Subject Teacher: Anil M. Naikwade

Class: FY

Subject Name: Identification of Components, Tools, SOP & Work Instructions-I	
Course Code :102 Semester: I	Course Code :102 Semester: I
Weekly Teaching Hours: TH: 03 Tut: 00 Scheme of Marking TH: 100 ISE: 50,	Weekly Teaching Hours: TH: 03 Tut: 00 Scheme of Marking TH: 100 ISE: 50,
Credit : 3	Scheme of Marking PR:50

Part –I MCQ questions

Unit 1: Main components & modules/ sub-assemblies of electronic

1. Which of the following is a passive electronic component?

- A) Transistor
- B) Diode
- C) Capacitor
- D) Microcontroller
  Answer: C) Capacitor

2. What is the primary function of a diode?

- A) Amplifying signals
- B) Storing energy
- C) Allowing current to flow in one direction
- D) Regulating voltage
  Answer: C) Allowing current to flow in one direction

3. Which of the following components stores energy in a magnetic field?

- A) Resistor
- B) Capacitor
- C) Inductor
- D) LED
  Answer: C) Inductor

4. Which type of memory is volatile and used for temporary storage in a computer?

- A) ROM
- B) Flash Memory
- C) RAM
- D) EEPROM
  Answer: C) RAM

5. What is the main function of a voltage regulator in an electronic circuit?

- A) Convert AC to DC
- B) Maintain constant output voltage
- C) Store electrical energy
- D) Amplify the signal
  Answer: B) Maintain constant output voltage

6. Which of the following is an example of an active electronic component?

- A) Resistor
- B) Inductor
- C) Microprocessor
- D) Transformer
  Answer: C) Microprocessor

7. Which component is commonly used in wireless communication to convert electrical signals into electromagnetic waves?

- A) Transformer
- B) Antenna
- C) Capacitor
- D) Relay
  Answer: B) Antenna

8. A Printed Circuit Board (PCB) primarily serves what function?

- A) Store energy
- B) Provide a visual display
- C) Provide mechanical support and electrical connections for components
- D) Amplify signals
  Answer: C) Provide mechanical support and electrical connections for components

9. What type of integrated circuit is used for high-speed real-time signal processing?

- A) Microcontroller
- B) Digital Signal Processor (DSP)
- C) Voltage Regulator
- D) Operational Amplifier
  Answer: B) Digital Signal Processor (DSP)

10. **Which device is typically used to open or close a door or window when integrated with a security system?**

- A) Motion Detector
- B) Glass Break Sensor
- C) Door and Window Contact
- D) Heat Sensor

Answer: C) Door and Window Contact

11. **What type of sensor would be most appropriate for detecting unauthorized entry through a window?**

- A) Capacitance Switch
- B) Glass Break Detection
- C) Smoke Detector
- D) Temperature Sensor

Answer: B) Glass Break Detection

12. **Which component is used to detect the presence of smoke in an environment?**

- A) Carbon Monoxide Detector
- B) Smoke Detector
- C) Water Detector
- D) Motion Detector

Answer: B) Smoke Detector

13. **What type of sensor would be used to detect changes in temperature?**

- A) Heat Sensor
- B) Water Detector
- C) Capacitance Switch
- D) Rotary Switch

Answer: A) Heat Sensor

14. **Which device is commonly used to detect the presence of water on surfaces?**

- A) Temperature Sensor
- B) Carbon Monoxide Detector
- C) Water Detector
- D) Motion Detector

Answer: C) Water Detector

15. **What is the primary function of a keypads in a security system?**

- A) To detect motion

- B) To activate or deactivate the alarm system
- C) To monitor environmental conditions
- D) To detect glass breakage

Answer: B) To activate or deactivate the alarm system

16. **Which device is used to measure changes in capacitance to detect physical contact?**

- A) Capacitance Switch
- B) Motion Detector
- C) Door and Window Contact
- D) Glass Break Detection

Answer: A) Capacitance Switch

17. **A system controller or control panel is primarily responsible for:**

- A) Detecting carbon monoxide levels
- B) Communicating with and managing all connected sensors and detectors
- C) Measuring water presence
- D) Breaking glass for security purposes

Answer: B) Communicating with and managing all connected sensors and detectors

18. **Which sensor would be most suitable for detecting a rise in carbon monoxide levels?**

- A) Smoke Detector
- B) Carbon Monoxide Detector
- C) Heat Sensor
- D) Water Detector

Answer: B) Carbon Monoxide Detector

19. **What type of switch allows for the physical turning of devices on or off through rotational movement?**

- A) Capacitance Switch
- B) Rotary Switch
- C) Push Button
- D) Keypad

Answer: B) Rotary Switch

20. **Which device is typically used to open or close a door or window when integrated with a security system?**

- A) Motion Detector
- B) Glass Break Sensor
- C) Door and Window Contact
- D) Heat Sensor

Answer: C) Door and Window Contact

21. What type of sensor would be most appropriate for detecting unauthorized entry through a window?

- o A) Capacitance Switch
- o B) Glass Break Detection
- o C) Smoke Detector
- o D) Temperature Sensor

Answer: B) Glass Break Detection

22. Which component is used to detect the presence of smoke in an environment?

- o A) Carbon Monoxide Detector
- o B) Smoke Detector
- o C) Water Detector
- o D) Motion Detector

Answer: B) Smoke Detector

23. What type of sensor would be used to detect changes in temperature?

- o A) Heat Sensor
- o B) Water Detector
- o C) Capacitance Switch
- o D) Rotary Switch

Answer: A) Heat Sensor

24. Which device is commonly used to detect the presence of water on surfaces?

- o A) Temperature Sensor
- o B) Carbon Monoxide Detector
- o C) Water Detector
- o D) Motion Detector

Answer: C) Water Detector

25. What is the primary function of a keypads in a security system?

- o A) To detect motion
- o B) To activate or deactivate the alarm system
- o C) To monitor environmental conditions
- o D) To detect glass breakage

Answer: B) To activate or deactivate the alarm system

26. Which device is used to measure changes in capacitance to detect physical contact?

o A) Capacitance Switch
o B) Motion Detector
o C) Door and Window Contact
o D) Glass Break Detection

Answer: A) Capacitance Switch

27. A system controller or control panel is primarily responsible for:

o A) Detecting carbon monoxide levels
o B) Communicating with and managing all connected sensors and detectors
o C) Measuring water presence
o D) Breaking glass for security purposes

Answer: B) Communicating with and managing all connected sensors and detectors

28. Which sensor would be most suitable for detecting a rise in carbon monoxide levels?

o A) Smoke Detector
o B) Carbon Monoxide Detector
o C) Heat Sensor
o D) Water Detector

Answer: B) Carbon Monoxide Detector

29. What type of switch allows for the physical turning of devices on or off through rotational movement?
30. A) Capacitance Switch
31. B) Rotary Switch
32. C) Push Button
33. D) Keypad

Answer: B) Rotary Switch

Unit: 2: Here are some multiple-choice questions (MCQs) related to digital electronics:

1. **What is the basic building block of digital electronics?**
   o A) Resistor
   o B) Capacitor
   o C) Transistor
   o D) Diode

   Answer: C) Transistor

2. **In digital circuits, the binary number system uses how many symbols?**
   o A) 2
   o B) 4
   o C) 8
   o D) 16

Answer: A) 2

3. **Which logic gate has an output of 1 only when all its inputs are 1?**
   - o A) OR
   - o B) AND
   - o C) NOR
   - o D) XOR

Answer: B) AND

4. **The device used to store a single bit of data in digital circuits is known as:**
   - o A) Flip-flop
   - o B) Counter
   - o C) Multiplexer
   - o D) Decoder

Answer: A) Flip-flop

5. **Which of the following is a type of sequential circuit?**
   - o A) Multiplexer
   - o B) Flip-flop
   - o C) Encoder
   - o D) XOR Gate

Answer: B) Flip-flop

6. **Which number system is most commonly used in digital electronics?**
   - o A) Decimal
   - o B) Binary
   - o C) Octal
   - o D) Hexadecimal

Answer: B) Binary

7. **The output of an XOR gate is 1 when:**
   - o A) All inputs are 1
   - o B) All inputs are 0
   - o C) The inputs are different
   - o D) The inputs are the same

Answer: C) The inputs are different

8. **Which of the following is a combinational logic circuit?**
   - o A) Flip-flop
   - o B) Counter
   - o C) Decoder
   - o D) Register

Answer: C) Decoder

9. **Which of the following digital devices converts binary data into a readable form?**
   - o A) Multiplexer
   - o B) Encoder
   - o C) Decoder
   - o D) Flip-flop

   Answer: C) Decoder

10. **In a JK flip-flop, what is the state of the output when both J and K inputs are 1?**
    - o A) No change
    - o B) Set to 1
    - o C) Reset to 0
    - o D) Toggles

    Answer: D) Toggles

11. **Which of the following is used to perform the binary addition of two numbers?**
    - o A) Multiplexer
    - o B) Adder
    - o C) Decoder
    - o D) Flip-flop

    Answer: B) Adder

12. **A 4-bit binary counter can count from 0 to:**
    - o A) 8
    - o B) 16
    - o C) 15
    - o D) 31

    Answer: C) 15

13. **In a full adder circuit, how many input bits are added?**
    - o A) 1
    - o B) 2
    - o C) 3
    - o D) 4

    Answer: C) 3

14. **Which gate is called a universal gate because it can be used to create any other logic gate?**
    - o A) AND
    - o B) OR
    - o C) XOR
    - o D) NAND

    Answer: D) NAND

15. **In digital electronics, what does 'MSB' stand for?**

- o A) Most Significant Bit
- o B) Main System Bus
- o C) Medium Scale Binary
- o D) Minimum System Byte

Answer: A) Most Significant Bit

Part –II Short note questions 2 marks each

• Unit I Questions

1. What is a sensor?

- **Answer:** A sensor is a device that detects and responds to some type of input from the physical environment. The input could be light, heat, motion, moisture, pressure, or any other environmental factor. The sensor converts the input into a signal which can be interpreted or processed by an electronic system.

2. What are the different types of sensors?

- **Answer:** Sensors can be classified into various types, such as:
    - o **Temperature Sensors:** Measure heat or temperature.
    - o **Proximity Sensors:** Detect the presence or absence of objects.
    - o **Motion Sensors:** Detect movement in an area.
    - o **Light Sensors:** Measure the intensity of light.
    - o **Pressure Sensors:** Measure pressure in gases or liquids.
    - o **Gas Sensors:** Detect the presence of gases like carbon dioxide or carbon monoxide.
    - o **Humidity Sensors:** Measure the moisture content in the air.
    - o **Sound Sensors:** Detect sound levels and convert them to electrical signals.

3. What is a temperature sensor and how does it work?

- **Answer:** A temperature sensor measures the heat or cold in an environment and converts it into a readable output, usually in degrees. Common temperature sensors include thermocouples and thermistors, which change their resistance with temperature variations.

4. What is the purpose of a motion sensor?

- **Answer:** A motion sensor detects movement within a specified range and is commonly used in security systems, automated lighting, and some smart devices. It uses technologies like infrared, ultrasonic, or microwave signals to sense motion.

5. How does a proximity sensor work?

- **Answer:** A proximity sensor detects the presence of objects without physical contact. It works by emitting electromagnetic fields or light (like infrared) and detecting

changes in the reflected signal when an object comes near. Proximity sensors are widely used in mobile phones, industrial machines, and robotics.

6. What is a gas sensor, and where is it used?

- **Answer:** A gas sensor detects the presence of gases in the environment and measures their concentration. These sensors are commonly used in industrial safety, air quality monitoring, and personal safety devices to detect harmful gases like carbon monoxide or methane.

7. What is the function of a humidity sensor?

- **Answer:** A humidity sensor measures the amount of moisture in the air. It is used in weather monitoring systems, HVAC systems, and various industrial applications where humidity levels must be controlled.

8. What is a light sensor, and how is it used in electronics?

- **Answer:** A light sensor measures the intensity of light in an environment. Common light sensors include Light Dependent Resistors (LDRs) and photodiodes. They are used in automatic lighting systems, mobile phones for adjusting screen brightness, and cameras for determining exposure settings.

9. How does a pressure sensor work?

- **Answer:** A pressure sensor measures the force exerted by a gas or liquid. It works by converting the physical pressure into an electrical signal. These sensors are used in various applications such as automotive systems, weather monitoring, and industrial equipment.

10. What is a touch sensor, and how does it operate?

- **Answer:** A touch sensor detects physical touch or proximity without the need for a mechanical push. It is often capacitive, meaning it measures changes in capacitance when a finger or object comes near. Touch sensors are used in touchscreens, smart devices, and automotive controls.

11. What is the function of a smoke detector sensor?

- **Answer:** A smoke detector uses a sensor to detect the presence of smoke in the air, usually by using photoelectric or ionization techniques. It triggers an alarm when smoke particles are detected, helping to prevent fires.

12. What is a sound sensor and how does it work?

- **Answer:** A sound sensor detects sound waves and converts them into electrical signals. It is typically used in devices like microphones, where sound is converted into voltage for further processing in audio systems.

13. What are the applications of infrared sensors?

- **Answer:** Infrared sensors detect infrared light, which is invisible to the human eye. These sensors are used in a variety of applications, such as remote controls, motion detectors, thermal imaging, and proximity detection in smartphones.

14. What is the role of a water sensor?

- **Answer:** A water sensor detects the presence of water or moisture and is used to monitor for leaks or flooding. These sensors are often found in basements, water tanks, or in industrial applications to prevent water damage.

15. What are capacitive sensors, and where are they used?

- **Answer:** Capacitive sensors detect changes in capacitance when an object comes near. They are used in touch-sensitive devices like smartphones, tablets, and capacitive touch buttons in electronics and appliances.

- # Unit II Questions

1. What is a logic gate?

- **Answer:** A logic gate is a basic building block of digital circuits that performs a logical operation on one or more binary inputs to produce a single binary output.

2. What are the basic logic gates?

- **Answer:** The basic logic gates are AND, OR, NOT, NAND, NOR, XOR, and XNOR.

3. What is a flip-flop in digital electronics?

- **Answer:** A flip-flop is a digital storage element that can store one bit of data. It has two stable states and can be used to store binary information.

4. How does an AND gate operate?

- **Answer:** An AND gate outputs 1 only when all its inputs are 1. For any other combination of inputs, the output is 0.

5. What is a binary number system?

- **Answer:** The binary number system is a base-2 number system that uses two symbols, 0 and 1, to represent values.

6. What is the function of an OR gate?

- **Answer:** An OR gate outputs 1 if at least one of its inputs is 1. It only outputs 0 when all inputs are 0.

7. Explain the concept of a truth table.

- **Answer:** A truth table is a tabular representation that shows all possible input values to a logic gate or circuit and the corresponding output values.

8. What is a multiplexer (MUX)?

- **Answer:** A multiplexer is a digital switch that selects one of several input signals and forwards it to a single output line based on control signals.

9. What is a decoder in digital electronics?

- **Answer:** A decoder is a circuit that converts binary information from n input lines to a maximum of 2^n unique output lines.

Number System Chart

Here's a handy table that shows the values of various numbers in the four number systems.

Decimal	Binary	Octal	Hexa
1	1	1	1
2	10	2	0
3	11	3	2
4	100	4	3
5	101	5	4
6	110	6	5
7	111	7	6
8	1000	10	7
9	1001	11	8
10	1010	12	9
11	1011	13	A
12	1100	14	B

13	1101	15	C
14	1110	16	D
15	1111	17	E
16	10000	20	F
17	10001	21	10
18	10010	22	11
19	10011	23	12
20	10100	24	13

Summary

Here's the summary of what we just learned about the four number systems

S.No.	Number System with Description
1	Binary Number System The base is 2. Digits used : 0, 1
2	Octal Number System The base is 8. Digits used : 0 to 7
3	Hexadecimal Number System The Base is 16. Digits used: 0 to 9, Letters used: A- F

1. Passive Components

- **Resistors**: Limit current flow and divide voltage.
- **Capacitors**: Store and release electrical energy; used in filtering, timing, and coupling applications.
- **Inductors**: Store energy in a magnetic field when electrical current passes through; used in filtering and energy storage.

- **Transformers**: Transfer electrical energy between two or more circuits through electromagnetic induction.

2. Active Components

- **Diodes**: Allow current to flow in one direction, used for rectification, switching, and signal modulation.
- **Transistors**: Amplify or switch electronic signals and power; essential for digital circuits (e.g., MOSFETs in VLSI).
- **Integrated Circuits (ICs)**: Packaged assemblies of transistors, diodes, resistors, and capacitors, performing specific tasks like amplification, digital logic, or signal processing (e.g., microprocessors, memory chips).
- **Operational Amplifiers (Op-Amps)**: Used in signal conditioning, filtering, or amplifying applications.

3. Power Supply Components

- **Batteries**: Provide portable, stored energy for circuits.
- **Power Adapters**: Convert AC to DC power and regulate voltage levels.
- **Voltage Regulators**: Maintain a constant output voltage despite varying input voltage.
- **Switching Power Supplies (SMPS)**: Convert electrical power efficiently, often used in modern electronics for power conversion.

4. Interconnection Components

- **Printed Circuit Boards (PCBs)**: Substrates that provide electrical connections between components, often used to mount ICs and other parts.
- **Connectors**: Provide removable electrical connections between two components, boards, or systems.
- **Cables**: Transfer electrical signals or power between different parts of a system.
- **Busbars**: Carry current within high-power systems, distributing electricity between modules.

5. Communication Components

- **Antennas**: Convert electrical signals into electromagnetic waves for communication (e.g., Wi-Fi, Bluetooth).
- **RF Components**: Used for high-frequency applications like wireless communication, including filters, mixers, and amplifiers.
- **Ethernet Controllers**: Manage wired network communication in computing systems.

6. Sensors and Actuators

- **Sensors**: Detect physical phenomena (e.g., temperature, light, pressure) and convert them into electrical signals.
- **Actuators**: Convert electrical energy into mechanical motion (e.g., motors, relays, solenoids).

7. Display and Input Devices

- **LEDs/LCDs/OLEDs**: Visual output devices for displaying information.
- **Keyboards, Buttons, Touchscreens**: Human-interface devices for input into electronic systems.

8. Memory Modules

- **RAM (Random Access Memory)**: Volatile memory used for temporary storage.
- **ROM (Read-Only Memory)**: Non-volatile memory used to store firmware or software that doesn't change.
- **Flash Memory**: Non-volatile, reprogrammable memory, used in USB drives, SSDs, etc.

9. Control and Processing Units

- **Microcontrollers (MCUs)**: Integrated circuits that contain a CPU, memory, and peripherals, often used in embedded systems.
- **Microprocessors**: CPUs that perform general-purpose processing in computers and other devices.
- **Digital Signal Processors (DSPs)**: Specialized processors designed for real-time signal processing tasks.

10. Sub-Assemblies

- **Power Modules**: Integrated power supply assemblies that include transformers, regulators, and capacitors.
- **Communication Modules**: Pre-built modules for communication protocols like Wi-Fi, Bluetooth, or Zigbee.
- **Sensor Modules**: Integrated sensor systems with built-in electronics for specific tasks like temperature, humidity, or motion detection.
- **Embedded System Boards**: Boards with pre-programmed MCUs or processors, used for specific functions in IoT devices, robotics, etc. (e.g., Arduino, Raspberry Pi).