

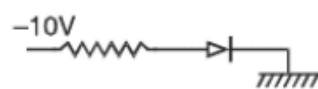
UNIT-9 ELECTRONIC DEVICES

QUESTIONS

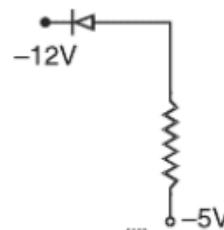
VERY SHORT ANSWER QUESTIONS (1 Mark)

1. Write the relation between number density of holes and number density of free electrons in an intrinsic semiconductor.
2. Write the value of resistance offered by an ideal diode when (i) forward biased (ii) reverse biased.
3. Write any one use of (i) photodiode (ii) LED.
4. Write the truth table for a two input AND gate.
5. At what temperature does a semiconductor behave as an insulator?
6. Write two uses of logic gates in daily life.
7. If L and C are the inductance and capacitance of the tank circuit of an oscillator, what will be the frequency of oscillation?
8. Semiconductors do not support strong current i.e., a semiconductor is damaged when strong current passes through it. Why?
9. Draw I - V characteristic of a solar cell.
10. What is the phase difference between input and output waveform in the common emitter transistor amplifier?
11. What type of feedback is required in an oscillator? Why?
12. What is the direction of diffusion current in a junction diode?

13. Draw a circuit diagram showing the biasing of a photodiode.
14. Name the semiconductor device that can be used to regulate an unregulated dc power supply.
15. Name the p.n. junction diode which emits spontaneous radiation when forward biased.
16. Name any one semiconductor used to make LED.
17. What is meant by 'regulation' as applied to a power supply?
18. A semiconductor device is connected in a series circuit with a battery and a resistance. A current is found to pass through the circuit. When polarity of the battery is reversed, the current drops to almost zero. Name the semiconductor device.
19. In the following diagram write which of the diode is forward biased and which is reverse biased?



(i)



(ii)

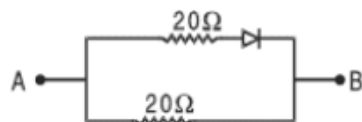
20. How does the energy gap in a semiconductor vary, when doped, with a pentavalent impurity?
21. What is the order of energy gap in a conductor, semiconductor and insulator.
22. The ratio of the number of free electrons to holes n_e/n_h for two different materials A and B are 1 and < 1 respectively. Name the type of semiconductor to which A and B belong.

SHORT ANSWER QUESTIONS (2 Marks)

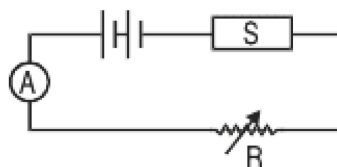
1. If the frequency of the input signal is f . What will be the frequency of the pulsating output signal in case of:
 - (i) half wave rectifier?
 - (ii) full wave rectifier?

2. Find the equivalent resistance of the network shown in figure between point A and B when the p-n junction diode is ideal and

(i) A is at higher potential (ii) B is at higher potential

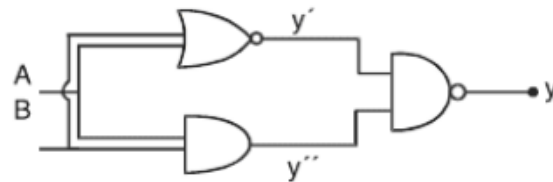


3. Potential barrier of p.n. junction cannot be measured by connecting a sensitive voltmeter across its terminals. Why?
4. Diode is a non linear device. Explain it with the help of a graph.
5. A *n*-type semiconductor has a large number of free electrons but still it is electrically neutral. Explain.
6. The diagram shows a piece of pure semiconductor *S* in series with a variable resistor *R* and a source of constant voltage *V*. Would you increase or decrease the value of *R* to keep the reading of ammeter *A* constant, when semiconductor *S* is heated? Give reason.

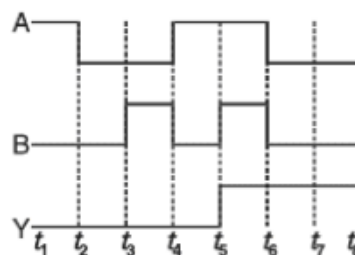


7. What is the field ionisation in zener diode? Write its order of magnitude.
8. Power gain of a transistor is high. Does it mean the power is generated by the transistor itself? Explain.
9. What is the role of feedback in an oscillator circuit?
10. Why is a photo diode used in reverse bias?
11. Give four advantages of LED over incandescent lamp.
12. Explain the amplifying action of a transistor.
13. Draw a labelled circuit diagram of *n-p-n* transistor amplifier in CE-configuration.
14. The output of a 2 input AND gates fed as input to a NOT gate. Write the truth table for the final output of the combination. Name the new logic gate formed

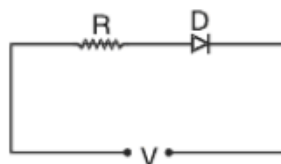
15. Write the truth table for the combination of gates shown.



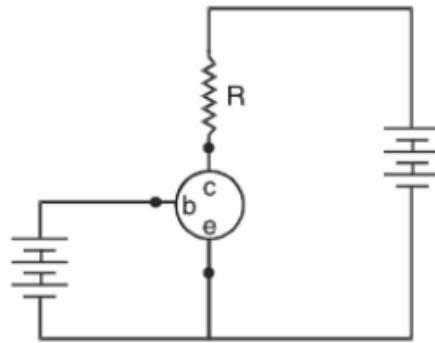
16. The following figure shows the input waveform 'A' and 'B' and output wave form Y of a gate. Write its truth table and identify the gate.



17. In the given circuit, D is an ideal diode. What is the voltage across R. When the applied voltage V makes the diode.
- Forward bias?
 - Reverse bias?



18. A transistor is a current operated device. Explain.
19. Given here is a circuit diagram of a transistor as a NOT gate. Here the transistor has been represented by a circle with the emitter (e), base (b) and collector (c) terminals marked clearly. Carefully look at the polarity of the voltages applied and answer the following question.
- What is the type of transistor *pnp* or *npn*?
 - Is the transistor in saturation or cutoff?



20. Why is photodiode used in reverse bias? Give one use of a photodiode.
21. Which special type of diode can act as a voltage regulator? Give the symbol of this diode and draw the general shape of its V-I characteristics.
22. In the working of a transistor as an amplifier emitter base junction is forward biased, while the collector base junction is reverse biased, why.
23. In a transistor, base is slightly doped and is a thin layer, why?
24. Show the donor energy level in energy band diagram of *n*-type semiconductor.
25. Show the acceptor energy level in energy band diagram of *p*-type semiconductor.
26. What is the value of knee voltage in
 - (a) Ge junction diode.
 - (b) Si junction diode.
27. Which of the input and output circuits of a transistor has a higher resistance and why?
28. Draw the transfer characteristic for a transistor, indicating cut off region, active region and saturation region.

SHORT ANSWER QUESTIONS (3 Marks)

1. What is depletion region in *p-n* junction diode. Explain its formation with the help of a suitable diagram.
2. Explain the working of *npn* transistor as an amplifier and find an expression for its voltage gain.

3. What is rectification? With the help of a labelled circuit diagram explain half wave rectification using a junction diode.
4. Explain the working of a transistor as a switch with the help of a suitable circuit diagram.
5. Using block diagram show the feedback in an oscillator.
6. With the help of a circuit diagram explain the V-I graph of a $p-n$ junction in forward and reverse biasing.
7. With the help of a circuit diagram, explain the input and output characteristic of a transistor in common emitter configuration.
8. What is $p-n$ junction? How is $p-n$ junction made? How is potential barrier developed in a $p-n$ junction?
9. What is a transistor? Draw symbols of nnp and pnp transistor. Explain action of transistor.
10. Give three differences between forward bias and reverse bias.
11. What is integrated circuit? Give two advantages of integrated circuit over conventional electronic circuit.
12. Write three differences between n -type semiconductor and p -type semiconductor.
13. Construct AND gate using NAND gate and give its truth table.
14. Construct NOT gate using NAND gate and give its truth table.

LONG ANSWER QUESTIONS (5 Marks)

1. How does a transistor work as an oscillator? Explain its working with suitable circuit diagram. Write the expression for frequency of output.
2. What is the function of base region of a transistor? Why is this region made thin and lightly doped? Draw a circuit diagram to study the input and output characteristics of nnp transistor in a common emitter configuration. Show these characteristics graphically.
3. What is $p-n$ junction diode? Define the term dynamic resistance for the junction. With the help of labelled diagram, explain the working of $p-n$ junction as a full wave rectifier.
4. What are logic gates? Why are they so called? Draw the logic symbol and write truth table for AND, OR and NOT gate.

5. Describe (i) NAND gate (ii) NOR gate and
6. Two signals A , B as given below are applied as input to (i) AND (ii) NOR and (iii) NAND gates. Draw the output waveform in each case.

