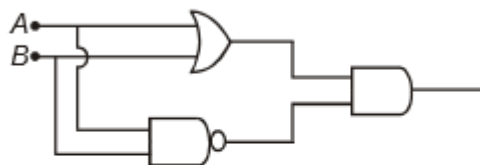


1.

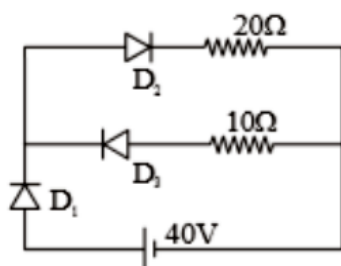
The following configuration of logic gate is equivalent to



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

2.

Three ideal diodes are connected to the battery as shown in the circuit. The current supplied by the battery is



1. Zero
2. 4A
3. 2A
4. 6A

3.

If a small amount of aluminium is added to the silicon crystal

1. Its resistance is decreased
2. It becomes a p-type semiconductor
3. There will be less free-electron than holes in semiconductor
4. All of these are correct

4.

When a pn junction is formed biased

1. Depletion region becomes thick
2. p-side is at a higher potential than n side
3. Current flowing is zero

4. Effective resistance is of the order of $10^6 \Omega$

5.

When a transistor is used as a switch it is in

1. Active state
2. Cut off state
3. Saturation state
4. Both cut off state and saturation state are possible

6.

For a transistor amplifier, the power gain and voltage gain are 150 and 10 respectively. The current gain is

1. $\frac{1}{10}$
2. $\frac{1}{15}$
3. 15
4. 1500

7.

When the temperature of the silicon sample is increased from 27°C to 100°C , the conductivity of silicon will be

1. Increased
2. Decreased
3. Remain same
4. Zero

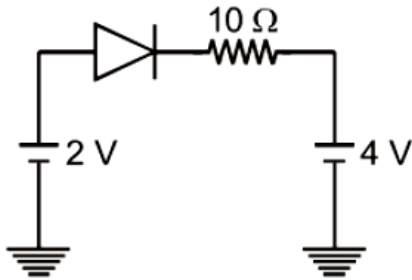
8.

A transistor is used in common emitter mode in an amplifier circuit. When a signal of 10 mV is added to the base-emitter voltage, the base current changes by $15 \mu\text{A}$ and the collector current changes by 1.5 mA. The current gain β will be

1. 50
2. 48
3. 100
4. 200

9.

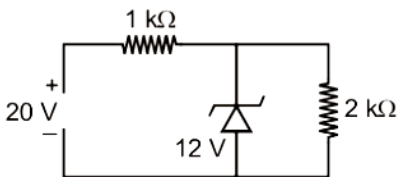
The current through an ideal p-n junction diode shown in the circuit will be -



1. 5 A
2. 0.2 A
3. 0.6 A
4. Zero

10.

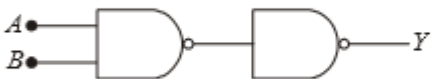
In the given circuit power developed in $1k\Omega$ resistor is



1. 36 mW
2. 12 mW
3. 144 mW
4. 64 mW

11.

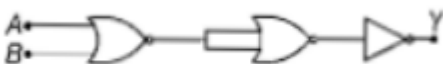
Following diagram performs logic function of



1. AND gate
2. NAND gate
3. XOR gate
4. OR gate

12.

The given electrical network is equivalent to

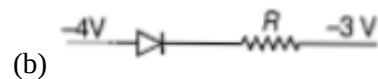


- (a) AND gate
- (b) OR gate
- (c) NOR gate

(d) NOT gate

13.

Which one of the following represents forward biased circuit?



14.

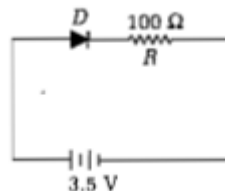
What is the output Y in the following circuit, when all the three inputs A,B,C are first 0 and then 1 ?



- (a) 0,1
- (b) 0,0
- (c) 1,0
- (d) 1,1

15.

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



- (a) 30mA
- (b) 40mA
- (c) 20mA
- (d) 35mA

16.

The barrier potential of a p-n junction depends on

(i) type of semiconductor material

(ii) amount of doping

(iii) temperature

Which one of the following is correct

(a) (i) and (ii) only

(b) (ii) only

(c) (ii) and (iii) only

(d) (i), (ii) and (iii)

17.

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

(a) 0.1 V

(b) 1.0 V

(c) 1 mV

(d) 10 mV

18.

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

(a) in case of C, the valence band is not completely filled at absolute zero temperature

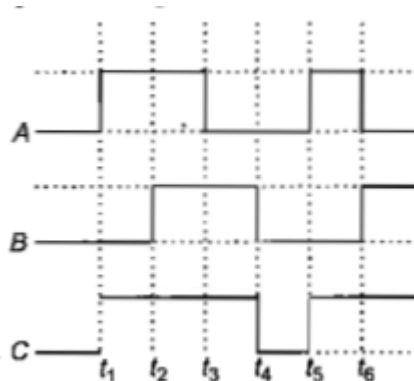
(b) in case of C, the conduction band is partly filled even at absolute zero temperature

(c) 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

(d) the four bonding electrons in the case of C lie in the third orbit, whereas for Si they lie in the fourth orbit

19.

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



(a) OR gate

(b) NOR gate

(c) AND gate

(d) NAND gate

20.

The input resistance of a silicon transistor is $100\text{ }\Omega$. Base current is changed by $40\text{ }\mu\text{A}$ 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

(a) 2000

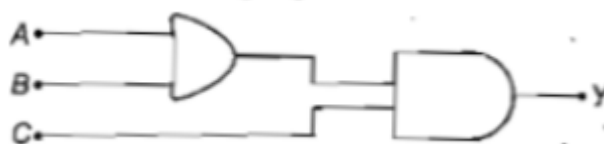
(b) 3000

(c) 4000

(d) 1000

21.

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



A B C A B C

(a) 1 0 0 (b) 1 0 1

(c) 1 1 0 (d) 0 1 0

22.

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

(a) 75

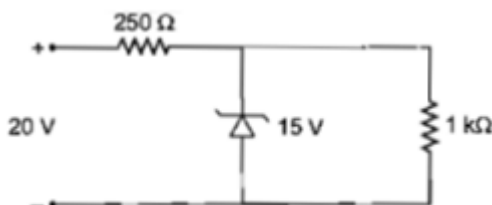
(b) 100

(c) 25

(d) 50

23.

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



(a) 10 mA

(b) 15 mA

(c) 20 mA

(d) 5 mA

24.

The device that can act as a complete electronic circuit is

(a) Junction diode

(b) Integrated circuit

(c) Junction transistor

(d) Zener diode

25.

A transistor is operated in common-emitter configuration at $V_c = 2\text{volt}$ 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

(a) 75

(b) 100

(c) 150

(d) 50

26.

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

(a) $10 \times 10^{14}\ \text{Hz}$

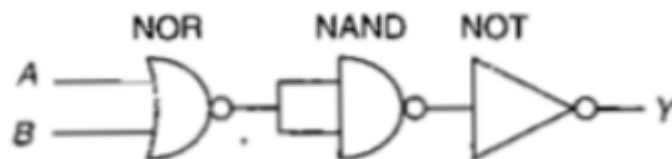
(b) $5 \times 10^{14}\ \text{Hz}$

(c) $1 \times 10^{14}\ \text{Hz}$

(d) $20 \times 10^{14}\ \text{Hz}$

27.

The circuit is equivalent to



(a) AND gate

(b) NAND gate

(c) NOR gate

(d) OR gate

28.

In a PN-junction diode

(a) The current in the reverse biased condition is generally very small

(b) The current in the reverse biased condition is small but the forward biased current is independent of the bias voltage

(c) The reverse biased current is strongly dependent on the applied bias voltage

(d) The forward biased current is very small in comparison to reverse biased current

29.

The reverse biasing in a PN junction diode

(a) Decreases the potential barrier

(b) Increases the potential barrier

(c) Increases the number of minority charge carriers

(d) Increases the number of majority charge carriers

30.

The electrical resistance of depletion layer is large because

(a) It has no charge carriers

(b) It has a large number of charge carriers

(c) It contains electrons as charge carriers

(d) It has holes as charge carriers

31.

In an NPN transistor the collector current is 24 mA. If 80% of electrons reach collector its base current in mA is

(a) 36

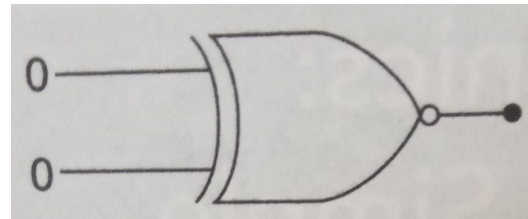
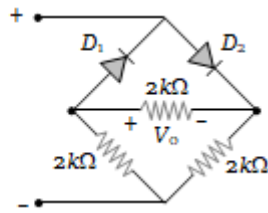
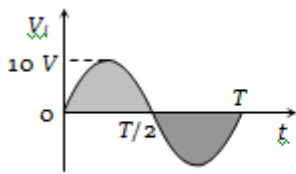
(b) 26

(c) 16

(d) 6

32.

In the circuit shown in figure the maximum output voltage V_0 is



- (a) 0 V
(b) 5 V
(c) 10 V
(d) $\frac{5}{\sqrt{2}}$

33.

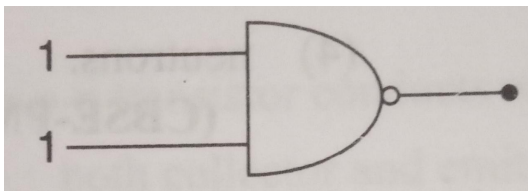
A semi-conducting device is connected in a series in the circuit with a battery and resistance. A current is allowed to pass through the circuit. If the polarity of the battery is reversed, the current drops to almost zero. The device maybe

- (1) a pn junction
(2) an intrinsic semiconductor
(3) a p-type semiconductor
(4) an n-type semiconductor

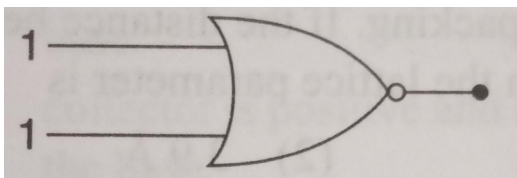
34.

Which one of the following gates will have an output of 1?

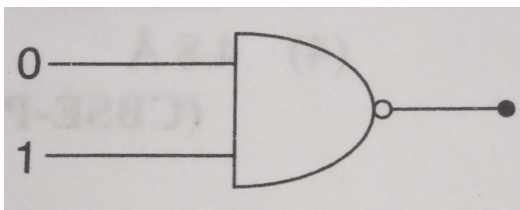
(A)



(B)



(C)



(D)

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

35.

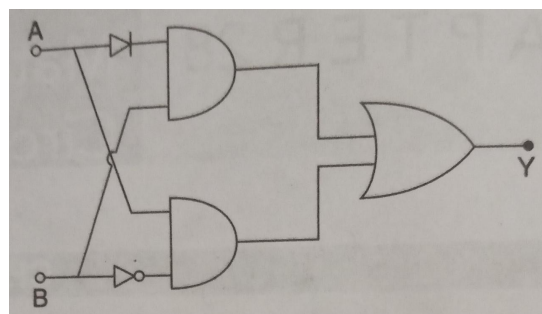
The truth table given below is for which gate?

Input		Output
A	B	C
0	0	1
0	1	1
1	0	1
1	1	0

- (1) XOR
(2) OR
(3) AND
(4) NAND

36.

The following circuit represents:



- (1) OR gate

(2) XOR gate

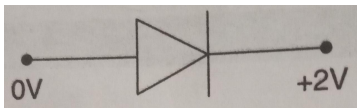
(3) AND gate

(4) NAND gate

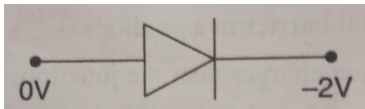
37.

In which of the following figures junction diode is forward biased?

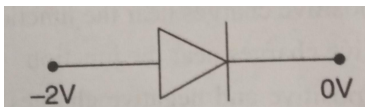
(1)



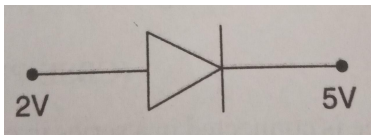
(2)



(3)

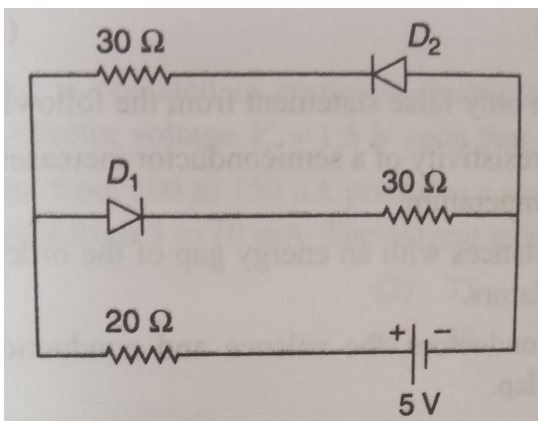


(4)



38.

If the internal resistance of the cell is negligible, then current flowing through the circuit is



(1) $\frac{3}{50} A$

(2) $\frac{5}{50} A$

(3) $\frac{4}{50} A$

(4) $\frac{2}{50} A$

39.

For a transistor $\frac{I_C}{I_E} = 0.96$, then, the current gain for common emitter configuration

(1) 12

(2) 6

(3) 48

(4) 24

40.

For which logic gate, the given truth table is shown?

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

(1) NAND

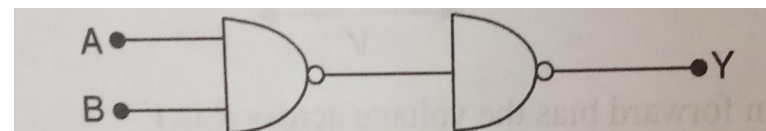
(2) XOR

(3) NOR

(4) OR

41.

Following diagram performs the logic function of



(1) AND gate

(2) NAND gate

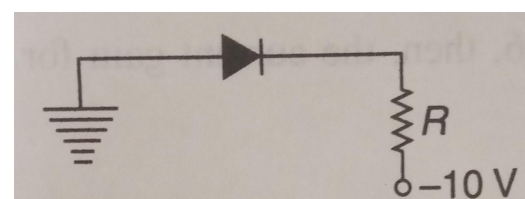
(3) OR gate

(4) XOR gate

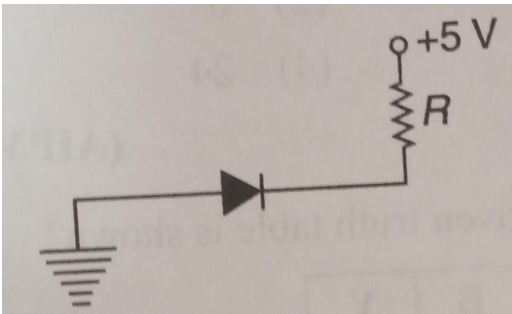
42.

Which one of the diode is reverse biased?

(1)



(2)

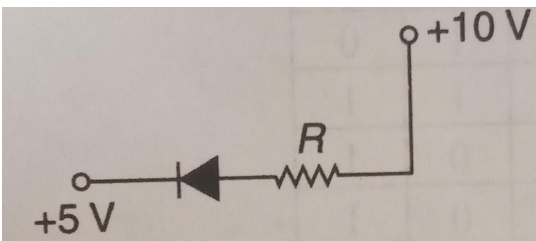


produces a change in the collector current from 5 to 10 mA. The current gain (β) is

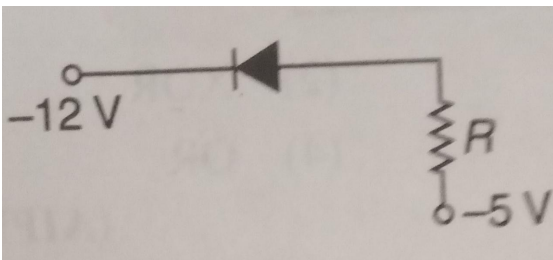
- (1) 67
- (2) 75
- (3) 100
- (4) 50

(3)

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(4)



43.

Application of forward bias to a p-n junction

- (1) widens the depletion zone
- (2) increases the number of donors on the n-side
- (3) increases the potential difference across the depletion zone
- (4) increases the electric field in the depletion zone

44.

In a p-n junction photocell, the value of the photo electromotive force produced by monochromatic light is proportional to

- (1) the intensity of the light falling on the cell
- (2) the frequency of the light falling on the cell
- (3) the voltage applied at the p-n junction
- (4) the barrier voltage at the p-n junction

45.

A transistor is operated in common emitter configuration at constant voltage $V_C = 1.5 \text{ V}$ such that a change in the base current from 100 to 150 μA

