

Chapter Ten : Semiconductor and Electronics

- On which type of substance is the Band Theory applicable?
 - liquid
 - gas
 - solid
 - plasma
- At a very low temperature, the resistance of some substance decreases to zero. These substances are called-
 - semiconductor
 - plasma
 - thermistor
 - superconductor
- When there is no forbidden region between the conduction band and valence band, the substance is-
 - semiconductor
 - superconductor
 - conductor
 - insulator
- Which of the following figure denotes semiconductor energy band?
 -
 -
 -
 -

- Which of the following impurities when added to pure germanium, creates p-type semiconductor?
 - arsenic
 - gallium
 - antimony
 - phosphorous
- When the diode is reverse biased, the Depletion layer-
 - decreases
 - remains the same
 - increases
 - vanishes
- In the depletion layer of a p-n junction with no bias applied, there is-
 - only electron
 - only hole
 - both electron and hole
 - only ion
- Which of the following is the correct charge carrier for n-type semiconductor?

Majority carrier	Minority carrier
hole	electron
electron	hole
hole	hole
electron	electron

- If the energy difference between valence band and conduction band is 0.7 eV then it is which of the following?
 - metal
 - insulator
 - semiconductor
 - alloy
- Which of the following elements when added to Germanium, creates n-type semiconductor?
 - aluminium
 - gallium
 - arsenic
 - indium
- Which of the following is present as impurity in a p-type semiconductor-
 - bivalent element
 - trivalent element
 - tetravalent element
 - pentavalent element
- Which of the following impurities when added to silicon, creates p-type semiconductor?
 - aluminum
 - phosphorous
 - arsenic
 - bismuth
- In which of the following, holes act as the majority charge carrier?
 - n-Type Semiconductor
 - p-Type Semiconductor
 - conductor
 - Nonconductor
- In which of the following, holes are the majority charge carrier?
 - n-Type Semiconductor
 - p-Type Semiconductor
 - conductor
 - nonconductor
- Which is the majority charge carrier in semiconductors?

n Type	p Type
hole	Free electron
hole	hole
Free electron	hole
Free electron	Free electron

- A 1.5 V bulb is connected with a diode with 15 V AC in two and 15 V DC in two through different connections according to the figure. In which circuit, the bulb will not glow at all?
 -
 -
 -
 -

- The following i - V graph is obtained when a p-n junction made of germanium is reverse biased.

- The voltage denoted by the line OP is called-
- biasing voltage
 - voltage barrier voltage
 - Hall voltage
 - Breakdown voltage

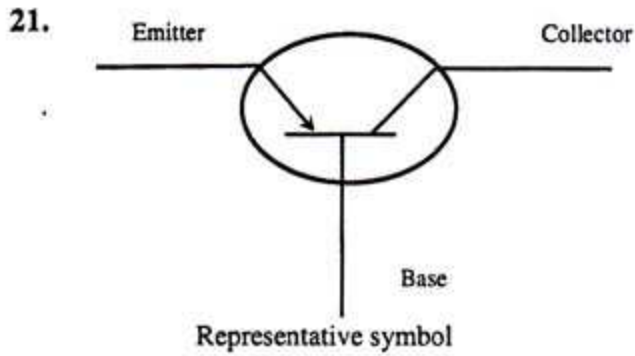
- The knee voltage of Si and Ge in the above figure are 0.7 V and 0.3 V respectively. What is the amount of current flow through the resistor?

 - 0.47 mA
 - 0.5 mA
 - 1.96 mA
 - 2.14 mA

- Which of the following device converts AC to DC?
 - Voltmeter
 - Diode
 - Ammeter
 - Transistor

20. How many junctions does a transistor have?

- (a) 1 (b) 2
(c) 3 (d) 4



What does the above figure denote?

- (a) p-n junction (b) p-n-p transistor
(c) n-p-n transistor (d) logic gate

22. For a bipolar npn junction transistor to work, the polarity of different electrons with respect to the emitter- [R. B.-17]

- (a) collector(+ve), base(-ve)
(b) collector(-ve), base(+ve)
(c) collector(-ve), base(-ve)
(d) collector(+ve), base(+ve)

23. In a common emitter circuit, the phase difference between the incoming and outgoing signal- [R. B.-15]

- (a) 0° (b) 45°
(c) 90° (d) 180°

24. The current amplification factor α is (common base) — [S. B.-15]

- (a) $\frac{i_C}{i_E}$ (b) $\frac{i_C}{i_B}$
(c) $\frac{i_B}{i_E}$ (d) $\frac{i_B}{i_C}$

25. When a transistor has $i_C = 5 \text{ mA}$ and $i_B = 100 \mu\text{A}$, its current amplification factor (β) will be [common base] —

- (a) 9.8 (b) 0.98
(c) 2.0 (d) 2.5

26. What is the relation between i_E , i_B and i_C ?

- (a) $i_E - i_B = i_C$ (b) $i_C = i_B + i_E$
(c) $i_B = i_E + i_C$ (d) none

27. The emitter current and base current of a transistor are 1 mA & 0.05 mA respectively. How much is the collector current?

- (a) 0.05 mA (b) 0.95 mA
(c) 1 mA (d) 1.05 mA

28. Binary value of $(7B.F6)_{16}$ — [B. B.-16]

- (a) $(1111011.1111011)_2$
(b) $(11011.1111011)_2$
(c) $(11101011.11100110)_2$
(d) $(11010111.11100011)_2$

29. What is the decimal number of the binary number $(10111)_2$? [B. B., R. B.-15]

- (a) $(22)_{10}$ (b) $(23)_{10}$
(c) $(18)_{10}$ (d) $(30)_{10}$

30. The binary of hexadecimal 'C' — [D. B.-15]

- (a) 1001 (b) 1100
(c) 1010 (d) 1110

31. Which of the following is the equivalent hexadecimal number of $(734)_8$? [R. B.-15]

- (a) C1D (b) D1C
(c) 1CD (d) IDC

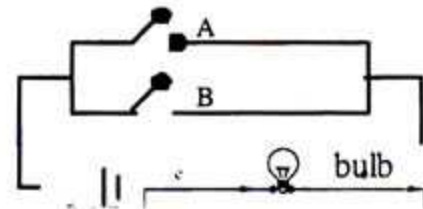
32. For binary subtraction $11001-1010 = ?$ [C. B.-17]

- (a) 9991 (b) 1111
(c) 1100 (d) 111

33. How many digits are there in the decimal number system? [All Board-18]

- (a) 2 (b) 8
(c) 10 (d) 16

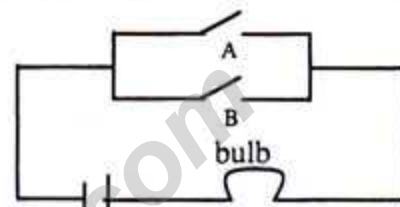
34.



Which gate is denoted by the above figure? [D. B.-17]

- (a) OR gate (b) NOR gate
(c) NOT gate (d) AND gate

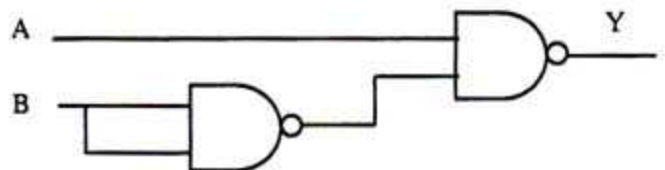
35.



Which gate is denoted by the above figure? [D. B.-15]

- (a) NOT gate (b) NOR gate
(c) AND gate (d) OR gate

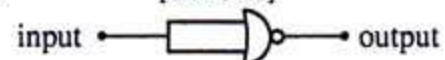
36.



Which is the output of the above logic gate? [Ctg. B.-17]

- (a) $\bar{A}B$ (b) $A\bar{B}$
(c) $A + \bar{B}$ (d) $\bar{A} + B$

37. Which of the following gate is equivalent to the gate below? [D. B.-16]



- (a) NAND gate (b) NOT gate
(c) AND gate (d) NOR gate

38. Which of the following is not a fundamental gate? [R. B.-15]

- (a) OR (b) AND
(c) NAND (d) NOT

39. AND gate is used for — [C. B.-15]

- (a) for logical addition
(b) for logical multiplication
(c) for logical inversion
(d) for logical division

40. Which of the following is made with the combination of AND and NOT gate? [Ctg. B.-15]

- (a) NAND (b) X-OR
(c) NOR (d) OR

41. Which of the two gates are called universal gates?

- (a) AND & OR (b) OR & NOT
(c) NOR & NAND (d) NAND & XOR

42. Which is represented by the symbol in the figure below? [Dj. B.-16]



- (a) AND (b) OR
(c) NOR (d) NOT

43.

Input		Output
X	Y	P
0	0	1
0	1	0
1	0	0
1	1	0

Of which gate does the truth table belong to? [All Board-

- (a) OR (b) XOR
(c) NOR (d) NAND

44. Transistor is usually used as — [J.B.-17]

- i. a rectifier ii. an amplifier
iii. a switch

Which of the following is correct?

- (a) i & ii (b) ii & iii
(c) i & iii (d) i, ii & iii

45. In the case of semiconductor—

- i. Nonconductor at absolute zero temperature
ii. Conducting property through is inverse to resistance
iii. Conductance can be increased by mixing impurities

Which of the following is correct?

- (a) i & ii (b) i & iii
(c) ii (d) i, ii & iii

46. p-n junction diode can be used as — [Dj. B.-15]

- i. an amplifier
ii. a rectifier
iii. a voltage stabilizer

Which of the following is correct?

- (a) i & ii (b) i & iii
(c) ii & iii (d) i, ii & iii

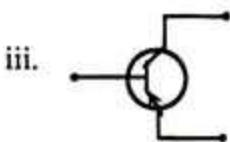
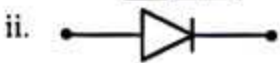
47. In the case of semiconductor — [C.B.-15]

- i. specific resistance is almost $10^{-4} \Omega\text{-m}$
ii. acts like an insulator at absolute zero temperature
iii. the distance between conductance and valence band is less than 1.1 eV

Which of the following is correct?

- (a) i & ii (b) ii & iii
(c) i & iii (d) i, ii & iii

48. Transistor is — [J. B.-15]



Which of the following is correct?

- (a) i & ii (b) i & iii
(c) ii & iii (d) i, ii & iii

49. Transistor is used as — [J. B.-15]

- i. an amplifier
ii. a rectifier
iii. a switch

Which of the following is correct?

- (a) i & ii (b) ii & iii
(c) i & iii (d) i, ii & iii

50. The number of diodes in a full wave rectifier is —

- i. 1 ii. 2
iii. 4

Which of the following is correct?

- (a) i & ii (b) i & iii
(c) ii & iii (d) i, ii & iii

51. In the case of IC it is—

- i. small ii. light
iii. cheap

Which of the following is correct?

- (a) i & ii (b) i & iii
(c) ii & iii (d) i, ii & iii

Read the following stimulus and answer the question no 52 and 53-

An n-p-n transistor is in common base configuration. Its emitter current is 0.85 mA and the base current is 0.05 mA.

52. How will the transistor work in this case?

- (a) as a good conductor (b) a good switch
(c) a good amplifier (d) a good rectifier

53. What is the amplification factor of the transistor?

- (a) 0.80 (b) 0.90
(c) 17 (d) 0.94

Read the following stimulus and answer the question no 54 and 55-

The emitter current and base current of a transistor are 5 mA and 100 μA respectively. [S. B.-16]

54. What is the emitter current?

- (a) 4.9 mA (b) 5 mA
(c) 5.1 mA (d) 5.2 mA

55. What is the current amplification factor?

- (a) 0.02 (b) 0.98
(c) 1.02 (d) 50

Read the following stimulus and answer the question no 56 and 57-

In a common base transistor circuit, the emitter current is changed from 100 μA to 150 μA changing the collector current from 98 μA to 147 μA .

56. What is the current amplification factor?

- (a) 0.96 (b) 0.97
(c) 0.98 (d) 0.99

57. If a 100 Ω resistor is added to a forward biased circuit, then what will be the change in voltage?

- (a) 0.002V (b) 0.003V
(c) 0.004V (d) 0.005V

Read the following stimulus and answer the question no 58 and 59-

For a transistor, $\beta = 100$ and $i_B = 50 \mu\text{A}$.

58. What is the emitter current of the given transistor?

- (a) 5.050 μA (b) 50.50 μA
(c) 505.0 μA (d) 5050 μA

59. The value of the α —

- (a) 0.99 (b) 0.099
(c) 0.98 (d) 0.098