BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, First Semester,

2nd In-Sem. Examination

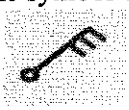
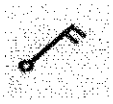
Course Code: ELE1101 **Time: 1 Hour**

Course Name: Construction Electrician **Max. Marks: 20**

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

Section – A

05X01 = 05 Marks

1. Heart convulsions usually fatal at:
   (a) 100 mA (b) 50 mA (c) 66 mA (d) None of these
2. Which is the symbol of two-way switch?
   (a)  (b) 
   (c)  (d) 
3. ECC stands for _____.
   (a) Electrical circuit conductor (b) Earth circuit conductor
   (c) Earth-continuity conductor (d) None of these
4. Which is the example of conductor?
   (a) Aluminum (b) Glass (c) Rubber (d) Plastic
5. The earth tester works on which principle:
   (a) Deflection method (b) Absolute or Fundamental method
   (c) fall of potential method (d) None of these

Section – B

03X02 = 06 Marks

1. Define wire joint and also write the names of its different type.
2. Explain the working principal of earth resistance tester.
3. Write the uses of wire stripper and cable stripper.

Section – C

03X03 = 09 Marks

1. Differentiate between the system and equipment earthing.
2. Explain staircase wiring with a suitable circuit diagram.
3. Write any five methods of reducing the resistance of an earth electrode to an acceptable value.

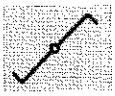
A

Answer Key Set – A
Course Code: ELE1101
Course Name: Construction Electrician

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Electrical Skills
Session: 2020-21 (Summer Semester)
B. Voc. Program, First Semester,
2nd In-Sem. Examination

Answer Key
Section – A

Ans 1. (b) 50 mA
Ans 2. (b) 

Ans 3. (c) Earth-continuity conductor
Ans 4. (a) Aluminum

Ans 5. (c) fall of potential method

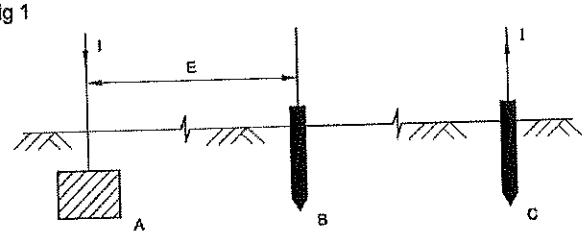
Section – B

Ans 1. Definition of joint: A joint in an electrical conductor means connecting/tying or interlaying together of two or more conductors such that the union/junction becomes secured both electrically and mechanically.
Types of joints: In electrical work, different types of joints are used, based on the requirement. The service to be performed by a joint determines the type to be used.
Some joints may require to have good electrical conductivity. They need not necessarily be mechanically strong.
Some of the commonly used joints are listed below.

- Pig-tail or rat-tail
- Twisted joints
- Married joint
- Tee joint
- Britannia straight joint
- Britannia tee joint
- Western union joint
- Scarfed joint
- Tap joint in single stranded conductor

Ans 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. Even varieties of earth testers are available in market.
Principle: The earth tester works on the principle of the fall of potential method.
In this method the two auxiliary electrodes B and C are placed at a straight line (Fig 1).

Fig 1



FALL OF POTENTIAL METHOD

An alternating current of I_{amps} magnitude is passed through the electrode A to the electrode C via the earth and the potential across electrodes A and B is measured.
The resistance of electrodes B and C does not influence the measurement result.
This is achieved by placing the electrode C at a sufficient distance from A so that the resistance areas of A and C are quite independent. A distance of above 15 meters between electrode A and C is regarded as sufficient distance.

Ans 3.
Wire Stripper: A wire stripper is a small, hand-held tool used to strip the electrical insulation from electric wires. Its blade material is hardened Steel and handle Material is plastic.

Cable Stripper: A cable stripper is a small, hand-held tool used to strip the electrical second insulation from electric cables. Its blade material is hardened Steel and handle Material is plastic.

Section – C

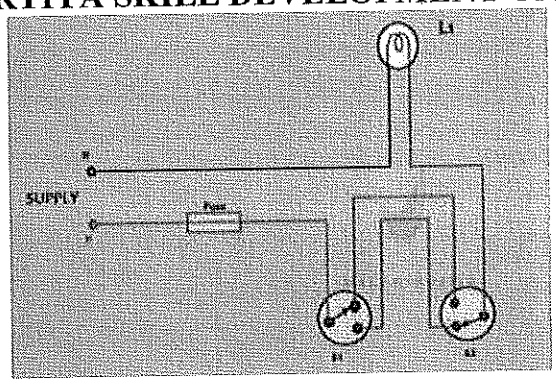
Ans 1.
System Earthing: Earthing associated with current-carrying conductors is normally essential to the security of the system, and is generally known as system earthing. System earthing is done at generating stations and substations.
The purpose of system earthing is to:
Maintain the ground at zero reference potential, thereby ensuring that the voltage on each live conductor is restricted to such a value with respect to the potential of the general mass of the earth as is consistent with the level of the insulation applied.
Protect the system when any fault occurs against which earthing is designed to give protection, by making the protective gear to operate and make the faulty portion of the plant harmless.

In most cases such operation involves isolation of the faulty main or plant by circuit breakers or fuses.
Earthing may not give protection against faults which are not essentially earth faults.
Equipment Earthing: Earthing of non-current carrying metal work and conductor which is essential for the safety of human life, animals and property is generally known as equipment earthing.

Ans 2.
Staircase wiring: This is a common multi-way switching or two-way light switching connection, one light two switching wiring. Here one lamp is controlled by two switches from two different positions. That is to operate the load from separate positions such as above or below the staircase, from inside or outside of a room, or as a two-way bed switch, etc.

Answer Key Set – A
Course Code: ELE1101
Course Name: Construction Electrician

BHARTIYA SKILL DEVELOPMENT UNIVERSITY



Ans 3.

Methods of reducing the resistance of an earth electrode to an acceptable value:

To achieve efficient operation of the protective devices, under fault condition the earth electrode resistance should be lower than an acceptable value which could be calculated from circuit details. However, the earth electrode resistance is found higher in rocky or sandy areas where moisture is very low.

The following methods are suggested to bring down the earth electrode resistance to an acceptable value:

1. After installing the rod or pipe or plate in earth, the earth pit (the area surrounding the rod / pipe / plate) should be treated with layers of coke and common salt to get a lower value of earth resistance.
2. Pouring water in the earth pit at repeated intervals lowers the earth electrode resistance.
3. Connecting a number of earth electrodes in parallel reduces the earth electrode resistance. (Distance Between two adjacent electrodes shall be not less than twice the length of the electrodes.)
4. Soldering the earth connections or using non-ferrous clamps lowers the earth electrode resistance.
5. Avoiding rust in the earth electrode connections lowers the earth electrode resistance.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, I Semester,

2nd In-Sem. Examination

Course Code: ELE1102 **Time: 1 Hour**

Course Name: Electrical Drawing **Max. Marks: 20**

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

Section – A

05X01 = 05 Marks

1. The following is not included in title block of drawing sheet.
   (a) Sheet No (b) Scale
   (c) Method of Projection (d) Size of sheet

2. Which of the following represent reducing scale?
   (a) 1:1 (b) 1:2
   (c) 2:1 (d) 10:1

3. Which of the following line is used for dimension line
   (a) Continuous thick (b) Continuous thin
   (c) Chain thin line (d) Short zigzag thin

4. The designation of sheet of size 594 x 841 is
   (a) A0 (b) A1 (c) A2 (d) A3

5. To insure that everyone understands what the electrical symbols represent it is customary to include a _____ on the electrical sheet.
   (a) List (b) Part number
   (c) Electrical legend (d) Electrical layer

Section – B

03X02 = 06 Marks

1. What do you understand by blueprints?
2. Explain 2D coordinate with respect to AutoCAD.
3. List the demerits of CAD software.

Section – C

03X03 = 09 Marks

1. Find the distance between the points A and B having the coordinates (−3,−1) and (2,3) respectively.
2. Draw standard symbols of the following which commonly used in electrical drawings-
   (a) Air Circuit Breaker
   (b) Fuse Cutout
   (c) Double-Throw Switch
3. Explain the single line diagram of a substation shown in Fig. 1 and identify the various symbols used in Fig.1.

A

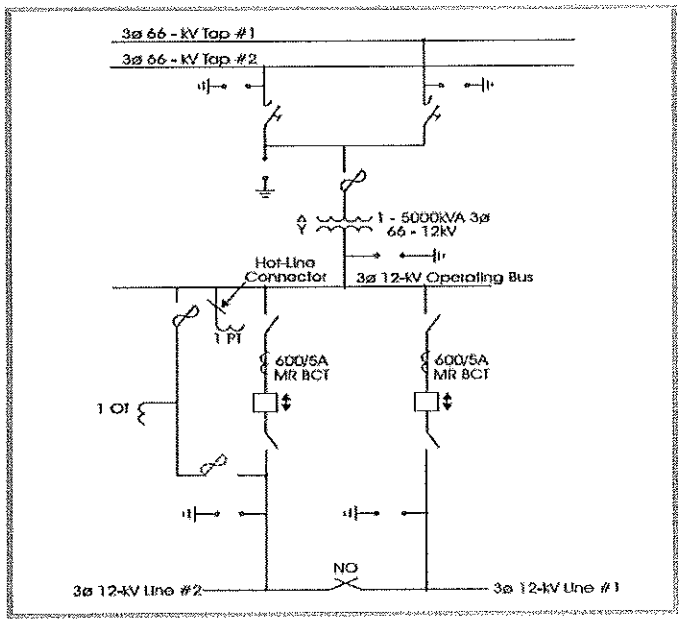

3ø 66 - kV Top #1
3ø 66 - kV Top #2
1 - 5000kVA 3ø
66 - 12kV
Hot-Line
Connector
3ø 12-kV Operating Bus
1 PT
600/5A
MR BCT
600/5A
MR BCT
1 OI
NO
3ø 12-kV Line #2
3ø 12-kV Line #1

Fig:1

Answer Key Set A
Course Code: ELE1102
Course Name: Electrical Drawing
School of Electrical Skills, Session: 2020-21 (Summer Semester)
B. Voc. Program, I Semester, 2nd In-Sem. Examination

Section – A

1. (d) Size of sheet

2. (b) 1:2

3. (b) Continuous thin

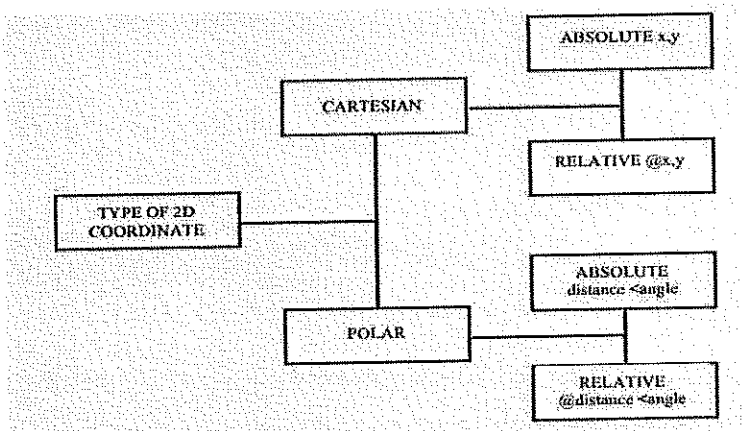
4. (b) A1

5. (c) Electrical legend

Section – B

1. 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.

2.

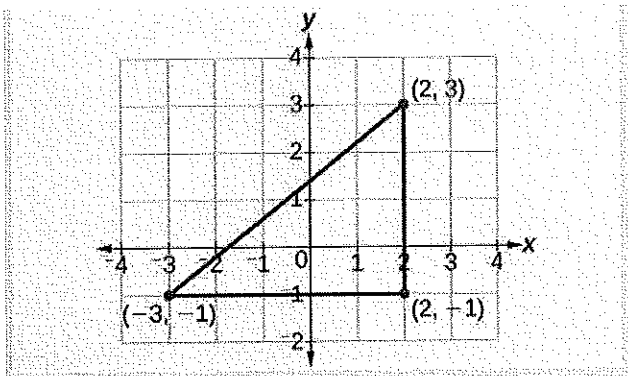


3. The size of the software pakage is large.
Skill and Judgment are required to prepare the drawing.
It requires large investment.
Every new release of CAD Software, operator has to update their skills.

Answer Key Set A
Course Code: ELE1102
Course Name: Electrical Drawing

School of Electrical Skills, Session: 2020-21 (Summer Semester)
B. Voc. Program, I Semester, 2nd In-Sem. Examination
Section – C

1.



Then, calculate the length of d using the distance formula.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
$$d = \sqrt{(2 - (-3))^2 + (3 - (-1))^2}$$
$$= \sqrt{(5)^2 + (4)^2}$$
$$= \sqrt{25 + 16}$$
$$= \sqrt{41}$$

2. (a) Air Circuit Breaker

(b) Fuse Cutout

(c) Double-Throw Switch

3. Two paralleled three-phase 66-kV power sources supply the substation. Each three-phase power source has a hand-operated air-break switch. Lightning arresters are located at the connection point of the air-break switches. The 66-kV supply powers the 3-phase, 5000-kVA (kilovoltamperes), 66- to 12-kV transformer through a fused disconnect switch. The 12-kV side has lightning arresters, and goes to a 12-kV operating bus. Two feeders are tapped from the 12-kV operating bus. An oil circuit breaker (OCB) protects each feeder. There are single-throw switches on both sides of the OCBs, to enable isolation of each OCB for maintenance. Also tapped off the operating bus is one operating transformer (OT), which can also be transferred to the other side of the OCB. A potential transformer (PT) is tapped off the operating bus with a hot-line connector. The PT provides voltage measurement in the substation. Each OCB has current transformers (CTs) on the operating bus side used to measure current and connected to the protective relaying in the substation (not shown on the one-line diagram). The 12-kV lines each have lightning arresters on the line side of the OCBs. A normally open load-break disconnect switch is connected between the two feeders. This connection enables a supply to either line or both lines from one or the other breakers.

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Electrical Skills
Session: 2020-21 (Summer Semester)
B. Voc. Program, 1st Semester,
2nd In-Sem. Examination

Course Code: ELE 1103 **Time: 1 Hour**

Course Name: Basic Electrical Engineering **Max. Marks: 20**

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

Section – A

05X01 = 05 Marks

1. The unit of magnetic flux is:
   (a) Henry (b) Weber (c) ampere turn/ weber (d) ampere/metre
2. Permeability in magnetic circuit corresponds to ----------in electrical circuit.
   (a) Resistance (b) resistivity (c) conductivity (d) conductance
3. The property of a material which opposes the creation of magnetic flux in it is known as:
   (a) Reluctivity (b) magneto motive force (c) permeance (d) reluctance
4. Two resisters of resistance R1 and R2 are connected in series the equivalent resistance (R) is:
   (a) R= R1+R2 (b) R=(R1R2)/(R1+R2)
   (c) R=(R1+R2)/(R1R2) (d) none of these
5. Current is said to be alternating when it changes in
   (a) Magnitude only (b) Direction only
   (c) Both Magnitude and direction (d) None of these

Section – B

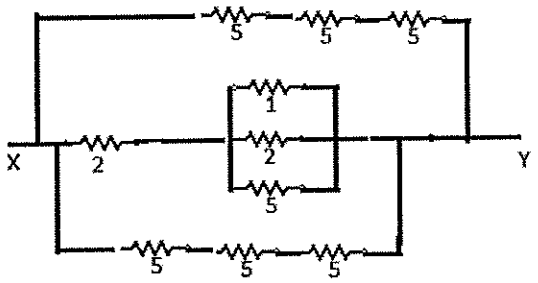
03X02 = 06 Marks

1. Define (i) permanent magnets (ii) Electromagnets.
2. Explain Faraday's law of electromagnetic induction.
3. Briefly explain following.
   i. Reluctance
   ii. Permeability

Section – C

03X03 = 09 marks

1. Three resistance 50 ohms, 100 ohms and 200 ohms are connected in parallel to a 250V supply. Determine the current flowing through each resistor.
2. Draw a sine wave and explain following:
   i. Cycle
   ii. Time period
   iii. Frequency
   iv. Amplitude.
3. Find the equivalent resistance between X and Y (Given all the resistances are in ohms).



A

Answer Key Set – A

Course Code: ELE 1103

Course Name: Basic Electrical Engineering

School of Electrical Skills
Session: 2020-21 (Summer Semester)
B. Voc. Program, 1st Semester,
2nd In-Sem. Examination

Section – A

05X01 = 05 Marks

1. The unit of magnetic flux is:
   (a) Henry **(b) Weber** (c) ampere turn/ weber (d) ampere/metre
2. Permeability in magnetic circuit corresponds to ----------in electrical circuit.
   (a) Resistance (b) resistivity **(c) conductivity** (d) conductance
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4. Two resisters of resistance R1 and R2 are connected in series the equivalent resistance (R) is:
   (a) R= R1+R2 (b) R=(R1R2)/(R1+R2)
   (c) R=(R1+R2)/(R1R2) (d) none of these
5. Current is said to be alternating when it changes in

   (a) Magnitude only (b) Direction only

   (c) Both Magnitude and direction (d) None of these

Section – B

03X02 = 06 Marks

1. Define (i) permanent magnets (ii) Electromagnets.

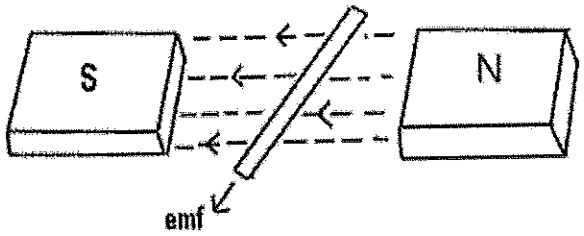
   Permanent Magnets

   These magnets are permanent in the sense that once they have been magnetized they retain a certain degree of magnetism. Permanent magnets are generally made of ferromagnetic material. Such material consists of atoms and molecules that each have a magnetic field and are positioned to reinforce each other

   Electromagnets

   Electromagnets are extremely strong magnets. They are produced by placing a metal core (usually an iron alloy) inside a coil of wire carrying an electric current. The electricity in the current produces a magnetic field. The strength of the magnet is directly proportional to the strength of the current and the number of coils of wire. Its polarity depends on the direction of flow of current. While the current flows, the core behaves like a magnet. However, as soon as the current stops, the core is demagnetized.

1. Explain Faraday's law of electromagnetic induction?



Faraday's First Law:
Whenever a conductor is placed in a varying magnetic field an EMF gets induced across the conductor (called as induced emf), and if the conductor is a closed circuit then induced current flows through it.
Magnetic field can be varied by various methods -
1. By moving magnet
2. By moving the coil
3. By rotating the coil relative to magnetic field

Faraday's Second Law:

Faraday's second law of electromagnetic induction states that, the magnitude of induced emf is equal to the rate of change of flux linkages with the coil. The flux linkages is the product of number of turns and the flux associated with the coil.

2. Briefly explain following.
   a. Reluctance
   b. Permeability

Reluctance

The obstruction offered by a magnetic circuit to the magnetic flux is known as reluctance. As in electric circuit, there is resistance similarly in the magnetic circuit, there is a reluctance, but resistance in an electrical circuit dissipates the electric energy and the reluctance in magnetic circuit stores the magnetic energy. Also in an electric circuit, the electric field provides the least resistance path to the electric current. Similarly, the magnetic field causes the least reluctance path for the magnetic flux. It is denoted by S.

Permeability

The magnetic permeability is defined as the property of the material to allow the magnetic line of force to pass through it. In other words, the magnetic material can support the development of the magnetic field.

The permeability of the material is equal to the ratio of the field intensity to the flux density of the material. It is expressed by the formula shown below.

$$\mu = \frac{B}{H}$$

Where, B – magnetic flux density
H – magnetic field intensity

Section – C

03X03 = 09 marks

1. Three resistance 50 ohms, 100 ohms and 200 ohms are connected in parallel to a 250V supply. Determine the current flowing through each resistor.

R1=50
R2=100
R3=200

Since it is a parallel circuit the voltage across all the resistor is same.

Thus,

250=50*I1
I1=5 A

Current through 50 ohm resistor is 5A

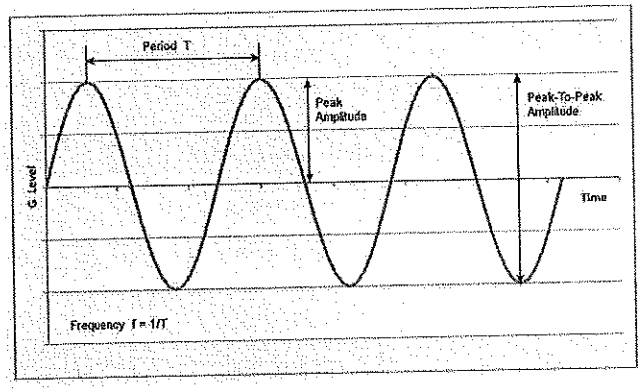
250=100*I2
I2=2.5

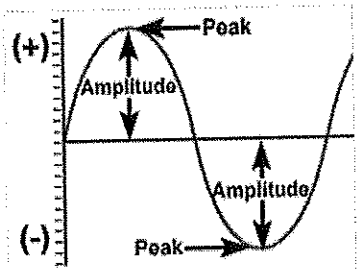
Current through 100 ohm resistor is 2.5A

250=200*I3
I3=1.25

Current through 200 ohm resistor is 1.25A

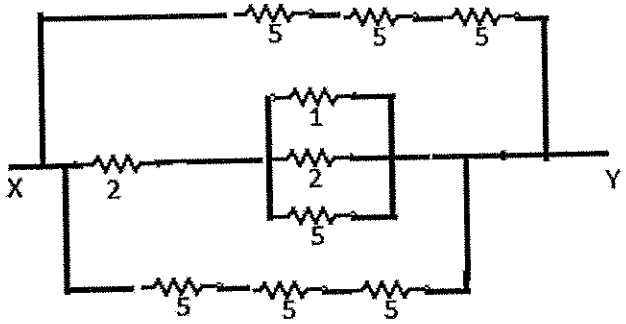
2. Draw a sine wave and explain following
   a. Cycle
   b. Time period
   c. Frequency
   d. Amplitude.





Cycle: One complete wave of alternating current or voltage.
Time Period (T): The time required to produce one complete cycle of a waveform
Frequency (f): is equal to number of cycles per second.
f=1/T
Amplitude: is the magnitude or intensity of the signal waveform measured in volts or amps.

3. Find the equivalent resistance between X and Y (Given all the resistances are in ohms).



RT1= 5+5+5
=15
RT2=5+5+5
=15
1/RT3=1/1+1/2+1/5
1/RT3=1+.5+.2
1/RT3=1.7
RT3=0.588
RT4=2+0.588
RT4=2.588
1/Rtotal =[1/15+1/15+1/2.588]
1/Rtotal=0.519732
Rtotal=1.924068

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY
School of Electrical Skills
Session: 2020-21 (Summer Semester)
B. Voc. Program, 1st Semester,
2nd In-Sem. Examination

Course Code: ELE1104 **Time: 1 Hour**
Course Name: Maintenance Technician Electrical **Max. Marks: 20**
Instruction: All questions are compulsory. Each question carries one mark in section A. Each question carries two marks in section B. Each question carries three marks in section C. Scientific calculator is allowed.

Section – A

05x01 = 05 Marks

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

2. 5s is a:
   (a) Principle (b) Rule
   (c) Law (d) both b and c

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

4. _____ is used for face protection as PPE.

5. _____ are used for hand protection as PPE.

Section – B

03x02 = 06 Marks

1. Write names of 5S.
2. Write different types of PPE used for eyes.
3. What is PPE? Why is it important?

Section – C

03x03 = 09 Marks

1. Explain any 3S principles.
2. What can be reasons for defects in electric iron?
3. Draw any 9 symbols used in electrical drawings with their names.

A

Ans Key- Set - A
ELE 1104
Maintenance Technician Electrical

School of Electrical Skills
Session: 2020-21 (Summer / Winter Semester)
B. Voc. Program, 1st Semester,
2nd In-Sem. Examination

Section – A

05x01 = 05 Marks

Ans. 1: (a)
Ans. 2: (a)
Ans. 3: (d)
Ans. 4: (Face shield)
Ans. 5: (Gloves)

Section – B

03x02 = 06 Marks

Ans. 1: -
1. Sorting
2. Straightening
3. Systematic Cleaning
4. Standardizing
5. Sustaining

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.

Ans. 3: - Different kind of PPEs used for protection of eyes are:
1. Goggles
2. Protective Glass
3. Face shields
4. Laser Protecting Goggles
5. Reflective Coating Specs

Section – C

03x03 = 09 Marks

Ans. 1: -

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.

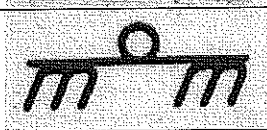
3. Shining or Systematic Cleaning:
Systematic cleaning is done for clean the unwanted things from the work place. Shining is done at the end of each shift, clean the work area and be sure everything is restored to its place.
- Clean the workspace and all equipment, and keep it clean, tidy and organized.
- 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.

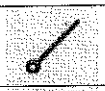
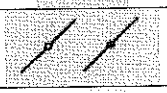
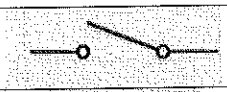
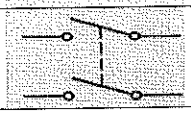
Ans. 2: -

Troubleshooting Chart of Dry Iron

Serial No	Trouble	Possible Cause	Corrective action to be taken
1	No Heat	• No Power at outlet. • Defective cord or plug • Loose terminal connections • Broken lead in iron • Loose thermostat control knob • Defective heater element • Open terminal fuse	• Check outlet for power • Repair or replace • 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.3: -

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		

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills
Session: 2020-21 (Summer Semester)
B. Voc. Program, 1st Semester,
2nd In-Sem. Examination

Course Code: ELE 1105 **Time: 1 Hour**

Course Name: Electrical Safety **Max. Marks: 20**

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

Section – A

05X01 = 05 Marks

1. Full form of MCP in fire safety system is:
   (a) Manual Call Point (b) Manual circuit point
   (c) Machine call point (d) Manual cross point
2. What is the full form of OSHA?
   (a) Occupational Safety and Health Administration
   (b) Occupational Safety and Hazard Administration
   (c) Operation Safety and Health Association
   (d) Operation Safety and Hazard Association
3. Which one is not the type of a lightening arrester?
   (a) Rod gap arrester
   (b) Expulsion type lightning arrester
   (c) Valve type lightning arrester
   (d) Tube type lightening arrester
4. Full form of LOTO is _____.
5. Full form of FACP is _____.

Section – B

03X02 = 06 Marks

1. Write short note on Rod gap type lightening arrester.
3. Explain the basic use of LOTO and also Name any four LOTO devices.
4. Explain the different operating modes of Public announcement system.

Section – C

03X03 = 09 Marks

1. Describe fire detection system with it's all equipment also draw the structure wiring diagram of fire detection system.
2. Explain the Working flowchart LOTO procedure.
3. Write the portable firefighting method of type A, B, and C type fires with the help for classification chart.

A

Answer Key Set – A
Course Code: ELE 1105
Course Name: Electrical Safety

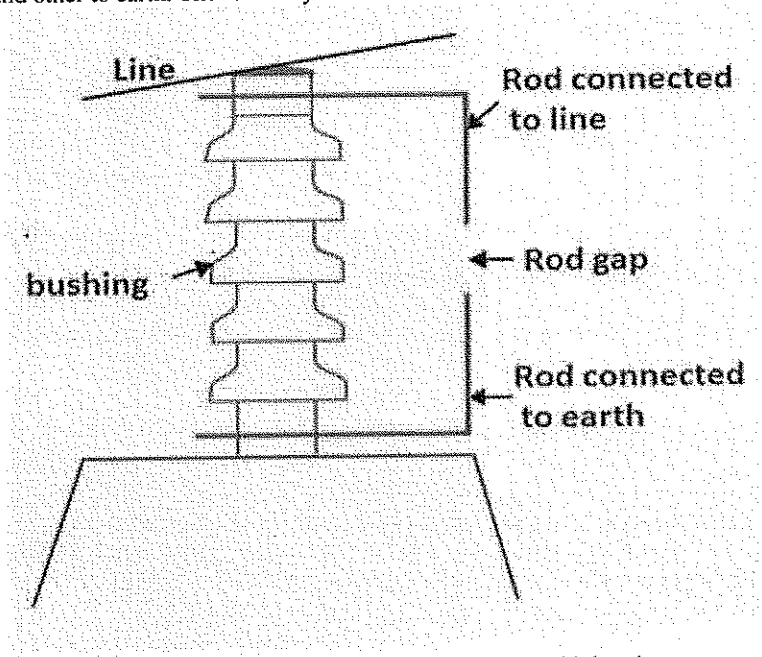
School of Electrical Skills, Session: 2020-21 (Summer Semester)
B. Voc. Program, 1st Semester, 2nd In-Sem. Examination

Section-A

1. A
2. A
3. D
4. Lockout-Tag out
5. Fire Alarm Control Panel

Section-B

Ans-1:
Rod gap lightning arrester: It is the simplest type of lighting arrestor. It consists two-rod electrodes, one of which is connected to the line and other to earth. The rods may be in the form of horn also.



Under normal operating conditions, the gap remains non-conducting. When a high voltage surge occurs, the gap sparks over and surge current is drained to earth. This is the simplest form of lightening arrester.
Such arresters suffer from the following disadvantages:

- The operation is affected by climatic conditions.
- After the surge is over, due to ionization of air, the arc in the gap is maintained even at the normal supply voltage.
- Increased possibility of bird faults.

Ans-2:
A lockout uses a lock to hold an energy isolation device in a safe position and prevents the energization of the machine or equipment.
Tag-out is when a tag is placed on a piece of equipment to indicate that the equipment being controlled may not be operated until the tag-out device is removed.
Loto device is:

- Caution Tag
- Danger Tag
- Locking Device
- Isolation Claps
- Physical Restrain Devices

Ans-3:
Alert Mode: also known as emergency mode. PA system sometimes work combined with Fire Alarm system of sometimes work independently. If PAS System call under the alarm then, this system automatically launches by the integrated input from the fire alarm panel and start pre-recorded warning message on all loops on full volume and bypass all other inputs.

Announcement mode: for making an announcement call it's used for general purpose announcement in this mode we can select the specific loop in which we want to make an announcement and also volume control units are also control the volume of announcement in specific areas.

Section-C

Ans-1:

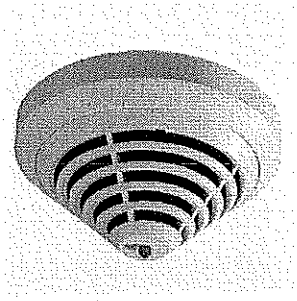
Key Components of a Fire Detection and Alarm System:

A Conventional fire detection and alarm system consist following parts

- Fire alarm panel
- Detectors and bases
- Call points
- Sounders and flashers
- Power supply accessories (fire alarm batteries)

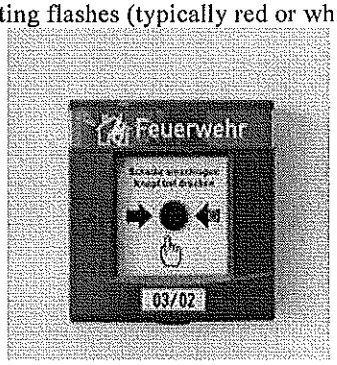
The fire alarm panel (or the fire alarm control panel - FACP) is the base or the control hub of the system. It controls the settings of the other components and communicates the information through the system.

Fire detectors can be heat, smoke or carbon monoxide sensors. They are placed around the building to trace the presence of such emergencies. Some advanced sensors can even detect radiation.



A smock Detector Sensor

Call points or pulls belong to manually controlled fire alarm systems. Most residential properties don't use them, but many business facilities still do. Sounders emit a loud siren signal. Flashers are for visual warnings and emit intermittent or rotating flashes (typically red or white).



A call point from a conventional fire alarm system

A fire alarm system can use the main electricity power supply as a primary source. In case of power failure, the system switches to the secondary power supply, consisting of a fire alarm battery.

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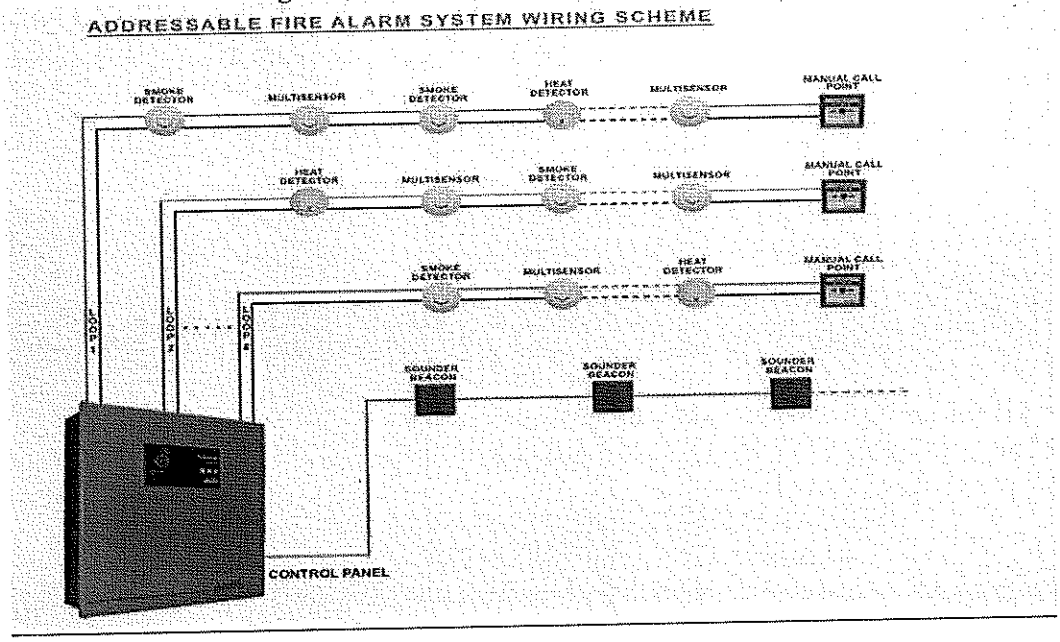
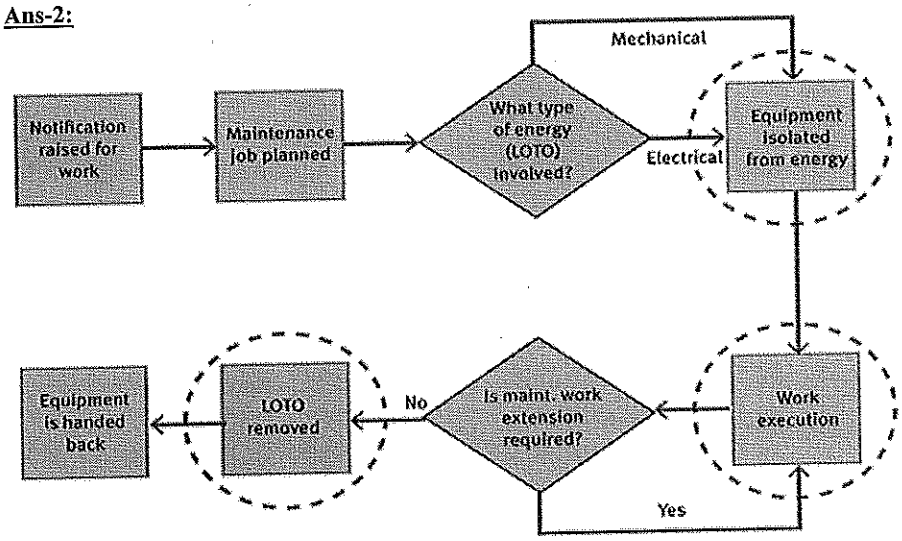
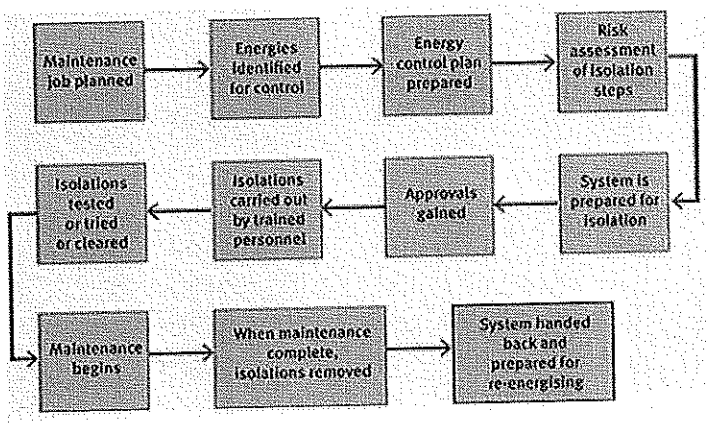


Ans-2:



OR



Ans-3:

CLASS	A	B	B	C	D	K
PICTURE SYMBOL						
TYPE	Common Combustibles Solids (wood, paper, cloth, etc.)	Flammable liquids Gasoline and solvents	Flammable gases Propane	Live electrical equipment Computers, fax machines	Combustible Metals Magnesium, Lithium, Titanium	Cooking Media Cooking oils and fats
Water	✓ Yes	✗ No	✗ No	✗ No	✗ No	✗ No
Foam	✓ Yes	✓ Yes	✗ No	✗ No	✗ No	✓ Yes (ABF Foam Only)
Dry Powder	✓ Yes	✓ Yes	✓ Yes	✓ Yes	✗ No	✗ No
M2B/L2	✗ No	✗ No	✗ No	✗ No	✓ Yes	✗ No
Carbon Dioxide CO2	✗ No	✓ Yes	✗ No	✓ Yes	✗ No	✗ No
Wet Chemical	✓ Yes	✗ No	✗ No	✗ No	✗ No	✓ Yes