



PHYSICS

BOOKS - DC PANDEY ENGLISH

SEMICONDUCTORS AND ELECTRONIC DEVICES

Only One Option Is Correct

1. A P -type semiconductor can be obtained by adding

A. arsenic to pure silicon

B. gallium to pure silicon

C. antimony to pure germanium

D. phosphorous to pure germanium

Answer: B



Watch Video Solution

2. The valance of the impurity atom that is to be added to germanium crystal so as to make it a *N*-type semiconductor, is

A. 6

B. 5

C. 4

D. 3

Answer: B



Watch Video Solution

3. A piece of copper and the other of germanium are cooled from the room

temperature to 80 K, then which of the following would be wrong statements?

- A. Resistance of each increases
- B. Resistance of each decreases
- C. Resistance of copper increases while that of germanium decreases
- D. Resistance of copper decreases while that of germanium increases

Answer: D



Watch Video Solution

4. In an insulator, the forbidden energy gap between the valence band and conduction band is of the order of

A. 1 MeV

B. 0.1 MeV

C. 1 eV

D. 5 eV

Answer: D



Watch Video Solution

5. The energy band gap of Si is

A. 0.70 eV

B. 1.1 eV

C. between 0.70 eV to 1.1 eV

D. 5 eV

Answer: B



Watch Video Solution

6. In an semiconductor the separation between conduction band and valence band is of the order of

A. 100 eV

B. 10 eV

C. 1 eV

D. zero

Answer: C



Watch Video Solution

7. A piece of semiconductors is connected in series in an electric circuit. On increasing the temperature, the current in the circuit will

- A. decrease
- B. remain unchanged
- C. increase
- D. stop flowing

Answer: C



Watch Video Solution

8. Intrinsic semiconductor is electrically neutral. Extrinsic semiconductor having large number of current carriers would be

A. positively charged

B. negatively charged

C. positively charged or negatively charged

depending upon the type of impurity

that has been added

D. electrically neutral

Answer: D



Watch Video Solution

9. Mobilities of electrons and holes in a sample of intrinsic germanium at room temperature are $0.36m^2 / Vs$ and $0.17m^2 / Vs$. The electron and hole densities are each equal to $2.5 \times 10^{19}m^{-3}$. The electrical conductivity of germanium is.

A. $0.47S / m$

B. $5.18S/m$

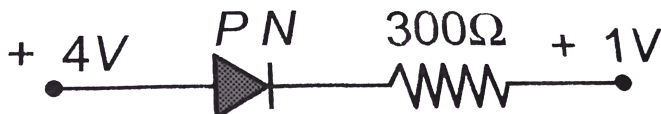
C. $2.12S/m$

D. $1.09S/m$

Answer: C

 **Watch Video Solution**

10. In the circuit given below, the value of the current is



A. zero

B. $10^{-2} A$

C. $10^2 A$

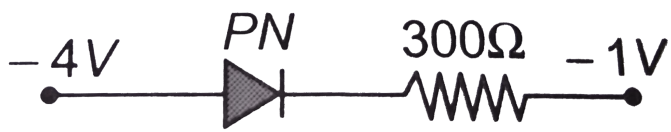
D. $10^{-3} A$

Answer: B



Watch Video Solution

11. What is the current in the circuit shown below?



A. zero

B. $10^{-2} A$

C. $1A$

D. $0.10A$

Answer: A



Watch Video Solution

12. In a p-n junction depletion region has a thickness of the order of

A. 1 cm

B. 1 mm

C. $10^{-6}m$

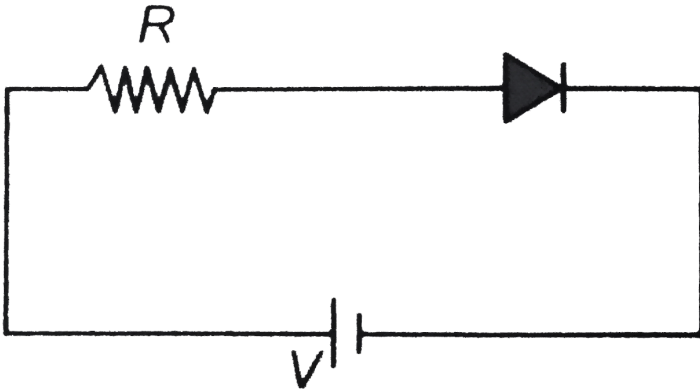
D. $10^{-12}cm$

Answer: C



Watch Video Solution

13. For the given circuit of PN -junction diode, which of the following statements is correct?



A. In forward biasing the voltage across R

is V

B. In forward biasing the voltage across R

is V

C. In reverse biasing the voltage across R is

V

D. In reverse biasing the voltage across R is

2V

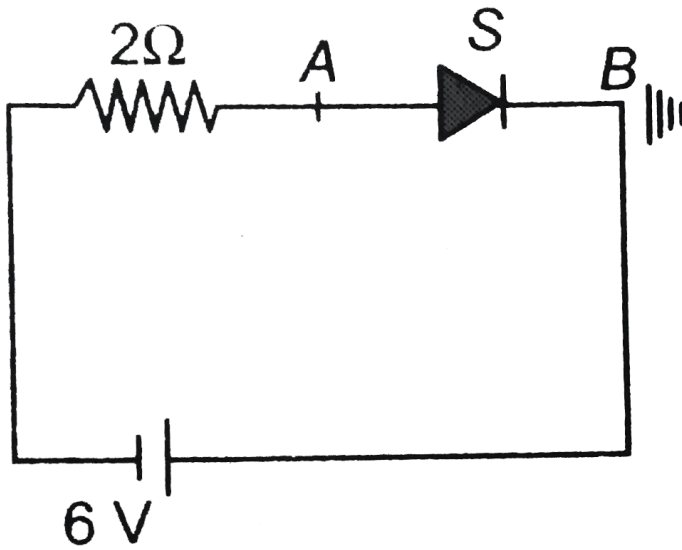
Answer: A



Watch Video Solution

14. The diode shown in the circuit is a silicon diode. The potential difference between the

points A and B will be



A. 6 V

B. 0.6 V

C. 0.7 V

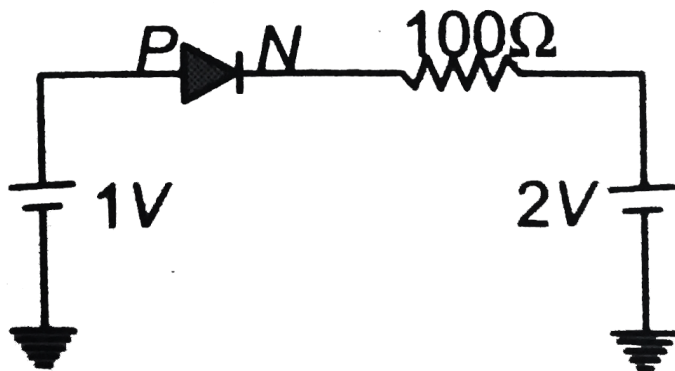
D. zero

Answer: A



Watch Video Solution

15. The current through an ideal PN -junction shown in the following circuit diagram will be



A. zero

B. 1 mA

C. 10 mA

D. 30 mA

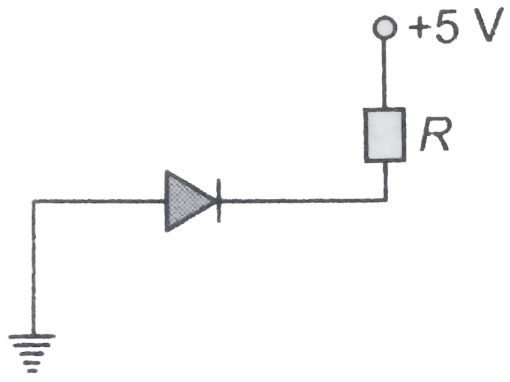
Answer: A



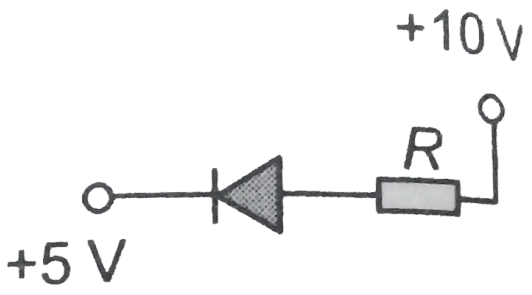
Watch Video Solution

16. In the given figure, which of the diodes are forward biased?

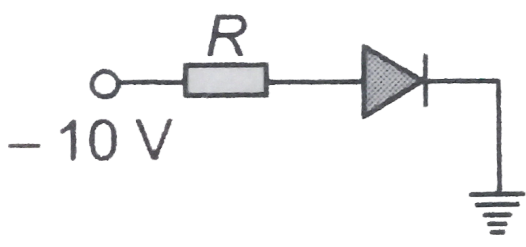
1.

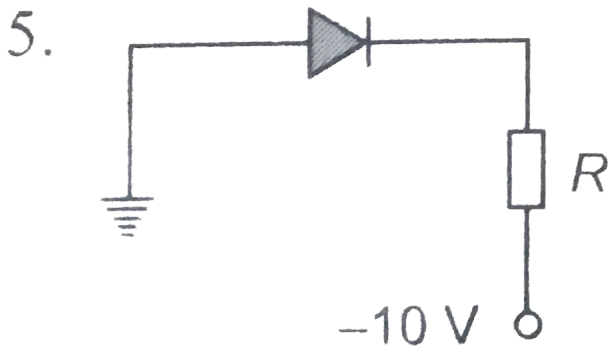
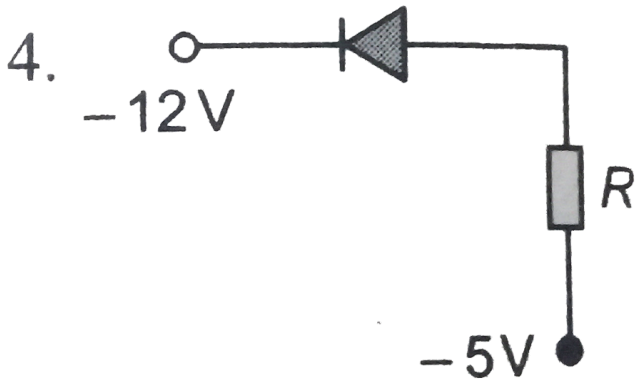


2.



3.





A. 1, 2, 3

B. 2, 4, 5

C. 1, 3, 4

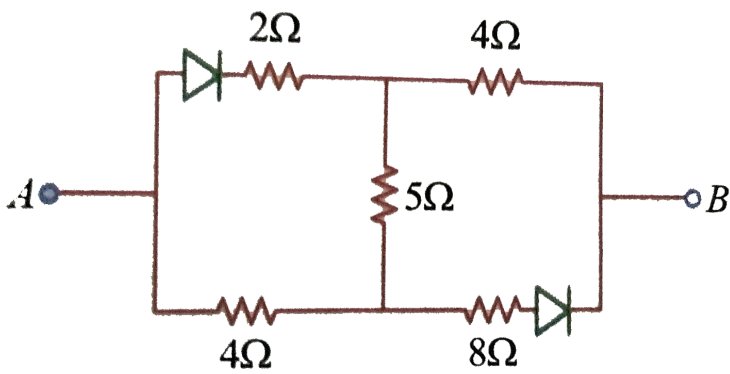
D. 2, 3, 4

Answer: B



Watch Video Solution

17. The equivalent resistance of the circuit across AB is given by



- A. 4Ω
- B. 13Ω
- C. 4Ω or 13Ω
- D. 4Ω or zero

Answer: A

 [Watch Video Solution](#)

18. The width of depletion region in p-n junction diode is $500nm$ and an intrinsic electric field of $6 \times 10^5 Vm^{-1}$ is also found to exist in it. What is the kinetic energy which a conduction electron must have in order to diffuse from the n-side to p-side?

A. 0.30 V

B. 0.40 V

C. 3 V

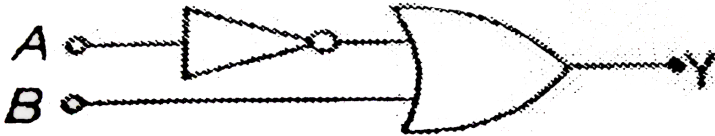
D. 4 V

Answer: A



Watch Video Solution

19. The Boolean expression for the circuit given in figure is



A. $Y = A + \bar{B}$

B. $Y = \overline{A + B}$

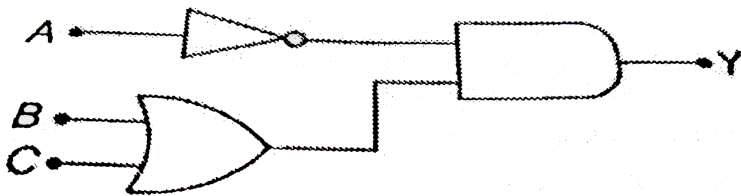
C. $Y = (\bar{A} + B)$

$$D. Y = A + B$$

Answer: C

 Watch Video Solution

20. The Boolean expression for the circuit given in figure is



$$A. Y = \bar{A} \cdot B + C$$

B. $Y = \bar{A} \cdot (\bar{B} + \bar{C})$

C. $Y = \bar{A} \cdot (B + \bar{C})$

D. $Y = \bar{A} \cdot (B + C)$

Answer: D



Watch Video Solution

21. In the case of constant α and β of a transistor

A. (1) $\alpha = \beta$

B. (2) $\beta < 1, \alpha > 1$

C. (3) $\alpha\beta = 1$

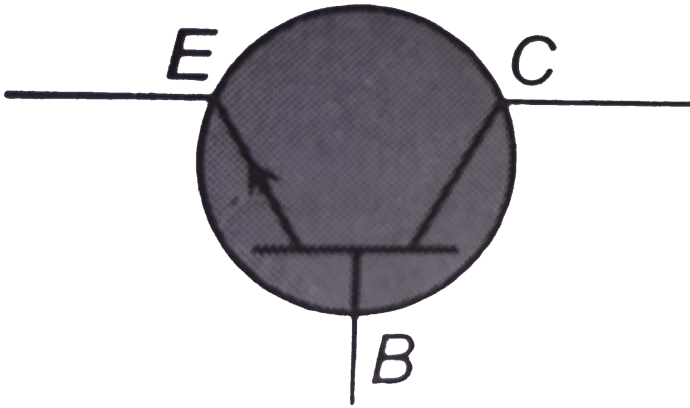
D. (4) $\beta > 1, \alpha < 1$

Answer: D



Watch Video Solution

22. The symbol given in figure represents



A. n-p-n transistor

B. p-n-p transistor

C. forward biased p-n junction diode

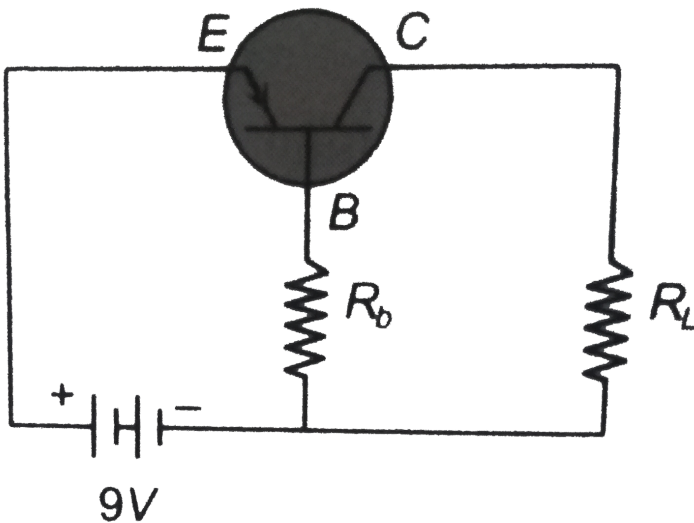
D. reverse biased n-p junction diode

Answer: A



Watch Video Solution

23. In a transistor circuit shown here the base current is $35\mu A$. The value of the resistor R_b is



A. $124k\Omega$

B. $257k\Omega$

C. $352k\Omega$

D. None of these

Answer: B



Watch Video Solution

24. In a common base transistor circuit, the current gain is 0.98. On changing the emitter current by 5.00 mA, the change in collector current is

A. 0.196 mA

B. 2.45 mA

C. 4.9 mA

D. 5.1 mA

Answer: C



Watch Video Solution

25. The transfer ratio of a transistor is 50. The input resistance of the transistor when used in the common -emitter configuration is $1k\Omega$.

The peak value for an *A. C.* input voltage of $0.01V$ peak is

A. $100\mu A$

B. $0.01\mu A$

C. $0.25\mu A$

D. $500\mu A$

Answer: D



Watch Video Solution

26. To use a transistor as an amplifier

A. both junctions are forward biased

B. both junctions are reverse biased

C. the emitter base junction is forward biased and the collector base junction is reverse biased

D. no biasing voltages are required

Answer: C



Watch Video Solution

27. A transistor has three impurity regions , emitter , base and collector. Arrange them in order of increasing doping levels.

A. emitter, base and collector

B. collector, base and emitter

C. base, emitter and collector

D. base, collector and emitter

Answer: D



Watch Video Solution

28. What is β value for transistor whose $\alpha = 0.98$?

A. 29

B. 38

C. 49

D. 56

Answer: C



Watch Video Solution

29. When the emitter current of a transistor is changed by 1 mA, its collector current changes by 0.990 mA. In the common base circuit, current gain for the transistor is

A. 0.099

B. 1.01

C. 1.001

D. 0.99

Answer: D



Watch Video Solution

30. Choose the correct relation between the transistor parameters α and β .

A. $\beta = \frac{\alpha + 1}{\alpha}$

B. $\beta = \frac{\alpha - 1}{\alpha}$

C. $\beta = \frac{\alpha}{1 - \alpha}$

D. $\beta = \frac{\alpha}{1 + \alpha}$

Answer: C



Watch Video Solution

31. In a transistor, the current amplification factor α is 0.9. The transistor is connected in common base configuration. The change in collector current when base current changes by 4 mA is

A. 4 mA

B. 12 mA

C. 24 mA

D. 36 mA

Answer: D



Watch Video Solution

32. Given below are four logic gates symbol (figure). Those for OR, NOR and NAND are respectively

A. 1, 4, 3

B. 4, 1, 2

C. 1, 3, 4

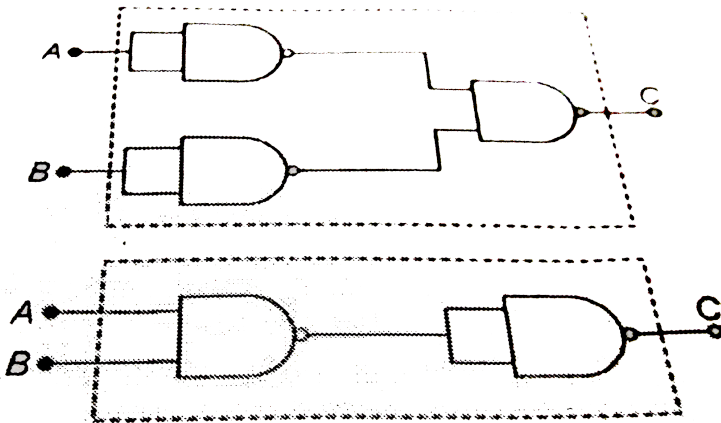
D. 4, 2, 1

Answer: C



Watch Video Solution

33. The combination of gates shown here are equivalent to



A. OR gate and an AND gate respectively

B. AND gate and a NOT gate respectively

C. AND gate and an OR gate respectively

D. OR gate and a NOT gate respectively

Answer: A



Watch Video Solution

34. Give Boolean expression and Truth table for NOR gate.

$$A. C = A + B$$

B. $C = \overline{A + B}$

C. $C = A \cdot B$

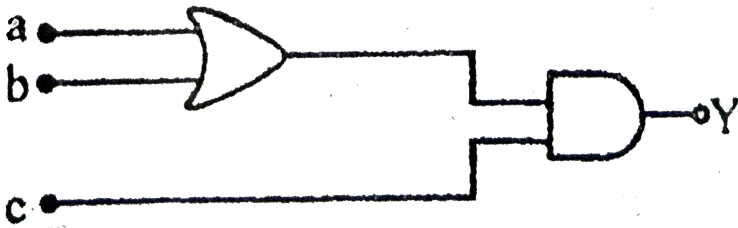
D. $C = \overline{A \cdot B}$

Answer: B



Watch Video Solution

35. To get an output of 1 from the circuit shown in figure the input must be :-



A. $A=0, B=1, C=0$

B. $A=1, B=0, C=0$

C. $A=1, B=0, C=1$

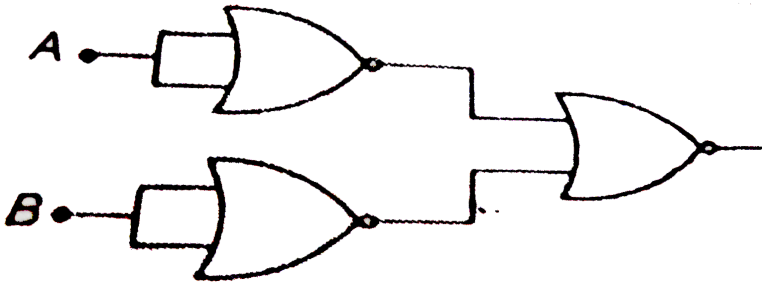
D. $A=1, B=1, C=0$

Answer: C



Watch Video Solution

36. The combination of the gates shown in the figure produces



A. NOR gate

B. OR gate

C. AND gate

D. XOR gate

Answer: C



Watch Video Solution

37. The following truth table corresponds to the logic gate

A	B	X
0	0	0
0	1	1
1	0	1
1	1	1

A. NAND

B. OR

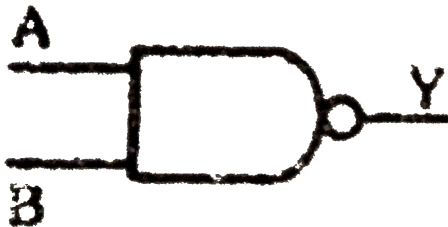
C. AND

D. XOR

Answer: B

 Watch Video Solution

38. The symbol represents :-



A. a) NOT gate

B. b) OR gate

C. c) AND gate

D. d) NAND gate

Answer: A



Watch Video Solution

39. The conductivity of a semiconductor increases with increase in temperature because

A. number density of free current carriers

increases

B. relaxation time increases

C. both number density of carriers and

relaxation time decreases but effect of

decrease in relaxation time is much less

than increase in number density.

D. number density of current carriers

increases, relaxation time decreases but

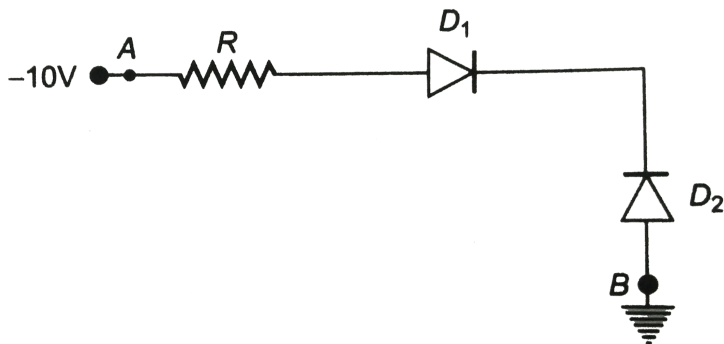
effect of decrease in relaxation time is

much less than increase in number
density

Answer: D

 [Watch Video Solution](#)

40. In figure , assuming the diodes to be ideal ,



A. D_1 is forward biased, D_2 is reverse biased and hence current flows from A to B

B. D_2 is forward biased, D_1 is reverse biased and hence no current flows from B to A and vice-versa

C. D_1 and D_2 are both forward biased and hence current flows from A to B

D. D_1 and D_2 are both reverse biased and hence no current flows from A to B and

vice-versa

Answer: B



Watch Video Solution

41. Hole is

A. an anti-particle of electron

B. a vacancy created when an electron
leaves a covalent bond

C. absence of free electrons

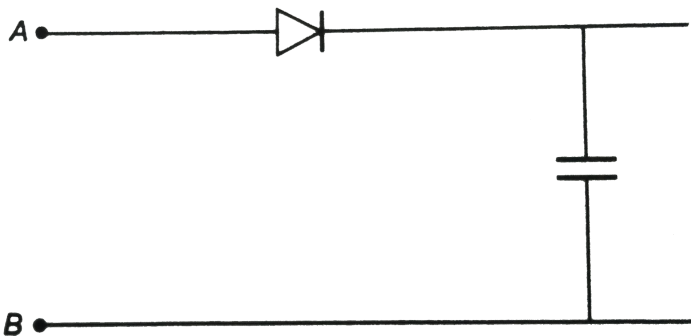
D. an artificially created particle

Answer: B



Watch Video Solution

42. A 220 V AC supply is connected between points A and B . What will be the potential difference V across the capacitor ?



A. 220V

B. 110V

C. 0V

D. $220\sqrt{2}V$

Answer: D



Watch Video Solution

43. In a common emitter transistor, the current gain is 80. What is the change in

collector current, when the change in base current is $250\mu A$?

A. $80 \times 250\mu A$

B. $(250 - 80)\mu A$

C. $(250 + 80)\mu A$

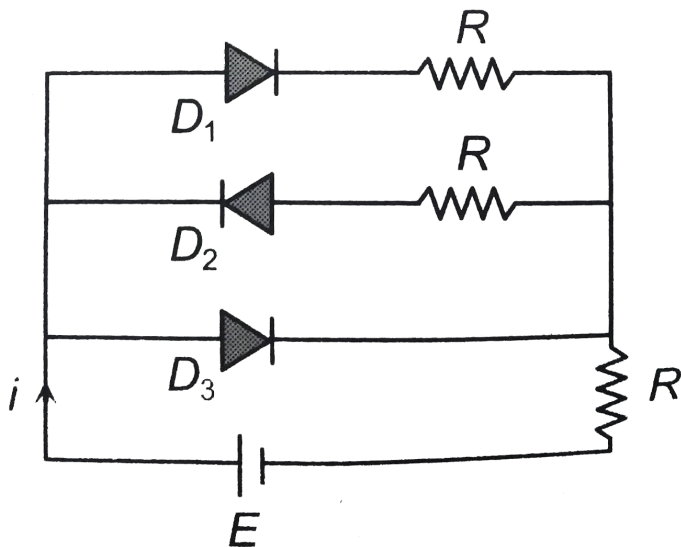
D. $250\mu A$

Answer: A



Watch Video Solution

44. In the following circuit of PN junction diodes D_1 , D_2 and D_3 are ideal then i is



A. E/R

B. $E/2R$

C. $2E/3R$

D. zero

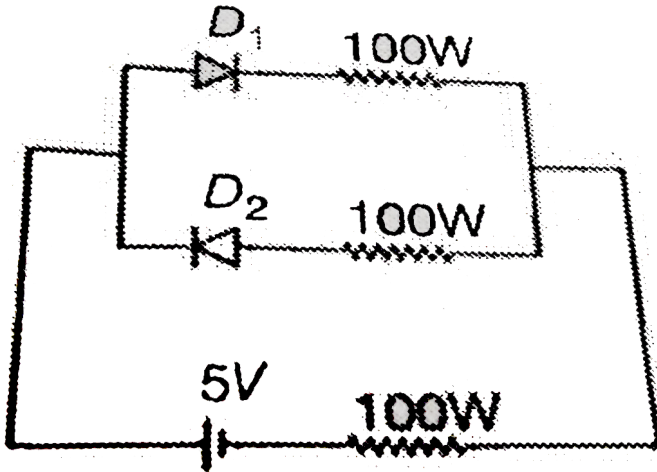
Answer: A



Watch Video Solution

45. Two ideal diodes D_1 and D_2 are connected with the battery of 5 volt as shown in figure.

Then the current through diode D_1 is



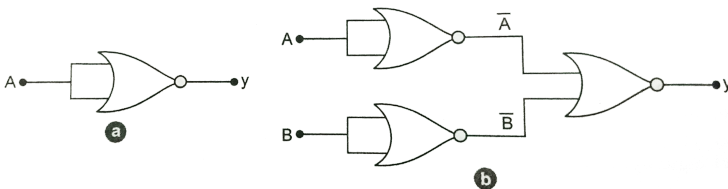
- A. 12.5 mA
- B. 25 mA
- C. zero
- D. 50 mA

Answer: B



Watch Video Solution

46. Write the truth table for the circuit given in Fig., consisting of NOR gates only. Identify the logic operations (OR, AND, NOT) performed by two circuits.



A. NOT

B. AND

C. OR

D. None of these

Answer: A



Watch Video Solution

47. In half-wave rectification, what is the output frequency if the input frequency is 50 Hz. What is the output frequency of a full-wave rectifier for the same input frequency.

A. a) 25 Hz

B. b) 50 Hz

C. c) 75 Hz

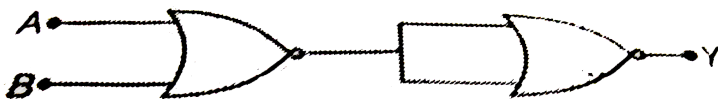
D. d) 100 Hz

Answer: D



Watch Video Solution

48. The circuit shown in the figure acts as



A. OR gate

B. AND gate

C. NOT gate

D. NAND gate

Answer: A



Watch Video Solution

49. The current gain for common emitter amplifier is 69. If the emitter current is 7.0mA , find (i) base current and (ii) collector current.

A. 4 mA

B. 4.4 mA

C. 3.8 mA

D. zero

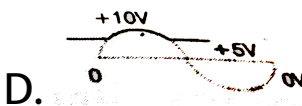
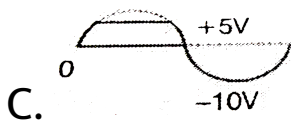
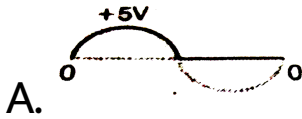
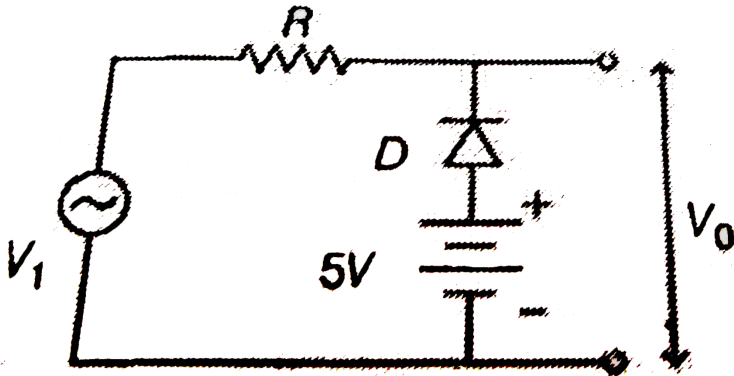
Answer: A



Watch Video Solution

50. In the figure, D is an ideal diode and an alternating voltage of peak value 10 volts is connected as input V_1 . Which of the following

figures represents the correct waveform of output voltage V_0 ?



Answer: D



Watch Video Solution

51. Regarding transistor what is not correct.

A. For transistor to act as an amplifier, EB junction should be forward biased and

CB junction should be reverse biased

B. $I_E = I_B + I_C$ in any configuration and

for any transistor

C. $\alpha = \frac{\beta}{1 + \beta}$ where α and β are

transistor parameters

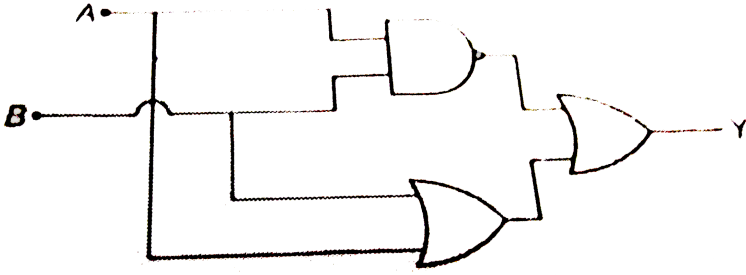
D. $\beta = \frac{\alpha}{1 + \alpha}$

Answer: D



Watch Video Solution

52. The truth table for the circuit shown in the figure is



A.

<i>A</i>	<i>B</i>	<i>Y</i>
1	1	1
0	1	0
1	0	0
0	0	1

B.

<i>A</i>	<i>B</i>	<i>Y</i>
1	1	0
0	0	1
1	0	0
0	1	1

C.

<i>A</i>	<i>B</i>	<i>Y</i>
1	1	0
0	1	0
1	0	0
0	0	0

$$\text{D. } \begin{vmatrix} A & B & Y \\ 1 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 1 \\ 0 & 0 & 1 \end{vmatrix}$$

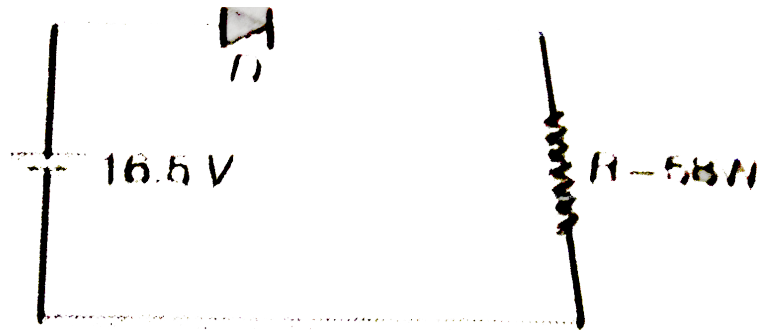
Answer: D



Watch Video Solution

53. The diode D shown in the circuit is governed by the V-I relation $V = (0.7 + 100I)$

Volt. The current supplied by the battery is



A. 0.3 A

B. 0.2 A

C. 0.15 A

D. 0.1 A

Answer: D



Watch Video Solution

54. A sample of n-type silicon

A. Contains an excess of free electrons
therefore it is negatively charged

B. Contains an excess of free electrons and
it is electrically neutral

C. Predominantly contains trivalent
impurities

D. Contains only pentavalent element

Answer: B



Watch Video Solution

More Than One Option Is Correct

1. When an electric field is applied across a semiconductor,

A. electrons move from lower energy level to higher energy level in the conduction band

B. electrons move from higher energy level to lower energy level in the conduction band

C. holes in the valence band move from higher energy level to lower energy level

D. holes in the valence band move from lower energy level to higher energy level

Answer: A::C



Watch Video Solution

2. Consider an n-p-n transistor with its base - emitter junction forward biased and collector base junction reverse biased . Which of the following statements are true? a) electrons crossover from emitter to collector. b) Holes move from base to collector c) Electrons move from emitter to base d) Electrons from emitter move out of base without going to the collector

A. Electrons crossover from emittor

statements are true?

B. Holes move from base to collector

C. Electrons move from emitter to base

D. Electrons from emitter move out of base

without going to the collector

Answer: A::C



Watch Video Solution

3. In a $n - p - n$ transistor circuit, the collector current is $10mA$. If 95 per cent of the

electrons emitted reach the collector, which of the following statements are true ?

A. A) The emitter current will be 8 mA

B. B) The emitter current will be 10.53 mA

C. C) The base current will be 0.53 mA

D. D) The base current will be 2mA

Answer: B::C



Watch Video Solution