

**UNIT 1**  
**ELECTRONIC COMPONENTS**  
**PART A**

1. Which of the following is an active component?

A) Resistor B) Capacitor C) Transistor D) Inductor

B) Answer: C

2. The SI unit of resistance is

A) Henry B) Farad C) Ohm D) Volt

Answer: C

3. A resistor is a

A) Active component B) Passive component C) Semiconductor D) Electromechanical device

Answer: B

4. Which resistor is used to vary resistance manually?

A) Fixed resistor B) Variable resistor C) Wire resistor D) Carbon resistor

B) Answer: B

5. The unit of capacitance is

A) Henry B) Ohm C) Farad D) Watt

Answer: C

6. In a series capacitor circuit, the equivalent capacitance is

A) Greater than the largest capacitor B) Equal to the largest capacitor

B) Less than the smallest capacitor D) Sum of all capacitors

Answer: C

7. Capacitors store

A) Heat energy B) Magnetic energy C) Electrical charge

D) Mechanical energy

Answer: C

8. The unit of inductance is

A) Farad B) Henry C) Ohm D) Tesla

Answer: B

9. An inductor stores energy in the form of

A) Electric field B) Magnetic field C) Heat D) Light

Answer: B

10. SPDT stands for

A) Single Pole Double Throw

B) Single Pole Dual Terminal

C) Simple Pole Double Throw

D) Single Point Double Throw

Answer: A

11. A switch is mainly used to

A) Amplify current B) Store charge C) Open or close a circuit D) Rectify AC

B) Answer: C

12. A relay is an

A) Electronic oscillator      B) Electromagnetic switch  
C) Capacitor                      D) Transformer

Answer: B

13. MEMS stands for

A) Micro Electro Mechanical Systems B) Mega Electronic Mechanical System  
C) Micro Electric Machine System D) Mechanical Electrical Monitoring System

Answer: A

14. Which is a passive component?

A) Diode B) Transistor C) Capacitor D) IC

Answer: C

15. Carbon film resistor is mainly used for

A) High power B) General-purpose applications C) AC generation D) Switching

Answer: B

16. Which component opposes sudden changes in current?

A) Capacitor B) Inductor C) Resistor D) Switch

Answer: B

17. Which component opposes sudden changes in voltage?

A) Capacitor B) Inductor C) Relay D) Fuse

Answer: A

18. Resistors connected in series have

A) Same voltage    B) Same current    C) Same resistance  
D) Same power

Answer: B

19. Capacitors connected in parallel have

A) Same voltage B) Same current C) Same resistance D) Zero capacitance

Answer: A

20. Which device uses an electromagnet for operation?

A) Relay B) Capacitor C) Resistor D) Diode

Answer: A

20. MEMS devices are commonly used in

A) Sensors B) Bulbs C) Motors D) Batteries

Answer: A

### **Analytical MCQs**

21. Two resistors of  $5\ \Omega$  and  $10\ \Omega$  are connected in series. The equivalent resistance is

A)  $2\ \Omega$  B)  $5\ \Omega$  C)  $15\ \Omega$  D)  $50\ \Omega$

Answer: C

22. If a switch in a circuit is kept open, the circuit is

A) Short circuited B) Closed C) Open D) Grounded

Answer: C

23. A circuit requires storing electrical charge. Which component should be selected?

A) Resistor B) Capacitor C) Inductor D) Relay

Answer: B

24. Which component is most suitable to limit current in an LED circuit?

A) Capacitor B) Relay C) Resistor D) Switch

Answer: C

25. An automatic water pump controller requires electrical isolation and switching. Which device is preferred?

A) Relay B) Capacitor C) Inductor D) Fuse

Answer: A

26. A smartphone accelerometer is an application of

A) Relay B) MEMS C) Inductor D) Transformer

Answer: B

27. A component stores energy in a magnetic field. Identify it.

A) Capacitor B) Inductor C) Resistor D) Switch

Answer: B

28. A fan regulator requires varying resistance. Which component is used?

A) Fixed resistor B) Variable resistor C) Capacitor D) Relay

Answer: B

29. Which combination contains only passive components?

A) Resistor, Capacitor, Inductor    B) Diode, Transistor, IC  
C) Relay, Transistor, IC                D) Diode, Capacitor, Relay

Answer: A

## **PART B**

### **Descriptive Questions**

1. (a) Classify electronic components into active and passive components with suitable examples. Explain the applications of different types of resistors.
2. Explain the construction, working principle, types, and applications of capacitors. Compare series and parallel connections of capacitors.
3. Explain the construction, working principle, types, and applications of inductors. Compare series and parallel connections of inductors.
4. Explain the construction and working of electromagnetic switches (Relay). Describe the principle of operation, types, and applications of switches including SPDT.

### **Analytical Descriptive Question**

5. An automatic street-light control system requires components for current limiting, energy storage, switching, and sensing.

Identify the appropriate electronic components required.

Justify your selection.

Explain the role of resistors, capacitors, inductors, relays, switches, and MEMS in the system with neat functional diagrams.

## **UNIT II SEMICONDUCTOR DIODES**

### **PART A**

1. The PN junction diode is formed by joining:  
a) Two P-type materials b) Two N-type materials c) P-type and N-type materials d) Metal and semiconductor

Answer C

2. Which diode allows current in only one direction? a) Zener diode b) PN junction diode c) Tunnel diode d) LED

Answer B

3. In forward bias, the depletion region:  
a) Increases b) Decreases c) Remains constant d) Disappears

Answer B

4. A half-wave rectifier uses:  
a) Two diodes b) One diode c) Four diodes d) Three diodes

Answer B

5. A bridge rectifier uses:  
a) One diode b) Two diodes c) Four diodes d) Six diodes

Answer C

6. Which rectifier requires a centre-tapped transformer?

a) Bridge rectifier b) Half-wave rectifier c) Full-wave centre-tapped rectifier d) Voltage doubler

Answer C

6. The main function of a filter is to:

a) Amplify voltage b) Remove ripple from rectifier output c) Increase frequency d) Reduce current

Answer B

7. The capacitor filter is connected:

a) In series b) Across the load c) Before transformer d) Across AC source

Answer B

8. LC filter consists of:

a) L and R b) L and C c) R and C d) Only C

Answer B

10. A clipper circuit is used to:

a) Amplify signal b) Remove a part of waveform c) Rectify AC d) Generate oscillations

Answer B

11. Positive clipper removes:

a) Positive half cycle b) Negative half cycle c) Both d) None

Answer A

12. Negative clipper removes:

a) Positive half cycle b) Negative half cycle c) Both d) None

Answer B

13. A clamper circuit is used to:

a) Shift DC level of waveform b) Amplify signal c) Generate pulses d) Rectify voltage

Answer A

14. Zener diode operates in:

a) Forward bias b) Reverse breakdown region c) Cut-off region d) Saturation region

Answer B

15. The main application of Zener diode is:

a) Amplification b) Voltage regulation c) Oscillation d) Rectification

Answer B

16. LED stands for:

a) Light Emitting Diode b) Low Energy Diode c) Linear Emitting Device d) Light Electronic Device

Answer A

17.LED converts:

- a) Light to electricity b) Electrical energy into light c) Heat to electricity d) Sound to light

Answer A

18.Which filter gives smoother DC output?

- a) Capacitor filter b) LC filter c) No filter d) Resistor

Answer B

19.Ripple is:

- a) Pure DC b) AC component present in DC output c) High-frequency signal d) Noise only

Answer B

20.Which device emits visible light?

- a) Zener diode b) LED c) Varactor diode d) Tunnel diode

Answer B

21.Semiconductor materials commonly used are:

- a) Copper and Aluminium b) Silicon and Germanium c) Iron and Steel d) Brass and Bronze

Answer B

### **Analytical MCQs**

22. A diode connected in forward bias will:

- a) Block current b) Conduct current c) Burn immediately d) Act as capacitor

Answer B

23. If a capacitor filter is removed from a rectifier, the output becomes:

- a) Smooth DC b) Pulsating DC with more ripple c) Pure AC d) Zero

Answer B

24. Which rectifier provides better efficiency than a half-wave rectifier?

- a) Half-wave b) Full-wave rectifier c) Clipper d) Clamper

Answer B

25. A circuit is required to protect equipment from excessive voltage. Which diode should be used? a) LED b) Zener diode c) Rectifier diode d) Photodiode

Answer B

26. If only the positive half-cycle of a waveform must be removed, use:

- a) Positive clipper b) Negative clipper c) Clamper d) Filter

Answer B

27. If the DC level of a signal has to be shifted upward without changing its shape, use:

- a) Rectifier b) Clamper c) Clipper d) Amplifier

Answer B

28. Which rectifier does not require a centre-tapped transformer?

- a) Half-wave b) Bridge rectifier c) Full-wave centre-tapped d) None

Answer B

29. During reverse breakdown, the Zener diode:

- a) Stops conduction b) Maintains nearly constant voltage c) Acts as open circuit d) Produces AC

Answer B

30. An LED indicator in an electronic device glows because:

- a) It works in reverse breakdown b) It emits light during forward bias c) It acts as a resistor d) It acts as a capacitor

Answer B

## **PART B**

### **Descriptive Questions**

1.Explain the construction, operation and V-I characteristics of a PN junction diode.

2.Explain the working of Half-Wave Rectifier and Full-Wave Rectifier (Centre-Tapped and Bridge) with neat circuit diagrams and applications.

3.Explain the working of capacitor filter and LC filter with suitable diagrams. State their advantages.

4.Explain the construction, working, characteristics and applications of a Zener diode and LED.

### **Analytical Descriptive Question**

5.Compare Half-Wave Rectifier, Centre-Tapped Full-Wave Rectifier and Bridge Rectifier based on circuit, number of diodes, transformer requirement, output waveform, efficiency, ripple and applications. Justify which rectifier is most suitable for a DC power supply.

## UNIT III BJT AND UJT

### PART -A

#### Normal MCQs

1.BJT stands for:

- A) Bipolar Junction Transistor      B) Binary Junction Transistor  
C) Bipolar Junction Terminal      D) Base Junction Transistor

Answer A

2.A BJT has:

- A) One terminal    B) Two terminals  
C) Three terminals    D) Four terminals

Answer C

3.The three terminals of a BJT are:

- A) Anode, Cathode, Gate    B) Base, Collector, Emitter  
C) Source, Drain, Gate      D) Input, Output, Ground

Answer B

4.The two types of BJT are:

- A) NPN and PNP    B) NMOS and PMOS  
C) SCR and TRIAC    D) JFET and MOSFET

Answer A

5.In a transistor, the base region is:

- A) Thick      B) Thin      C) Wide      D) Highly resistive

Answer B

6.The emitter is:

- A) Lightly doped      B) Moderately doped  
C) Heavily doped      D) Undoped

Answer C

7.Which transistor configuration has high current gain?

- A) Common Base    B) Common Emitter  
C) Common Collector    D) None

Answer B

8.The Common Base configuration has:

- A) High current gain      B) Current gain less than one  
C) Infinite current gain    D) Zero current gain

Answer B

9.Which configuration is widely used as an amplifier?

- A) Common Base    B) Common Emitter  
C) Common Collector    D) None

Answer C

10. A transistor acts as a switch in:

- A) Cut-off and Saturation regions
- B) Active region only
- C) Breakdown region
- D) Reverse bias only

Answer A

11. Biasing is required to:

- A) Reduce resistance
- B) Establish proper operating point
- C) Increase capacitance
- D) Reduce voltage

Answer B

12. Thermal runaway causes:

- A) Stable operation
- B) Excessive temperature rise
- C) Reduced current
- D) Zero power loss

Answer B

13. Which biasing method is commonly used?

- A) Voltage Divider Bias
- B) Capacitor Bias
- C) Relay Bias
- D) Filter Bias

Answer A

14. UJT stands for:

- A) Unijunction Transistor
- B) Universal Junction Transistor
- C) Unified Junction Transistor
- D) Unit Junction Transistor

Answer A

15. UJT has:

- A) One PN junction
- B) Two PN junctions
- C) Three PN junctions
- D) No PN junction

Answer A

16. UJT is mainly used as:

- A) Oscillator
- B) Amplifier
- C) Rectifier
- D) Regulator

Answer A

17. Which terminal is not present in UJT?

- A) Emitter
- B) Base1
- C) Base2
- D) Collector

Answer D

18. The Common Collector configuration is also called:

- A) Emitter Follower
- B) Voltage Follower
- C) Source Follower
- D) Drain Follower

Answer A

19. Which transistor region is used for amplification?

- A) Active Region
- B) Cut-off Region
- C) Saturation Region
- D) Breakdown Region

Answer A

20. Voltage Divider Bias provides:

- A) Poor stability
- B) Good stability
- C) No stability
- D) Reverse bias

Answer B

21.UJT is widely used in:

- A) Triggering circuits      B) Rectifiers
- C) Filters      D) Voltage regulators

Answer A

### **Analytical MCQs**

22.A transistor is to be used as an electronic switch to control an LED. It should operate in:

- A) Active region      B) Cut-off and Saturation regions
- C) Breakdown region      D) Reverse bias

Answer B

23.A circuit requires high voltage gain for audio amplification. Which configuration is suitable?

- A) Common Base      B) Common Emitter
- C) Common Collector      D) UJT

Answer B

24.If transistor biasing is improper, the result is:

- A) Stable operation      B) Distorted output
- C) Improved efficiency      D) Constant gain

Answer B

25.A transistor becomes very hot due to increasing collector current. This condition is called:

- A) Avalanche      B) Thermal Runaway
- C) Breakdown      D) Reverse Recovery

Answer B

26.A stable amplifier circuit should use:

- A) Fixed Bias      B) Voltage Divider Bias
- C) No Bias      D) Capacitor Bias

Answer B

27.Which device is preferred for generating trigger pulses for SCR circuits?

- A) BJT      B) UJT      C) Zener Diode      D) LED

Answer B

28.In a transistor amplifier, the signal is applied between:

- A) Collector and Emitter      B) Base and Emitter
- C) Base and Collector      D) Collector and Ground

Answer B

29.Which transistor configuration has high input impedance and is suitable as a buffer?

- A) Common Base      B) Common Collector

C) Common Emitter                      D) None

Answer B

30. A transistor amplifier should be biased in:

- A) Cut-off region      B) Active region  
C) Saturation region      D) Breakdown region

Answer B

## **Part B**

### **Descriptive Questions**

1. Explain the construction, operation and characteristics of PNP and NPN transistors with neat diagrams.
2. Describe the Common Base, Common Emitter and Common Collector transistor configurations and compare their characteristics.
3. Explain the need for transistor biasing, thermal runaway and Voltage Divider Bias with a neat circuit diagram.
4. Explain the construction, operation, characteristics and applications of UJT with neat sketches.

### **Analytical Descriptive Question**

5. A transistor is required for two different applications:

- (i) as an amplifier in an audio system, and
- (ii) as an electronic switch in an LED control circuit.

Select the appropriate transistor configuration and operating region for each application. Justify your choice by comparing the characteristics of Common Base, Common Emitter and Common Collector configurations.

## **UNIT IV**

### **FET**

#### **PART A**

#### **Normal MCQs**

1. FET stands for:

- A) Field Effect Transistor      B) Frequency Effect Transistor  
C) Fast Electronic Transistor      D) Field Electronic Terminal

Answer: A

2. FET is a:

- A) Bipolar device      B) Unipolar device  
C) Passive device      D) Electromechanical device

Answer: B

3. The terminals of a JFET are:

- A) Base, Collector, Emitter
- B) Gate, Source, Drain
- C) Anode, Cathode, Gate
- D) Input, Output, Ground

Answer: B

4. Current in a JFET is controlled by:

- A) Base current      B) Gate voltage
- C) Collector current   D) Emitter current

Answer: B

5. JFET gate is always:

- A) Forward biased   B) Reverse biased
- C) Neutral      D) Open circuited

Answer: B

6. MOSFET stands for:

- A) Metal Oxide Semiconductor Field Effect Transistor
- B) Metal Output Semiconductor FET
- C) Magnetic Oxide Semiconductor
- D) None

Answer: A

7. Which MOSFET mode is included in the syllabus?

- A) Enhancement mode      B) Depletion mode
- C) Both      D) None

Answer: B

8. FET has:

- A) High input impedance   B) Low input impedance
- C) Zero impedance   D) Medium impedance

Answer: A

9. JFET is a:

- A) Voltage-controlled device      B) Current-controlled device
- C) Power device      D) Switching device

Answer: A

10. The oxide layer in MOSFET is made of:

- A) Silicon dioxide      B) Copper
- C) Aluminium      D) Germanium

Answer: A

11.The source terminal supplies:

- A) Output current    B) Charge carriers
- C) Gate voltage    D) Bias current

Answer: B

12.The drain terminal:

- A) Receives current from source    B) Supplies gate voltage
- C) Controls current    D) None

Answer: A

13.FET consumes:

- A) High input power    B) Very low input power
- C) Medium input power    D) No power

Answer: B

14.Which transistor is voltage-controlled?

- A) BJT    B) FET    C) SCR    D) UJT

Answer: B

15.Which device has higher input impedance?

- A) BJT    B) FET    C) Diode    D) SCR

Answer: B

16.FET is mainly used as:

- A) Amplifier    B) Rectifier    C) Regulator    D) Filter

Answer: A

17.The gate current of an ideal FET is:

- A) High    B) Zero    C) Moderate    D) Variable

Answer: B

18.JFET channel may be:

- A) N-channel or P-channel    B) Only N-channel
- C) Only P-channel    D) None

Answer: A

19.Which device is compared with FET in this unit?

- A) SCR    B) BJT    C) UJT    D) LED

Answer: B

20.Common Source amplifier is a:

- A) FET application    B) Diode application
- C) SCR application    D) Relay application

Answer: A

21. In FET, the control terminal is:

- A) Drain      B) Gate      C) Source      D) Substrate

Answer: B

### **Analytical MCQs**

22. A circuit requires very high input impedance. Which device is suitable?

- A) BJT      B) FET      C) Diode      D) SCR

Answer: B

23. A battery-operated instrument needs very low input power consumption. Choose:

- A) BJT      B) FET      C) Relay      D) Transformer

Answer: B

24. A designer wants a voltage-controlled amplifier. Which device is preferred?

- A) BJT      B) FET      C) Diode      D) SCR

Answer: B

25. Which transistor is more suitable for buffer circuits because of high input impedance?

- A) BJT      B) FET      C) UJT      D) SCR

Answer: B

26. A JFET gate is accidentally forward biased. The device will:

- A) Operate normally      B) Not operate as intended  
C) Improve performance      D) Increase gain

Answer: B

27. Which device provides better noise performance in amplifier circuits?

- A) BJT      B) FET      C) SCR      D) TRIAC

Answer: B

28. When comparing BJT and FET, which has negligible input current?

- A) BJT      B) FET      C) Both      D) Neither

Answer: B

29. A Common Source amplifier is equivalent to which BJT configuration?

- A) Common Base      B) Common Emitter  
C) Common Collector      D) Non

Answer: B

30. For a sensor interface requiring minimum loading effect, the preferred device is:

- A) BJT      B) FET      C) Diode      D) SCR

Answer: B

## **PART B**

- 1.Explain the construction, operation and characteristics of JFET with a neat diagram.
- 2.Explain the construction, operation and characteristics of Depletion-type MOSFET with neat sketches.
- 3.Compare BJT and FET based on construction, operation, input impedance, control mechanism, noise, gain and applications.
- 4.Explain the Common Source Amplifier using FET with circuit diagram, operation and applications.
5. An electronic circuit is to be designed for a medical sensor amplifier, where high input impedance, low noise and low power consumption are essential.
  - a) Select the suitable device (BJT or FET) and justify your choice.
  - b) Explain why a Common Source FET amplifier is preferred for this application.
  - c) Compare the performance of BJT and FET with respect to input impedance, power consumption, control mechanism and practical applications.

## **UNIT V THYRISTOR AND OPTOELECTRONIC DEVICES PART A**

### **Normal MCQs**

1. SCR stands for
  - A) Silicon Controlled Rectifier
  - B) Semiconductor Current Rectifier
  - C) Silicon Current Regulator
  - D) Semiconductor Control RelayAnswer: A
2. SCR is a
  - A) Two-layer device
  - B) Three-layer device
  - C) Four-layer PNP device
  - D) Five-layer deviceAnswer: C
3. SCR has
  - A) Two terminals
  - B) Three terminals
  - C) Four terminals
  - D) Five terminalsAnswer: B
4. The terminals of SCR are
  - A) Base, Collector, Emitter
  - B) Anode, Cathode, Gate
  - C) Source, Drain, Gate
  - D) Positive, Negative, EarthAnswer: B

5. SCR is mainly used for

- A) Amplification      B) Controlled rectification and power control
- C) Oscillation      D) Voltage regulation

Answer: B

6. DIAC is a

- A) Unidirectional device      B) Bidirectional triggering device
- C) Amplifier      D) Rectifier

Answer: B

7. TRIAC conducts current

- A) In one direction only      B) In both directions
- C) Only during positive cycle      D) Only during negative cycle

Answer: B

8. TRIAC is mainly used in

- A) AC power control      B) DC regulation
- C) Rectification      D) Amplification

Answer: A

9. Photodiode converts

- A) Light into electrical current      B) Electrical energy into light
- C) Heat into electricity      D) Sound into electricity

Answer: A

10. Solar cell converts

- A) Heat into electricity      B) Solar energy into electrical energy
- C) Electrical energy into light      D) AC into DC

Answer: B

11. Optocoupler provides

- A) Mechanical isolation      B) Optical isolation
- C) Thermal isolation      D) Magnetic isolation

Answer: B

12. LCD stands for

- A) Light Crystal Display      B) Liquid Crystal Display
- C) Linear Crystal Display      D) Liquid Current Display

Answer: B

13. Seven-segment display is used to display

- A) Pictures      B) Numbers      C) Audio signals      D) Video

Answer: B

14. LED emits

A) Heat      B) Light      C) Sound      D) Magnetic field

Answer: B

15. Gate terminal is used to trigger

A) BJT      B) SCR      C) Capacitor      D) Resistor

Answer: B

16. SCR behaves like a

A) Controlled switch      B) Capacitor  
C) Transformer      D) Oscillator

Answer: A

17. TRIAC is equivalent to

A) Two SCRs connected in inverse parallel      B) Two diodes  
C) Two BJTs      D) Two MOSFETs

Answer: A

18. Photodiode normally operates in

A) Forward bias      B) Reverse bias  
C) Zero bias      D) Saturation

Answer: B

19. Solar cells are connected together to form

A) Relay      B) Solar panel      C) LCD      D) TRIAC

Answer: B

20. LCD consumes

A) High power      B) Low power      C) Medium power      D) No power

Answer: B

21. Seven-segment display consists of

A) 5 segments      B) 6 segments      C) 7 segments      D) 8 segments

Answer: C

### **Analytical MCQs**

22. Which device is suitable for controlling the speed of an AC fan?

A) SCR      B) TRIAC      C) Zener diode      D) Photodiode

Answer: B

23. A calculator display should use

A) LCD      B) SCR      C) TRIAC      D) Photodiode

Answer: A

24. A light sensor for an automatic street light should use

A) LED      B) Photodiode      C) TRIAC      D) SCR

Answer: B

25. To isolate a low-voltage microcontroller from a high-voltage circuit, use

- A) SCR      B) Optocoupler      C) TRIAC      D) Solar cell

Answer: B

26. Which device is suitable for a solar-powered calculator?

- A) Solar cell   B) SCR      C) TRIAC      D) DIAC

Answer: A

27. Which device is used to trigger a TRIAC in AC control circuits?

- A) DIAC      B) LED      C) Photodiode      D) LCD

Answer: A

28. A digital clock displaying only numbers should use

- A) Seven-segment display   B) LCD TV

- C) Solar panel      D) TRIAC

Answer: A

29. An SCR remains ON after the gate pulse is removed because

- A) It latches ON until the anode current falls below the holding current

- B) The gate continuously supplies current

- C) It becomes reverse biased

- D) The cathode stores charge

Answer: A

30. A lamp dimmer circuit requires smooth bidirectional control of AC power. The suitable device is

- A) SCR      B) TRIAC      C) Photodiode      D) Zener diode

Answer: B

## **PART B**

### **Descriptive Questions**

1. Explain the construction, principle of operation, transistor analogy and applications of SCR with neat diagrams.
2. Explain the construction, operation, characteristics and applications of DIAC and TRIAC with neat sketches.
3. Explain the principle of working, characteristics and applications of Photodiode and Solar Cell.
4. Explain the construction, working principle and applications of Optocoupler, LCD and Seven-Segment Display with neat diagrams.

### **Analytical Descriptive Question**

5. A smart home system requires:

AC fan speed control

Electrical isolation between control and power circuits

A numeric display for temperature

Solar-powered backup during power failure

Answer the following:

Select the suitable device for AC power control and justify your choice.

Select the device that provides electrical isolation and explain its working.

Choose the suitable display device for temperature indication.

Explain how a solar cell can provide backup power.