BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills
Session: 2020-21 (Summer Semester)
B. Voc. Program, 3rd Semester,
2nd In-Sem. Examination

Course Code: ELE 1301 **Time: 1 Hour**
Course Name: Automation & Control **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. In a PLC, the scan time refers to the amount of time in which
   (a) the technician enters the program
   (b) one "rung" of ladder logic takes to complete
   (c) the entire program takes to execute
   (d) transmitted data communications must finish
2. Colored contact in PLC ladder diagram indicates
   (a) Closed contact (b) Open contact
   (c) Any of these (d) None of these
3. An example of discrete (digital) control is
   (a) Varying the volume of a music system (b) Turning a lamp ON or OFF
   (c) Varying the brightness of a lamp (d) Controlling the speed of a fan
4. Ladder logic programming consists primarily of
   (a) Virtual relay contacts and coils (b) Logic gate symbols with connecting lines
   (c) Text-based code (d) Function blocks with connecting lines
5. To reset the time for a PLC what condition must be true?
   (a) Reset rung of TON must be true
   (b) Reset rung of TON must be false
   (c) RST instruction with timer address must be true
   (d) RST instruction with associated timer address must be false

Section – B

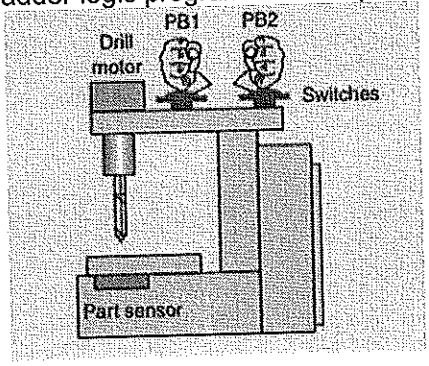
03X02 = 06 Marks

1. Define contractor and also write their applications.
2. Write function of NO and NC push buttons.
3. List atleast four output devices with their symbols that can be operated by PLC.

Section – C

03X03 = 09 Marks

1. Discuss the working of latching relays.
2. Define SCADA and also write its application.
3. A drilling process that requires the drill press to turn on only if there is a part present and the operator has one hand on each of the start switches, as shown in Figure. This precaution will ensure that the operator's hands are not in the way of the drill. The sequence of operation requires that switches 1 and 2 and the part sensor all be activated to make the drill motor operate. Make ladder logic program with all specifications.



A

Answer Key Set – A

Course Code: ELE 1301, Course Name: Automation & Control

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Section – A

05X01 = 05 Marks

1. (c) the entire program takes to execute
2. (a) Closed contact
3. (b) Turning a lamp ON or OFF
4. (a) Virtual relay contacts and coils
5. (c) RST instruction with timer address must be true

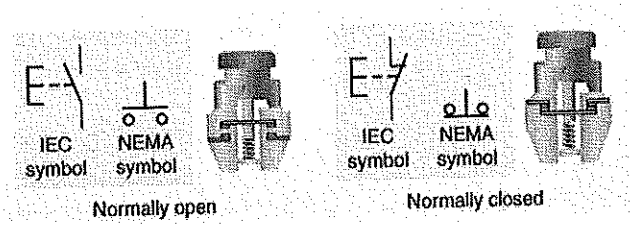
Section – B

1. A contactor is an electrical device which is used for switching an electrical circuit on or off. It is considered to be a special type of relay. However, the basic difference between the relay and contactor is that the contactor is used in applications with higher current carrying capacity, whereas the relay is used for lower current applications. Contactors can be field mounted easily and are compact in size. Generally, these electrical devices feature multiple contacts. These contacts are in most cases normally open and provide operating power to the load when the contactor coil is energized. Contactors are most commonly used for controlling electric motors.

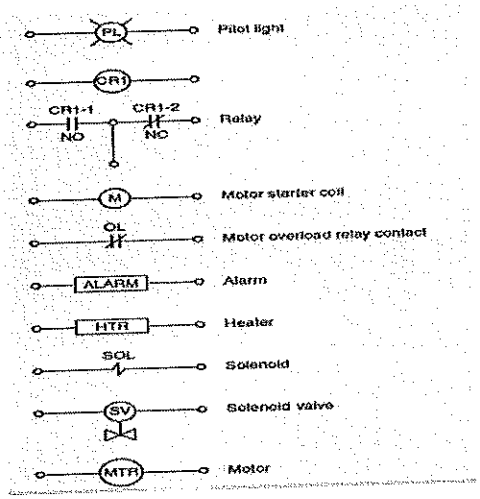
2. Pushbutton switches are the most common form of manual control. A pushbutton operates by opening or closing contacts when pressed. Figure shows commonly used types of pushbutton switches, which include:

•Normally open (NO) pushbutton, which makes a circuit when it is pressed and returns to its open position when the button is released.

•Normally closed (NC) pushbutton, which opens the circuit when it is pressed and returns to the closed position when the button is released.



3.



Answer Key Set – A

Course Code: ELE 1301, Course Name: Automation & Control

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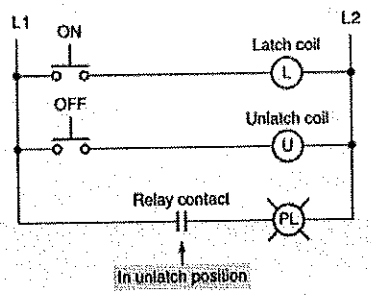
Section – C

1. Electromagnetic latching relays are designed to hold the relay closed after power has been removed from the coil. Latching relays are used where it is necessary for contacts to stay open and/or closed even though the coil is energized only momentarily.

Figure shows a hardwired control circuit for an electromagnetic latching relay. The operation of the circuit can be summarized as follows:

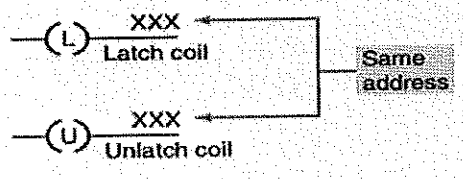
- The contact is shown with the relay in the unlatched position.
- In this state the circuit to the pilot light is open and so the light is off.
- When the ON button is momentarily actuated, the latch coil is energized to set the relay to its latched position.
- The contacts close, completing the circuit to the pilot light, and so the light is switched on.
- The relay coil does not have to be continuously energized to hold the contacts closed and keep the light on.
- The only way to switch the lamp off is to actuate the OFF button, which will energize the unlatch coil and return the contacts to their open, unlatched state.

In cases of power loss, the relay will remain in its original latched or unlatched state when power is restored.



- Electromagnetic latching relay function can be programmed on a PLC to work like its real-world counterparts.
- A description of the output latch (OTL) and output unlatch (OTU) instruction is given in Figure.
- Both the latch and unlatch outputs must have the same address. The OTL (latch) instruction can only turn a bit on and the OTU (unlatch) instruction can only turn a bit off.

Command	Name	Symbol	Description
OTL	Output latch	-(L)-	OTL sets the bit to "1" when the rung becomes true and retains its state when the rung loses continuity or a power cycle occurs.
OTU	Output unlatch	-(U)-	OTU resets the bit to "0" when the rung becomes true and retains it.



2. Supervisory Control and Data Acquisition- It's a system that has both software and hardware elements and is usually used for a couple of things:

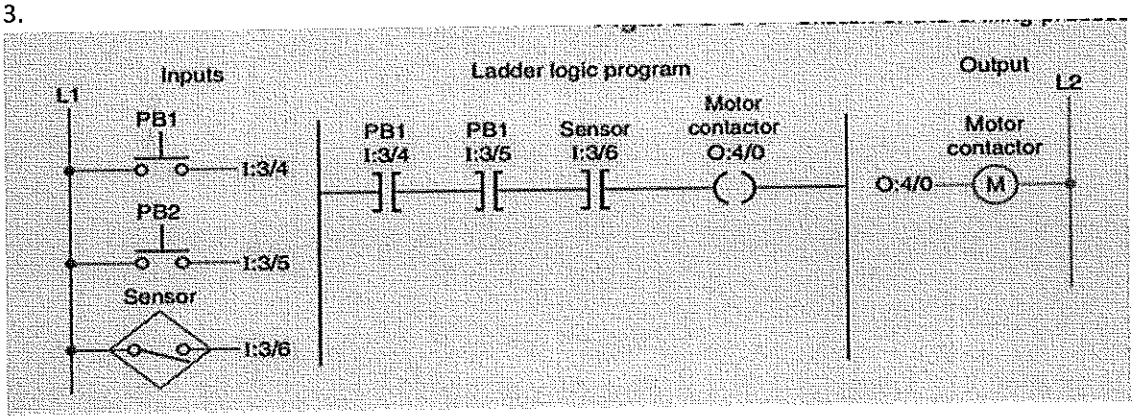
- Control of various processes from a remote location or locally
- Interaction with sensors, pumps, motors, and valves through an HMI (Human-Machine Interface) software

- Monitoring, acquiring, and processing real-time data
- Recording the events into a file.

Application-

- Electric power system, operation and control: SCADA systems are used in electric power generation plants, transmission area and distribution system.
- Manufacturing Industries or plants: A SCADA helps in management of different inventory items or raw materials, controlling of automated systems in synchronous manner.
- Telecom and IT based systems: Management of different RF based systems, communication mediums and large communication systems including data logging through antennas can be easily done through the SCADA.

3.



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Registration No.: .....

School of Electrical Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

2nd In-Sem. Examination

Course Code: ELE1302 **Time: 1 Hour**

Course Name: Electrical Machine - I **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

1. Wave winding is also known as:
   a) Parallel winding
   b) Complex winding
   c) Series winding
   d) None of these

2. Value of Multiplicity factor for Simplex winding is:
   a) 1
   b) 2
   c) 4
   d) 3

3. Sumpner's test used to calculate:
   a) Copper losses
   b) Core losses
   c) Core & Copper losses both
   d) None of these

4. No. of Parallel paths in Lap winding:
   a) = 2
   b) = no. of poles
   c) = 3
   d) = 4

5. Carbon Brushes are placed on:
   a) MNA axis
   b) Can be placed anywhere
   c) GNA axis
   d) None of these

Section – B

03X02 = 06 Marks

1. The armature of 2-pole, 200V, and wave wound DC machine has 400 conductors and runs at 300 rpm. Calculate the machine flux per pole.
2. Draw the circuit diagram to perform short circuit test on transformer and also give brief information about this test.
3. Single phase induction motor is not self-started, explain why?

Section – C

03X03 = 09 Marks

1. A 400V, 8-pole, 600 rpm DC machine has 100 slots. Each slot contains 40 conductors. The flux per pole is 0.01 Weber. What type of winding is used?
2. Discuss the working of Buchholz relay with suitable diagram.
3. Develop Simplex progressive lap winding 24 conductors & 4 poles.

A

School of Electrical Skills, Session: 2020-21 (Summer Semester)
B. Voc. Program, 3rd Semester, 2nd In-Sem. Examination
Course Code: ELE1302, Course Name: Electrical Machine - I

Answer Key
Section – A

1. C
2. A
3. C
4. B
5. A

Section-B

1.

Given

$p = 2$ $\quad E = 200V$ $\quad Z = 400\ conductors$

$N = 300\ r.p.m$ $\quad a = 2\ (wave\ winding)$

Required:

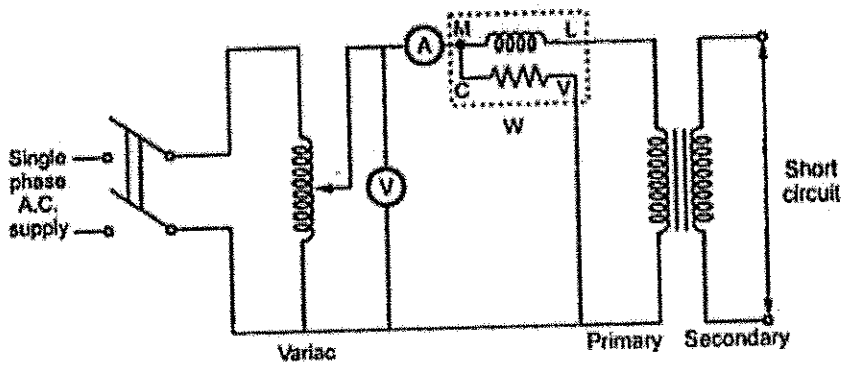
The machine flux per pole (φ)

Solution:

$$E = \frac{p}{a} * \frac{Z}{60} * \varphi * N$$

$$200 = \frac{2}{2} * \frac{400}{60} * \varphi * 300 \quad \rightarrow \quad \varphi = 0.1\ weber$$

2. **Diagram to perform Short Circuit Test on transformer:**



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The main purpose of this test is to find full load copper loss and winding parameters which are helpful for finding regulation of transformer. In this test, secondary is short circuited with the help of ammeter. (secondary may be short circuited with thick copper wire or solid link). As secondary is shorted, its resistance is very small and on rated voltage it may draw very large current. Such large current can cause overheating and burning of the transformer. To limit this short circuit current, primary is supplied with low/reduced voltage (2 - 5% of the rated voltage) which is just enough to cause rated current to flow through primary which can be observed on an ammeter. The reduced voltage can be adjusted with the help of auto transformer. The wattmeter reading as well as voltmeter, ammeter readings are recorded. As the voltage applied is low which is a small fraction of the rated voltage and iron losses are function of applied voltage, hence iron losses are negligibly small. Since the currents flowing through the windings are rated currents hence the total copper loss is full load copper loss. Hence the wattmeter reading is the power loss which is equal to full load copper losses.

3. In induction machine a rotating magnetic field is required to produce torque. A rotating magnetic field can produce if we have balanced three phase supply and each phase is electrically spaced 120^0 to each other or we have required minimum two phase. But in single phase induction motor there is single phase supply to the stator of motor, a single phase supply cannot produce a rotating magnetic field but it produces a pulsating magnetic field which does not rotate. Due to this pulsating magnetic field torque cannot produce so motor is not self-starting.

Section – C

1.

Given :

$p = 8$ $\quad E = 400V$ $\quad \#\ of\ slots = 100\ slot$

$N = 600\ r.p.m$ $\quad \varphi = 0.01\ weber$ $\quad conductors/slot = 40$

Required:

What is the type of the winding?

Solution:

$$E = \frac{p}{a} * \frac{Z}{60} * \varphi * N$$

$$400 = \frac{8}{2a} * \frac{100 * 40}{60} * 0.01 * 600$$

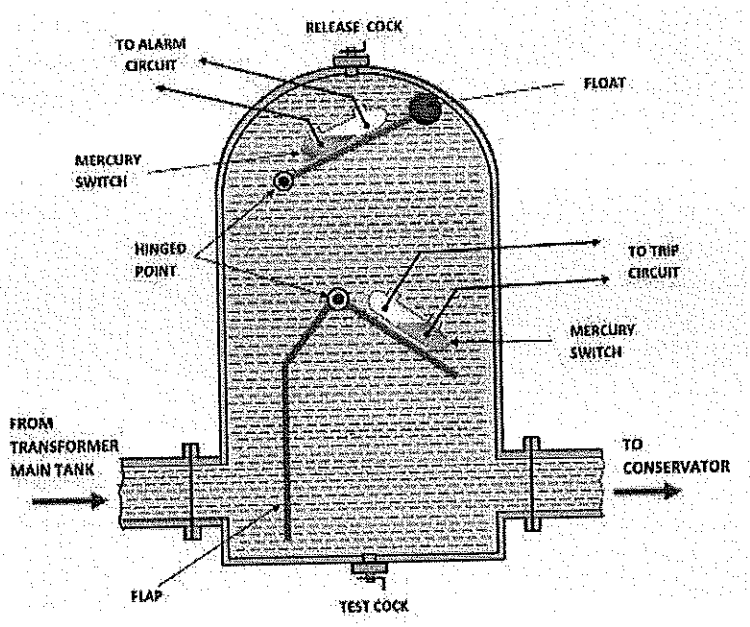
$$2a = 8$$

$\because \quad a = \quad p = 8$

Here Lap winding is used.

2. **Working of Buchholz relay:**

- The **Buchholz relay working principle** of is very simple. **Buchholz relay function** is based on very simple mechanical phenomenon. It is mechanically actuated. Whenever there will be a minor internal fault in the transformer such as an insulation fault between turns, breakdown of core of the transformer, core heating, the insulating transformer oil will be decomposed in different hydrocarbon gases, CO2 and CO. The gases produced due to the decomposition of transformer insulating oil will accumulate in the upper part the Buchholz container which causes fall of oil level in it.
- Fall of oil level means lowering the position of the float and thereby tilting the mercury switch. The contacts of this mercury switch are closed and an alarm circuit energized. Sometimes due to oil leakage on the main tank air bubbles may be accumulated in the upper part of the Buchholz container which may also cause a fall of oil level in it and the alarm circuit will be energized. By collecting the accumulated gases from the gas release pockets on the top of the relay and by analysing them one can predict the type of fault in the transformer.
- More severe types of faults, such as short circuit between phases or to earth and faults in the tap changing equipment, are accompanied by a surge of oil which strikes the baffle plate and causes the mercury switch of the lower element to close.



- This switch energized the trip circuit of the circuit breakers associated with the transformer and immediately isolate the faulty transformer from the rest of the electrical power system by inter tripping the circuit breakers associated with both LV and HV sides of the transformer. This is how **Buchholz relay functions.**

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Course Code: ELE1302, Course Name: Electrical Machine - I

3.

Pole pitch $= \frac{z}{p} = \frac{2m}{n} = 6$ z/pole

Avg. pitch; $Y_A = \frac{Y_b + Y_f}{2} = \frac{z}{p}$ ⇒ lap winding

$\frac{Y_b + Y_f}{2} = 6$

$Y_b + Y_f = 12$ — (1)

$Y_b - Y_f = 2M$ → multiplicity factor

M = 1 for simplex

$Y_b - Y_f = 2$ — (2)

$Y_b = \frac{14}{2} = 7$ & $Y_f = 5$

$Y_b = 7$ (1st last coil side)

right coil side		1st last coil side		$Y_f = 5$ (1st coil side)	2nd first coil side
1	+ 7	= 8		8 − 5	= 3
3	+ 7	= 10		10 − 5	= 5
5	+ 7	= 12		12 − 5	= 7
7	+ 7	= 14		14 − 5	= 9
9	+ 7	= 16		16 − 5	= 11
11	+ 7	= 18		18 − 5	= 13

Answer Key Set – A

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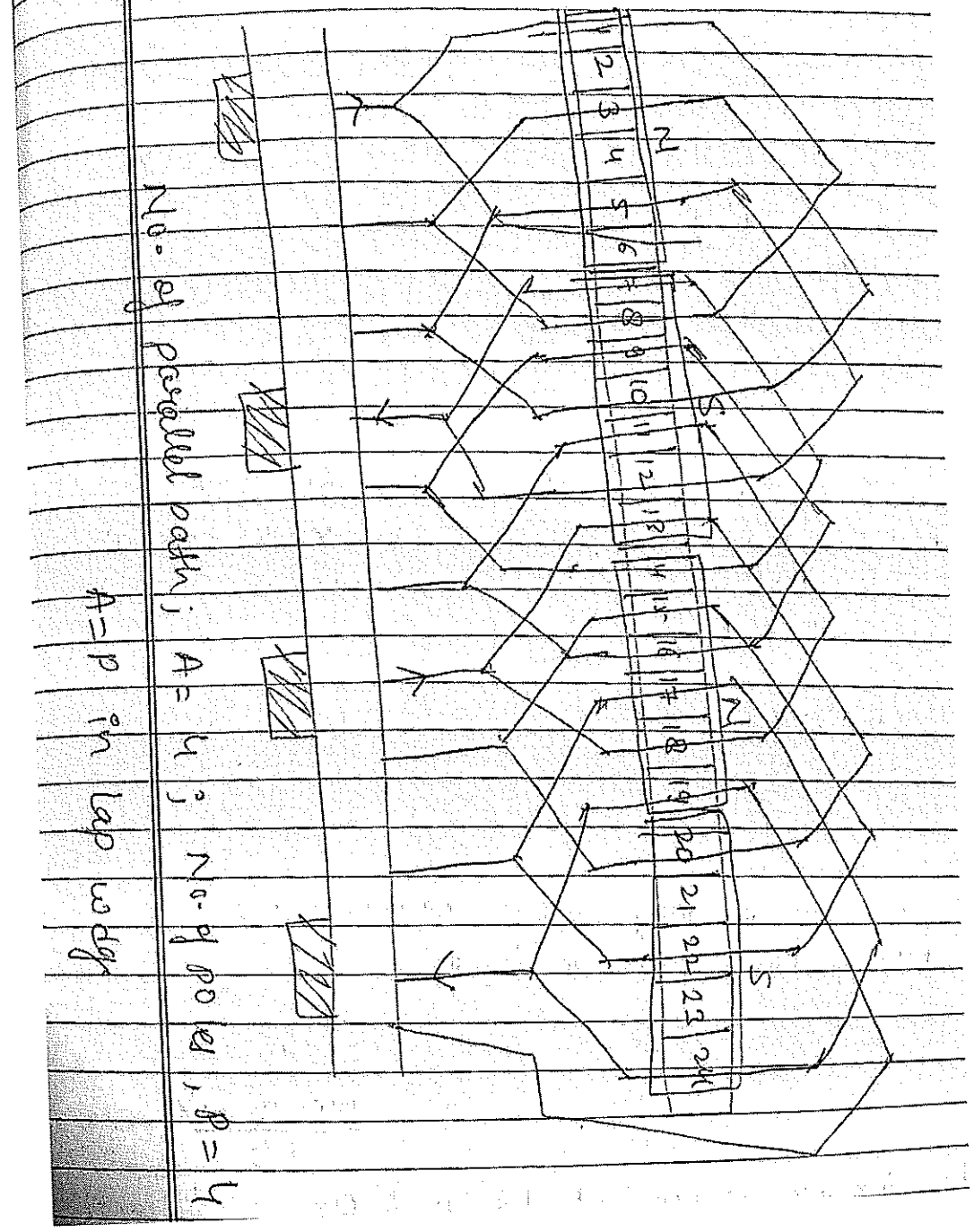
13+7 = 20	20-5 = 15
15+7 = 22	22-5 = 17
17+7 = 24	24-5 = 19



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Registration No.: .....

School of Electrical Skills
Session: 2020-21 (Summer Semester)
B. Voc. Program, 3rd Semester,
2nd In-Sem. Examination

Course Code: ELE1303 **Time: 1 Hour**

Course Name: Electric Circuit & 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. Disadvantage of Maximum Power Transfer Theorem:
   a) Efficiency Gets reduced
   b) Efficiency Increased
   c) Power transferred is high
   d) None of these

2. Full form of TRS:
   a) Total Radiated System
   b) Theology & Religious Studies
   c) Turbulence Reduction System
   d) Tip, Ring & Sleeve

3. While calculation of the value of R_{th} all independent sources to be:
   a) Short Circuit
   b) Deactivated according to their internal resistance values
   c) Open Circuit
   d) None of these

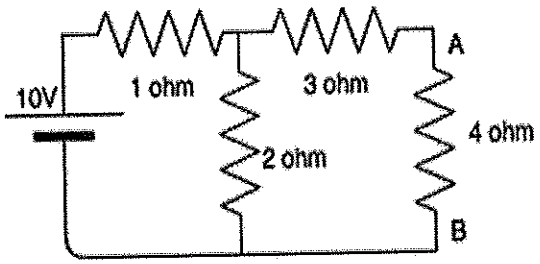
4. Colour of wire used for Earthing purpose is of:
   a) Green Colour
   b) Yellow – Green Colour
   c) Both (a) and (b)
   d) None of these

5. Number of Nodal Equations can be given by:
   a) = branch – node – 1
   b) = node – 1
   c) Both (a) & (b)
   d) None of these

Section-B

03x02 = 06 Marks

1. Calculate the value of V_{th} & R_{th} across AB terminals shown in the circuit diagram and also draw thevenin equivalent.



2. Draw the typical single phase wiring diagram of a House with following components.

   (i) Energy Meter (ii) MCB (iii) Fuse (iv) 3 bulbs, 1 fan and 1 TV

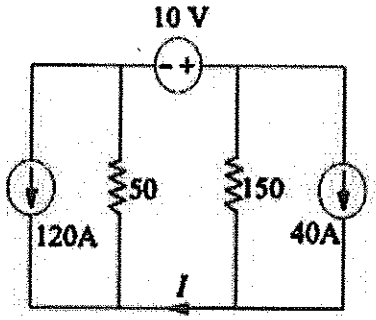
   (v) Two sockets and all loads must operate individually

3. Draw the Norton's equivalent circuit by using Thevenin equivalent parameters and these are:
   (a) V_{th} = 50 volts (b) R_{th} = 50 ohms (c) R_L = 10 ohms.
   Also calculate the value of current in load resistor using Current Division Rule.

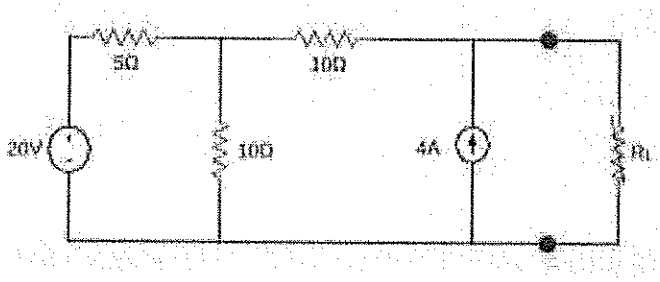
Section-C

03x03 = 09 Marks

1. Calculate the value of I using Superposition theorem:



2. Draw the planning flowchart for Single phase or Three phase supply for wiring installations in the building.
3. Calculate the value of resistances for which the maximum power will transferred in the resistance.



Answer Key Set – A

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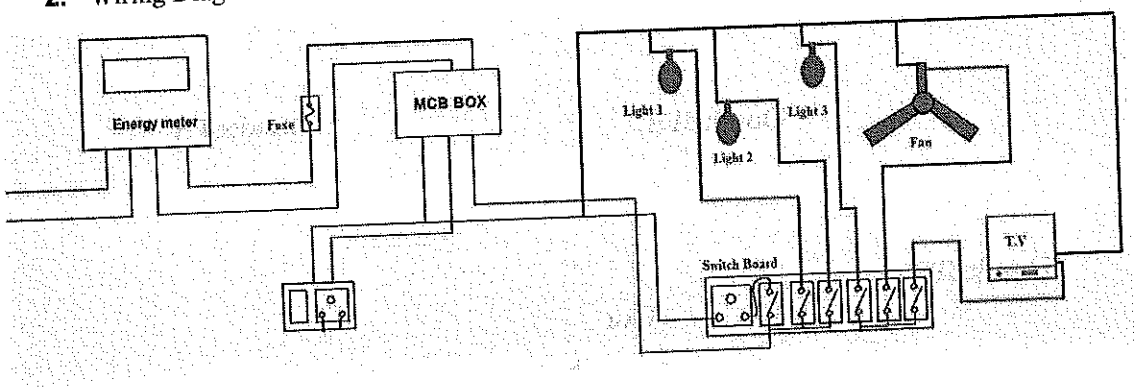
Course Code: ELE1303, Course Name: Electric Circuit & Drawing

Section-A

1. A
2. D
3. B
4. C
5. B

Section - B

1. Thevenin resistance is found by opening the circuit between the specified terminal and shorting all voltage sources.
   When the 10V source is shorted, we get:
   Rth=(1||2)+3=3.67 ohm.
   4 ohm is removed and then v across 2 ohm is calculated by voltage divider 2*10/(2+1) = 6.67V.
   Voltage between A and B i.e. V_{th} is equal to voltage across 4 ohm resistance since no current flow through 3 ohm resistance. So, V_{th} = 6.67V.
2. Wiring Diagram of House:



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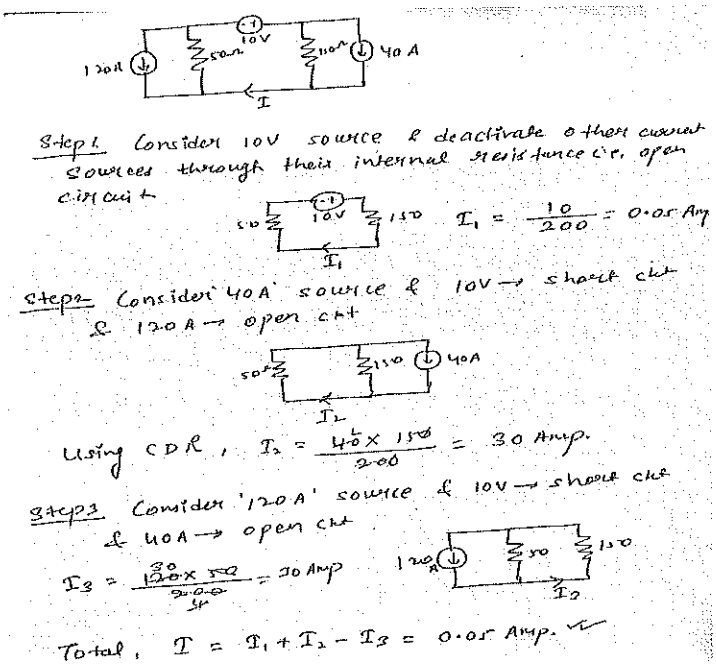
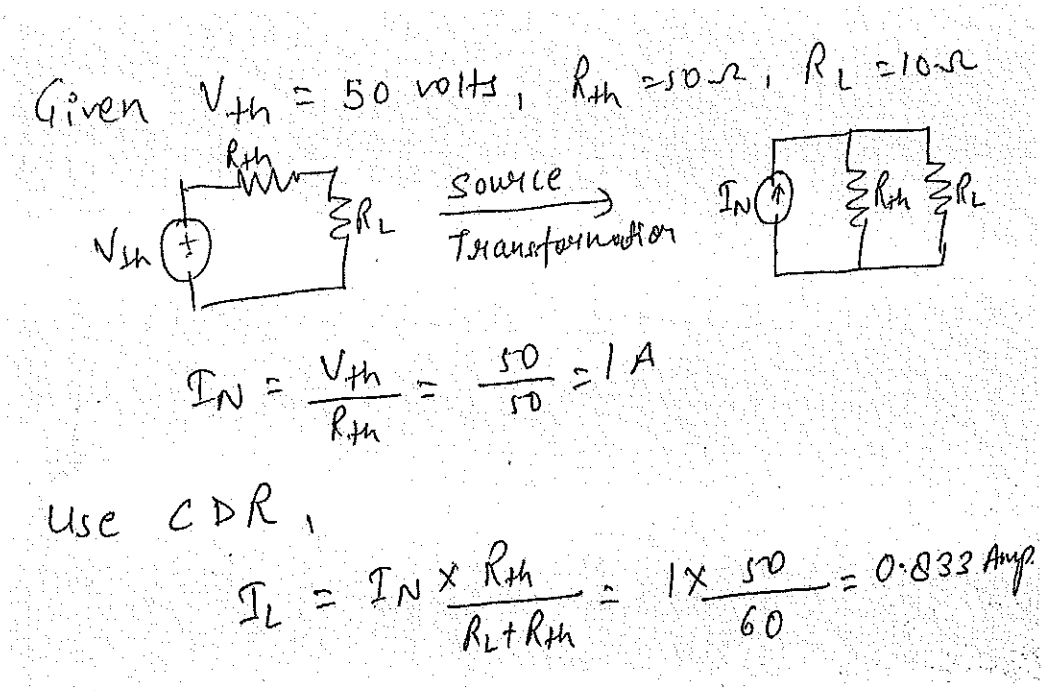
3.

Section - C

1.





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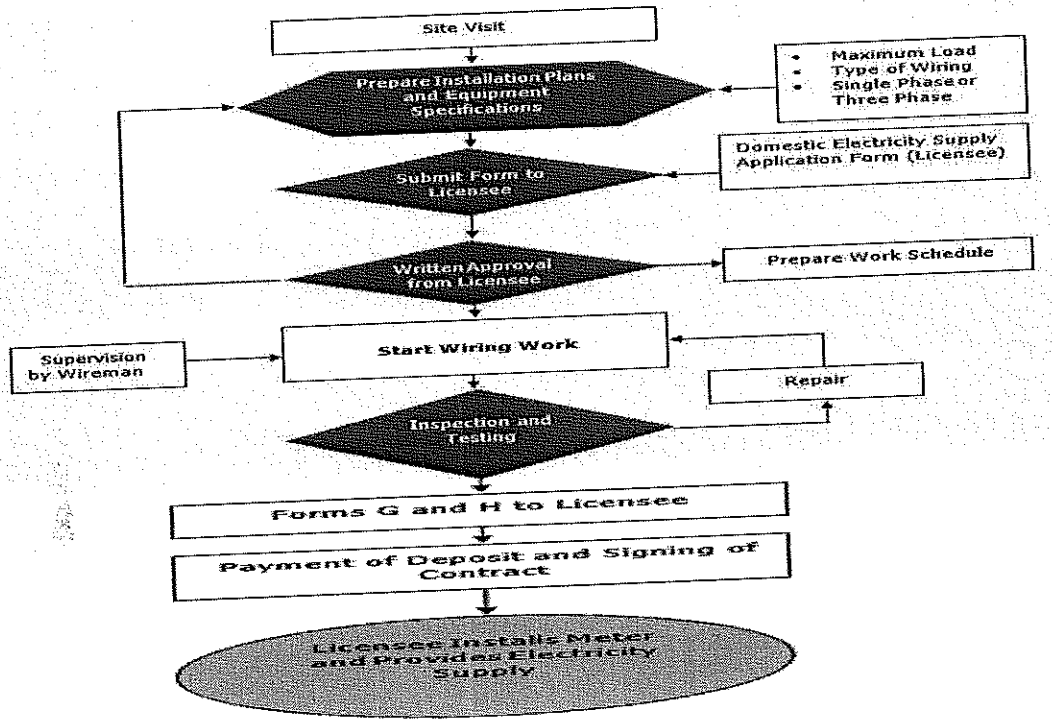
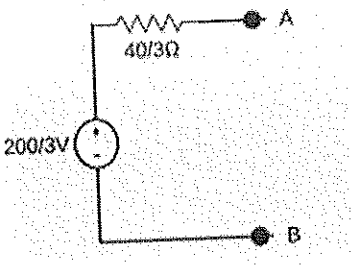
2.



3. Apply Thevenin's theorem to the circuit,



Here, Thevenin's voltage (Vth)= (200/3) and Thevenin's resistance (Rth) = (40/3) Ω

Substitute the fraction of the circuit, which is left-side of terminals A & B of the given circuit with the Thevenin's equivalent circuit. The secondary circuit diagram is shown below.

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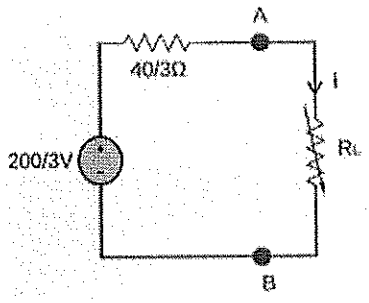

We can find the maximum power that will be delivered to the load resistor, RL by using the following formula.

PL, Max = V^2 TH / 4 RTH

Substitute VTh = (200/3) V and RTh = (40/3) Ω in the above formula.

PL, Max = $(200/3)^2$/ 4(40/3) = 250/3 watts
Therefore, the maximum power that will be delivered to the load resistor RL of the given circuit is 250/3 W.

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Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

2nd In-Sem. Examination

Course Code: ELE1304 **Time: 1 Hour**

Course Name: Electrical Measuring Instruments **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. Induction type instruments are generally used as:
   (a) Ammeter (b) Voltmeter
   (c) Wattmeter (d) All of these

2. Smallest change which a sensor can detect is _____.
   (a) Resolution (b) Accuracy
   (c) Precision (d) Scale

3. Following acts as detector in Optical sensor:
   (a) Light emitting diode (b) Photo diode
   (c) Transistor (d) All of these

4. Basically sound waves are:
   (a) Voltage signals (b) Pressure waves
   (c) Current (d) Radiation

5. The ability to give same output reading when same input value is applied repeatedly is known as:
   (a) Stability (b) Repeatability
   (c) Accuracy (d) Sensitivity

Section – B

03X02 = 06 Marks

1. What is proximity sensor? What is the use of proximity sensor in the mobile phones?
2. Explain the principal of hall effect sensors and piezoelectric sensors.
3. What are the sources of error in induction type energy meter?

Section – C

03X03 = 09 Marks

1. Explain the terms resolution, sensitivity and accuracy.
2. Write difference between sensor and transducer.
3. Discuss the constructional features of single phase induction type energy meter.

A

Answer Key Set – A

Course Code: ELE1304, Course Name: Electrical Measuring Instruments

School of Electrical Skills, Session: 2020-21 (Summer Semester)

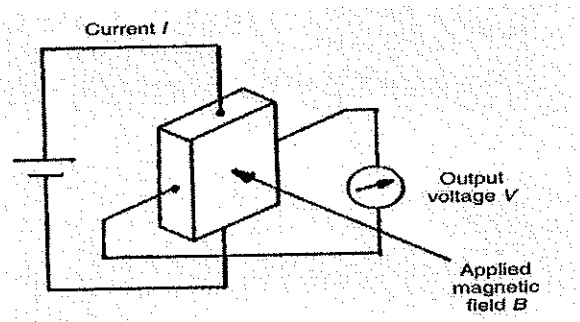
B. Voc. Program, 3rd Semester, 2nd In-Sem. Examination

Section – A

1. (d) All of these
2. (a) Resolution
3. (b) Photo diode
4. (b) Pressure waves
5. (b) Repeatability

Section – B

1. A proximity sensor is a sensor able to detect the presence of nearby objects without any physical contact. A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation (infrared, for instance), and looks for changes in the field or return signal. The proximity sensor detects when a user is holding the phone near their face during a call and turns off the display to prevent keypad presses and battery consumption from the display. The proximity/light sensor is located to the right of the earpiece.
2. Hall-effect sensor is a device that is used to measure the magnitude of a magnetic field. It consists of a conductor carrying a current that is aligned orthogonally with the magnetic field, as shown in Fig. This produces a transverse voltage difference across the device that is directly proportional to the magnetic field strength. For an excitation current I and magnetic field strength B, the output voltage is given by V= KIB, where K is known as the Hall constant.



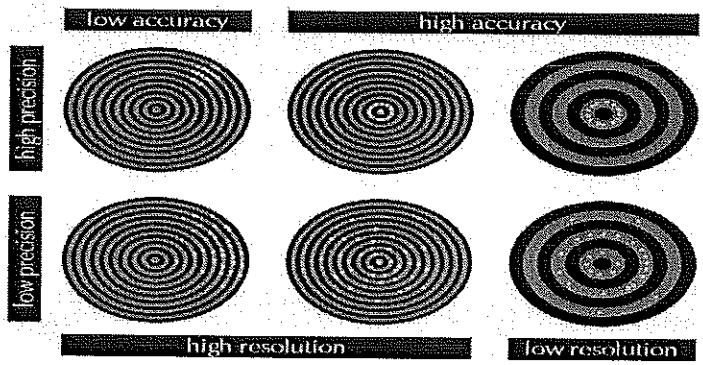
The main principle of a piezoelectric transducer is that a force, when applied on the quartz crystal, produces electric charges on the crystal surface. The charge thus produced can be called as piezoelectricity. Piezo electricity can be defined as the electrical polarization produced by mechanical strain on certain class of crystals. The rate of charge produced will be proportional to the rate of change of force applied as input. As the charge produced is very small, a charge amplifier is needed so as to produce an output voltage big enough to be measured.

3. Sources of error may include-
   a) Incorrect magnitude of the fluxes: These may arise from abnormal voltages and load currents.
   b) Incorrect phase relation of fluxes: These may arise from defective lagging, abnormal frequencies, change in iron losses etc.

c) Unsymmetrical magnetic structure: The disc may go on rotating while no current is being drawn but pressure coils alone are excited.
d) Changes in the resistance of the disc: It may occur due to changes in temperature.
e) Changes in strength of the drag magnet: It may arise due to temperature or ageing.
f) Phase angle errors due to lowering of power factor.
g) Abnormal friction of moving parts.
h) Badly distorted waveform.

Section – C

1. **Resolution:** is the minimal change of the input necessary to produce a detectable change at the output. In other words, the smallest to be distinguished magnitude from the measured value.



Sensitivity:

- The slope of the calibration curve y=f(x) g. An ideal sensor will have a large and constant sensitivity
- It is the ratio of change in output to change in input. If Y be the output quantity in response to input X, then sensitivity S can be expressed as

$$S = \frac{dY}{dX} = \frac{\Delta Y}{\Delta X}$$

Accuracy: is the capacity of a measuring instrument to give RESULTS close to the TRUE VALUE of the measured quantity.

- Accuracy is measured by the absolute and relative errors
- The measurement value (which is sometimes referred to simply as the measurement) is the value given by a measuring instrument and the true value is the actual value of the property being measured.

$$\text{ABSOLUTE ERROR} = \text{RESULT} - \text{TRUE VALUE}$$

$$\text{RELATIVE ERROR} = \frac{\text{ABSOLUTE ERROR}}{\text{TRUE VALUE}}$$

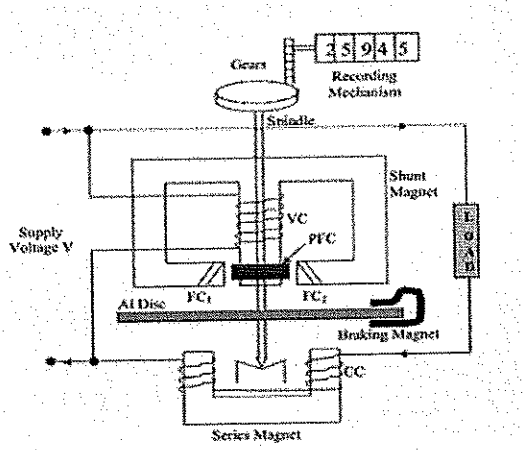
2.

Basis For Comparison	Sensor	Transducer
Definition	Senses the physical changes occurs in the surrounding and converting it into a readable quantity.	The transducer is a device which, when actuates transforms the energy from one form to another.
Components	Sensor itself	Sensor and signal conditioning
Function	Detects the changes and induces the corresponding electrical signals.	Conversion of one form of energy into another.
Examples	Proximity sensor, Magnetic sensor, Accelerometer sensor, Light sensor etc.	Thermistor, Potentiometer, Thermocouple, etc.

3. Induction type energy meter essentially consists of following components-

(a) Driving system- It consists of two electromagnets, called "shunt" magnet and "series" magnet. Series magnet: it consists of a number of U-shaped laminations of silicon steel together to form a core. A coil of thick wire having a few turns is wounded in both legs of U-shaped magnet. the coil is known is current coil which is connected series with load to produce the magnetic field proportional and in phase with line current I.

Shunt magnet: It consists of number of M-shaped laminations of silicon steel assembled together to form a core. A coil of thin wire having large number of turn in wound on central limb of the magnet. this coil is connected across the load. thus it is excited by current proportional to the supply voltage and known is potential coil.



(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.

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 kilowatt-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 there form, the speed of the rotating disc can be controlled.

(d) Registering system- The function of recording or registering mechanism is to record continuously a number on the dial which is proportional to the revolutions made by the moving system. The no of revolution on the disc is a measured the electrical energy passing though the meter.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Electrical Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, 3rd Semester,

2nd In-Sem. Examination

Course Code: ELE 1305 **Time: 1 Hour**

Course Name: Introduction to Power System **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. Skin effect depends on
   (a) size of the conductor
   (b) frequency of the current
   (c) resistivity of the conductor material
   (d) all of the above.

2. When alternating current passes through a conductor
   (a) it remains uniformly distributed throughout the section of conductor
   (b) portion of conductor near the surface carries more current as compared to the core
   (c) portion of conductor near the surface carries less current as compared to the core
   (d) entire current passes through the core of the conductor.

3. As compared with the HVAC lines, dc transmission system is free from:
   (a) Inductance
   (b) Capacitance
   (c) Phase displacement
   (d) all of the mentioned

4. Which among these HVDC projects are commissioned in India?
   (a) Rihand – Delhi HVDC
   (b) Vindhyachal Back to Back only
   (c) Chandrapur only
   (d) All of these

5. Corona loss can be reduced by the use of hollow conductor because:
   (a) The current density is reduced
   (b) The eddy current in the conductor is eliminated
   (c) For a given cross section, the radius of the conductor is increased
   (d) of better ventilation in the conductor

Section – B

03X02 = 06 Marks

1. List the various types of feeders in distribution system.
2. What is the maximum DC transmission voltage in India?
3. Define Ferranti Effect.

Section – C

03X03 = 09 Marks

1. Explain the Ring main type feeder used in distribution system.
2. With the help of the suitable diagram explain the Bipolar HVDC transmission system.
3. Compare overhead and underground transmission cables.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Answer Key Set – A

Course Code: ELE 1305, Course Name: Introduction to Power System

School of Electrical Skills, Session: 2020-21 (Summer Semester)

B. Voc. Program, III Semester, 2nd In-Sem. Examination

Section – A

05X01 = 05 Marks

1. Ans. (d)

2. Ans. (b)

3. **Ans. (d)**

4. Ans. (d)

5. Ans. (c)

Section – B

03X02 = 06 Marks

1. List the various types of feeders in distribution system.

Ans. There are four distribution feeder systems are used

1. Radial
2. Parallel feeders
3. Ring main
4. interconnected systems

2. What is the maximum DC transmission voltage in India?

Ans. DC **transmission voltage** (**highest**) in **India** is 600KV .This has restriction due to conversion

3. Define Ferranti Effect.

Ans. The effect in which the voltage at the receiving end of the transmission line is more than the sending voltage is known as the Ferranti effect. Such type of effect mainly occurs because of light load or open circuit at the receiving end.

Section – C

03X03 = 09 Marks

1. Explain the Ring main type feeder used in distribution system.

In this type of feeder system, we could get reliability as much as in a parallel system

This type of feeders are used in urban and industrial environment in this type the distribution transformers are connected with two feeders cabling has done for many routes starting and finishing is in the same location the power is delivered to the substations if there is any fault In the ring it will be isolated by circuit breaker and the supply will continue by using ring feeder there will be few fluctuations in the customer section there is always an alternative path if any fault occurs

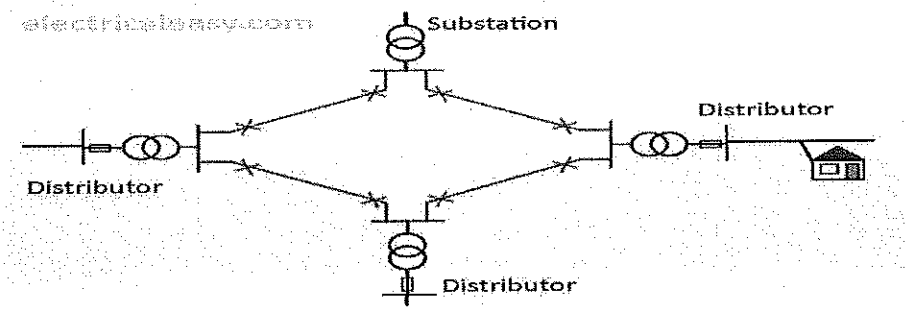
BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Answer Key Set – A

Course Code: ELE 1305, Course Name: Introduction to Power System

School of Electrical Skills, Session: 2020-21 (Summer Semester)

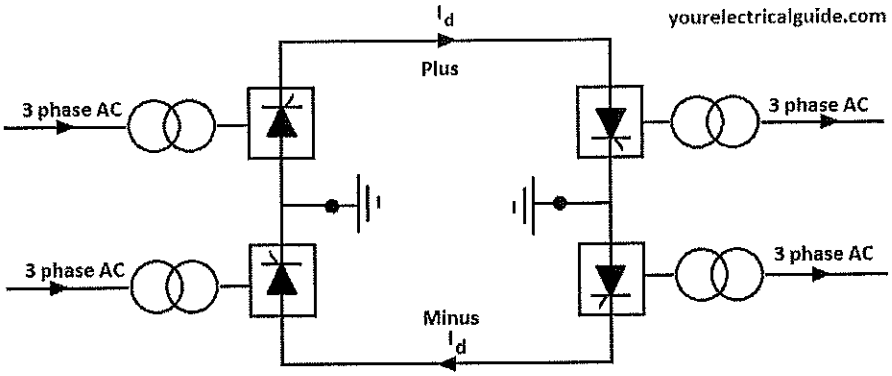
B. Voc. Program, III Semester, 2nd In-Sem. Examination



2. With the help of the suitable diagram explain the Bipolar HVDC transmission system.

Ans: This system has two poles, one positive and one negative pole with respect to earth. The midpoints of converters at each terminal are earthed.

Normally, this system consists of two separate monopolar systems with a common earth. Normally, both are operated with equal currents. The earth carries only small out of balance current.This system is generally used for transmission of power over long distance. The power rating of one pole is about half of system power rating.During fault on one pole, this system can be changed to monopolar mode. In this mode, ground current exceeds and may produce excessive heat on earth electrodes if the electrode resistance is high.



Bipola HVDC transmission system

3. Compare overhead and underground transmission cables.

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Answer Key Set – A

Course Code: ELE 1305, Course Name: Introduction to Power System

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Ans.