

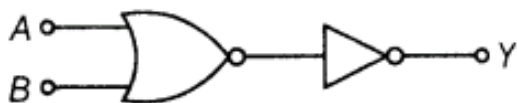
Board – CBSE

Class –12

Topic – Semiconductor, Diode and its Applications

## 1 Marks Questions

- In a transistor, doping level in base is increased slightly. How will it affect
  - Collector current and
  - Base current?
- Draw the logic circuit of AND gate and write its truth table.
- Define current amplification factor in common-emitter mode of transistor.
- Give the logic symbol of NOR gate.
- Write the truth table for the following circuit. Name the equivalent gate that this circuit represents.



## 2 Marks Questions

- Draw a circuit diagram of n-p-n transistor amplifier in CE configuration. Under what condition does the transistor act as an amplifier?
- The outputs of two NOT gates are fed to a NOR gate. Draw the logic circuit of the combination of gates. Give its truth table. Identify the gate represented by this combination.
- Describe briefly with the help of a circuit diagram, how the flow of current carriers in a p-n-p transistor is regulated with emitter-base junction in forward biased and base-collector junction in reverse biased.
- Distinguish between analog signal and digital signal.
- The output of a 2-input AND gate is fed to a NOT gate. Give the name of the combination and its logic symbol. Write down its truth table.

## 3 Marks Questions

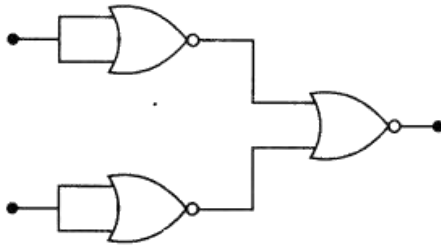
- Draw transfer characteristics of a common-emitter n-p-n. Point out the region in which the transistor operates as an amplifier.

Define the following terms used in transistor amplifiers:

- Input resistance
- Output resistance
- Current amplification factor.

12. Draw the labelled circuit diagram of a common-emitter transistor amplifier. Explain clearly, how the input and output signals are in opposite phase?
13. The inputs A and B are inverted by using two NOT gates and their outputs are fed to the NOR gate as shown below:

Analyze the action of the gates (1) and (2) and identify the logic gate of the complete circuit so obtained. Give its symbol and the truth table.



## 5 Marks Questions

14. (i) Differentiate between three segments of a transistor on the basis of their size and level of doping.
- (ii) How is a transistor biased to be in active state?
- (iii) With the help of necessary circuit diagram, describe briefly, how n-p-n transistor in CE configuration amplifies a small sinusoidal input voltage. Write the expression for the AC current gain.
15. Draw a circuit diagram of an n-p-n transistor with its emitter base junction forward biased and base- collector junction reverse biased. Describe briefly it's working.
- Explain, how a transistor in active state exhibits a low resistance at its emitter-base junction and high resistance at its base-collector junction?