1. Name the device which replaced vacuum tubes.
2. Give the history details, whatever you know, of inventions after the vacuum tubes to I.C.
3. Give the physical structure diagram of a transistor labeling all its sections and junctions.
4. Make a table to show three different modes of transistor operations with their corresponding biasing of the two junctions.
5. Draw a physical structure diagram to show current flow in an *npn* transistor biased to operate in the active mode.
6. What is approximate thickness of base in a bipolar junction transistor? Why is so thin?
7. Specify the terminals of a transistor in which the main path for current exists.
8. Specify the type of transistor and its mode by observing carefully the diagram below.

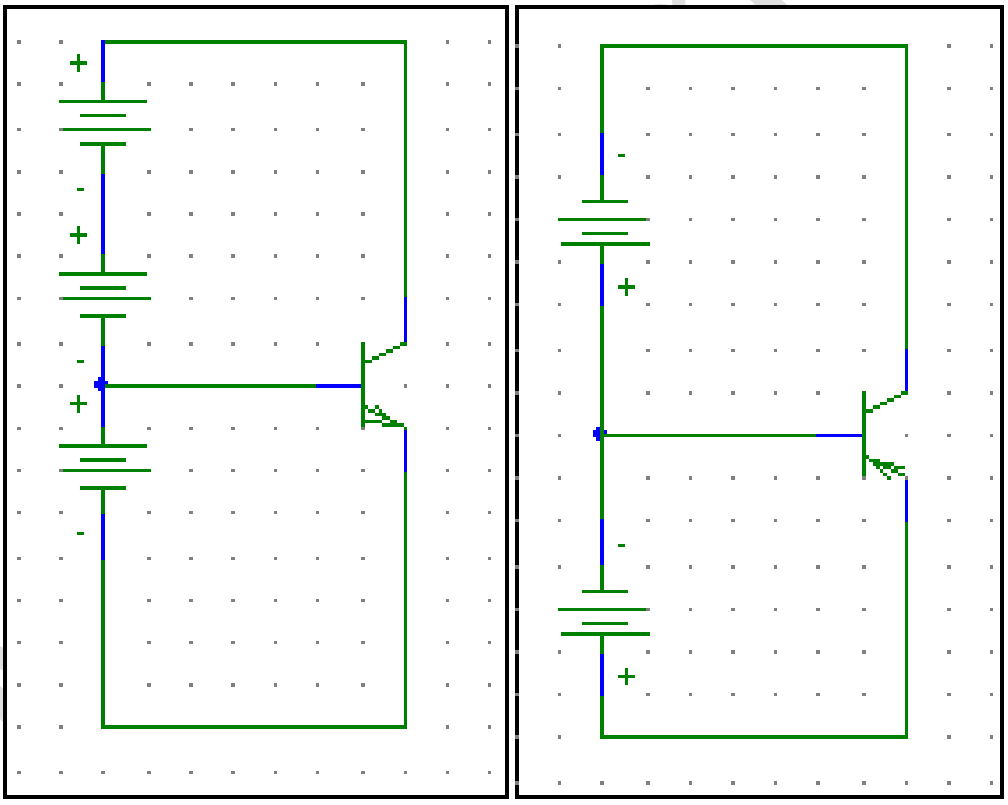


diagram (a) diagram (b)

9. For transistor action, why does higher voltage is used to bias collector junction than the emitter junction?

10. There is an arrowhead in the circuit symbol of a transistor. What does it represent?

11. Draw a circuit symbol of a transistor containing 2 p- and 1 n-type layers of material.

12. What is the result of applying Kirchhoff's junction rule when a transistor is in active mode?

13. Draw the Conceptual circuit for measuring the *output* characteristics of a common emitter npn-Transistor. And also sketch its *output* characteristics.

14. It is said that "A transistor plays the same kind of role in an amplifier circuit that a valve of a facet does when it controls the flow of water through a pipe". Explain giving relevant comparisons between the functioning of the valve and the action of a transistor amplifier.

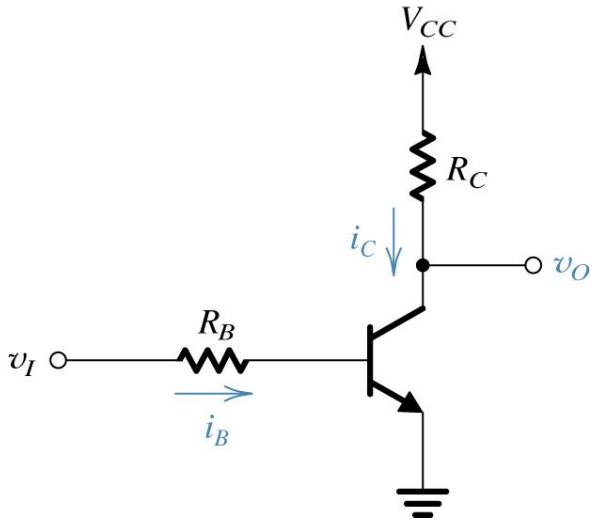
15. Explain the working of a transistor as an Amplifier showing input and out put waveforms.

16. Draw a conceptual circuit diagram of a npn transistor used to amplify small a.c. signal voltages.

17. Explain, giving at least two important reasons for the production of large change in the collector current for a small voltage change across the forward biased emitter junction.

18. When a transistor acting like an amplifier, collector current i_c is given by $I_c = g_m v_{be}$. What is g_m? What does it signify?

19. To get a low output voltage V_o (less than V_{cc}), the input voltage V_I, given in the following diagram should be low or high? Explain



20. What happens to the transconductane as collector current increase? Explain

21. When the BJT emitter area is increased by a factor *n*, I_C increases by the factor *n*. What will happen to transconductance in this case? Explain.

22. Why does collector current increase, For a fixed value of V_{BE}, as V_{CE} increases?

23. Why the name "transistor"?

24. Which semiconductor device can function as an insulator or a conductor? What is the importance of this ability?

25. Explaining transistor switching action using a transistor circuit diagram.

26. What are the approximate resistances between E and C for different modes of transistor acting as a switch? Also draw a circuit to show npn Transistor like a switch.

27. Label the Amplifier mode and switching mode in the output characteristic of Transistor graph and explain graph special characteristics.

28. Explain the working of a npn transistor like a switch, just using two diodes.

29. Draw a circuit diagram of a transistor which stays biased "**always on"** with the frequency of output is the same as its input, but having the polarity of the signal is inverted.

30. What are the representations used in transistor amplifier circuits for d.c. , a.c. quantities while singly used and while dealing with a.c. signals superimposed on d.c. bias levels?

31. Why biasing voltages in common emitter configuration are represented by V_{BE} and V_{CE}?

32. Explain working of a npn transistor with a circuit diagram giving the cause for phase Relation between the output and the input signals.

33. Explain working of a pnp transistor with a circuit diagram giving the cause for phase Relation between the output and the input signals.

34. Show the graphical variation of following quantities used in Transistor amplifier circuit?

    (a) i_b

    (b) I_B

    (c) i_B

35. The common emitter current-transfer ratio β is also given by $\beta = \frac{\alpha}{1-\alpha}$. What does this equation signify? What is α ? Deduce the given relation.

36. Draw an input characteristic (by plotting base current I_B against base-emitter voltage V_{BE}).

    Using these characteristic curves explain how the transistor operates as a linear amplifier for a.c. signals.

37. Draw an output characteristic (by plotting collector current I_c against collector-emitter voltage V_{CE}). what are its silent features.

38. What are the three different amplifier gains? Write the corresponding gain equations.

39. Determine the Voltage, Current and Power Gain of an amplifier that has an input signal of 1mA at 10mV and a corresponding output signal of 10mA at 1V.

40. Why, In **Common Emitter Amplifier** circuits, capacitors C1 and C2 are used as **Coupling Capacitors?**

41. Explain the working of a transistor (either pnp or npn) in CEC as an oscillator.