

PYQSide

NEET SEMICONDUCTOR ELECTRONICS — PYQS

Max. Marks: 432

Questions: 108

Section A (MCQ)

Q.1 Two statements are given below :

A. When the forward bias voltage across a p-n junction diode increases above a certain threshold voltage, the diode current increases significantly.

B. This current is called reverse saturation current. Choose the correct answer from the options given below :

[NEET (UG) 2026]

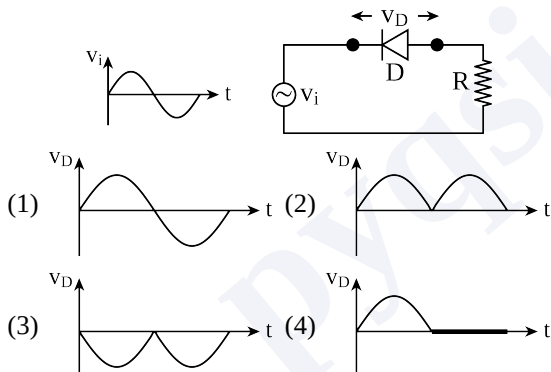
- (1) Both Statements A and B are true
- (2) Both Statements A and B are false
- (3) Statement A is true, but Statement B is false
- (4) Statement A is false, but Statement B is true

Scan or tap for the full solution



Q.2 In the circuit shown below, the voltage appearing across the diode D will be of the form :

[NEET (UG) 2026]

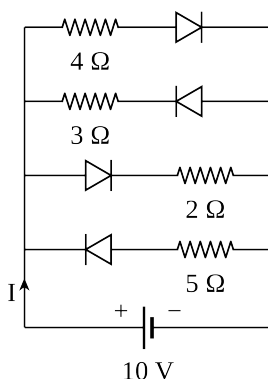


Scan or tap for the full solution



Q.3 The current I in the circuit shown below is : (All diodes are ideal and identical)

[NEET (UG) 2026]



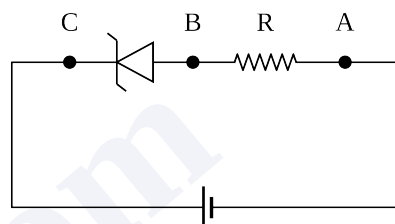
- (1) $\frac{1}{3}$ A
- (2) $\frac{15}{2}$ A
- (3) $\frac{5}{3}$ A
- (4) $\frac{5}{9}$ A

Scan or tap for the full solution



Q.4 An ideal Zener diode with breakdown voltage of -3 V is reverse biased with a negative input voltage $V_i = -5$ V. The magnitude of voltage difference between point B and A is:

[RE-NEET (UG) 2026]



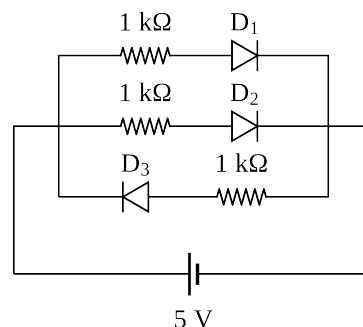
- (1) 0 V
- (2) 3 V
- (3) 2 V
- (4) 1 V

Scan or tap for the full solution



Q.5 Three identical p-n junction diodes D_1 , D_2 , and D_3 are connected across a battery as shown in the figure. If the width of the depletion regions of D_1 , D_2 and D_3 are W_1 , W_2 and W_3 , respectively, then the correct option is:

[RE-NEET (UG) 2026]



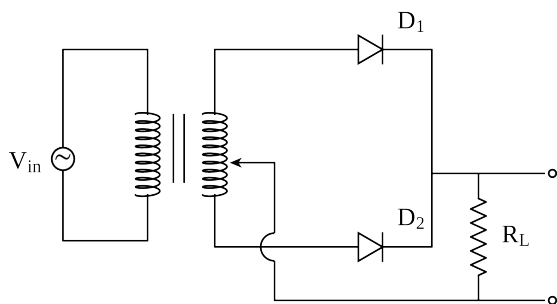
- (1) $W_2 > W_1 = W_3$
- (2) $W_1 > W_2 > W_3$
- (3) $W_3 = W_1 > W_2$
- (4) $W_3 > W_2 > W_1$

Scan or tap for the full solution



Q.6 A full wave rectifier circuit with diodes (D_1) and (D_2) is shown in the figure. If input supply voltage $V_{in} = 220\sin(100\pi t)$ volt, then at $t = 15$ msec

[NEET (UG) 2025]



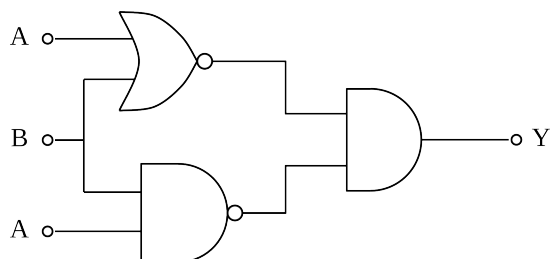
- (1) D_1 and D_2 both are forward biased
- (2) D_1 and D_2 both are reverse biased
- (3) D_1 is forward biased, D_2 is reverse biased
- (4) D_1 is reverse biased, D_2 is forward biased.

Scan or tap for the full solution



Q.7 The output (Y) of the given logic implementation is similar to the output of an/a _____ gate.

[NEET (UG) 2025]



- (1) OR
- (2) NOR
- (3) AND
- (4) NAND

Scan or tap for the full solution



Q.8 A logic circuit provides the output Y as per the following truth table :

A	B	Y
0	0	1
0	1	0
1	0	1
1	1	0

The expression of the output Y is :

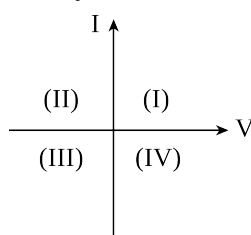
[NEET (UG) 2024]

- (1) $A \cdot B + \bar{A}$
- (2) $A \cdot \bar{B} + \bar{A}$
- (3) $\bar{B}$
- (4) B

Scan or tap for the full solution



Q.9 Consider the following statements A and B and identify the correct answer :



- A. For a solar-cell, the I-V characteristics lies in the IV quadrant of the given graph.
- B. In a reverse biased pn junction diode, the current measured in (μA), is due to majority charge carriers.

[NEET (UG) 2024]

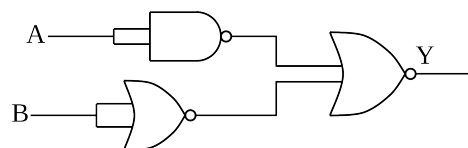
- (1) A is correct but B is incorrect
- (2) A is incorrect but B is correct
- (3) Both A and B are correct
- (4) Both A and B are incorrect

Scan or tap for the full solution



Q.10 The output (Y) of the given logic gate is similar to the output of an/a _____

[NEET (UG) 2024]

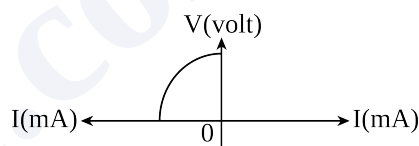


- (1) NAND gate
- (2) NOR gate
- (3) OR gate
- (4) AND gate

Scan or tap for the full solution



Q.11



The I-V characteristics shown above are exhibited by a

[RE-NEET (UG) 2024]

- (1) Light emitting diode
- (2) Zener diode
- (3) Photodiode
- (4) Solar cell

Scan or tap for the full solution



Q.12 When the output of an OR gate is applied as input to a NOT gate, then the combination acts as a

[RE-NEET (UG) 2024]

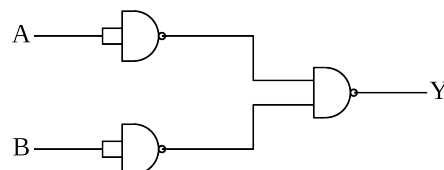
- (1) NAND gate
- (2) NOR gate
- (3) AND gate
- (4) OR gate

Scan or tap for the full solution



Q.13 The output Y for the inputs A and B of the given logic circuit is:

[RE-NEET (UG) 2024]



- (1) $A \cdot B$
- (2) $\bar{A} \cdot \bar{B}$
- (3) $A + B$
- (4) $\bar{A} + \bar{B}$

Scan or tap for the full solution



Q.14 Given below are two statements:

Statement-I: Photovoltaic devices can convert optical radiation into electricity.

Statement-II: Zener diode is designed to operate under reverse bias in breakdown region.

In the light of the above statements, choose the most appropriate answer from the options given below :

[NEET (UG) 2023]

- (1) Both Statement-I and Statement-II are incorrect.
- (2) Statement-I is correct but Statement-II is incorrect.
- (3) Statement-I is incorrect but Statement-II is correct.
- (4) Both Statement-I and Statement-II are correct.

Scan or tap for the full solution



Q.15 A full wave rectifier circuit consists of two p-n junction diodes, a centre-tapped transformer, capacitor and a load resistance. Which of these components removes the ac ripple from the rectified output?

[NEET (UG) 2023]

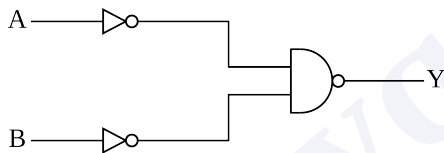
- (1) p-n junction diodes
- (2) Capacitor
- (3) Load resistance
- (4) A centre-tapped transformer

Scan or tap for the full solution



Q.16 For the following logic circuit, the truth table is:

[NEET (UG) 2023]



(1)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

(2)

A	B	Y
0	0	1
0	1	0
1	0	1
1	1	0

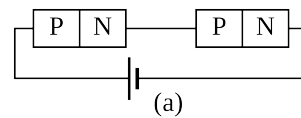
(3)

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

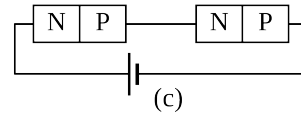
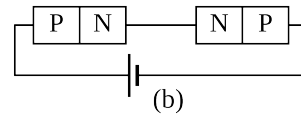
(4)

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

Scan or tap for the full solution



Q.17



In the given circuits (a), (b) and (c), the potential drop across the two p-n junctions are equal in

[NEET (UG) 2022]

- (1) Circuit (a) only
- (2) Circuit (b) only
- (3) Circuit (c) only
- (4) Both circuits (a) and (c)

Scan or tap for the full solution



Q.18 In half wave rectification, if the input frequency is 60 Hz, then the output frequency would be

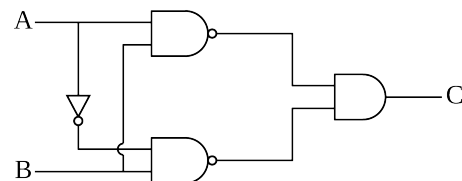
[NEET (UG) 2022]

- (1) Zero
- (2) 30 Hz
- (3) 60 Hz
- (4) 120 Hz

Scan or tap for the full solution



Q.19



The truth table for the given logic circuit is

[NEET (UG) 2022]

(1)

A	B	C
0	0	0
0	1	1
1	0	1
1	1	0

(2)

A	B	C
0	0	1
0	1	0
1	0	0
1	1	1

(3)

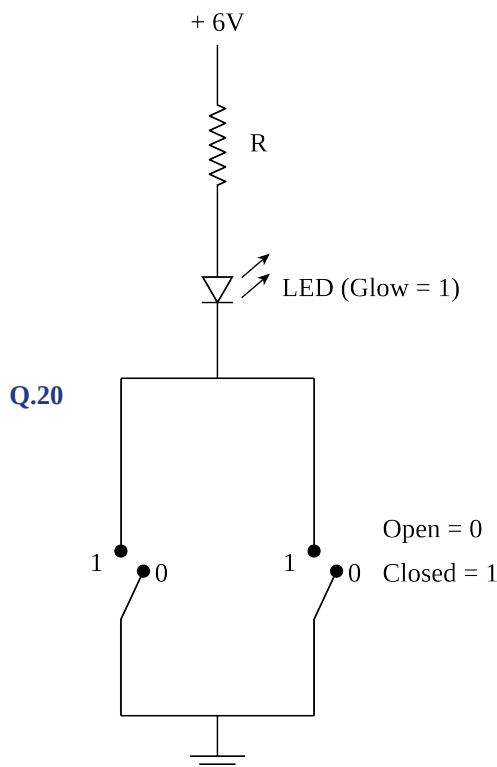
A	B	C
0	0	1
0	1	0
1	0	1
1	1	0

(4)

A	B	C
0	0	0
0	1	1
1	0	0
1	1	1

Scan or tap for the full solution





Identify the equivalent logic gate represented by the given circuit

[NEET (UG) 2022 (Phase 2)]

- (1) NAND (2) OR (3) NOR (4) AND

Scan or tap for the full solution



Q.21 The incorrect statement about the property of a Zener diode is :

[NEET (UG) 2022 (Phase 2)]

- (1) p and n regions of Zener diode are heavily doped
(2) Zener voltage remains constant at breakdown
(3) It is designed to operate under reverse bias
(4) Depletion region formed is very wide

Scan or tap for the full solution



Q.22 The collector current in a common base amplifier using n-p-n transistor is 24 mA. If 80% of the electrons released by the emitter is accepted by the collector, then the base current is numerically :

[NEET (UG) 2022 (Phase 2)]

- (1) 3 mA and entering the base
(2) 6 mA and leaving the base
(3) 3 mA and leaving the base
(4) 6 mA and entering the base

Scan or tap for the full solution



Q.23 Consider the following statements (A) and (B) and identify the correct answer.

- (A) A Zener diode is connected in reverse bias, when used as a voltage regulator.
(B) The potential barrier of p-n junction lies between 0.1 V to 0.3 V.

[NEET (UG) 2021]

- (1) (A) is incorrect but (B) is correct.
(2) (A) and (B) both are correct.
(3) (A) and (B) both are incorrect.
(4) (A) is correct and (B) is incorrect.

Scan or tap for the full solution



Q.24 The electron concentration in an n-type semiconductor is the same as hole concentration in a p-type semiconductor. An external field (electric) is applied across each of them. Compare the currents in them.

[NEET (UG) 2021]

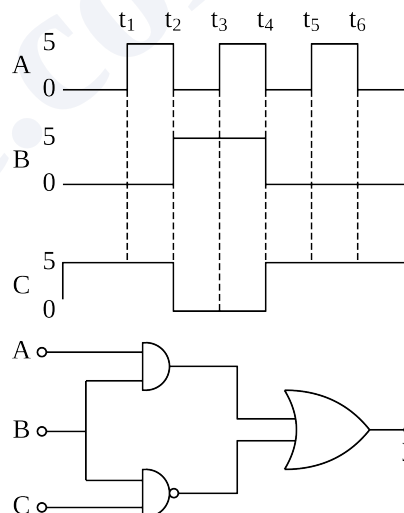
- (1) No current will flow in p-type, current will only flow in n-type
(2) Current in n-type = current in p-type
(3) current in p-type > current in n-type
(4) current in n-type > current in p-type

Scan or tap for the full solution



Q.25 For the given circuit, the input digital signals are applied at the terminals A, B and C. What would be the output at the terminal y?

[NEET (UG) 2021]



- (1) y | t1 | t2 | t3 | t4 | t5 | t6 | 0V
(2) | 5V | 0V | 5V | 0V | 5V | 0V | 0V
(3) | 5V | 5V | 5V | 5V | 5V | 5V | 5V
(4) | 5V | 0V | 5V | 0V | 5V | 0V | 0V

Scan or tap for the full solution



Q.26 The increase in the width of the depletion region in a p-n junction diode is due to :

[NEET (UG) 2020]

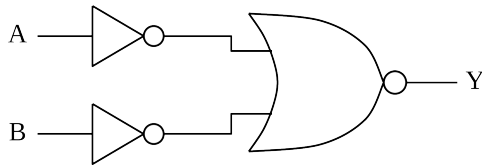
- (1) reverse bias only
- (2) both forward bias and reverse bias
- (3) increase in forward current
- (4) forward bias only

Scan or tap for the full solution



Q.27 For the logic circuit shown, the truth table is :

[NEET (UG) 2020]



(1)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

(2)

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

(3)

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

(4)

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

Scan or tap for the full solution



Q.28 For transistor action, which of the following statements is **correct**?

[NEET (UG) 2020]

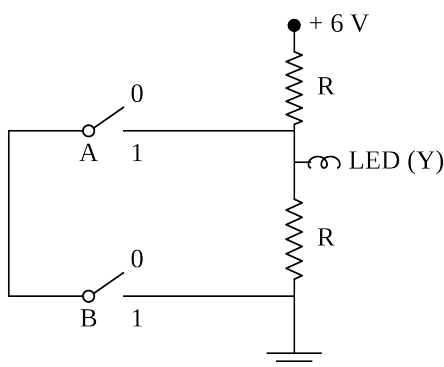
- (1) Base, emitter and collector regions should have same size.
- (2) Both emitter junction as well as the collector junction are forward biased.
- (3) The base region must be very thin and lightly doped.
- (4) Base, emitter and collector regions should have same doping concentrations.

Scan or tap for the full solution



Q.29 The **correct** Boolean operation represented by the circuit diagram drawn is :

[NEET (UG) 2019]



- (1) OR
- (2) NAND
- (3) NOR
- (4) AND

Scan or tap for the full solution



Q.30 For a p-type semiconductor, which of the following statements is **true**?

[NEET (UG) 2019]

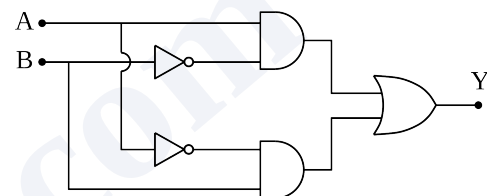
- (1) Holes are the majority carriers and trivalent atoms are the dopants.
- (2) Holes are the majority carriers and pentavalent atoms are the dopants.
- (3) Electrons are the majority carriers and pentavalent atoms are the dopants.
- (4) Electrons are the majority carriers and trivalent atoms are the dopants.

Scan or tap for the full solution



Q.31 In the combination of the following gates the output Y can be written in terms of inputs A and B as

[NEET 2018]



- (1) $\overline{A} \cdot B$
- (2) $A \cdot \overline{B} + \overline{A} \cdot B$
- (3) $\overline{A} \cdot \overline{B} + A \cdot B$
- (4) $\overline{A} + \overline{B}$

Scan or tap for the full solution



Q.32 In a p-n junction diode, change in temperature due to heating

[NEET 2018]

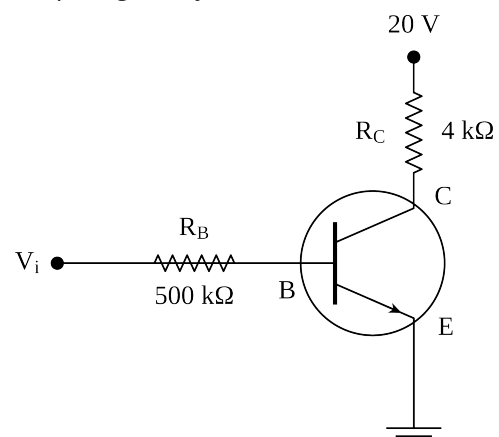
- (1) affects only reverse resistance
- (2) affects only forward resistance
- (3) does not affect resistance of p-n junction
- (4) affects the overall V - I characteristics of p-n junction

Scan or tap for the full solution



Q.33 In the circuit shown in the figure, the input voltage V_i is 20 V, $V_{BE} = 0$ and $V_{CE} = 0$. The values of I_B , I_C and β are given by

[NEET 2018]



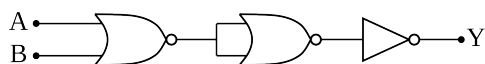
- (1) $I_B = 40 \mu\text{A}$, $I_C = 10 \text{ mA}$, $\beta = 250$
 (2) $I_B = 25 \mu\text{A}$, $I_C = 5 \text{ mA}$, $\beta = 200$
 (3) $I_B = 20 \mu\text{A}$, $I_C = 5 \text{ mA}$, $\beta = 250$
 (4) $I_B = 40 \mu\text{A}$, $I_C = 5 \text{ mA}$, $\beta = 125$

Scan or tap for the full solution



Q.34 The given electrical network is equivalent to

[NEET 2017]



- (1) OR gate (2) NOR gate
 (3) NOT gate (4) AND gate

Scan or tap for the full solution



Q.35 Which one of the following represents forward bias diode?

[NEET 2017]

- (1) -4 V -3 V
 (2) -2 V $+2 \text{ V}$
 (3) 3 V 5 V
 (4) 0 V -2 V

Scan or tap for the full solution



Q.36 In a common emitter transistor amplifier the audio signal voltage across the collector is 3 V . The resistance of collector is $3 \text{ k}\Omega$. If current gain is 100 and the base resistance is $2 \text{ k}\Omega$, the voltage and power gain of the amplifier is

[NEET 2017]

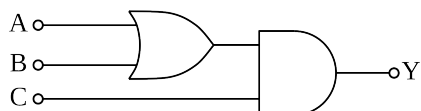
- (1) 15 and 200 (2) 150 and 15000
 (3) 20 and 2000 (4) 200 and 1000

Scan or tap for the full solution



Q.37 To get output 1 for the following circuit, the correct choice for the input is

[NEET 2016 (Phase 1)]



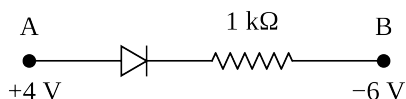
- (1) $A = 1$, $B = 1$, $C = 0$ (2) $A = 1$, $B = 0$, $C = 1$
 (3) $A = 0$, $B = 1$, $C = 0$ (4) $A = 1$, $B = 0$, $C = 0$

Scan or tap for the full solution



Q.38 Consider the junction diode as ideal. The value of current flowing through AB is

[NEET 2016 (Phase 1)]



- (1) 10^{-1} A (2) 10^{-3} A (3) 0 A (4) 10^{-2} A

Scan or tap for the full solution



Q.39 A npn transistor is connected in common emitter configuration in a given amplifier. A load resistance of 800Ω is connected in the collector circuit and the voltage drop across it is 0.8 V . If the current amplification factor is 0.96 and the input resistance of the circuit is 192Ω , the voltage gain and the power gain of the amplifier will respectively be

[NEET 2016 (Phase 1)]

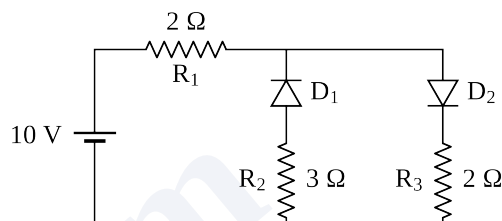
- (1) 4, 4 (2) 4, 3.69 (3) 4, 3.84 (4) 3.69, 3.84

Scan or tap for the full solution



Q.40 The given circuit has two ideal diodes connected as shown in the figure. The current flowing through the resistance R_1 will be

[NEET 2016 (Phase 2)]



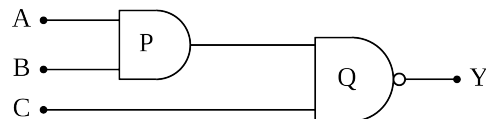
- (1) 2.5 A (2) 10.0 A (3) 1.43 A (4) 3.13 A

Scan or tap for the full solution



Q.41 What is the output Y in the following circuit, when all the three inputs A, B, C are first 0 and then 1?

[NEET 2016 (Phase 2)]



- (1) 0, 1 (2) 0, 0 (3) 1, 0 (4) 1, 1

Scan or tap for the full solution



Q.42 For CE transistor amplifier, the audio signal voltage across the collector resistance of $2 \text{ k}\Omega$ is 4 V . If the current amplification factor of the transistor is 100 and the base resistance is $1 \text{ k}\Omega$, then the input signal voltage is

[NEET 2016 (Phase 2)]

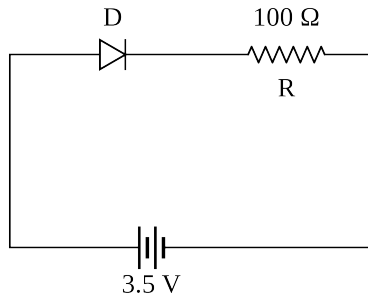
- (1) 10 mV (2) 20 mV (3) 30 mV (4) 15 mV

Scan or tap for the full solution



Q.43 In the given figure, a diode D is connected to an external resistance $R = 100 \Omega$ and an e.m.f. of 3.5 V . If the barrier potential developed across the diode is 0.5 V , the current in the circuit will be

[AIPMT 2015]



- (1) 20 mA (2) 35 mA (3) 30 mA (4) 40 mA

Scan or tap for the full solution



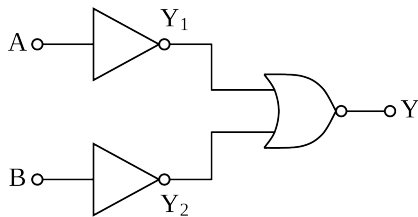
Q.44 The input signal given to a CE amplifier having a voltage gain of 150 is $V_i = 2\cos\left(15t + \frac{\pi}{3}\right)$. The corresponding output signal will be [AIPMT 2015]

- (1) $2\cos\left(15t + \frac{5\pi}{6}\right)$ (2) $300\cos\left(15t + \frac{4\pi}{3}\right)$
 (3) $300\cos\left(15t + \frac{\pi}{3}\right)$ (4) $75\cos\left(15t + \frac{2\pi}{3}\right)$

Scan or tap for the full solution



Q.45 Which logic gate is represented by the following combination of logic gates? [AIPMT 2015 (Cancelled)]

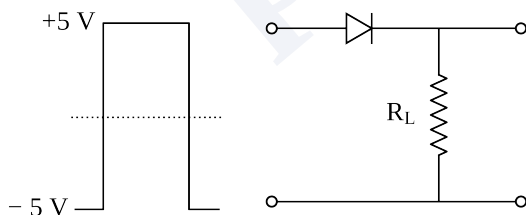


- (1) AND (2) NOR (3) OR (4) NAND

Scan or tap for the full solution



Q.46 If in a p-n junction, a square input signal of 10 V is applied, as shown,



then the output across R_L will be

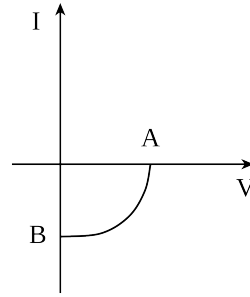
[AIPMT 2015 (Cancelled)]

- (1) (2)
 (3) (4)

Scan or tap for the full solution



Q.47 The given graph represents V-I characteristic for a semiconductor device.



Which of the following statement is correct ?

[AIPMT 2014]

- (1) It is V-I characteristic for solar cell where, point A represents open circuit voltage and point B short circuit current.
 (2) It is for a solar cell and points A and B represent open circuit voltage and current, respectively.
 (3) It is for a photodiode and points A and B represent open circuit voltage and current, respectively.
 (4) It is for a LED and points A and B represent open circuit voltage and short circuit current, respectively.

Scan or tap for the full solution



Q.48 The barrier potential of a p-n junction depends on Which one of the following is correct ?

- A. type of semiconductor material
 B. amount of doping
 C. temperature

[AIPMT 2014]

- (1) A and B only (2) B only
 (3) B and C only (4) A, B and C

Scan or tap for the full solution



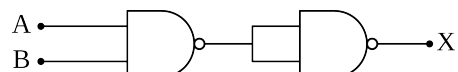
Q.49 In a n-type semiconductor, which of the following statements is true? [NEET 2013]

- (1) Holes are minority carriers and pentavalent atoms are dopants.
 (2) Holes are majority carriers and trivalent atoms are dopants.
 (3) Electrons are majority carriers and trivalent atoms are dopants.
 (4) Electrons are minority carriers and pentavalent atoms are dopants.

Scan or tap for the full solution



Q.50 The output (X) of the logic circuit shown in figure will be [NEET 2013]



(1) $X = A \cdot B$

(2) $X = \overline{A + B}$

(3) $X = \overline{\overline{A} \cdot \overline{B}}$

(4) $X = \overline{A \cdot B}$

Scan or tap for the full solution



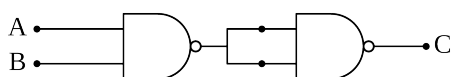
Q.51 In a common emitter (CE) amplifier having a voltage gain G , the transistor used has transconductance 0.03 mho and current gain 25 . If the above transistor is replaced with another one with transconductance 0.02 mho and current gain 20 , the voltage gain will be [NEET 2013]

- (1) $\frac{1}{3} G$ (2) $\frac{5}{4} G$ (3) $\frac{2}{3} G$ (4) $1.5G$

Scan or tap for the full solution



Q.52 The output from a NAND gate is divided into two in parallel and fed to another NAND gate. The resulting gate is a [NEET 2013 (Karnataka)]



- (1) AND gate (2) NOR gate
(3) OR gate (4) NOT gate

Scan or tap for the full solution



Q.53 In an unbiased p-n junction, holes diffuse from the p-region to n-region because of [NEET 2013 (Karnataka)]

- (1) The attraction of free electrons of n-region.
(2) The higher hole concentration in p-region than that in n-region.
(3) The higher concentration of electrons in the n-region than that in the p-region.
(4) The potential difference across the p-n junction.

Scan or tap for the full solution



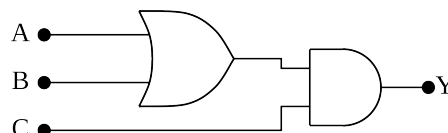
Q.54 One way in which the operation of an n-p-n transistor differs from that of a p-n-p is [NEET 2013 (Karnataka)]

- (1) The emitter junction injects minority carriers into the base region of the p-n-p
(2) The emitter injects holes into the base of the p-n-p and electrons into the base region of n-p-n
(3) The emitter injects holes into the base of n-p-n
(4) The emitter junction is reverse biased in n-p-n

Scan or tap for the full solution



Q.55 To get an output $Y = 1$ in given circuit which of the following input will be correct ? [AIPMT 2012 (Mains)]



- (1) $A \rightarrow 1, B \rightarrow 0, C \rightarrow 0$
(2) $A \rightarrow 1, B \rightarrow 0, C \rightarrow 1$
(3) $A \rightarrow 1, B \rightarrow 1, C \rightarrow 0$
(4) $A \rightarrow 0, B \rightarrow 1, C \rightarrow 0$

Scan or tap for the full solution



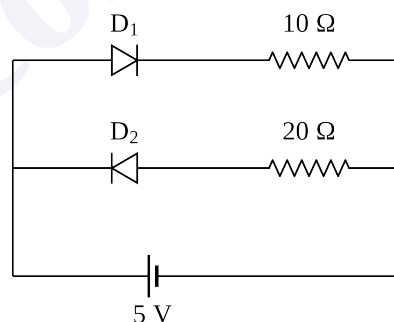
Q.56 The input resistance of a silicon transistor is 100Ω . Base current is changed by $40 \mu\text{A}$ which results in a change in collector current by 2 mA . This transistor is used as a common emitter amplifier with a load resistance of $4 \text{ k}\Omega$. The voltage gain of the amplifier is [AIPMT 2012 (Mains)]

- (1) 2000 (2) 3000 (3) 4000 (4) 1000

Scan or tap for the full solution



Q.57 Two ideal diodes are connected to a battery as shown in the circuit. The current supplied by the battery is [AIPMT 2012 (Prelims)]



- (1) 0.75 A (2) zero (3) 0.25 A (4) 0.5 A

Scan or tap for the full solution



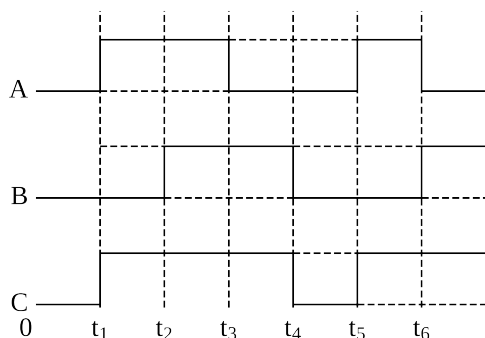
Q.58 C and Si both have same lattice structure; having 4 bonding electrons in each. However, C is insulator whereas Si is intrinsic semiconductor. This is because [AIPMT 2012 (Prelims)]

- (1) In case of C the valence band is not completely filled at absolute zero temperature.
(2) In case of C the conduction band is partly filled even at absolute zero temperature.
(3) The four bonding electrons in the case of C lie in the second orbit, whereas in the case of Si they lie in the third.
(4) The four bonding electrons in the case of C lie in the third orbit, whereas for Si they lie in the fourth orbit.

Scan or tap for the full solution



- Q.59** The figure shows a logic circuit with two inputs A and B and the output C. The voltage wave forms across A, B and C are as given. The logic circuit gate is [AIPMT 2012 (Prelims)]



- (1) OR gate (2) NOR gate
(3) AND gate (4) NAND gate

Scan or tap for the full solution



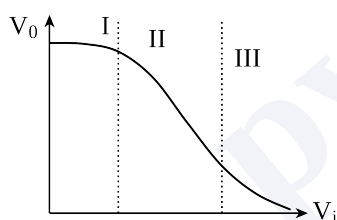
- Q.60** In a CE transistor amplifier, the audio signal voltage across the collector resistance of $2\text{ k}\Omega$ is 2 V . If the base resistance is $1\text{ k}\Omega$ and the current amplification of the transistor is 100, the input signal voltage is [AIPMT 2012 (Prelims)]

- (1) 0.1 V (2) 1.0 V (3) 1 mV (4) 10 mV

Scan or tap for the full solution



- Q.61** Transfer characteristics [output voltage (V_0) vs input voltage (V_i)] for a base biased transistor in CE configuration is as shown in the figure. For using transistor as a switch, it is used [AIPMT 2012 (Prelims)]

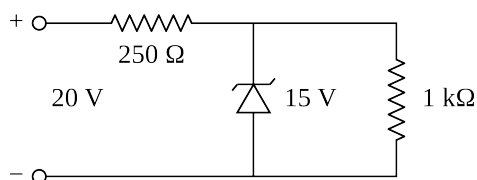


- (1) in region III
(2) both in region (I) and (III)
(3) in region II
(4) in region I

Scan or tap for the full solution



- Q.62** A Zener diode, having breakdown voltage equal to 15 V , is used in a voltage regulator circuit shown in figure. The current through the diode is [AIPMT 2011 (Mains)]

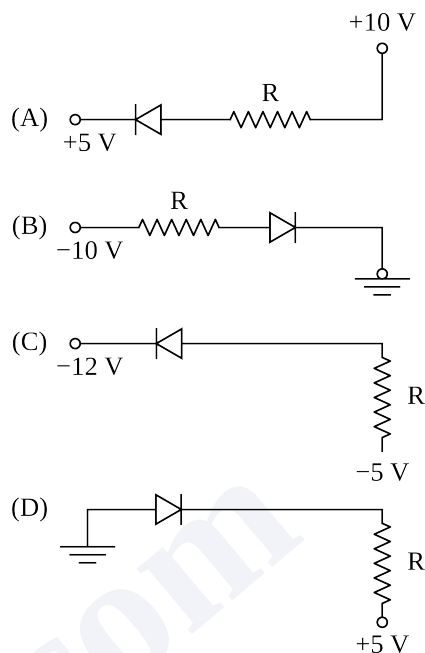


- (1) 5 mA (2) 10 mA (3) 15 mA (4) 20 mA

Scan or tap for the full solution



- Q.63** In the following figure, the diodes which are forward biased, are [AIPMT 2011 (Mains)]



- (1) (A), (B) and (D) (2) (C) only
(3) (C) and (A) (4) (B) and (D)

Scan or tap for the full solution



- Q.64** Pure Si at 500 K has equal number of electron (n_e) and hole (n_h) concentrations of $1.5 \times 10^{16}\text{ m}^{-3}$. Doping by indium increases n_h to $4.5 \times 10^{22}\text{ m}^{-3}$. The doped semiconductor is of [AIPMT 2011 (Mains)]

- (1) p-type having electron concentration $n_e = 5 \times 10^9\text{ m}^{-3}$
(2) n-type with electron concentration $n_e = 5 \times 10^{22}\text{ m}^{-3}$
(3) p-type with electron concentration $n_e = 2.5 \times 10^{10}\text{ m}^{-3}$
(4) n-type with electron concentration $n_e = 2.5 \times 10^{23}\text{ m}^{-3}$

Scan or tap for the full solution



- Q.65** In forward biasing of the p-n junction [AIPMT 2011 (Prelims)]

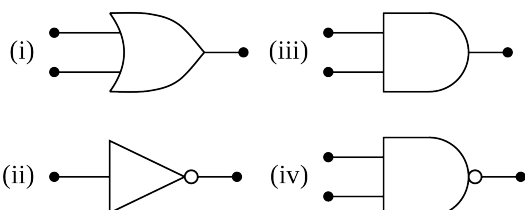
[AIPMT 2011 (Prelims)]

- (1) the positive terminal of the battery is connected to p-side and the depletion region becomes thick.
- (2) the positive terminal of the battery is connected to n-side and the depletion region becomes thin.
- (3) the positive terminal of the battery is connected to n-side and the depletion region becomes thick.
- (4) the positive terminal of the battery is connected to p-side and the depletion region becomes thin.

Scan or tap for the full solution



Q.66 Symbolic representations of four logic gates are shown as



Pick out which ones are for AND, NAND and NOT gates, respectively

[AIPMT 2011 (Prelims)]

- (1) (ii), (iii) and (iv)
- (2) (iii), (ii) and (i)
- (3) (iii), (ii) and (iv)
- (4) (iii), (iv) and (ii)

Scan or tap for the full solution



Q.67 If a small amount of antimony is added to germanium crystal

[AIPMT 2011 (Prelims)]

- (1) it becomes a p-type semiconductor
- (2) the antimony becomes an acceptor atom
- (3) there will be more free electrons than holes in the semiconductor
- (4) its resistance is increased

Scan or tap for the full solution



Q.68 A transistor is operated in common emitter configuration at $V_C = 2$ V such that a change in the base current from $100 \mu\text{A}$ to $300 \mu\text{A}$ produces a change in the collector current from 10 mA to 20 mA. The current gain is

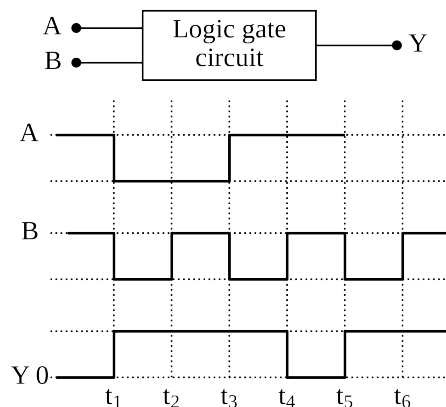
[AIPMT 2011 (Prelims)]

- (1) 50
- (2) 75
- (3) 100
- (4) 25

Scan or tap for the full solution



Q.69 The following figure shows a logic gate circuit with two inputs A and B and the output Y. The voltage waveforms of A, B and Y are as given.



The logic gate is

[AIPMT 2010 (Mains)]

- (1) NOR gate
- (2) OR gate
- (3) AND gate
- (4) NAND gate

Scan or tap for the full solution



Q.70 For transistor action

Which one of the following pairs of statements is correct?

- A. Base, emitter and collector regions should have similar size and doping concentrations.
- B. The base region must be very thin and lightly doped.
- C. The emitter-base junction is forward biased and base-collector junction is reverse biased.
- D. Both the emitter-base junction as well as the base-collector junction are forward biased.

[AIPMT 2010 (Mains)]

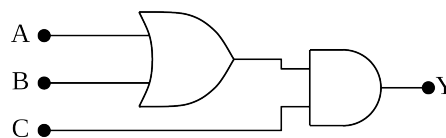
- (1) D and A
- (2) A and B
- (3) B and C
- (4) C and D

Scan or tap for the full solution



Q.71 To get an output $Y = 1$ in given circuit which of the following input will be correct?

[AIPMT 2010 (Prelims)]



- (1) $A \rightarrow 1, B \rightarrow 0, C \rightarrow 0$
- (2) $A \rightarrow 1, B \rightarrow 0, C \rightarrow 1$
- (3) $A \rightarrow 1, B \rightarrow 1, C \rightarrow 0$
- (4) $A \rightarrow 0, B \rightarrow 1, C \rightarrow 0$

Scan or tap for the full solution



Q.72 Which one of the following statements is false?

[AIPMT 2010 (Prelims)]

- (1) Pure Si doped with trivalent impurities gives a p-type semiconductor.
- (2) Majority carriers in a n-type semiconductor are holes.
- (3) Minority carriers in a p-type semiconductor are electrons.
- (4) The resistance of intrinsic semiconductor decreases with increase of temperature.

Scan or tap for the full solution



Q.73 Which one of the following bonds produces a solid that reflects light in the visible region and whose electrical conductivity decreases with temperature and has high melting point? [AIPMT 2010 (Prelims)]

- (1) metallic bonding
- (2) van der Waals' bonding
- (3) ionic bonding
- (4) covalent bonding

Scan or tap for the full solution



Q.74 The device that can act as a complete electronic circuit is [AIPMT 2010 (Prelims)]

- (1) junction diode
- (2) integrated circuit
- (3) junction transistor
- (4) zener diode

Scan or tap for the full solution



Q.75 A common emitter amplifier has a voltage gain of 50, an input impedance of $100\ \Omega$ and an output impedance of $200\ \Omega$. The power gain of the amplifier is [AIPMT 2010 (Prelims)]

- (1) 500
- (2) 1000
- (3) 1250
- (4) 50

Scan or tap for the full solution



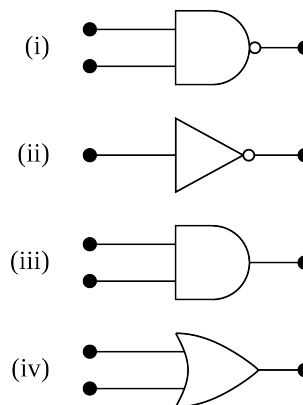
Q.76 A p-n photodiode is fabricated from a semiconductor with a band gap of 2.5 eV. It can detect a signal of wavelength [AIPMT 2009]

- (1) 4000 nm
- (2) 6000 nm
- (3) 4000 Å
- (4) 6000 Å

Scan or tap for the full solution



Q.77 The symbolic representation of four logic gates are given below



The logic symbols for OR, NOT and NAND gates are respectively [AIPMT 2009]

- (1) (iv), (i), (iii)
- (2) (iv), (ii), (i)
- (3) (i), (iii), (iv)
- (4) (iii), (iv), (ii)

Scan or tap for the full solution



Q.78 A transistor is operated in common-emitter configuration at $V_C = 2\text{ V}$ such that a change in the base current from $100\ \mu\text{A}$ to $200\ \mu\text{A}$ produces a change in the collector current from 5 mA to 10 mA. The current gain is [AIPMT 2009]

- (1) 100
- (2) 150
- (3) 50
- (4) 75

Scan or tap for the full solution



Q.79 A p-n photodiode is made of a material with a band gap of 2.0 eV. The minimum frequency of the radiation that can be absorbed by the material is nearly [AIPMT 2008]

- (1) $1 \times 10^{14}\text{ Hz}$
- (2) $20 \times 10^{14}\text{ Hz}$
- (3) $10 \times 10^{14}\text{ Hz}$
- (4) $5 \times 10^{14}\text{ Hz}$

Scan or tap for the full solution



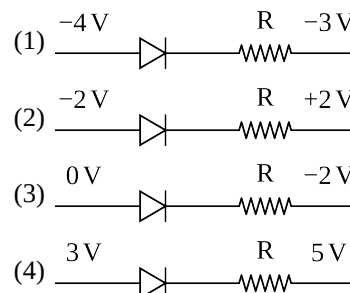
Q.80 The voltage gain of an amplifier with 9% negative feedback is 10. The voltage gain without feedback will be [AIPMT 2008]

- (1) 1.25
- (2) 100
- (3) 90
- (4) 10

Scan or tap for the full solution



Q.81 Which one of the following represents forward bias diode? [AIPMT 2007]

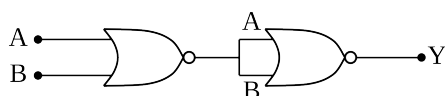


Scan or tap for the full solution



Q.82 In the following circuit, the output Y for all possible inputs A and B is expressed by the truth table.

[AIPMT 2007]



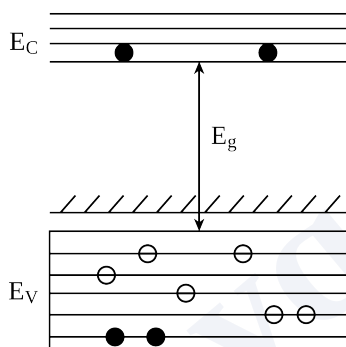
A	B	Y	A	B	Y
0	0	1	0	0	1
(1) 0	1	1	(2) 0	1	0
1	0	1	1	0	0
1	1	0	1	1	0
A	B	Y	A	B	Y
0	0	0	0	0	0
(3) 0	1	1	(4) 0	1	0
1	0	1	1	0	0
1	1	1	1	1	1

Scan or tap for the full solution



Q.83 In the energy band diagram of a material shown below, the open circles and filled circles denote holes and electrons respectively. The material is

[AIPMT 2007]

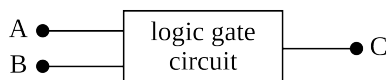


- (1) an insulator
- (2) a metal
- (3) an n-type semiconductor
- (4) a p-type semiconductor

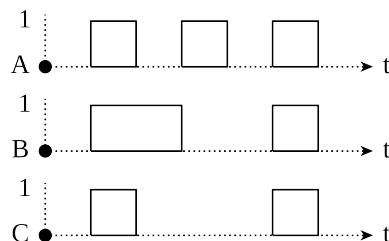
Scan or tap for the full solution



Q.84 The following figure shows a logic gate circuit with two inputs A and B and the output C.



The voltage waveforms of A, B and C are as shown below.



The logic circuit gate is

[AIPMT 2006]

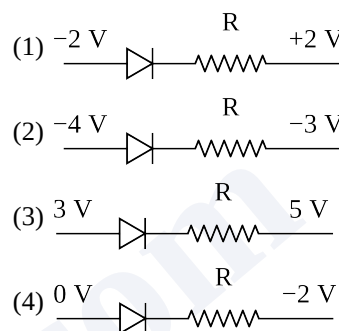
- (1) OR gate
- (2) AND gate
- (3) NAND gate
- (4) NOR gate

Scan or tap for the full solution



Q.85 Which one of the following represents forward bias diode ?

[AIPMT 2006]



Scan or tap for the full solution



Q.86 A transistor is operated in common emitter configuration at constant collector voltage $V_C = 1.5$ V such that a change in the base current from $100 \mu\text{A}$ to $150 \mu\text{A}$ produces a change in the collector current from 5 mA to 10 mA. The current gain β is

[AIPMT 2006]

- (1) 50
- (2) 67
- (3) 75
- (4) 100

Scan or tap for the full solution



Q.87 Choose the only false statement from the following.

[AIPMT 2005]

- (1) In conductors the valence and conduction bands overlap.
- (2) Substances with energy gap of the order of 10 eV are insulators.
- (3) The resistivity of a semiconductor increases with increase in temperature.
- (4) The conductivity of a semiconductor increases with increase in temperature.

Scan or tap for the full solution



Q.88 If a full wave rectifier circuit is operating from 50 Hz mains, the fundamental frequency in the ripple will be

[AIPMT 2003]

- (1) 25 Hz
- (2) 50 Hz
- (3) 70.7 Hz
- (4) 100 Hz

Scan or tap for the full solution



- Q.89** Zener diode is used for [AIPMT 2005]
- (1) amplification
 - (2) rectification
 - (3) stabilisation
 - (4) producing oscillations in an oscillator.

Scan or tap for the full solution



- Q.90** Application of a forward bias to a p-n junction [AIPMT 2005]
- (1) widens the depletion zone
 - (2) increases the potential difference across the depletion zone
 - (3) increases the number of donors on the n side
 - (4) decreases the electric field in the depletion zone.

Scan or tap for the full solution



- Q.91** Carbon, silicon and germanium atoms have four valence electrons each. Their valence and conduction bands are separated by energy band gaps represented by $(E_g)_C$, $(E_g)_{Si}$ and $(E_g)_{Ge}$ respectively. Which one of the following relationships is true in their case? [AIPMT 2005]
- (1) $(E_g)_C > (E_g)_{Si}$
 - (2) $(E_g)_C < (E_g)_{Si}$
 - (3) $(E_g)_C = (E_g)_{Si}$
 - (4) $(E_g)_C < (E_g)_{Ge}$

Scan or tap for the full solution



- Q.92** In a p-n junction photo cell, the value of the photo-electromotive force produced by monochromatic light is proportional to [AIPMT 2005]
- (1) The barrier voltage at the p-n junction.
 - (2) The intensity of the light falling on the cell.
 - (3) The frequency of the light falling on the cell.
 - (4) The voltage applied at the p-n junction.

Scan or tap for the full solution



- Q.93** In semiconductors at room temperature [AIPMT 2004]
- (1) the valence band is partially empty and the conduction band is partially filled
 - (2) the valence band is completely filled and the conduction band is partially filled
 - (3) the valence band is completely filled
 - (4) the conduction band is completely empty

Scan or tap for the full solution



- Q.94** The peak voltage in the output of a half wave diode rectifier fed with a sinusoidal signal without filter is 10 V. The d.c. component of the output voltage is [AIPMT 2004]

- (1) $(10/\sqrt{2})$ V
- (2) $\left(\frac{10}{\pi}\right)$ V
- (3) 10 V
- (4) $(20/\pi)$ V

Scan or tap for the full solution

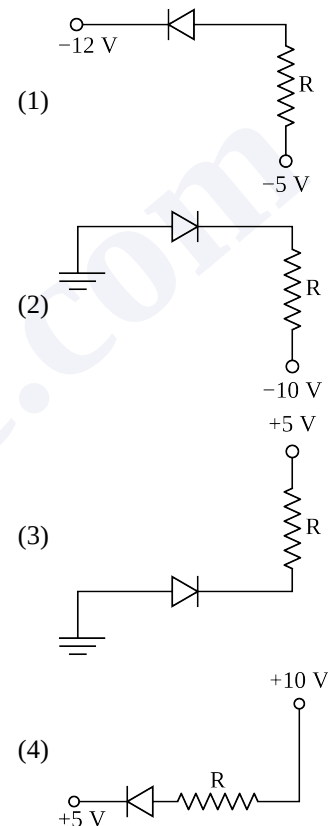


- Q.95** The output of OR gate is 1 [AIPMT 2004]
- (1) if both inputs are zero
 - (2) if either or both inputs are 1
 - (3) only if both inputs are 1
 - (4) if either input is zero

Scan or tap for the full solution



- Q.96** Of the diodes shown in the following diagrams, which one is reverse biased? [AIPMT 2004]



Scan or tap for the full solution



- Q.97** Reverse bias applied to a junction diode [AIPMT 2003]
- (1) lowers the potential barrier
 - (2) raises the potential barrier
 - (3) increases the majority carrier current
 - (4) increases the minority carrier current

Scan or tap for the full solution



Q.98 Barrier potential of a p-n junction diode does not depend on [AIPMT 2003]

- (1) diode design (2) temperature
(3) forward bias (4) doping density

Scan or tap for the full solution



Q.99 An n-p-n transistor conducts when [AIPMT 2003]

- (1) both collector and emitter are positive with respect to the base
(2) collector is positive and emitter is negative with respect to the base
(3) collector is positive and emitter is at same potential as the base
(4) both collector and emitter are negative with respect to the base

Scan or tap for the full solution



Q.100 In a p-n junction [AIPMT 2002]

- (1) high potential at n side and low potential at p side
(2) high potential at p side and low potential at n side
(3) p and n both are at same potential
(4) undetermined.

Scan or tap for the full solution



Q.101 The given truth table is for which logic gate? [AIPMT 2002]

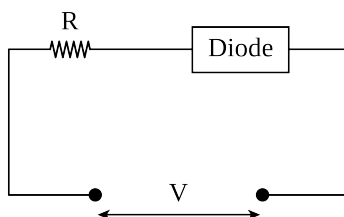
A	B	Y
1	1	0
0	1	1
1	0	1
0	0	1

- (1) NAND (2) XOR (3) NOR (4) OR.

Scan or tap for the full solution



Q.102 For the given circuit of p-n junction diode, which is correct? [AIPMT 2002]



- (1) in forward bias the voltage across R is V
(2) in reverse bias the voltage across R is V
(3) in forward bias the voltage across R is 2V
(4) in reverse bias the voltage across R is 2V.

Scan or tap for the full solution



Q.103 For a transistor $\frac{I_C}{I_E} = 0.96$, then current gain for common emitter is [AIPMT 2002]
(1) 12 (2) 6 (3) 48 (4) 24

Scan or tap for the full solution



Q.104 The given truth table is for which logic gate [AIPMT 2001]

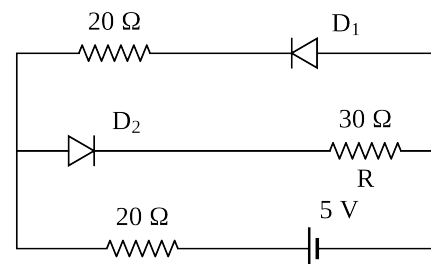
A	B	Y
1	1	0
0	1	1
1	0	1
0	0	1

- (1) NAND (2) XOR (3) NOR (4) OR

Scan or tap for the full solution



Q.105 The current in the circuit will be [AIPMT 2001]



- (1) $\frac{5}{40}$ A (2) $\frac{5}{50}$ A (3) $\frac{5}{10}$ A (4) $\frac{5}{20}$ A

Scan or tap for the full solution



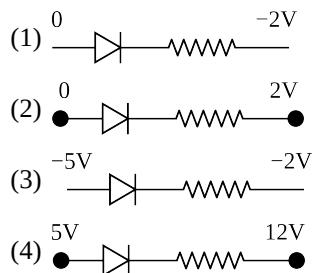
Q.106 For a common base circuit if $\frac{I_C}{I_E} = 0.98$ then current gain for common emitter circuit will be [AIPMT 2001]

- (1) 49 (2) 98 (3) 4.9 (4) 25.5

Scan or tap for the full solution



Q.107 From the following diode circuits, which diode is in forward biased condition? [AIPMT 2000]



Scan or tap for the
full solution



Q.108 The correct relation between α and β for a transistor is

[AIPMT 2000]

- (1) $\beta = \frac{1-\alpha}{\alpha}$ (2) $\beta = \frac{\alpha}{1-\alpha}$
 (3) $\alpha = \frac{\beta-1}{\beta}$ (4) $\alpha\beta = 1$

Scan or tap for the
full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7
Ans.	3	4	2	3	4	3, 4	2
Ques.	8	9	10	11	12	13	14
Ans.	3	1	4	4	2	3	4
Ques.	15	16	17	18	19	20	21
Ans.	2	1	4	3	3	2	4
Ques.	22	23	24	25	26	27	28
Ans.	4	4	4	3	1	4	3
Ques.	29	30	31	32	33	34	35
Ans.	2	1	2	4	4	2	4
Ques.	36	37	38	39	40	41	42
Ans.	2	2	4	3	1	3	2
Ques.	43	44	45	46	47	48	49
Ans.	3	2	1	2	1	4	1
Ques.	50	51	52	53	54	55	56
Ans.	1	3	1	2	2	2	1
Ques.	57	58	59	60	61	62	63
Ans.	4	3	1	4	2	1	3
Ques.	64	65	66	67	68	69	70
Ans.	1	4	4	3	1	4	3
Ques.	71	72	73	74	75	76	77
Ans.	2	2	1	2	3	3	2
Ques.	78	79	80	81	82	83	84
Ans.	3	4	2	3	3	4	2
Ques.	85	86	87	88	89	90	91
Ans.	4	4	3	4	3	4	1
Ques.	92	93	94	95	96	97	98
Ans.	2	1	2	2	3	2	1
Ques.	99	100	101	102	103	104	105
Ans.	2	1	1	1	4	1	2
Ques.	106	107	108				
Ans.	1	1	2				