



**School of Electrical Skills**  
**Session: 2019-20 (Summer Semester)**  
**B. Voc. Program, 1<sup>st</sup> Semester,**  
**2<sup>nd</sup> In-Sem. Examination**

**Course Code: ELE 1101**

**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.

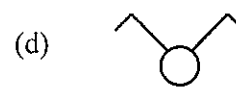
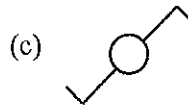
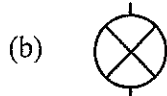
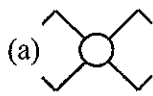
**Section – A**

05X01 = 05 Marks

Q1. Batten is made of which material in batten house wiring:

- (a) PVC                      (b) Bakelite                      (c) Wood                      (d) None of these

Q2. Which one is the symbol of an intermediate switch?



Q3. Which, among the following is a unit for resistivity?

- (a) ohm/meter                      (b) ohm/meter<sup>2</sup>                      (c) ohm-meter                      (d) ohm-meter<sup>2</sup>

Q4. The resistance of earthing is:

- (a) Less than 10 ohms                      (b) Less than 2 ohms  
(c) Less than 20 ohms                      (d) None of these

Q5. RCD stands for:

- (a) Residual Current Device                      (b) Remote Control Device  
(c) Residual Circuit Device                      (d) Required Current Device

**Section -- B**

03X02 = 06 Marks

Q.1. Differentiate between conductors and insulators with examples.

Q.2. What is MCB? Explain its working.

Q.3. A 20-meter length of wire has a cross-sectional area of 1mm<sup>2</sup> and a resistance of 5 ohms. Calculate the conductivity and resistivity of the wire.

**Section – C**

03X03 = 09 Marks

Q.1. Suppose, a consumer consumes 1000 watts' load per hour daily for one month. Calculate total energy bill of the consumer if per unit rate is 9 Rs. [Take 1 month = 30 Days].

Q.2. Explain construction and operation of megger.

Q.3. Describe major components of induction type energy meter.

A





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School of Electrical Skills  
Session: 2019-20 (Summer Semester)  
B. Voc. Program, First Semester,  
2<sup>nd</sup> In-Sem. Examination

Course Code: ELE1101  
Course Name: Construction Electrician

Time: 1 Hour  
Max. Marks: 20

Answer Key

Section – A

05X01 = 05 Marks

A1. (c) Wood

A2. (a)

A3. (c) ohm-meter

A4. (b) Less than 2 ohms

A5. (a) Residual Current Device

Section – B

03X02 = 06 Marks

**Ans. 1. 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. E.g. silver, iron, copper and aluminium.

**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. E.g. wood, plastic, glass and rubber.

**Ans. 2. MCB:** A MCB (Miniature Circuit Breaker) is a manually or automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuit.

**Working:**

- 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.

**Ans. 3. Data given:** DC resistance,  $R = 5$  ohms, cable length,  $L = 20$ m, and the cross-sectional area of the conductor is  $1\text{mm}^2$  giving an area of:  $A = 1 \times 10^{-6}$  or  $1/1000000$  meters<sup>2</sup>.

$$R = \frac{\rho L}{A} \text{ so } \rho = \frac{R \times A}{L}$$

$$\rho = \frac{5 \times 1}{20 \times 1000000}$$

$$\rho = 25 \times 10^{-8} \text{ ohm-meter}$$

$$\sigma = \frac{1}{\rho}$$

$$\sigma = \frac{100000000}{25}$$

$$\sigma = 4 \times 10^6 \text{ 1/ohm-meter}$$



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Section – C

03X03 = 09 Marks

**Ans. 1. Solution:**

$$1 \text{ unit} = 1 \text{ kWh.}$$

$$\begin{aligned} \text{So Total kWh} &= 1000 \text{ Watts} \times 24 \text{ Hrs} \times 30 \text{ Days} \\ &= 720000 \text{ watts-hour.} \end{aligned}$$

we have to convert it into Units,

$$\begin{aligned} \text{Where is } 1 \text{ unit} &= 1 \text{ kWh.} \\ \text{So total Consumed units.} &= 720000/1000 \dots\dots (\text{k=kilo}=1000). \\ \text{Total Units} &= 720. \\ \text{Cost of per unit is} &= 9 \text{ Rs.} \end{aligned}$$

$$\text{So total Cost or Electricity bill} = 720 \times 9 = 6480 \text{ Rs.}$$

**Ans. 2. Construction:**

- Megohmmeter or megger is a special type of ohmmeter used to measure the electrical resistance of insulators.
- Insulating components, Megohmmeter can provide high DC voltages (typically in ranges from 500 V to 5 kV, some are up to 15 kV) at specified current capacity.
- Acceptable insulator resistance values are typically 1 to 10 mega ohms, depending on the standards.
- Megger is a very useful instrument which is used to determine all the resistances between Zero and Infinity.
- Actually zero is the 1<sup>st</sup> mark and 10k ohm is the 2<sup>nd</sup> mark so it is impossible to accurately measure small resistances with the help of a Megger
- This instrument is very simple to operate, portable and independent of the external supplies.

**Operation:**

- Resistance to be measured is connected across the terminals i.e. connected in series with the deflecting coil and across the generator. When the current is supplied to the coils then they have torque in opposite directions.
- If resistance to be measured is high, no current will flow through the deflecting coil, the controlling coil, will therefore, set itself perpendicular to the magnetic axis and hence set the pointer to the infinity.
- If the resistance to be measured is small, a high current flow through the deflecting coil and the resulting torque sets the pointer to zero.
- For intermediate value of resistance, depending upon the torque production, the pointer is set at a point between zero and infinity.
- The hand driven generator is of permanent magnet type and it is designed to generate from 500 to 2500 volts.

**Ans. 3. Induction type energy meter essentially consists of following components:**

**(A) Driving system:**

- It has two magnets; series magnet carries a coil which is of few turns of thick wire connected in series with line whereas shunt magnet carries coil with many turns of thin wire connected across the supply.
- Series magnet produces the flux which is proportional to the current flowing and shunt magnet produces the flux proportional to the voltage. These two fluxes lag by 90 degrees due to inductive nature. The interaction of these two fields produces eddy current in the disk, exerting a force, which is proportional to product of instantaneous voltage, current and phase angle between them.
- The copper shading bands are also called the power factor compensator or compensating loop.

**(B) Moving system:**

- The moving system essentially consists of a light rotating aluminium disk mounted on a vertical spindle or shaft. The shaft that supports the aluminium disk is connected by a gear arrangement to the clock mechanism on the front of the meter to provide information that consumed energy by the load.





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- The time varying (sinusoidal) fluxes produced by shunt and series magnet induce eddy currents in the aluminium disc. The interaction between these two magnetic fields and eddy currents set up a driving torque in the disc. The number of rotations of the disk is therefore proportional to the energy consumed by the load in a certain time interval and is commonly measured in kilo watt-hours (Kwh).

**(C) Braking system:**

- Damping of the disk is provided by a small permanent magnet, located diametrically opposite to the a.c. magnets. The disk passes between the magnet gaps.
- The movement of rotating disc through the magnetic field crossing the air gap sets up eddy currents in the disc that reacts with the magnetic field and exerts a braking torque.
- By changing the position of the brake magnet or diverting some of the flux their form, the speed of the rotating disc can be controlled.

**(D) Registering or Counting system:**

- The registering or counting system essentially consists of gear train, driven either by gear on the disc shaft, which turns pointers that indicate on dials the number of times the disc has turned.
- The energy meter thus determines and adds together or integrates all the instantaneous power values so that total energy used over a period is thus known. Therefore, this type of meter is also called an “integrating” meter.

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Session: 2019-20 (Summer Semester)

B. Voc. Program, 1<sup>st</sup> Semester,2<sup>nd</sup> In-Sem. Examination

Course Code: ELE 1102

Course Name: Electrical Drawing

Time: 1 Hour

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. Estimation and wiring calculation for domestic building is illustrated in:  
(a) Indian electricity rules, 1947 (b) Indian electricity rules, 1956  
(c) Indian electricity rules, 1963 (d) Indian electricity rules, 1999
2. Clearance above ground for low voltage line is:  
(a) 1.1metre (b) 2.1metre (c) 4.1metre (d) 5.5 metre
3. Tail part of cable end is \_\_\_\_ to keep the cable in tight position:  
(a) welded (b) soldered (c) both of these (d) None of these
4. The bottom of ceiling fan should have minimum clearance of \_\_\_\_ above floor level:  
(a) 1.75m (b) 2.75m (c) 3.25m (d) 4.4m
5. Cable lugs are fitted on which side of cable:  
(a) Starting of cable (b) end of cable (c) anywhere in cable (d) Any of these.

**Section – B**

03X02 = 06 Marks

1. What are the different voltage levels for estimation and wiring calculation in electrical drawing?
2. What factors to be considered for selection of different wiring in electrical drawing?
3. What are the necessary conditions for domestic installation?

**Section – C**

03X03 = 09 Marks

1. A residential single bedroom flat is to be electrified with PVC concealed type wiring. Estimate the quantity of materials required with specification. The details of the fittings are as follows:

S.No.	Name of room	Size	No. of tube light points	No. of ceiling fan	No. of ordinary lamps	No. of plug points
1	Hall	5m*6m	2	1	2	2
2	Bed room	4m*4m	1	1	1	1
3	Kitchen	4m*2m	1	1	1	1
4	Bath room	1.5m*1.5m	-	-	1	1
5	Toilet	1.5m*1.5m	-	-	1	-

Draw the plan of building considering the data in the above table.

2. Estimate the total load, number of sub-circuits, current drawn by the components of the building. Take data from above table.
3. Explain tee joints for stranded cable in detail.





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School of Electrical Skills  
Session: 2019-20 (Summer Semester)  
B. Voc. Program, 1<sup>st</sup> Semester,  
2<sup>nd</sup> In-Sem. Examination

Course Code: ELE 1102  
Course Name: Electrical Drawing

Time: 1 Hour  
Max. Marks: 20

### Section – A

05X01 = 05 Marks

1. Estimation and wiring calculation for domestic building is illustrated in:  
Ans. (b) Indian electricity rules, 1956
2. Clearance above ground for low voltage line is:  
Ans. (d) 5.5 metre
3. Tail part of cable end is \_\_\_\_ to keep the cable in tight position:  
Ans. (b) soldered
4. The bottom of ceiling fan should have minimum clearance of \_\_\_\_ above floor level:  
Ans. (b) 2.75m
5. Cable lugs are fitted on which side of cable:  
Ans. (b) end of cable

### Section – B

03X02 = 06 Marks

1. What are the different voltage levels for estimation and wiring calculation in electrical drawing?

Ans.

<b>Low voltage</b>	: Does not exceed 250v under normal condition .
<b>Medium voltage</b>	: Does not exceed 650v under normal condition .
<b>High voltage</b>	: Does not exceed 22kv under normal condition .
<b>Extra High voltage</b>	: voltage exceed 22kv

2. What factors to be considered for selection of different wiring in electrical drawing?

Ans.

- Initial cost** : It should be economical.
- Durability** : It must be able to withstand wear and tear due to weather.
- Safety from fire** : It should be free from risk of fire as far as possible.
- Mechanical Protection** : It must provide good mechanical protection to the cables.
- Permanency** : The wiring must not be affected by the action of weather, fumes, dampness, chemicals etc.,
- Appearance** : It is an architectural point of view.
- Accessibility** : It should be easy to extend or repair the wiring.
- Life** : The System adopted should have good life.
- Maintenance Cost** : It should be low.

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3. What are the necessary conditions for domestic installation?

- Ans.
- Height of switch board must be 1.3m to 1.75m from floor level
  - Height of distribution board must be 1.5m to 1.75m from floor level
  - The bottom of ceiling fan should have minimum clearance of 2.75m
  - All lamp should be fitted with a minimum clearance of 2.75m above floor level
  - For load above 4kw, 3 phase supply must arrange
  - load should be equally shared.
  - In any building light wiring and power wiring should be kept separate
  - Power per circuit may take it as 800w or 1000w, (10points)

### Section – C

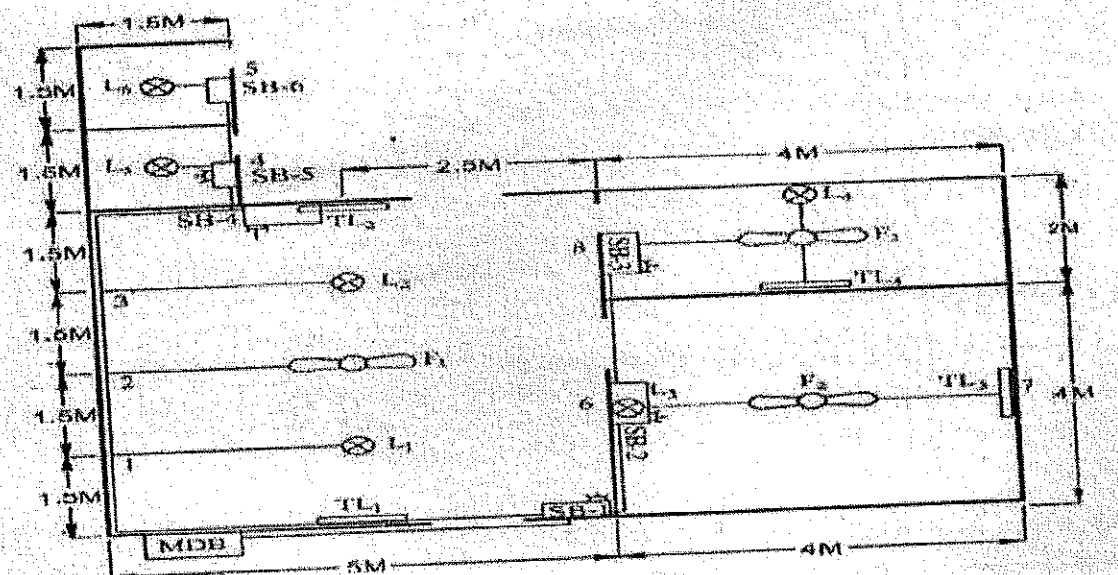
03X03 = 09 Marks

1. A residential single bedroom flat is to be electrified with PVC concealed type wiring. Estimate the quantity of materials required with specification. The details of the fittings are as follows:

S.No.	Name of room	Size	No. of tube light points	No. of ceiling fan	No. of ordinary lamps	No. of plug points
1	Hall	5m*6m	2	1	2	2
2	Bed room	4m*4m	1	1	1	1
3	Kitchen	4m*2m	1	1	1	1
4	Bath room	1.5m*1.5m	-	-	1	1
5	Toilet	1.5m*1.5m	-	-	1	-

Draw the plan of building considering the data in the above table.

Ans.



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2. Estimate the total load, number of sub-circuits, current drawn by the components of the building. Take data from above table.

Ans. Total Load:

<b>Assuming</b>		(1) Fan point - 60 watts	
		(2) Light point - 60 watts	
		(3) Tub light point - 40 watts	
		(4) Plug point - 100 watts	
<b>Total load</b>	(i) Fan load	= 3 × 60	= 180 watts
	(ii) Light load	= 6 × 60	= 360 watts
	(iii) Tube light load	= 4 × 40	= 160 watts
	(iv) Plug point load	= 5 × 100	= 500 watts
			<b>1200 watts</b>

Number of Sub-circuit:

<b>Power per circuit</b>	= 800 watts or 10 points
<b>No of sub circuits</b>	= $\frac{1200}{800} = 2$ circuits

Current drawn by the components-

**Calculation of current**

$$\text{Total current } I = \frac{\text{Total load}}{230} = \frac{1200}{230} = 5.21 \text{ A}$$

$$\text{Current of sub circuit 1} = \frac{680}{230} = 2.95 \text{ Amps}$$

$$\text{Current of sub circuit 2} = \frac{520}{240} = 2.16 \text{ Amps}$$

**Selection of Main switch and DB**

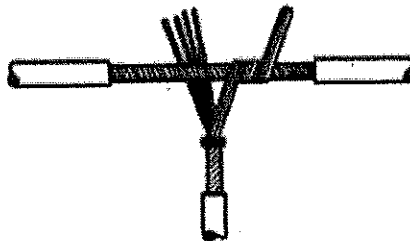
Total current = 5.21 A

∴ Maximum current = 2 × Full load current

$$= 2 \times 5.21 = 10.42 \text{ A}$$

3. Explain tee joints for stranded cable in detail.

Ans.



**TEE JOINT ON STRANDED CABLE**

(b)



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### *Tee joint on stranded cable*

1. Use 7/0.737 PVC single core cable
2. Strip off 8 cm insulation from through wire. Do not cut cable
3. Strip 8 cm of tee wire
4. Twist tee wire for 3 cm in direction of lay
5. Secure with two or three turns of 1/0.737 binding wire
6. Divide tee wire strands, three on one side of through wire and four on other side
7. Wrap three strands tightly round through wire to the right
8. Wrap four strands in opposite direction to the left
9. Tighten with pliers and solder the joint.

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School of Electrical Skills  
Session: 2019-20 (Summer Semester)  
B. Voc. Program, 1<sup>st</sup> Semester,  
2<sup>nd</sup> 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

- The unit of flux ( $\Phi$ ) is:  
(a) Weber (b) Tesla (c) Amp. meter (d) Amp / meter
- The unit of reluctance (S) is:  
(a) A/ wb (b) Tesla (c) Amp. web (d) H / M
- Absolute permeability is equal to:  
(a)  $\mu \mu_0$  (b)  $\mu_0 \mu_r$  (c)  $\mu \mu_r$  (d)  $\mu_0$
- Fleming's left hand rule is applied for:  
(a) Motors (b) Generators (c) Transformers (d) Breakers
- Screw rule is applied to determine:  
(a) Magnetic field direction (b) Current direction  
(c) Force direction (d) None of these

**Section – B**

03X02 = 06 Marks

- Define the magnetic flux and magnetic flux density and state their units.
- Explain Flemings's right hand rule. Where it is applicable?
- Define magneto motive force and state its units.

**Section – C**

03X03 = 09 Marks

- Compare electrical and magnetic quantities.
- Explain the reasons of hysteresis losses in ferromagnetic materials.
- The wing span of metal aero plane is 36 meter. If the aero plane is flying at 400 km/ hr. determine the emf induced between wing tips. Assume the vertical component of earth's magnetic field is  $40 \mu\text{T}$ .



**BHARTIYA SKILL DEVELOPMENT UNIVERSITY**

School of Electrical Skills  
Session: 2019-20 (Summer Semester)  
B. Voc. Program, 1<sup>st</sup> Semester,  
2<sup>nd</sup> In-Sem. Examination

Course Code: ELE 1103

Course Name: Basic Electrical Engineering

Time: 1 Hour

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 flux ( $\Phi$ ) is:  
**Ans. (a) Weber**
2. The unit of reluctance (S) is:  
**Ans. (a) A/ wb**
3. Absolute permeability is equal to:  
**Ans. (b)  $\mu_0 \mu_r$**
4. Fleming's left hand rule is applied for:  
**Ans. (a) Motors**
5. Screw rule is applied to determine:  
**Ans. (a) Magnetic field direction**

**Section – B**

03X02 = 06 Marks

1. Define the magnetic flux and magnetic flux density and state their units.

**Ans. Magnetic Flux:** The amount of magnetic field (or the number of lines of force) produced by a magnetic source.

The unit of magnetic flux is weber.

**Magnetic flux density** is the amount of flux passing through a defined area that is perpendicular to the direction of the flux.

$$\text{Magnetic flux density} = \frac{\text{magnetic flux}}{\text{area}}$$

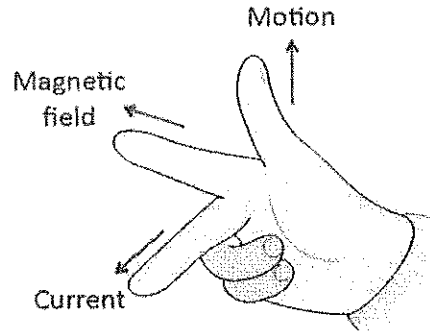
The symbol for magnetic flux density is B. the magnetic flux density unit is the Tesla  $T$  where one Tesla =  $\frac{1 \text{ wb}}{\text{m}^2}$

2. Explain Flemings's right hand rule. Where it is applicable?

**Ans.** Fleming's right hand rule is applicable for electrical generators. As per Faraday's law of electromagnetic induction, whenever a conductor is forcefully moved in an electromagnetic field, an emf gets induced across the conductor. If the conductor is provided a closed path, then the induced emf causes a current to flow. According to the **Fleming's right hand rule**, the thumb, fore finger and middle finger of the right hand are stretched to be perpendicular to each other as shown in the illustration at right, and if the thumb represents the direction of the movement of conductor, fore-finger represents direction of the magnetic field, then the middle finger represents direction of the induced current.



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3. Define magneto motive force and state its units.

Ans. **Magneto motive force and magnetic field strength**

Magneto motive force (mmf) is the cause of the existence of magnetic flux in magnetic circuit.

$$\text{mmf} = NI \text{ Amp turns}$$

N = Number of turns – turns have no dimension

I = current in Amps. So mmf = NI Amps.

**Section – C**

03X03 = 09 Marks

1. Compare electrical and magnetic quantities.

Ans. Current – flux

Emf – mmf

Resistance – Reluctance

2. Explain the reasons of hysteresis losses in ferromagnetic materials.

Ans. **Hysteresis losses**

The disturbance in the alignment of the group of atoms of a ferromagnetic material causes energy to be expended in taking through a cycle of magnetization.

This energy appears as heat in the specimen and is called hysteresis loss.

The energy loss associated with hysteresis is **proportional to the area of hysteresis loop**

3. The wing span of metal aero plane is 36 meter. If the aero plane is flying at 400 km/hr. determine the emf induced between wing tips. Assume the vertical component of earth's magnetic field is 40  $\mu\text{T}$ .

Ans. We know that:

$$E = Blv = 40 \times 10^{-6} \times 36 \times 400 \times 10^3 / 36 = 0.16 \text{ V}$$

The induced emf between wing tips will be equal to 0.16 V.





# BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Electrical Skills

Session: 2019-20 (Summer / Winter Semester)

B. Voc. Program, 1st Semester,

2<sup>nd</sup> In-Sem. Examination

Course Code: ELE1104

Time: 1 Hour

Course Name: Maintenance Technician Electrical

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

- Personal Protective Equipment is required when:
  - Employers suffer an injury
  - The employees suffer an injury
  - An employee asks for it
  - Whenever worker/ engineer is on the job
- Industrial safety management is the branch of management which helps in \_\_\_\_\_ hazards from the industries.
  - Reducing
  - Controlling
  - Eliminating
  - All of the above
- The following is not a classification of maintenance:
  - Corrective maintenance
  - Sudden maintenance
  - Scheduled maintenance
  - Preventive maintenance
- Full form of PPE is:
  - Personal Protective Equipment
  - Personally Part of Equipment
  - Protective Personal of Equipment
  - none of these
- Which of the following is NOT one of the steps of the 5S method?
  - Shine
  - Sustain
  - Specialize
  - Set

## Section – B

03x02 = 06 Marks

- What is computerized maintenance management system (CMMS)?
- What are advantages of Personal Protective equipment?
- What is Autonomous Maintenance?

## Section – C

03x03 = 09 Marks

- Write down the advantages and disadvantages of preventive maintenance.
- Define purpose of 5 S.
- Name the basic tools which are used for maintenance of any machine





**Answer Key (ELE 1104) Set-A**

**BHARTIYA SKILL DEVELOPMENT UNIVERSITY**

School of Electrical Skills  
Session: 2019-20 (Summer / Winter Semester)  
B. Voc. 1st Semester,  
2nd In-Sem. Examination

Course Code: ELE1104  
Course Name: Maintenance Technician

Time: 1 Hour  
Max. Marks: 20

Answer Sheet  
Section – A

05X01 = 05 Marks

1. (d)
2. (d)
3. (b)
4. (a)
5. (d)

Section – B

03X02 = 06 Marks

**Ans. 1.**

Computerized maintenance management system (CMMS), also known as computerized maintenance management information system (CMMIS), is a software package that maintains a computer database of information about an organization's maintenance operations. This information is intended to help maintenance workers do their jobs more effectively (for example, determining which machines require maintenance and which storerooms contain the spare parts they need) and to help management make informed decisions (for example, calculating the cost of machine breakdown repair versus preventive maintenance for each machine, possibly leading to better allocation of resources). CMMS data may also be used to verify regulatory compliance. To properly control the maintenance of a facility, information is required to analyze what is occurring. Manually this requires a tremendous amount of effort and time. A CMMS also allows for record keeping, to track completed and assigned tasks in a timely and cost-effective manner. In recognition of this, companies have started using CMMS extensively to better control and organize maintenance management. The different steps of implementing a CMMS plan have been described in the diagram.

**Ans. 2.**

Safety is a major issue for day laborers and skilled laborers. 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.

1. Head Protection
2. Eye and Face Protection
3. Hand & Skin protection
4. Hearing protection

**Ans. 3.**

A maintenance strategy wherein machine adjustments and minor maintenance is performed by operators who are deemed to have unique knowledge about the equipment. It is a principal pillar of Total Productive Maintenance (TPM).

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.



**Section – C**

03X03 = 09 Marks

**Ans. 1.**

Advantages:

1. Equipment will be more efficient.
2. Savings on your resources.
3. Longer lasting equipment.
4. Full and accurate information on operations.
5. The creation of a Preventive Maintenance Plan (PMP).
6. A more motivated and efficient team.

Disadvantages:

1. More Money Upfront
2. Over Maintenance
3. More Workers

**Ans. 2.**

5S is a workplace organization methodology that uses a list of five Japanese words

Which are Seiri, Seiton, Seiso, Seiketsu and Shitsuke.

In English these are:

- Sorting (*seiri*)
- Straightening (*seiton*)
- Systematic cleaning (*seiso*)
- Standardizing (*seiketsu*)
- Sustaining (*shitsuke*)

**Sorting: -**

- 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.

**Straightening: -**

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

**Systematic cleaning: -**

- 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.

**Standardizing: -**

- 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.

**Sustaining: -**

- 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.

**Ans. 3.**

**Tools used for maintenance:**

- Combination plier
- Side cutter
- Inch tap
- Ruler
- Gloves
- Spirit level
- Knife
- Tape
- Engineering square
- Wire stripper
- Cable stripper
- Multimeter, etc.

**BHARTIYA SKILL DEVELOPMENT UNIVERSITY**

**School of Electrical Skills**  
**Session: 2019-20 (Summer Semester)**  
**B. Voc. Program, 1<sup>st</sup> Semester,**  
**2<sup>nd</sup> 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. National fire service day is being observed every year on:  
(a) 14<sup>th</sup> April (b) 14<sup>th</sup> March (c) 14<sup>th</sup> September (d) 9<sup>th</sup> October
2. Fire service week is observed nation-wide during:  
(a) 14<sup>th</sup> April to 20<sup>th</sup> April (b) 14<sup>th</sup> March to 20<sup>th</sup> March  
(c) 14<sup>th</sup> Sept. to 20<sup>th</sup> Sept. (d) 9<sup>th</sup> October to 20<sup>th</sup> October
3. Fire prevention day is being observed every year on:  
(a) 9<sup>th</sup> October (b) 14<sup>th</sup> April (c) 12<sup>th</sup> August (d) 5<sup>th</sup> September
4. Fire prevention week is being observed every year:  
(a) On Sunday through Saturday period in which October 9  
(b) On Monday through Sunday period in which October 9  
(c) On Thursday through Wednesday period in which October 9  
(d) On Saturday through Sunday period in which October 9
5. The full form of PM in reference to air pollution is:  
(a) Particulate Matter (b) Program manager (c) Past meridiem (d) Per-trophic matrix

**Section – B**

03X02 = 06 Marks

1. What is difference between class F and class K fire?
2. What are the main reasons of electrical fires?
3. What are three factors responsible for the ignition of fire?

**Section – C**

03X03 = 09 Marks

1. What actions to be taken for fire-fighting after fire?
2. What is the purpose of fire certificates from fire authority?
3. What are the duties/ responsibilities of fire safety manager?





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### Section – A

05X01 = 05 Marks

- Ans. 1. (a)
- Ans. 2. (a)
- Ans. 3. (a)
- Ans. 4. (a)
- Ans. 5. (a)

### Section – B

03X02 = 06 Marks

1. What is difference between class F and class K fire?

**Ans. 1.** The fire of cooking oil & fuels in Europe is name as class F fire while in America it called class K fire.

2. What are the main reasons of electrical fires?

**Ans.** Short circuiting and overloading of cables and spacing in loose cables.

3. What are three factors responsible for the ignition of fire?

**Ans. (i)** air  
(ii) Fuel and  
(iii) Heat

### Section – C

03X03 = 09 Marks

1. What actions to be taken for fire-fighting after fire?

**Ans. (i)** Immediately use of portable fire extinguishers and simultaneously call to fire brigade.

- (ii) second act of defence – use of fire hydrant, hose and nozzle
- (iii) Third act of defence – operate the fire extinguishing system installed in the plant.
- (iv) Leave the fire location and
- (v) Assemble at a safe location





## BHARTIYA SKILL DEVELOPMENT UNIVERSITY

2. What is the purpose of fire certificates from fire authority?

**Ans.** (i) As per fire precautions act 1971 all places of work, industrial, commercial and public premises require a fire certificate to be obtained from the fire authority.

(ii) Any building where 10 or more persons are employed at ground floor require fire certificate.

(iii) Fire authority ensures the means of escape that can be used safely and effectively at all the times, means of fighting fire for use by persons in the premises and means of warning in the premises in case of fire.

(iv) If the arrangements are not satisfactory a notice will be served to the applicant about the action desired within time period given.

(v) Fire certificate authority may impose certain other conditions such as adequate training in respect of what do in case of fire. Testing of alarm systems at specified intervals and maintenance of fire-fighting equipment with proper record.

(vi) Once issued a fire certificate remains valid to long as the circumstances under which it was issued remain unchanged like extensions or structural alteration to the premises or storage of any explosive or highly flammable material beyond the level specified. The fire authority must be consulted before any change made.

3. What are the duties/ responsibilities of fire safety manager?

**Ans.** The fire safety manager normally carries out a wide range of functions within a given organization. These duties are mainly to ensure the safety of workers within such organization.

The job description below is a typical example of what the tasks, duties, and responsibilities of a fire safety manager entail:

- Ensure that all fire and safety equipment in an establishment are in good shape always.
- Make sure that there are well-developed plans for easy evacuation of people in a building in the case of a fire outbreak.
- Conduct fire safety checks from time to time
- Enforce safety codes and regulations/guidelines within a particular organization
- Carry out training and enlightenment of co-workers or employees as regards general fire safety rules and procedures
- Address any form of violation of safety codes within the organization
- Investigate and implement appropriate disciplinary action on violators of safety codes within the establishment.

