = 24 Marks

1. Title Block:

The title block of a drawing, usually located on the bottom or lower right hand corner, contains all the information necessary to identify the drawing and to verify its validity. A title block is divided into several areas.

One of the areas normally found within the title block are the drawing title, the drawing number, and lists the location, the site, or the vendor. The drawing title and the drawing number are used for identification and filing purposes. Usually the number is unique to the drawing and is comprised of a code that contains information about the drawing such as the site, system, and type of drawing. The drawing number may also contain information such as the sheet number, if the drawing is part of a series, or it may contain the revision level. Drawings are usually filed by their drawing number because the drawing title may be common to several prints or series of prints.

Other areas of the title block normally contain the signatures and approval dates, which provide information as to when and by whom the component/system was designed and when and by whom the drawing was drafted and verified for final approval. This information can be invaluable in locating further data on the system/component design or operation. These names can also help in the resolution of a discrepancy between the drawing and another source of information.

Procedure:

1. Firstly, we draw a rectangle of 297 mm length and 210 mm width by using rectangle command.
2. We draw a border line at 5 mm distance outside of rectangle by using offset command.
3. We draw symmetric vertical lines across the rectangle at the gap of 19.8 mm distance from left starting point to right end point of rectangle.
4. We draw symmetric horizontal lines across the rectangle at the gap of 21 mm distance from top starting point to bottom end point of rectangle.
5. Then we trim the unnecessary objects as shown in the drawing.
6. We draw a rectangle of 113.80 mm length and 58 mm width at the right bottom corner of the rectangle as shown in the drawing by using rectangle command.
7. We draw symmetric horizontal lines across the previously created rectangle at the gap of 5.8 mm distance from top starting point to bottom end point of that rectangle.
8. We draw two vertical lines across the previously created rectangle at the gap of 59.4 mm and 86.60 mm distance from left starting point to right end point of that rectangle.
9. Again, we trim the unnecessary objects as shown in the drawing.
10. We write some text as shown in the drawing by using text command.
11. Now we take the measurements of lines and circles as shown in the drawing.

2. Draw Commands:

Line Command:

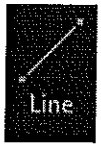
A line in AutoCAD is drawn by specifying the starting and ending point through the cursor. When we place the cursor on the Line icon, a window appears as shown in the below image:

The window here will specify the characteristics of a line.

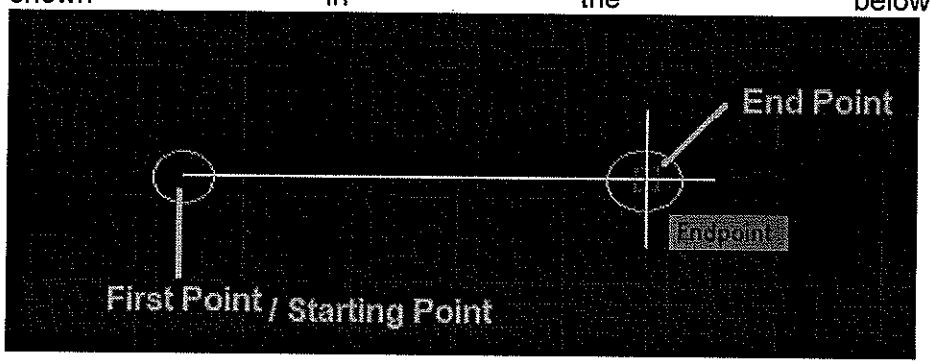
The steps to create a line are listed below:

1. Open the AutoCAD software.
2. Select the Line icon from the ribbon panel or type **L** or **Line** and press **Enter** on the command line.

   The line icon will look like the given image:



3. Specify the starting point and endpoint using the cursor on the workspace or drawing area, as shown in the below image:



   We can also continue the line segments by specifying the endpoints.
4. Press **Enter** or **Esc** to exit.

Circle Command:

The circles are widely used in design and drawings.

The circle command is used to draw a circle by specifying the center point and radius.

Let's understand by two examples.

Example 1:

The steps to create a circle are given below:

1. Click on the **Circle** icon on the Ribbon Panel, as shown in the below image:

   OR

   Type **Circle** or C on the command line and press **Enter**.
2. Specify the center point of a circle on the workspace or viewport.

3. Specify the **radius** of the circle.

   Or

   To specify **diameter**, type **D** - press **Enter** - specify the diameter of the circle.

4. Press **Enter**.

Types of Circles: There are three types of circles, which are listed below:

1. Radis and Center Circle
2. Diameter and Center Circle
3. 2 point circle
4. 3 point circle
5. Tangent, Tangent, Center circle
6. Tangent, Tangent, Tangent Circle

Polygon Command:

- A polygon is a figure formed by the finite number of line segments connected to form a closed circuit.
- The categories of the polygon are triangle, quadrilateral, pentagons, hexagon, heptagon (or septagon), octagon, etc. The triangle is a figure with three sides, and an octagon is a figure with eight sides.
- The polygon command is used to create polygons in AutoCAD. We need to specify the number of sides to create a polygon.
- The maximum number of lines available to create a polygon is 1024.
- The shortcut command to create a polygon is 'pol'.

Types (Methods to use Polygon)

There are two types of the polygon, which are given below:

1. **Inscribe in Circle:** The polygon formed will be drawn inside the circle. The command is best used when we want to create any polygon with its vertices or corners touching the circle.

The shortcut command for inscribing is I.

2. Circumscribe about Circle: The polygon formed will be drawn outside the circle.

The shortcut command for circumscribing is C.

3. Modify commands:

Move Command:

The **move** command in AutoCAD is used to move objects at a specified distance and direction.

To move the objects with precision, we can use object **snaps, grid snaps, coordinates,** etc.

There are four steps to move any object at a specific distance in a specified direction.

1. **Select objects**
   We need to select the objects.
2. **Specify the base point**
   Specify the starting point to move, which acts as a base point of an object.
3. **Specify the point to place a moving object**
   Specify a point to put the object being moved. We can either specify it using a cursor or can enter the displacement value in the X, Y, and Z-direction. For example, **3, 4**. The object will be moved **3 Units in the X-direction** and **4 Units in the Y-direction** from its current position.
4. **Displacement**
   It signifies the relative distance and direction of the object from its last position. It determines how far the object is placed from its original position.

Mirror Command:

The **mirror** command in AutoCAD is used to create a copy (mirror copy) of the selected object. We can also delete the source object after mirroring the object.

The objects that represent the same as the half of their object can be mirrored across a center line to create the other half of the object.

Trim Command:

- The Trim command in AutoCAD is used to remove the objects, which meet the edges of other objects. It is used to remove extra lines or extra parts of an object.
- We can also perform trim using different selection methods.
- We are required to select the portion of the object to trim.

4. DIMENSIONING:

The dimensions are inserted in the drawing by use of Dim command. There are various types of dimensions used their AutoCAD.

(I) Linear Dimensions: Horizontal, Vertical, aligned (for inclined dimensions), Rotated (for inclined dimensions).

(I) Angular dimensions: For angular dimensioning of objects.

(II) Radial dimensions: For radial dimensioning of arc or circle.

(III) Diametral dimensions: For diametral dimensioning of circle.

(IV) Ordinate dimensions: For ordinate dimensioning of objects.

Precaution while dimensioning:

(i) Dimension lines in a drawing should be placed as far as possible outside the outline of a view.

(ii) All dimensions should be placed above their respective dimension lines, and normal to the lines, such that these can be easily read from the bottom or right hand side of the drawing sheet.

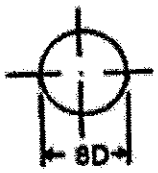
iii) Dimension lines should not cut each other. Smaller dimensions should be placed first, that is, the dimensions should be marked in the ascending order.

(iv) Dimension lines are never shown dotted.

(v) Dimensions must only be given once and not be repeated on other views.

(vi) Holes are dimensioned by stating their diameters.
There are usually three representations as follows:

(a)



(b)

(c)

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester,

End Sem. Examination

Course Code: ELE1102 **Time: 2 Hour**

Course Name: Electrical Drawing **Max. Marks: 50**

Instruction: Answer all questions from each and every section. Section A, each question carries one mark, section B, each question carries four marks and in section C, each question carries six marks. Scientific calculator is allowed.

Section – A

10X01 = 10 Marks

1. Which symbol is used for radius in the electrical drawing?
   a) ⌀ b) R
   c) σ d) None of these
2. PLINE stands for_____.
   a) Poly Line b) Phase Line
   c) Portrait Line d) None of these
3. Which relation is the right between L (length) and W (width) of a rectangle?
   a) L=Area/W b) W=Area x L
   c) Area= L+W d) None of these
4. What do you understand by "tera" prefix used with the units in the drawings?
   a) 10^3 b) 10^5
   c) 10^6 d) 10^{12}
5. Which command is used to show the ribbon of commands palettes in the AutoCAD?
   a) Ribbon b) Ribbon Close
   c) Either (a) and (b) d) None of these
6. Which command is used to draw the lines at the different angles in the AutoCAD?
   a) Object Snap b) Ortho Mode
   c) Dynamic Input d) Polar Tracking
7. Which keyboard button is used to complete the command in the AutoCAD?
   a) Enter b) Tab
   c) Backspace d) Space
8. What is the size of A0 sheet in mm x mm?
   a) 210 x 297 b) 297 x 420
   c) 841 x 1189 d) None of these
9. What is the drawing lines' colour of the blueprints on the sheet?
   a) Blue b) White
   c) Yellow d) Red
10. Which method is right to draw a polygon in the AutoCAD?
    a) Inscribed b) Circumscribed

Set B

c) Both (a) and (b) d) None of these

Section – B

04X04 = 16 Marks

1. Differentiate between continuous dotted/dashed line and thin line in the electrical drawing.
2. Describe the layer command with benefits of the layer command in the AutoCAD.
3. What is the computer aided drawing? Also explain the applications of CAD.
4. Explain the blueprints with the types of blueprints.

Section – C

04X06 = 24 Marks

1. What is the electrical symbol in the electrical drawing. Explain the steps for making an electrical symbol.
2. Explain Polyline, Rectangle and Polygon draw commands of AutoCAD with the steps of command.
3. Explain copy, trim and rotate modify commands of AutoCAD with the steps of command.
4. Explain the dimensioning in the electrical drawing with the precautions followed while dimensioning a drawing.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester,

End Sem. Examination

Course Code: ELE1102 **Time: 2 Hour**

Course Name: Electrical Drawing **Max. Marks: 50**

Instruction: Answer all questions from each and every section. Section A, each question carries one mark, section B, each question carries four marks and in section C, each question carries six marks. Scientific calculator is allowed.

Answer Key

Section – A

10X01 = 16 Marks

1. (b) R
2. (a) Poly Line
3. (a) L=Area/W
4. (d) 10^{12}
5. (a) Ribbon
6. (d) Polar Tracking
7. (a) Enter
8. (c) 841 x 1189
9. (b) White
10. (c) Both (a) and (b)

Section – B

04X04 = 16 Marks

1. Lines:

Dotted/dashed line:

Dotted or dashed lines therefore have an association with the temporary, the invisible, the hidden, the not finished or not solid. In the image above a dotted line is used to represent what is hidden beneath the body. However the dashed or dotted line can also be used to represent movement.

Continuous Thin line:

Continuous Thin lines are used for the Dimensions line, Leader lines, Fictitious line, hatching lines (Hatching lines when drafting of model drawing to show as a sectioning) and also for the Imaginary intersection of surfaces, Revolved sections, Adjacent parts

2. AutoCAD Layers:

- The layer command is used to control and manage the drawings in AutoCAD for different purposes.

It increases the display performance of the AutoCAD by hiding the portion of our drawing when needed. It also improves the visual complexity of the drawing.

- We are required to create a set of layers having different properties. For example, in a floor plan or house plan, we can create separate layers for doors, walls, etc.
- We can create many layers by specifying the name for the corresponding layer. We can also control the order of the layers.
- The shortcut command of the layer is 'LA'.

Benefits of layer:

1. Whether objects of any layer should be visible or not.
2. Whether objects of any layer should be plotted or not.
3. How the lines will appear and be plotted.
4. Whether objects of any layer should be editable or not.
5. easy to convert to 3D
6. layer are really important in Cad

3. CAD:

Computer Aided Drawing /Drafting is a process of preparing a drawing of an object on the screen of a computer.
There are various types of drawings required in different fields of engineering and science.

- In the field of mechanical engineering the drawing of machine components and layouts are prepared.
- In the field of civil engineering plans and layouts of buildings are prepared.
- In all other fields of engineering use of computer is made for drawing and drafting.

Applications of AutoCAD:

There is virtually no limit to the kinds of line drawings using AutoCAD. If a drawing can be created by hand, it can be generated by AutoCAD. Here are a few of the applications of the AutoCAD:

- Architectural drawing of all kinds
- Interior design and facility planning
- Work-flow charts and organizational diagrams
- Proposals and presentations
- Graphs of all kinds
- Drawings for electronic, chemical, civil, mechanical, automotive and aerospace engineering applications
- Topographic maps and nautical charts
- Yacht design
- Plots and other representations of mathematical and scientific functions
- Theater set-lighting designs
- Musical scores
- Technical illustrations and assembly diagrams

Company logos

- Greeting cards
- Line drawings for the fine art

4. Blueprints:

A blueprint is a photographic print of a prepared drawing with the lines and lettering in white on a bright blue background; it's used for mechanical, electrical, and architectural drawings.
You'll encounter blueprints only when working with old plans, which generally have now been converted to microfilm or microfiche to preserve the information they contain.
We will use the terms blueprint, drawing, and prints interchangeably to talk about the documents used to convey electrical information.
Designers use blueprints and sketches to communicate architectural and engineering details of construction projects to the owners, constructors, operators, and decision makers.

Type of blueprints:

- Electrical blueprints are those drawings that deal mainly with the installation of electrical equipment in homes, commercial buildings, industrial plants, power plants, and utility substations.
- With such widespread use, many other types of drawings and schedules are encountered. Some of the common drawings or schedules you'll come across are

1. Electrical Construction Drawings
2. Schematic or Wiring Diagrams
    - One-line diagram
    - Three-line diagram
    - Ladder diagram
3. Panel and Switchgear Drawings
4. Bill of Material
5. Schedules

• Panels
• Light fixture
• Motor
• Conduit and cable

6. Lighting and Power Plans

• Lighting
• Power
• Ancillary system

Section – C

04X06 = 24 Marks

1. Electrical Symbols:

The Symbol Builder tool is used to create new symbols such as filters, drives, controllers, and so on, or convert the existing symbols as per requirement. Using this tool, you can create the symbols easily and quickly. You can also create the electrical symbols using the AutoCAD tools but that takes more time. Also, this tool is used to convert the existing non-AutoCAD Electrical symbols to the AutoCAD Electrical symbols.

The symbols that you create using this tool will be compatible with AutoCAD Electrical and they will be displayed in the schematic reports. To create a symbol, choose the Symbol Builder tool from the Symbol Builder drop-down in the Other Tools panel of the Schematic tab.

Procedure:

1. Firstly, we draw a rectangle of 26 mm length and 16 mm width by using rectangle command.

2. Then we draw four circles of 1.3 mm diameter inside the rectangle at distance of 3 mm from horizontal line and 4 mm from vertical line of rectangle.

3. Now, we open the symbol builder in the AutoCAD electrical.

Then we set the attributes of that symbol from the properties tab in the symbol builder.

5. Then we provide a unique name so we can use this symbol later in the another drawing.

2. Draw Commands:

PolyLine Command:

A polyline is a connected sequence of line and arc segments.

Draw a thick line of width 2 units from (8, 4) to (6, 7) using pline

command.

Command: pline¿ From point: 8, 4

Arc/close/Half width/length/undo/width/< Endpoint of line> : width¿ Width: 2

Next point: 6, 7 Next point:

A box drawn by using pline will act as one object insteadof four discrete lines.

Rectangle Command:

Draw a rectangle defined by diagonal points (10, 10) and (30, 20).

Command: Rectangle First Corner: 10, 10

Second Corner: 30, 20

Polygon Command:

- A polygon is a figure formed by the finite number of line segments connected to form a closed circuit.
- The categories of the polygon are triangle, quadrilateral, pentagons, hexagon, heptagon (or septagon), octagon, etc. The triangle is a figure with three sides, and an octagon is a figure with eight sides.
- The polygon command is used to create polygons in AutoCAD. We need to specify the number of sides to create a polygon.
- The maximum number of lines available to create a polygon is 1024.
- The shortcut command to create a polygon is 'pol'.

Types (Methods to use Polygon)

There are two types of the polygon, which are given below:

1. **Inscribe in Circle:** The polygon formed will be drawn inside the circle. The command is best used when we want to create any polygon with its vertices or corners touching the circle.
The shortcut command for inscribing is I.

2D Circumscribe about Circle: The polygon formed will be drawn outside the circle.

The shortcut command for circumscribing is C.

3. Modify commands:

COPY command: -

This command is similar to move command, but it places copies of the related object at the specified displacements.

Command: copy¿

Select objects: click on objects¿

<Base point or displacement>/multiple:

specify a point for a single copy or enter m for multiple copies¿

<Second point of displacement>: specify a point or P¿

(For placement multiple copies)

ROTATE command: - This command moves object about a base point. Command: rotate

Select objects: click on objects Base point: specify a point

<Rotation angle>/Reference: Specify an angle or enter or specify a point

Trim Command:

- The Trim command in AutoCAD is used to remove the objects, which meet the edges of other objects. It is used to remove extra lines or extra parts of an object.
- We can also perform trim using different selection methods.
- We are required to select the portion of the object to trim.

4. DIMENSIONING:

The dimensions are inserted in the drawing by use of Dim command. There are various types of dimensions used their AutoCAD.

(I) Linear Dimensions: Horizontal, Vertical, aligned (for inclined dimensions), Rotated (for inclined dimensions).

(I) Angular dimensions: For angular dimensioning of objects.

(II) Radial dimensions: For radial dimensioning of arc or circle.

(III) Diametral dimensions: For diametral dimensioning of circle.

(IV) Ordinate dimensions: For ordinate dimensioning of objects.

Precaution while dimensioning:

(i) Dimension lines in a drawing should be placed as far as possible outside the outline of a view.

(ii) All dimensions should be placed above their respective dimension lines, and normal to the lines, such that these can be easily read from the bottom or right hand side of the drawing sheet.

iii) Dimension lines should not cut each other. Smaller dimensions should be placed first, that is, the dimensions should be marked in the ascending order.

(iv) Dimension lines are never shown dotted.

(v) Dimensions must only be given once and not be repeated on other views.

(vi) Holes are dimensioned by stating their diameters.
There are usually three representations as follows:

(a)

(b)

(c)

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester

End-Sem. Examination

Course Code: Basic Electrical Engineering **Time: 2 Hours**

Course Name: ELE1103 **Max. Marks: 50**

Instruction: Answer all questions from each and every section. Section A, each question carries one mark, section B, each question carries four marks and in section C, each question carries six marks. Scientific calculators are allowed.

Section – A

10X01 = 10 Marks

1. Tube-light chock is connected in____
   (A) Series B) Parallel (C) Both (D) None of these
2. LED is a____
   (A) Resistance (B) Diode (C) Capacitor (D) All of these
3. Which one is the correct current formula?
   (A) I=V-R (B) I=V*R (C) I=V/R (D) I=V+R
4. Which one is a transistor?
   (A) BJT (B) LDR (C) Capacitor (D) All of these
5. IGBT is a_____
   (A) Resistor (B) Light (C) Transistor (D) Sensor
6. Coaxial cable is used for_____
   (A) Internet (B) TV (C) Telephone (D) Loud-Speaker
7. Which resistance material is accurate in RTD?
   (A) Silver (B) Iron (C) Copper (D) Platinum
8. SI unit of Inductance is_____
   (A) Henry (B) Volt (C) Hertz (D) Coulomb
9. Which one is a good semiconductor?
   (A) Copper (B) BJT (C) Wood (D) Mercury
10. Symbol of capacitance is_____
    (A) F (B) C (C) J (D) H

Set A

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Section – B

04X04 = 16 Marks

1. Explain about RTD.
2. Write the types of cables and their respective uses in different electrical installations.
3. Draw the resistance color code chart.
4. Explain about IGBT.

Section – C

04X06 = 24 Marks

1. Explain about electrical Conducting materials.
2. How to trace out a short circuit with the help of multimeter? Explain.
3. Write the difference between MCCB & MCB.
4. Write the types of transistor and explain.

Answers Key

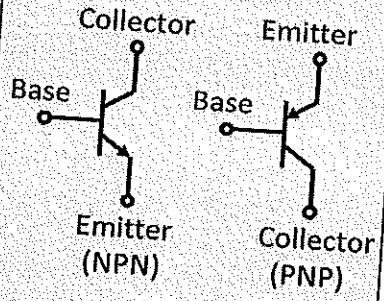
Course Code: Basic Electrical Engineering, **Course Name: ELE 1103**
School of Electrical Skills, Session: 2021-22 (Summer Semester)
B. Voc. Program, I Semester, End-Sem. Examination

3. (Ans.)

MCB	MCCB
It stands for Miniature Circuit Breaker.	It stands for Molded Case Circuit Breaker.
Rated current not more than 125 Ampere.	Rated Current up to 1600A
Its interrupting current rating is under 10KA	Their interrupting current ranges from around 10KA -85KA
Judging from their power capacities, MCB is mainly used for low Breaking capacity requirement mainly domestic.	MCCB is mainly used for both low and high Breaking capacity requirements mainly industrial.
Its trip characteristics are normally not adjustable since they basically cater to low circuits.	Its trip current may be fixed as well as adjustable for overload and magnetic setting.

4. (Ans.)

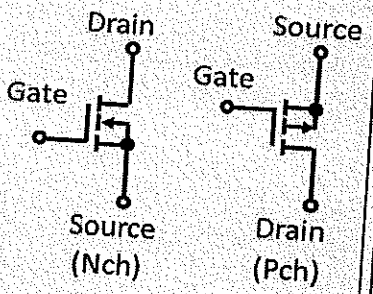
Bipolar transistors



- Operation speed - Slow
- Drive power - High
- Large current capacity - Excellent

Mainly used for low power applications because it uses current drive, which has high drive loss and makes using higher frequencies more difficult.

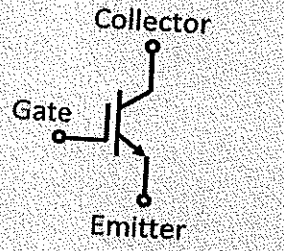
MOSFETs



- Operation speed - Fast
- Drive power - Low
- Large current capacity - Poor

Uses voltage drive, which has low drive loss and is well suited to using higher frequencies.
This is the main device type used in recent years.

IGBTs



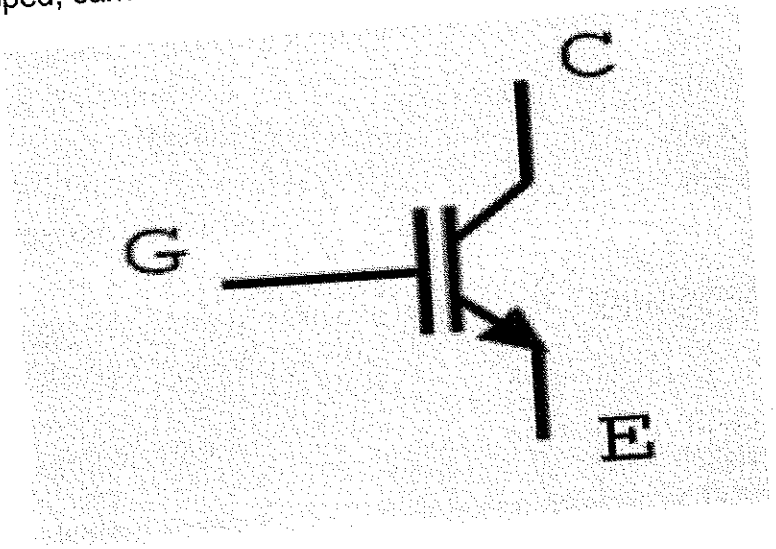
- Operation speed - Slow
- Drive power - Low
- Large current capacity - Excellent

Combines the benefits of both transistors and MOSFETs.
The leading device for high power applications.
Higher frequency use is an issue.

Answers Key

Course Code: Basic Electrical Engineering, **Course Name: ELE 1103**
School of Electrical Skills, Session: 2021-22 (Summer Semester)
B. Voc. Program, I Semester, End-Sem. Examination

4. (Ans.)
An **insulated-gate bipolar transistor** (IGBT) is a three-terminal power semiconductor device primarily used as an electronic switch, which, as it was developed, came to combine high efficiency and fast switching.



Section – C

1. (Ans.)
The materials which conduct electricity due to free electrons when an electric potential difference is applied across them are known as conducting materials. ... Conducting materials are good conductors of electricity and heat. Gold, silver, copper, aluminum are the examples of conducting materials.
   1. Fuse
   2. RTD

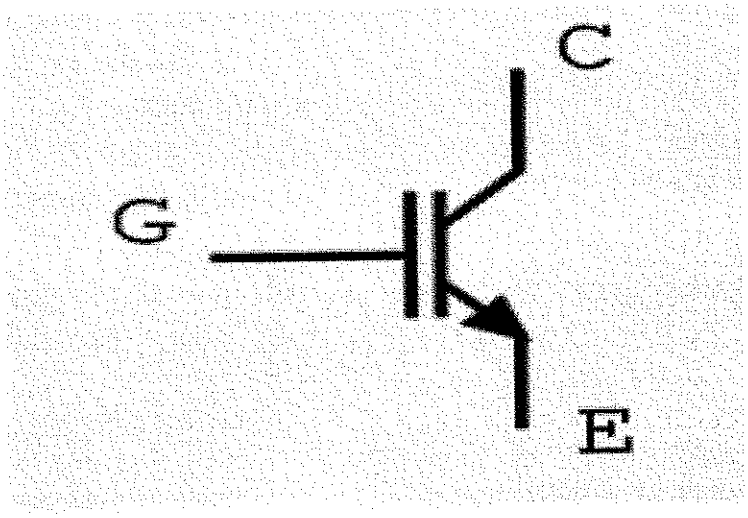
2. (Ans.)
The first step in finding a short circuit is to look for physical signs. This may include visible burns or melted metal on wires, burning smells, or flickering lights. Once you've identified a potential short, use your Multimeter to confirm the voltage by placing it on its resistance or continuity setting.

- How to Find a Short Circuit with a Multimeter.?
- Preparation and Safety. ...
- Turn on the Multimeter and Set it to Continuity or Resistance. ...
- Test the Function of the Multimeter. ...
- Identify and Locate the Circuit Component. ...
- Apply the Probe Tips to the Circuit. ...
- Check the Display of the Multimeter.

Answers Key

Course Code: Basic Electrical Engineering, **Course Name: ELE 1103**
School of Electrical Skills, Session: 2021-22 (Summer Semester)
B. Voc. Program, I Semester, End-Sem. Examination

4. (Ans.)
An **insulated-gate bipolar transistor** (IGBT) is a three-terminal power semiconductor device primarily used as an electronic switch, which, as it was developed, came to combine high efficiency and fast switching.



Section – C

1. (Ans.)
The materials which conduct electricity due to free electrons when an electric potential difference is applied across them are known as conducting materials. ... Conducting materials are good conductors of electricity and heat. Gold, silver, copper, aluminum are the examples of conducting materials.
   1. Fuse
   2. RTD

2. (Ans.)
The first step in finding a short circuit is to look for physical signs. This may include visible burns or melted metal on wires, burning smells, or flickering lights. Once you've identified a potential short, use your Multimeter to confirm the voltage by placing it on its resistance or continuity setting.

- How to Find a Short Circuit with a Multimeter.?
- Preparation and Safety. ...
- Turn on the Multimeter and Set it to Continuity or Resistance. ...
- Test the Function of the Multimeter. ...
- Identify and Locate the Circuit Component. ...
- Apply the Probe Tips to the Circuit. ...
- Check the Display of the Multimeter.

Answers Key

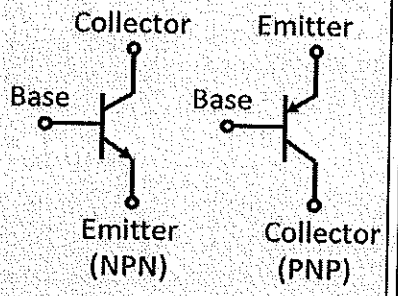
Course Code: Basic Electrical Engineering, **Course Name: ELE 1103**
School of Electrical Skills, Session: 2021-22 (Summer Semester)
B. Voc. Program, I Semester, End-Sem. Examination

3. (Ans.)

MCB	MCCB
It stands for Miniature Circuit Breaker.	It stands for Molded Case Circuit Breaker.
Rated current not more than 125 Ampere.	Rated Current up to 1600A
Its interrupting current rating is under 10KA	Their interrupting current ranges from around 10KA -85KA
Judging from their power capacities, MCB is mainly used for low Breaking capacity requirement mainly domestic.	MCCB is mainly used for both low and high Breaking capacity requirements mainly industrial.
Its trip characteristics are normally not adjustable since they basically cater to low circuits.	Its trip current may be fixed as well as adjustable for overload and magnetic setting.

4. (Ans.)

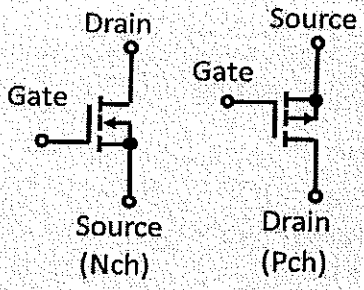
Bipolar transistors



- Operation speed - Slow
- Drive power - High
- Large current capacity - Excellent

Mainly used for low power applications because it uses current drive, which has high drive loss and makes using higher frequencies more difficult.

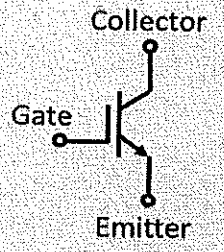
MOSFETs



- Operation speed - Fast
- Drive power - Low
- Large current capacity - Poor

Uses voltage drive, which has low drive loss and is well suited to using higher frequencies.
This is the main device type used in recent years.

IGBTs



- Operation speed - Slow
- Drive power - Low
- Large current capacity - Excellent

Combines the benefits of both transistors and MOSFETs.
The leading device for high power applications.
Higher frequency use is an issue.

Answers Key

Course Code: Basic Electrical Engineering, **Course Name: ELE 1103**
School of Electrical Skills, Session: 2021-22 (Summer Semester)
B. Voc. Program, I Semester, End-Sem. Examination

Section – A

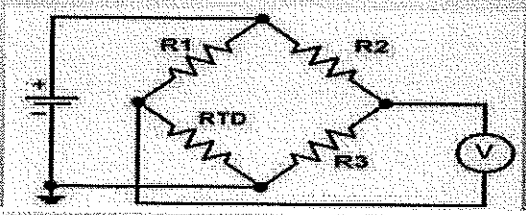
1. A
2. B
3. C
4. A
5. C
6. B
7. D
8. A
9. B
10. A

Section – B

1. (Ans.)

RTD

- RTD stands for Resistance Temperature Detector.
- The change in temperature is detected by the change in resistance of the wire.
- There are two types of RTD, viz. having positive and negative thermal coefficients of resistivity (resistance increases or decreases with the increase in temperature respectively).
- RTDs are used for temperature measurements by using them in bridge circuits.
- The change in temperature causes considerable resistance change which gives a voltage drop in accordance with the thermal coefficient of resistance of the wire.
- This voltage is further amplified and the temperature is read thus. This is how the RTDs are used in circuits assisting in automatic control and measurement with high accuracy.



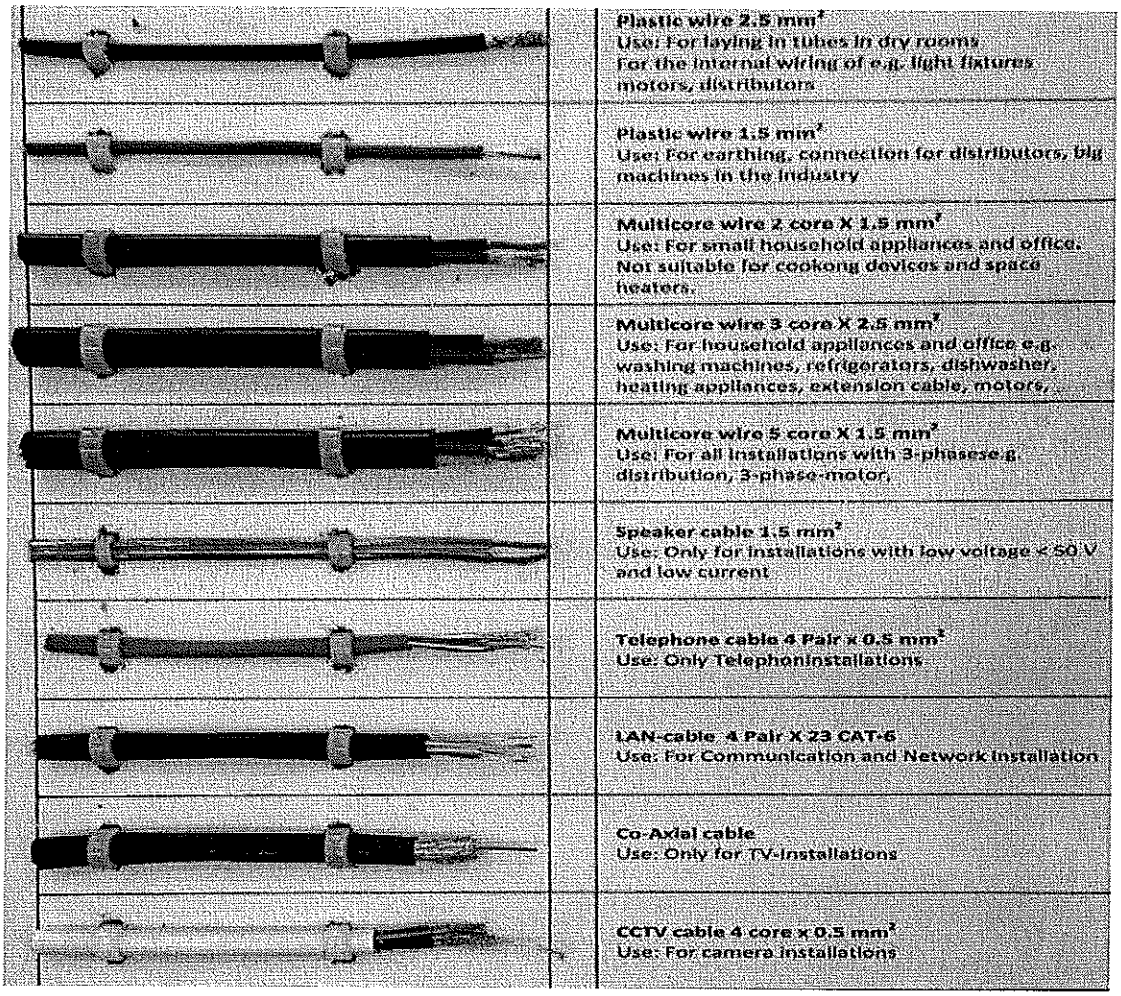
Advantages

- Due to no fluid present absolute temperature is recorded.
- It is highly sensitive and gives accurate results.
- It has a good range of temperature measurement. It can thus measure from very low to very high temperature.
- Due to electrical output (resistance change) complete automation can be achieved.

Answers Key

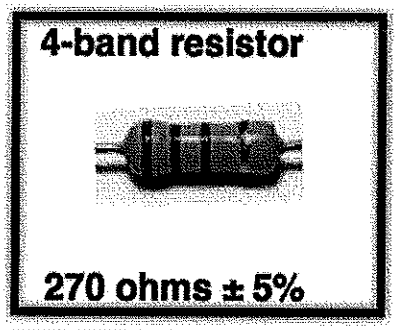
Course Code: Basic Electrical Engineering, **Course Name: ELE 1103**
School of Electrical Skills, Session: 2021-22 (Summer Semester)
B. Voc. Program, I Semester, End-Sem. Examination

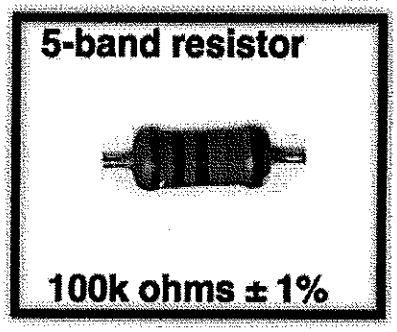
2. (Ans.)



3. (Ans.)

Color	Value	Multiplier	Tolerance
Black	0	$\times 10^0$	± 20%
Brown	1	$\times 10^1$	± 1%
Red	2	$\times 10^2$	± 2%
Orange	3	$\times 10^3$	± 3%
Yellow	4	$\times 10^4$	- 0, + 100%
Green	5	$\times 10^5$	± 0.5%
Blue	6	$\times 10^6$	± 0.25%
Violet	7	$\times 10^7$	± 0.10%
Gray	8	$\times 10^8$	± 0.05%
White	9	$\times 10^9$	± 10%
Gold	–	$\times 10^{-1}$	± 5%
Silver	–	$\times 10^{-2}$	± 10%





BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester

End-Sem. Examination

Course Code: Basic Electrical Engineering **Time: 2 Hours**

Course Name: ELE1103 **Max. Marks: 50**

Instruction: Answer all questions from each and every section. Section A, each question carries one mark, section B, each question carries four marks and in section C, each question carries six marks. Scientific calculators are allowed.

Section – A

10X01 = 10 Marks

1. SI unit of Impedance of is____
   (A) OHM (B) Watt (C) Joule (D) Henry
2. MOSFET is a_____
   (A) Insulator (B) Semiconductor (C) Conductor (D) None of these
3. How much tolerance of silver color in resistance?
   (A) 2% (B) 5% (C) 10% (D) 20%
4. B types MCB is used for_____
   (A) Industry (B) Home (C) Hospital (D) None of these
5. Ammeter is connected in_____
   (A) Series (B) Parallel (C) Both (A+B) (D) None of these
6. MCB is used for_____
   (A) Circuit protection (C) Over Voltage protection
   (B) Human protection (D) All of these
7. Which one is a good insulator?
   (A) Mercury (B) Cotton (C) Water (D) Metal
8. A Fuse is connected____
   (A) After load (B) Before load (C) In parallel (D) All of these
9. In which conduction RCCB trip?
   (A) Over Voltage (B) Low Voltage (C) Low Current (D) Leakage Current
10. Which one is a PPE tool?
    (A) Screwdriver (B) Hammer (C) Helmet (D) Cable

set B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Section – B

04X04 = 16 Marks

1. Explain about cartridge fuse.
2. What is P-N junction?
3. Explain about Zener diode.
4. What is BJT?

Section – C

04X06 = 24 Marks

1. Write the types & class of a MCB.
2. How to trace out a short circuit with the help of multimeter? Explain.
3. Explain about electrical hazards and its various issue.
4. Draw the connections of fluorescent lamp and explain about its part.

Answers Key

Course Code: Basic Electrical Engineering, **Course Name: ELE 1103**
School of Electrical Skills, Session: 2021-22 (Summer Semester)
B. Voc. Program, I Semester, End-Sem. Examination

Section – A

1. A
2. B
3. C
4. B
5. A
6. A
7. B
8. B
9. D
10. C

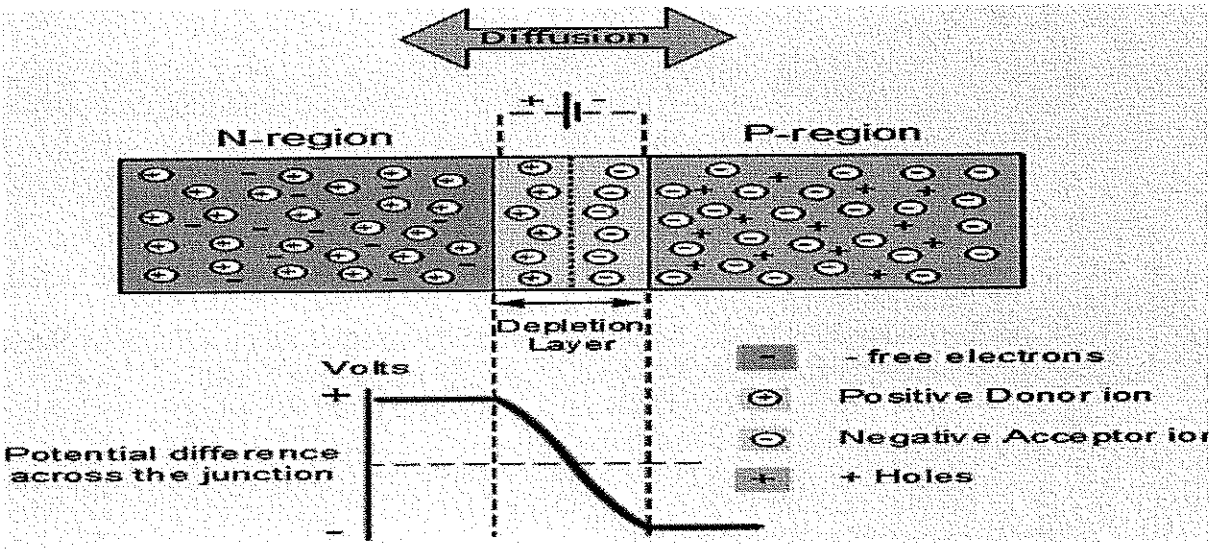
Section – B

1. (Ans.)

A cartridge fuse is a cylinder shaped fuse with either metal caps (ferrules) or blade contact points, at both ends Most cartridge fuses are rated for 250 Volt to 600 Volt circuits, dependent on the class of the fuse, and rated for varying amperages as high as 600 amps, again dependent on the specific fuse. Cartridge fuses are used to protect electrical appliances such as motors, air-conditions, refrigerator, pumps etc., where high voltage rating and currents are required. They are available up to 600A and 600V AC and widely used in industries, commercial as well as home distribution panels.

2. (Ans.)

A p–n junction is a boundary or interface between two types of semiconductor materials, p-type and n-type, inside a single crystal of semiconductor. The "p" side contains an excess of holes while the "n" side contains an excess of electrons in the outer shells of the electrically neutral atoms there.

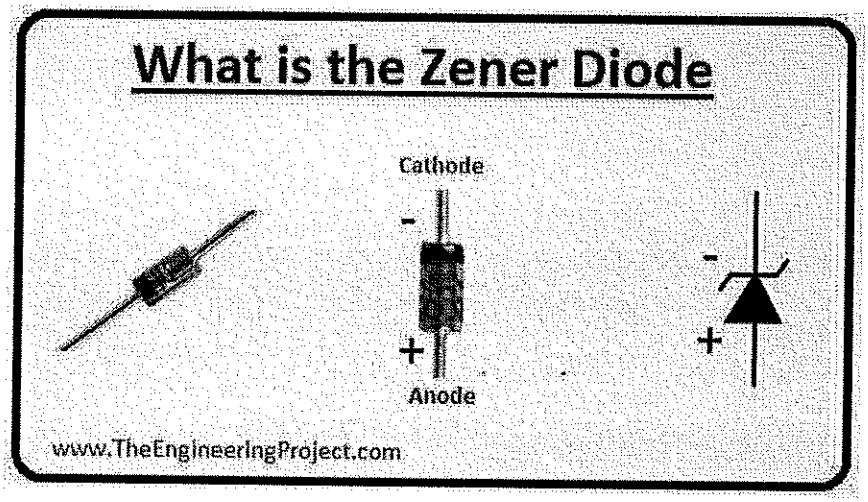


Answers Key

Course Code: Basic Electrical Engineering, **Course Name: ELE 1103**
School of Electrical Skills, Session: 2021-22 (Summer Semester)
B. Voc. Program, I Semester, End-Sem. Examination

3. (Ans.)

A Zener diode is a special type of diode designed to reliably allow current to flow "backwards" when a certain set reverse voltage, known as the Zener voltage, is reached. Zener diodes are manufactured with a great variety of Zener voltages and some are even variable.



4. (Ans.)

A Bipolar Junction Transistor (also known as a BJT or BJT Transistor) is a three-terminal semiconductor device consisting of two p-n junctions which are able to amplify or magnify a signal. It is a current controlled device. The three terminals of the BJT are the base, the collector and the emitter. A BJT is a type of transistor that uses both electrons and holes as charge carriers.

- There are two types of bipolar junction transistors
- NPN transistors
- PNP transistors

Section – C

1. (Ans.)

- There are four factors you need to take into account when choosing an MCB:
- 1) Current rating. This is the rated current on which the tripping characteristics will be based.
- 2) Tripping characteristics. The multiple of the current rating at which you want the MCB to trip. This will determine the MCB Type.
- 3) Breaking capacity. The breaking capacity is the maximum current and voltage that the MCB is designed to safely interrupt. The breaking capacity may also be given as the maximum current at a given voltage.
- 4) Number of poles. The number of poles determines the number of phases (or circuits) that you can protect with a single device. A single pole MCB will only protect one circuit, while a three (3) pole MCB will protect up to three circuits. An overload on any one pole will cause the MCB to trip.
- Another factor to consider is the durability, or endurance, which tells you the number of cycles that the MCB is designed to operate for. In general, an MCB will be designed to be manually operated twice.

Answers Key

Course Code: Basic Electrical Engineering, **Course Name: ELE 1103**
School of Electrical Skills, Session: 2021-22 (Summer Semester)
B. Voc. Program, I Semester, End-Sem. Examination

2. (Ans.)

The first step in finding a short circuit is to look for **physical signs**. This may include visible burns or melted metal on wires, burning smells, or flickering lights. Once you've identified a potential short, use your Multimeter to confirm the voltage by placing it on its resistance or continuity setting.

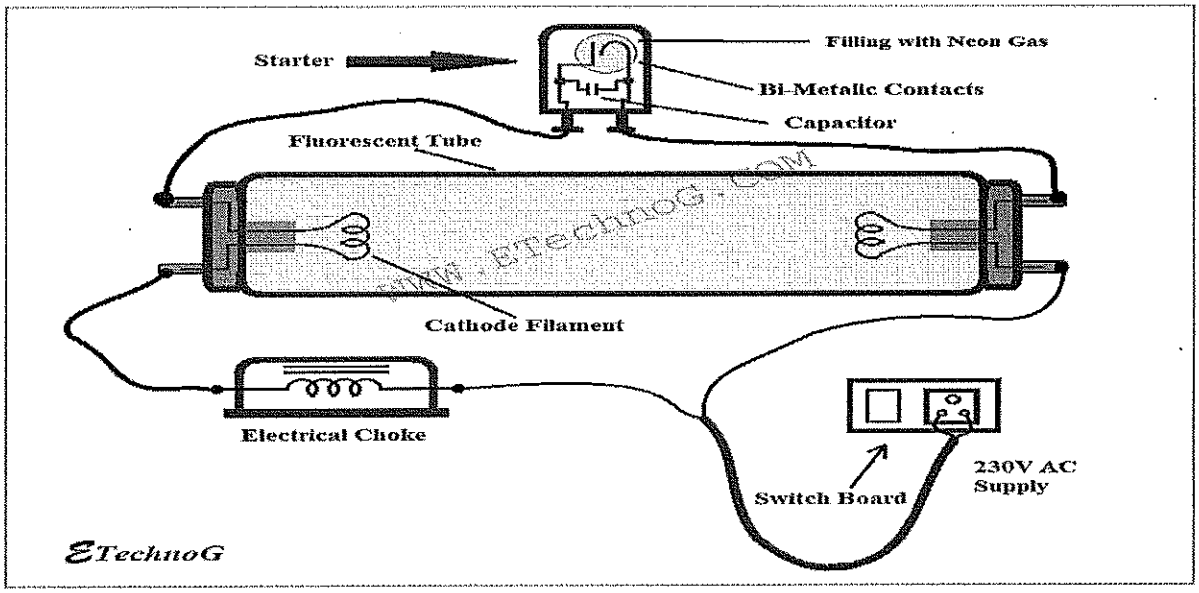
- How to Find a Short Circuit with a Multimeter.?
- Preparation and Safety. ...
- Turn on the Multimeter and Set it to Continuity or Resistance. ...
- Test the Function of the Multimeter. ...
- Identify and Locate the Circuit Component. ...
- Apply the Probe Tips to the Circuit. ...
- Check the Display of the Multimeter.

3. (Ans.)

The main hazards of working with electricity arc injury from exposure to arcing, fire from faulty electrical equipment or installations. explosion caused by unsuitable electrical apparatus or static electricity igniting flammable vapors or dusts, for example in a spray paint booth.

- Arc Faults. ...
- Ground Faults. ...
- Old Wiring. ...
- Light Bulbs with the Wrong Wattage. ...
- Overloaded Outlets. ...
- Unprotected Outlets. ...
- Faulty Appliances and Cords.

4. (Ans.)



Answers Key

Course Code: Basic Electrical Engineering, **Course Name: ELE 1103**

School of Electrical Skills, Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester, End-Sem. Examination

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Electrical Skills
Session: 2021-22 (Summer Semester)
B. Voc. Program, 1st Semester,
End-Sem. Examination

Course Code: ELE1104 **Time: 2 Hours**
Course Name: Maintenance Technician Electrical **Max. Marks: 50**
Instruction: All questions are compulsory. Each question carries one mark in section A, four marks in section B and six marks in section C. Scientific calculator is allowed.

Section – A

10x01 = 10 Marks

Q.1. Full form of ELCB is:
(a) Earth Leakage Circuit Breaker
(b) Earth Linear Circuit Breaker
(c) Earth Leakage Current Breaker
(d) Earth Linear Current Breaker

Q.2. _____ is used for ear protection as PPE.

Q.3. Unit of frequency is:
(a) Second
(b) Cycle
(c) Hertz
(d) Weber

Q.4. PPE stands for:
(a) Personal Protective Equipment
(b) Professional Protective Equipment
(c) Personal Professional Equipment
(d) Professional Personal Equipment

Q.5. 5s is a:
(a) Principle
(b) Rule
(c) Law
(d) both b and c

Q.6. Eye PPE protects from:
(a) Chemical Exposure
(b) Laser Exposure
(c) Welding Light Exposure
(d) All of the above

Q.7. The capacity of an air conditioner is expressed in:
(a) KWh
(b) Tons
(c) KVA
(d) KVAR

Q.8. _____ are used for feet protection as PPE.

Q.9. The rating of an electric iron is expressed in:
(a) KW
(b) KWh
(c) KVA
(d) HP

Q.10. What are the benefits of 5s to an organization?
(a) Improved Safety
(b) Increased Profitability
(c) Increased Efficiency
(d) All of the above

Section – B

04x04 = 16 Marks

Q.1. Explain types of PPE used for eye protection.
Q.2. Draw any 10 electrical symbols, write their names and uses in the electrical drawings.
Q.3. Define PPE. What is the importance of using PPE?
Q.4. Explain any of the 4s' principles.

Set- A

Section – C

04x06 = 24 Marks

Q.1. Explain autonomous maintenance. Write any 4 advantages of autonomous maintenance.
Q.2. What are the advantages of 5s principles?
Q.3. What can be reasons for defects in a microwave oven?
Q.4. Write any 12 preventive maintenance checklist points.

Answer Key (ELE 1104)

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Electrical Skills
Session: 2021-22 (Summer Semester)
B.Voc. Program, 1st Semester,
End-Sem. Examination

Course Code: ELE 1104
Course Name: Maintenance Technician Electrical

Max. Marks: 50

Section – A

10x01 = 10 Marks

Ans. 01: (a)
Ans. 02: (Earplug)
Ans. 03: (c)
Ans. 04: (a)
Ans. 05: (a)
Ans. 06: (d)
Ans. 07: (b)
Ans. 08: (Safety shoe)
Ans. 09: (a)
Ans. 10: (d)

Section – B

04x04 = 16 Marks

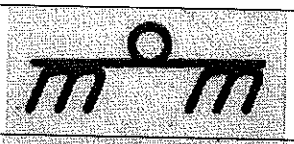
Ans. 1: -

Different types of PPE used for eye are:

- Non-Prescription safety glasses.
- Prescription safety glasses.
- Employees that wear prescription (Rx) lenses can use non-prescription eye protection worn over prescription lenses as long as it does not compromise the fit of either piece of eyewear.
- Goggles
- Chemical
- Laser
- Welding
- Chemical goggles protect your eyes, eye sockets, and the facial area immediately surrounding the eyes from impact, dust, and splashes.
- Chemical goggles are generally stronger than safety glasses and are used for higher impact, particle and chemical splash protection.
- Laser and Welding goggles protect the eyes from harmful light.

Ans. 2: -

Sr. no.	Name	Symbols used in circuit diagrams	Symbols used in layout
1	General wiring	N.A.	
2	Wiring on the surface	N.A.	
3	Wiring under the surface	N.A.	

4	Conduit on the surface	**N.A.**	
5	Conduit under the surface	**N.A.**	
6	Wiring going upward	**N.A.**	
7	Wiring going downward	**N.A.**	
8	Wiring passing vertically through a room	**N.A.**	

Ans. 3: -

PPE is abbreviation used for Personal Protective Equipment. It is important for the safety of people working in industries where they can get harmed physically.

- Making the workplace safe includes providing instructions, procedures, training and supervision to encourage people to work safely and responsibly.
- Even where engineering controls and safe systems of work have been applied, some hazards might remain. These include injuries to:
    - the lungs, e.g., from breathing in contaminated air
    - the head and feet, e.g., from falling materials
    - the eyes, e.g., from flying particles or splashes of corrosive liquids
    - the skin, e.g., from contact with corrosive materials
    - the body, e.g., from extremes of heat or cold

PPE is needed in these cases to reduce the risk.

Ans. 4: -

1. Sorting:

"Sorting" means to sort through & separate everything in each work area. Keep only what is necessary. Materials, tools, equipment and supplies that are not frequently used should be moved to a separate, common storage area.

- Eliminate all unnecessary tools, parts, and instructions.
- Keep only essential items and eliminate what is not required.
- Prioritizing things per requirements and keeping them in easily-accessible places.
- Everything else is stored or discarded.

2. Straightening or setting in order:

Once you have completed the sort step, the workplace should be free from clutter and unnecessary items. Now it is time to straighten everything up and organize it. The goal is to put everything in its place and organize each workstation for maximum efficiency and productivity.

- There should be a place for everything and everything should be in its place.
- The place for each item should be clearly labelled.
- Items should be arranged in a manner that promotes efficient work flow, with equipment used most often being the most easily accessible.

3. Shining or Systematic Cleaning:

Systematic cleaning is done for clean the unwanted things from the work place. Shining is done at the end of each shift, clean the work area and be sure everything is restored to its place.

- Clean the workspace and all equipment, and keep it clean, tidy and organized.
- At the end of each shift, clean the work area and be sure everything is restored to its place.

- Maintaining cleanliness should be part of the daily work – not an occasional activity initiated when things get too messy.

4. **Standardizing:** Implement color coding and labels to stay consistent with other areas.
   - All work stations for a particular job should be identical.
   - All employees doing the same job should be able to work in any station with the same tools that are in the same location in every station.
   - Everyone should know exactly what his or her responsibilities are for adhering to the first 3 S's.

5. **Sustaining the discipline or self-discipline:**

Discipline and training imposed upon a person. Children are taught by their parents to brush their teeth after every meal.

- Maintain and review standards.
- Maintain focus on this new way and do not allow a gradual decline back to the old ways.
- While thinking about the new way, also be thinking about yet better ways.

Section – C

06x04 = 24 Marks

Ans. 1: -

Autonomous Maintenance: Autonomous Maintenance follows a structured approach to increase the skill levels of personnel so that they can understand manage and improve their equipment and processes.

Standards are introduction for cleaning, inspection, tightening and lubrication to ensure the conditions are sustained.

In many production or processing plants operators and technicians have some form of technical education such as a trade in machinery, electrician, or tooling technician and in larger organizations these positions are entry level positions for graduate engineers. This is beneficial as qualified operators have a much better understanding of fixed plant machinery, engineering design, plant maintenance procedures and are much better at troubleshooting production problems.

Advantages of Autonomous Maintenance:

1. Increase in productivity and Overall Plant Efficiency by 1.5 or 2 times.
2. Customer complaints are rectified swiftly.
3. Accidents are reduced considerably.
4. Total productive Management ensures higher confidence level among the employees.
5. Better upkeep of the work place by making it clean, neat and attractive.
6. Favorable change in the attitude of the operators.
7. Reduction in total manpower.
8. AM ensures better and more energy saving measures and also better safety of men and machine as all concerned people know well about the equipment and those devices.

Ans. 2: -

1. Improves organizational efficiency
2. Reduces waste in all forms
3. Cuts down employee frustration when "the system doesn't work"
4. Improves speed and quality of work performance
5. Improves safety
6. Creates a visually attractive environment

Ans. 3: -

Serial No.	Problem	Possible Cause	Corrective Action
1	Oven will not heat.	• Selector switch if off. • Blown fuse. • Loose connection. • Open circuit in oven element.	• Set selector switch. • Check fuse. • Tighten all connection. • Check circuit continuity.
2	Oven too hot or cold.	• Thermostat calibration. • Improper oven door fit.	• Check Thermostat adjustment. • Check Door seal and fit.
3	Surface unit dose not heat.	• Blown main fuse. • Loose connection. • Open unit. • Broken wire. • Inoperative switch. • Incorrect connection.	• Check fuse. • Tighten. • Check wiring diagram. • Continuity check. • Replace switch. • Check wiring diagram.
4	Timer does not control often.	• Incorrect connection. • Incorrect setting. • Inoperative motor. • Inoperative mechanism	• Tighten. • Refer to owner's manual see Timer operation. • Replace Motor. • Replace Timer.
5	Oven will not turn off.	• Inoperative selector switch. • Inoperative timer.	• Check selector switch. • Check timer setting.
6	Oven interior light does not on.	• Loose or inoperative bulb. • Inoperative light switch. • Loose connection.	• Tighten or replace bulb. • Light switch replacement. • Tighten
7	Oven door opens under heat.	• Door needs adjustment. • Loose or worn pin	• Check door seal and fit. • Replace bracket.

Ans. 4: -

1. All Lights Working
2. Glassware conditions
3. Fixture support conditions
4. Wiring Conditions
5. Ballast Conditions
6. Siren/Timer Conditions
7. JB Cover conditions
8. Switch Conditions
9. Outlet Cord Conditions
10. Protective caging conditions
11. Security Cameras working properly
12. Proper viewing angle of security cameras

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Electrical Skills
Session: 2021-22 (Summer Semester)
B. Voc. Program, 1st Semester,
End-Sem. Examination

Course Code: ELE1104 **Time: 2 Hours**
Course Name: Maintenance Technician Electrical **Max. Marks: 50**
Instruction: All questions are compulsory. Each question carries one mark in section A, four marks in section B and six marks in section C. Scientific calculator is allowed.

Section – A

10x01 = 10 Marks

Q.1. Which of the following is used for hammering soft materials?
(a) Ball Peen Hammer
(b) Mallet
(c) Chisel
(d) None of the above

Q.2. Combination plier is used for:
(a) Twisting (b) Holding (c) Cutting (d) All of these

Q.3. _____ are used for hand protection as PPE.

Q.4. The innermost insulation of cables is called _____.

Q.5. The tool used for removing fine amounts of material from a workpiece is called:
(a) File
(b) Chisel
(c) Handsaw
(d) None of these

Q.6. Full form of MCCB is:
(a) Miniature Current Circuit Breaker
(b) Molded Case Circuit Breaker
(c) Miniature Case Current Breaker
(d) Miniature Circuit Current Breaker

Q.7. The capacity of an air conditioner is expressed in:
(a) KWh
(b) Tons
(c) KVA
(d) KVAR

Q.8. What are the benefits of 5s to an organization?
(a) Improved Safety
(b) Increased Profitability
(c) Increased Efficiency
(d) All of the above

Q.9. The rating of an electric iron is expressed in:
(a) KW
(b) KWh
(c) KVA
(d) HP

Q.10. The tool used for checking horizontal and vertical levels of a surface or an object is called _____.

Set-B

Section – B

04x04 = 16 Marks

Q.1. Write any four advantages of 5s principle.
Q.2. Write different types of PPE used for hands.
Q.3. Write preventive maintenance checklist points that are taken care of while performing the maintenance.
Q.4. What are the advantages of performing autonomous maintenance operations?

Section – C

04x06 = 24 Marks

Q.1. Draw any 12 symbols with their names used in electrical drawings/schematics.
Q.2. What is PPE. Write PPEs used for eyes and feet?
Q.3. What can be reasons for defects in electric irons?
Q.4. Explain any three 5S Principles in detail.

Answer Key (ELE 1104)

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Electrical Skills
Session: 2021-22 (Summer Semester)
B.Voc. Program, 1st Semester,
End-Sem. Examination

Course Code: ELE 1104
Course Name: Maintenance Technician Electrical **Max. Marks: 50**

Section – A

10x01 = 10 Marks

Ans. 01: (b)
Ans. 02: (d)
Ans. 03: (Gloves)
Ans. 04: (First insulation)
Ans. 05: (a)
Ans. 06: (b)
Ans. 07: (b)
Ans. 08: (d)
Ans. 09: (a)
Ans. 10: (spirit level)

Section – B

04x04 = 16 Marks

Ans. 1: -

1. Improves organizational efficiency
2. Reduces waste in all forms
3. Cuts down employee frustration when "the system doesn't work"
4. Improves speed and quality of work performance
5. Improves safety
6. Creates a visually attractive environment

Ans. 2: -

- Needed when work presents thepotential of causing hand injury from physical, chemical, or radiation agents.
- Examples of hazards:
  - Absorbing harmful substances
  - Sharp objects capable of causing cuts, abrasions, or punctures
  - Chemical or thermal burns
  - Electrical work

Types of Hand Protection:

- High/Low temperatures
- Voltage Rated
- Temperature Resistant
- Infectious Agent / Biohazard Resistant – (Latex, Vinyl, Nitrile, etc)

Ans. 3: -

1. All Lights Working

2. Glassware conditions
3. Fixture support conditions
4. Wiring Conditions
5. Ballast Conditions
6. Siren/Timer Conditions
7. JB Cover conditions
8. Switch Conditions

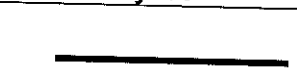
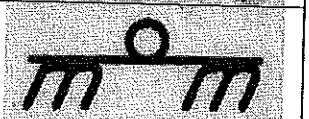
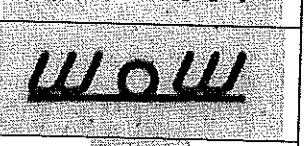
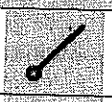
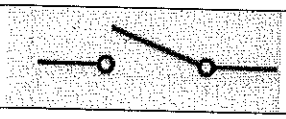
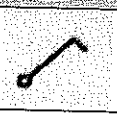
Ans. 4: -

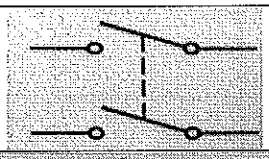
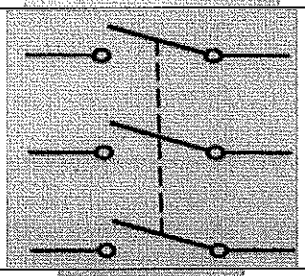
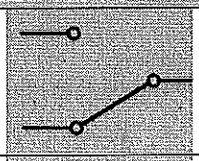
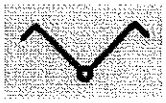
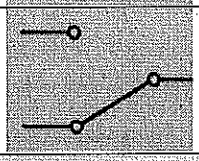
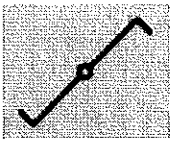
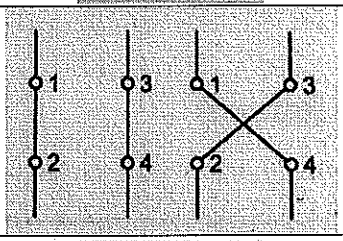
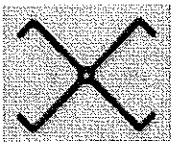
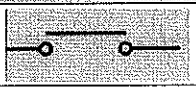
1. Increase in productivity and Overall Plant Efficiency by 1.5 or 2 times.
2. Customer complaints are rectified swiftly.
3. Accidents are reduced considerably.
4. Total productive Management ensures higher confidence level among the employees.
5. Better upkeep of the work place by making it clean, neat and attractive.
6. Favorable change in the attitude of the operators.
7. Reduction in total manpower.
8. AM ensures better and more energy saving measures and also better safety of men and machine as all concerned people know well about the equipment and those devices.

Section – C

06x04 = 24 Marks

Ans. 1: -

Sr. no.	Name	Symbols used in circuit diagrams	Symbols used in layout
1	General wiring	**N.A.**	
2	Wiring on the surface	**N.A.**	
3	Wiring under the surface	**N.A.**	
4	Conduit on the surface	**N.A.**	
5	Conduit under the surface	**N.A.**	
6	Wiring going upward	**N.A.**	
7	Wiring going downward	**N.A.**	
8	Wiring passing vertically through a room	**N.A.**	
9	Single pole one way switch		

10	Double pole one way switch		
11	Three pole one way switch		
12	Multi-position switch		
13	Two way switch		
14	Intermediate switch		
15	Push button or bell push		

Ans. 2: - PPE is abbreviation used for Personal Protective Equipment. It is important for the safety of people working in industries where they can get harmed physically.

- Making the workplace safe includes providing instructions, procedures, training and supervision to encourage people to work safely and responsibly.
- Even where engineering controls and safe systems of work have been applied, some hazards might remain.

Types of eye protection include:

- Non-Prescription safety glasses.
- Prescription safety glasses.
- Employees that wear prescription (Rx) lenses can use non- prescription eye protection worn over prescription lenses as long as it does not compromise the fit of either piece of eyewear.

Types of hand protection include:

- Voltage Rated
- Temperature Resistant
- Infectious Agent / Biohazard Resistant – (Latex, Vinyl, Nitrile, etc)

Ans. 3: -

Serial No	Trouble	Possible Cause	Corrective action to be taken
1	No Heat	• No Power at outlet. • Defective cord or plug	• Check outlet for power • Repair or replace

		• Loose terminal connections • Broken lead in iron • Loose thermostat control knob • Defective heater element • Open terminal fuse	• Check and tighten. • Repair or replace of lead • Clean and tighten • Replace the element if separate. If cast in, replace sole-plate assembly • Replace
2	Insufficient Heat	• Low line voltage. • Incorrect thermostat setting • Defecting thermostat • Loose connection	• Check voltage at outlet. • Adjust and recalibrate thermostat. • Replace thermostat. • Clean and tighten connections
3	Excessive Heat	• Incorrect thermostat setting • Defective thermostat	• Adjust and recalibrate thermostat or replace • Replace thermostat
4	Iron gives shock	• Loose connection. • Broken wire • Disconnected earth connection. • Weak insulation or heating element. • Earth continuity with common earth not available	• Clean and tighten • Repair or replace • Check earth connection and connect properly. • Check insulation resistance of heating element; If necessary, replace element • Check the main earth continuity and connect properly

Ans. 4: -

1. Sorting:

"Sorting" means to sort through & separate everything in each work area. Keep only what is necessary. Materials, tools, equipment and supplies that are not frequently used should be moved to a separate, common storage area.

- Eliminate all unnecessary tools, parts, and instructions.
- Keep only essential items and eliminate what is not required.
- Prioritizing things per requirements and keeping them in easily-accessible places.
- Everything else is stored or discarded.

2. Straightening or setting in order:

Once you have completed the sort step, the workplace should be free from clutter and unnecessary items. Now it is time to straighten everything up and organize it. The goal is to put everything in its place and organize each workstation for maximum efficiency and productivity.

- There should be a place for everything and everything should be in its place.
- The place for each item should be clearly labelled.
- Items should be arranged in a manner that promotes efficient work flow, with equipment used most often being the most easily accessible.

3. Shining or Systematic Cleaning:

Systematic cleaning is done for clean the unwanted things from the work place. Shining is done at the end of each shift, clean the work area and be sure everything is restored to its place.

- Clean the workspace and all equipment, and keep it clean, tidy and organized.
- At the end of each shift, clean the work area and be sure everything is restored to its place.

- Maintaining cleanliness should be part of the daily work – not an occasional activity initiated when things get too messy.

4. **Standardizing:** Implement color coding and labels to stay consistent with other areas.
   - All work stations for a particular job should be identical.
   - All employees doing the same job should be able to work in any station with the same tools that are in the same location in every station.
   - Everyone should know exactly what his or her responsibilities are for adhering to the first 3 S's.

5. **Sustaining the discipline or self-discipline:**

Discipline and training imposed upon a person. Children are taught by their parents to brush their teeth after every meal.

- Maintain and review standards.
- Maintain focus on this new way and do not allow a gradual decline back to the old ways.
- While thinking about the new way, also be thinking about yet better ways.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: ELE 1105 **Time: 2 Hour**

Course Name: Electrical Safety **Max. Marks: 50**

Instruction: Answer all questions from section A. Each question carries one mark. Answer all questions from section B, each question carries four marks. Answer all questions from section C, each question carries six marks. Scientific calculator is allowed.

Section – A

10X01 = 05 Marks

1. Touching electrocuted person may pass the current through you
   (a) True (b) False
2. What type of protection is needed when you are exposed to hazards from flying particles?
   (a) Eye protection (b) Face protection
   (c) Ear protection (d) Bothe (a) and (b)
3. Which class of fire involves an electrical equipment
   (a) Class A (b) Class B
   (c) Class C (d) Class D
4. Cover the dressing completely when applying bandages
   (a) True (b) false
5. Used appliance, if
   (a) Clean (b) Wiring condition is good
   (c) working properly (d) All of these
6. What does PPE Stand for
   (a) Personal protective equipment (b) personal protect equipment
   (c) Protective personal equipment (d) protect protective equipment
7. Material handling consists of movements of material from
   (a) one machine to another (b) One shop to another shop
   (c) Stores to shop (d) all of the above
8. It is best practice to wear gloves when dealing with a bleed
   (a) True (b) false
9. For major injury, dial 108 immediately
   (a) True (b) false
10. Which part of your body is most likely to be injured if you lift a heavy load
    (a) Knees (b) Shoulder
    (c) Back (d) Feet

Set-A

Section – B

04X4 = 16 Marks

1. What is fire extinguisher? Explain the different types of fire?
2. Write down the procedure of how to be operate fire extinguisher.
3. Brief the different types of accidents
4. What are warning signs? Explain it

Section – C

04X06 = 24 Marks

1. What is fire triangle? Explain the cause of fire
2. Draw the flow chart of first aid.
3. Write down the importance of first aid & personal protective equipment's
4. What is an emergency condition and how to be dealing with an emergence situation?

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: ELE 1105 **Time: 2 Hour**

Course Name: Electrical Safety **Max. Marks: 50**

Instruction: Answer all questions from section A. Each question carries one mark. Answer all questions from section B, each question carries four marks. Answer all questions from section C, each question carries six marks. Scientific calculator is allowed.

Section – A

10X01 = 05 Marks

1. What is your first action when examining the condition of a patient
   (a) Check for breathing (b) Check for insurance
   (c) Speak to victim and shake his shoulder (d) Check for external injuries
2. Pallet truck is used for:
   (a) Lifting & lowering (b) Vertical transportation
   (c) None of the above (d) Bothe (a) and (b)
3. How far away should you stand when you are using a fire extinguisher:
   (a) 4 feet (b) 6 feet
   (c) 8 feet (d) 10 feet
4. Which of the following reasons cause accidents
   (a) Alertness (b) Activeness
   (c) Activeness (d) Carelessness
5. Which of the following should be followed to prevent accidents at home
   (a) Carelessness (b) Safety rules at home
   (c) Activeness (d) All of these
6. A safety electrical one-line diagram should be used to -------all source of electrical energy
   (a) Identify (b) Castigate
   (c) Evaluate (d) Modify
7. Use caution when working near electricity.
   (a) Always (b) Never
   (c) Rarely (d) all of the above
8. Avoid working in..... conditions
   (a) Cold (b) Dry
   (c) Sunny (d) Wet

Set-B
Rishabh

9. When should safety footwear be inspected?

(a) Every 15 days (b) Every Month

(c) Every week (d) Prior to each use

10. Which part of your body is most likely to be injured if you lift a heavy load

(a) Knees (b) Shoulder

(c) Back (d) Feet

Section – B

04X4 = 16 Marks

1. Brief the different types of fire?
2. Write down the aims of first aid
3. Brief the different types of accidents
4. What are hazards? Explain any two types of hazards

Section – C

04X06 = 24 Marks

1. Write down the different types of the cause of fire
2. Make the tabular representation of fire extinguishers.
3. Explain the any tree personal protective equipment's
4. What is an emergency condition and how to be dealing with an emergence situation?

Answer Key Set – A, Course Code: ELE1105, Course Name: Electrical Safety

School of Electrical Skills, Session: 2021-22 (Summer Semester)

B. Voc. Program, 1st Semester, End-Sem. Examination

Section – A 10X01 = 05 Marks

1. A
2. D
3. C
4. A
5. D
6. A
7. D
8. A
9. A
10. C

Section – B

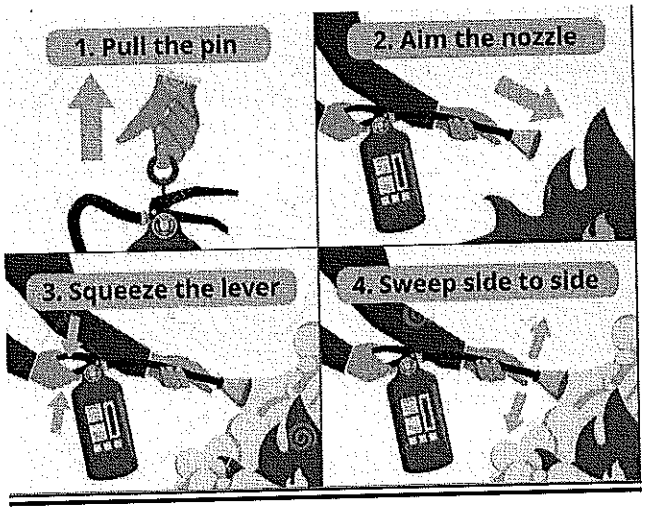
04X04 = 16 Marks

1. What is fire extinguisher? Explain the different types of fire?

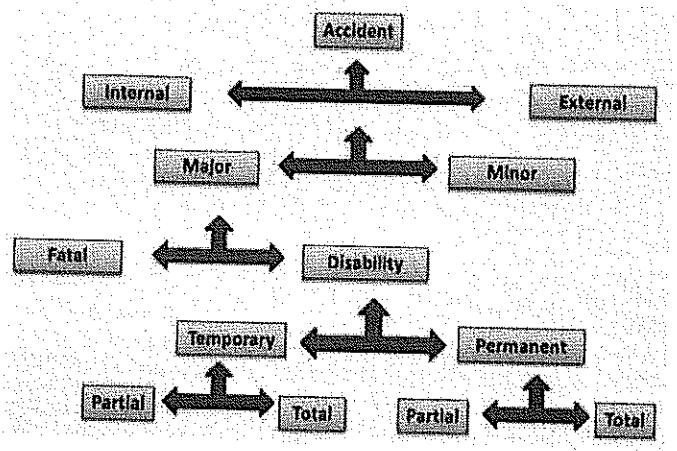
   Fire extinguishers are portable devices used to extinguish small fires or reduce their destruction before firefighters arrive at the scene. These are kept handy at places, namely fire points, in buildings, factories, public paces or transportation. The types and numbers of extinguishers legally required for an area are governed by the safety regulations in force in that particular area

   - **Class A**: freely burning, combustible solid materials such as wood or paper
   - **Class B**: flammable liquid or gas
   - **Class C**: energized electrical fire (energized electrical source serves as the ignitor of a class or B fire – if electrical source is removed, it is no longer a class C fire)
   - **Class D**: metallic fire (titanium, zirconium, magnesium, sodium)
   - **Class K/F**: cooking fires – animal, vegetable oils, or fats

2. Write down the procedure of how to be operate fire extinguisher



3. Brief the different types of accidents



4. What are warning signs? Explain it

Warning Signs: Warning signs are there to warn you of dangers. Unlike the two previous signs, they do not tell you not to do something, or to do something. They simply aim to make you aware of a danger, so you can protect yourself. These signs are triangular. The pictogram is black on a yellow background; the triangle has a black border.

Colour: Yellow

Shape: Triangle

Meaning: Warning, Be careful, Be aware

Examples:

- Caution hot water
- Danger 440 volts
- Mind the step
- Fragile roof

Section – C

03X03 = 09 Marks

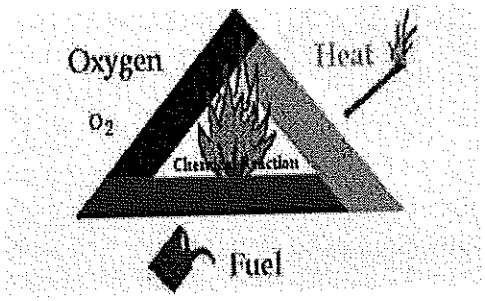
1. What is fire triangle? Explain the cause of fire

Answer Key Set – A, Course Code: ELE1105, Course Name: Electrical Safety

School of Electrical Skills, Session: 2021-22 (Summer Semester)

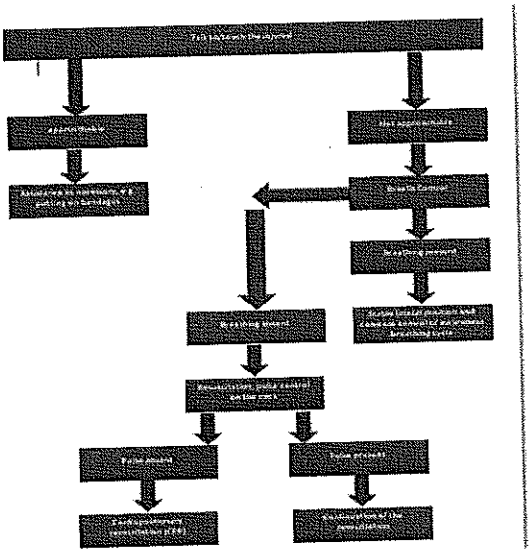
B. Voc. Program, 1st Semester, End-Sem. Examination

Fire is the visible effect of the process of combustion – a special type of chemical reaction. It occurs between oxygen in the air and some sort of fuel. The products from the chemical reaction are completely different from the starting material. The fuel must be heated to its ignition temperature for combustion to occur. The reaction will keep going as long as there is enough heat, fuel and oxygen. This is known as the fire triangle.



Oxygen, fuel and heat are needed for fire to occur. This is known as the fire triangle.

2. Draw the flow chart of first aid.



3. Write down the importance of first aid & personal protective equipment's

Procedure when finding a person:

General rules of conduct. Keep calm, secure the accident site, self-protection must be borne in mind, get person out of danger area

Check that the person is conscious. Speak to the person, touch him, and shake him by the shoulders

Conscious:

Give help according to necessity, support/positioning, bandage...

If need, call the Emergency Medical Services

Unconscious:

To call for help, initiate an emergency call

Check breathing

Check respiratory system and, if necessary, loosen clothing

Raise the head and chin

Check breathing by listening, seeing, feeling

Breathes normally:

Stable side position constant monitoring of breathing

Emergency call

Not breathing normally

First Person: Emergency Call

Second Person: Cardiopulmonary resuscitation Heart massage: Artificial respiration 30:2 Start with the cardiac massage! If AED (Automated External Defibrillator) is available, follow instructions. No, interruption until the arrival of the Emergency Services or until normal breathing!

Safety is a major issue for day labourers and skilled labourers. Each year, accidents happen frequently in the construction industry and often times it is due to the absence of Personal Protective Equipment (PPE) or failure to wear the provided PPE. PPE is equipment that will protect workers against health or safety risks on the job. The purpose is to reduce employee exposure to hazards when engineering and administrative controls are not feasible or effective to reduce these risks to acceptable levels. These hazard risks can be anything from wet floors to falling debris and everything in between. PPE includes items such as protective helmets, eye protection, high-visibility clothing, safety footwear, safety harnesses and, sometimes, respiratory protective equipment.

4. What is an emergency condition and how to be dealing with an emergence situation?

Dealing with an Emergency:

Emergency situations vary greatly but there are four main steps that always apply:

- Make the area safe.
- Evaluate the injured person's condition.
- Seek help.
- Give first aid.

STEP 1: MAKE THE AREA SAFE

Your own safety should always come first. As a first aider, you should:

- Check for any danger: is there a threat from traffic, fire, electricity cables, etc.
- Never approach the scene of an accident if you are putting yourself in danger
- Do your best to protect both the injured person(s) and other people on the scene
- Be aware that the property of the injured person is at risk. Theft can occur. So mind your safety.
- Seek police or emergency help if an accident scene is unsafe and you cannot offer help without putting yourself in danger.

STEP 2: EVALUATE THE CONDITION OF THE SICK OR INJURED PERSON

If it is safe, you can evaluate the sick or injured person's condition. Always check that he is conscious and breathing normally. Situations in which consciousness or breathing are impaired are often life threatening. Bleeding can also happen inside the body and can be life-threatening although the loss of blood is not seen. Techniques of resuscitation (CPR), the recovery position, etc. are explained in this manual.

STEP 3: SEEK HELP

Once you have evaluated the sick or injured person's condition you can decide if help is needed urgently. If help is needed, ask a bystander to call for help. Ask him to come back and confirm that help is underway. If you call for help, be prepared to have the following information available:

- The location where the help is required (address, street, specific reference points, location; if in a building: floor, room).
- The telephone or mobile number you are calling.
- The nature of the problem.
- What happened (car accident, fall, sudden illness, explosion)
- How many injured.
- Nature of the injuries (if you know).
- What type of help is needed.
- Ambulance,
- police,
- fire brigade, or other services; and any other information that might help.

STEP 4: PROVIDE FIRST AID

Give first aid in accordance with the instructions given in the following chapters in this manual. When providing first aid, try to protect an ill or injured person from cold and heat. Do not give anything to eat or drink to a person who is: severely injured,

- Feeling nausea.
- becoming sleepy.
- falling unconscious.

Answer Key Set – B

Course Code: ELE1105,

Course Name: Electrical Safety

School of Electrical Skills, Session: 2021-22 (Summer Semester)

B. Voc. Program, 1st Semester, End-Sem. Examination

Section – A 10X01 = 05 Marks

1. C
2. D
3. C
4. D
5. B
6. A
7. A
8. D
9. D
10. C

Section – B

04X04 = 16 Marks

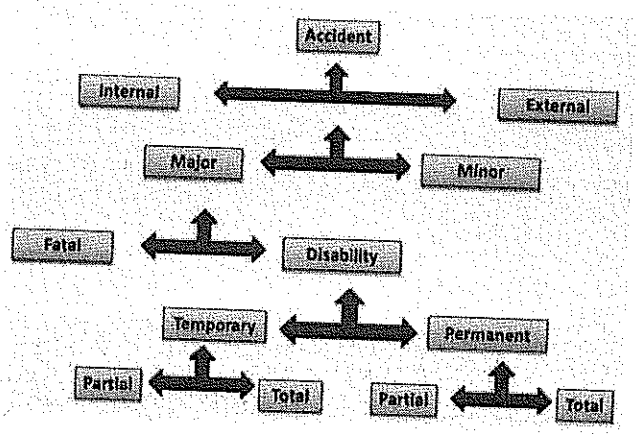
1. Brief the different types of fire?
   - **Class A**: freely burning, combustible solid materials such as wood or paper
   - **Class B**: flammable liquid or gas
   - **Class C**: energized electrical fire (energized electrical source serves as the ignitor of a class or B fire – if electrical source is removed, it is no longer a class C fire)
   - **Class D**: metallic fire (titanium, zirconium, magnesium, sodium)
   - **Class K/F**: cooking fires – animal, vegetable oils, or fats
2. Write down the aims of first aid

Aims of first aid:

First aid is the first assistance or treatment given to a casualty or a sick person for any injury or sudden illness before the arrival of an ambulance, the arrival of a qualified paramedical or medical person or before arriving at a facility that can provide professional medical care. As a consequence of disaster or civil strife people suffer injuries which requires urgent care and transportation to the nearest healthcare facility

- To preserve life.
- To prevent the worsening of one's medical condition.
- To promote recovery.
- To help to ensure safe transportation to the nearest healthcare facility.

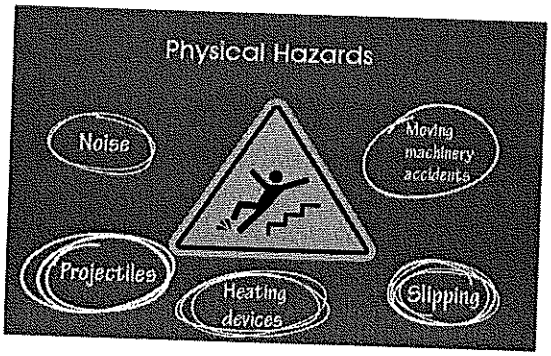
3. Brief the different types of accidents



4. What are hazards? Explain any two types of hazards

A hazard is any object, situation, or behavior that has the potential to cause injury, ill health, or damage to property or the environment. Health and safety hazards exist in every workplace. Some are easily identified and corrected, while others are necessary risks of the job and must be managed in other ways (by using protective equipment). Most occupational hazards are inactive or have a low potential of actually occurring; however, employers must be prepared to deal with them since a hazard becoming active can generate an emergency

Physical Hazards: These are the most common hazards and they include extremes of temperature, excessive noise, electrical exposure, working from heights, and unguarded machinery



Mechanical Hazards: These are usually created by machinery, often with protruding and moving parts.

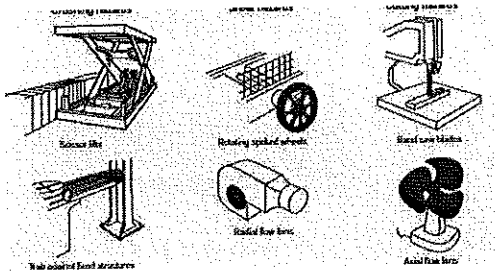
Answer Key Set – B

Course Code: ELE1105,

Course Name: Electrical Safety

School of Electrical Skills, Session: 2021-22 (Summer Semester)

B. Voc. Program, 1st Semester, End-Sem. Examination



Section – C

03X03 = 09 Marks

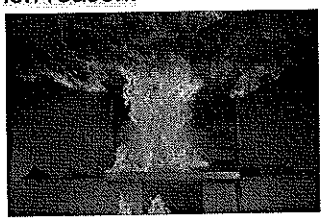
1. Write down the different types of the cause of fire

Various Cause of Fire

Every year in India, there are thousands of house fires; some are minor with no injury or even a need to call out the fire services but some are more serious, even fatal. It is estimated 60% of house fires originate in the kitchen. However, the risk of fire lurks almost everywhere in the home.

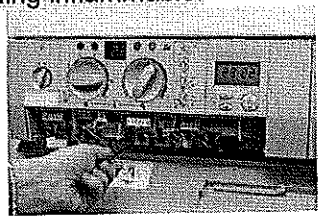
Cooking:

It can take only seconds to cause a serious fire in the kitchen. Hot, spattering oil is extremely dangerous and can quickly get of control. Distraction and leaving cooking unattended is the most common reason.



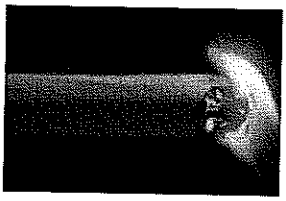
Heating System:

We often forget about our home heating system, but they do need periodic maintenance checks to ensure they remain safe. Ensure portable heaters are sited at least one metre from anything inflammable.



Smoking:

Year on year fire rescue services are called out to house fires caused by smoking. If you must smoke in the house, make sure you use large, deep ashtrays.

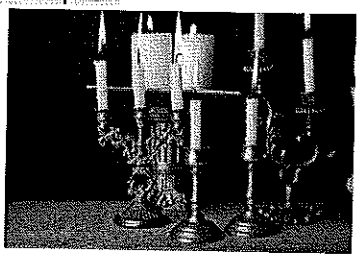


Electrical Appliances:

Overloading extension leads, damaged cables, plugs and sockets, all cause fires if ignored. Visually check these items occasionally; it takes only seconds, but can save a lot of grief and costs.

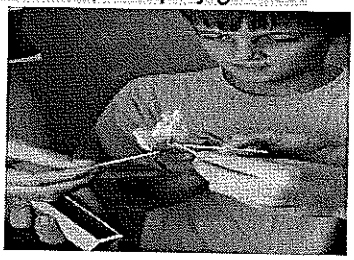
Candles:

Candles are romantic and atmospheric, but ensure they are fitted in a robust, stable, holder. Use them on a level, flat surface where they cannot fall over, and out of reach of children and inquisitive pets.



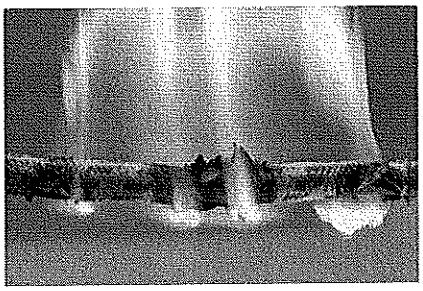
Children & Fire:

Children are full of fun, often oblivious to their surroundings when absorbed in serious play. They are also curious, and play games.



Old, Inadequate Wiring:

This type of fire is often associated with older properties. Wiring and cabling deteriorates eventually with temperature fluctuations over time affecting the integrity of many older materials. Substandard workmanship also accounts for many household fires.



Flammable Liquids:

Look in almost any home and you will find a dozen or so inflammable products of one kind or another. We use liquid fuels, solvents, cleaning products, paint and thinners, cosmetics, adhesives and paints, to name but a few. Always check the manufacturer's storage recommendations.

Spontaneous ignition:

Spontaneous ignition occurs when a combustible object is heated to its ignition temperature by a chemical reaction involving the oxygen in the air around us. This "oxidation" process creates heat that, if not dissipated, will build up until ignition occurs. Generally, this can happen when the materials are left in piles and the heat being generated in the pile cannot be released into the air.

Answer Key Set – B

Course Code: ELE1105,

Course Name: Electrical Safety

School of Electrical Skills, Session: 2021-22 (Summer Semester)

B. Voc. Program, 1st Semester, End-Sem. Examination

2. Make the tabular representation of fire extinguishers.

Extinguisher		Type of Fire					
Colour	Type	Solids (wood, paper, cloth, etc)	Flammable Liquids	Flammable Gasses	Electrical Equipment	Cooking Oils & Fats	Special Notes
	Water	✓ Yes	✗ No	✗ No	✗ No	✗ No	Dangerous if used on "liquid fires" or live electricity.
	Foam	✓ Yes	✓ Yes	✗ No	✗ No	✓ Yes	Not practical for home use.
	Dry Powder	✓ Yes	✓ Yes	✓ Yes	✓ Yes	✗ No	Safe use up to 1000v.
	Carbon Dioxide (CO_2)	✗ No	✓ Yes	✗ No	✓ Yes	✓ Yes	Safe on high and low voltages.

3. Explain the any tree personal protective equipment's

Safety Goggles and Glasses: Safety goggles are intended to shield the wearer's eyes from impact hazards such as flying fragments, objects, large chips, and particles. Goggles fit the face immediately surrounding the eyes and form a protective seal around the eyes. This prevents objects from entering under or around the goggles. Helmets and Head Covers: Head injuries may be caused by falling or flying objects, or by bumping the head against a fixed object.

Protective helmets must do three things: o Resist penetration. o Absorb the shock of a blow. o Protect against electrical shock. Head injuries may be prevented by the selection and use of appropriate head protection. Helmet colour are decide according to work the different colour codes are

Ear Protection buds: Hearing protectors are required to prevent noise induced hearing loss. Hearing protection devices reduce the noise energy reaching and causing damage to the inner ear. Ear muffs and earplugs are the most common types of PPE.

4. What is an emergency condition and how to be dealing with an emergence situation?

Dealing with an Emergency:

Emergency situations vary greatly but there are four main steps that always apply:

- Make the area safe.
- Evaluate the injured person's condition.
- Seek help.
- Give first aid.

STEP 1: MAKE THE AREA SAFE

Your own safety should always come first. As a first aider, you should:

- Check for any danger: is there a threat from traffic, fire, electricity cables, etc.
- Never approach the scene of an accident if you are putting yourself in danger
- Do your best to protect both the injured person(s) and other people on the scene
- Be aware that the property of the injured person is at risk. Theft can occur. So mind your safety.
- Seek police or emergency help if an accident scene is unsafe and you cannot offer help without putting yourself in danger.

STEP 2: EVALUATE THE CONDITION OF THE SICK OR INJURED PERSON

If it is safe, you can evaluate the sick or injured person's condition. Always check that he is conscious and breathing normally. Situations in which consciousness or breathing are impaired are often life threatening. Bleeding can also happen inside the body and can be life-threatening although the loss of blood is not seen. Techniques of resuscitation (CPR), the recovery position, etc. are explained in this manual.

STEP 3: SEEK HELP

Once you have evaluated the sick or injured person's condition you can decide if help is needed urgently. If help is needed, ask a bystander to call for help. Ask him to come back and confirm that help is underway. If you call for help, be prepared to have the following information available:

- The location where the help is required (address, street, specific reference points, location; if in a building: floor, room).
- The telephone or mobile number you are calling.
- The nature of the problem.
- What happened (car accident, fall, sudden illness, explosion)
- How many injured.
- Nature of the injuries (if you know).
- What type of help is needed.
- Ambulance,
- police,
- fire brigade, or other services; and any other information that might help.

STEP 4: PROVIDE FIRST AID

Give first aid in accordance with the instructions given in the following chapters in this manual. When providing first aid, try to protect an ill or injured person from cold and heat. Do not give anything to eat or drink to a person who is: severely injured,

- Feeling nausea.
- becoming sleepy.
- falling unconscious.