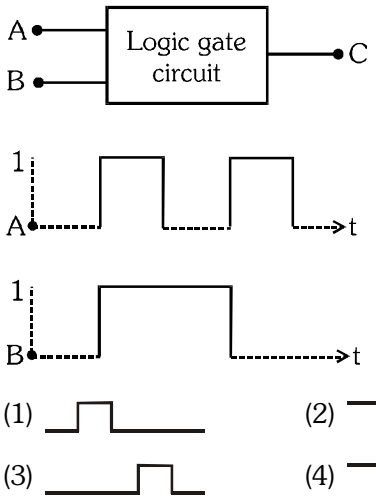
AIPMT 2006

1. A transistor-oscillator using a resonant circuit with an inductor L (of negligible resistance) and a capacitor C in series produce oscillations of frequency f. If L is doubled and C is changed to 4C, the frequency will be :-

(1) $\frac{f}{4}$ (2) 8 f (3) $\frac{f}{2\sqrt{2}}$ (4) $\frac{f}{2}$

2. The following figure shows a AND logic gate circuit with two inputs A and B and the output C. The voltage waveforms of C will be -

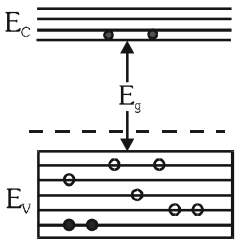


(1) (2)

(3) (4)

AIPMT 2007

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



(1) an n-type semiconductor

(2) a p-type semicoductor

(3) an insulator

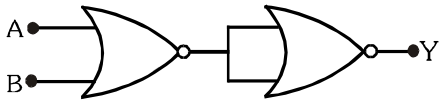
(4) a metal

4. A common emitter amplifier has a voltage gain of 50, an input impedance of 100 Ω and an output impedance of 200 Ω. The power gain of the amplifier is :-

(1) 100 (2) 500

(3) 1000 (4) 1250

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



(1)

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

(2)

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

(3)

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

(4)

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

AIPMT 2008

6. 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 :-

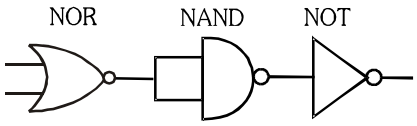
(1) 1×10^{14} Hz (2) 20×10^{14} Hz

(3) 10×10^{14} Hz (4) 5×10^{14} Hz

7. The voltage gain of an amplifier with 9% negative feedback is 10. The voltage gain without feedback will be :-

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

8. The circuit



is equilvalent to:-

(1) NOR gate (2) OR gate

(3) AND gate (4) NAND gate

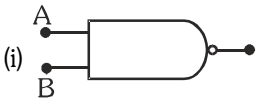
AIPMT 2009

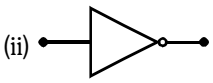
9. A p-n photodiode is fabricated from a semiconductor with a band gap of 2.5 eV. It can detect a signal of wavelength :-

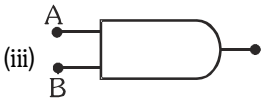
(1) 4000 Å (2) 6000 Å

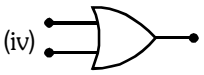
(3) 4000 nm (4) 6000 nm

10. The symbolic representation of four logic gates are given below :

(i) 

(ii) 

(iii) 

(iv) 

The logic symbols for OR, NOT and NAND gates are respectively :-

(1) (i), (iii), (iv) (2) (iii), (iv), (ii)

(3) (iv), (i), (iii) (4) (iv), (ii), (i)

AIPMT 2010

11. The device that can act as a complete electronic circuit is :

(1) Zener diode

(2) Junctions diode

(3) Integrated circuit

(4) Junction transistor

SC0126

12. Which one of the following statement is false ?

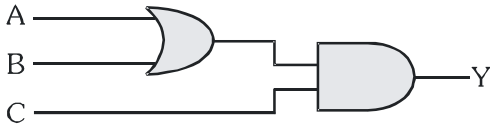
(1) The resistance of intrinsic semiconductor decreases with increase of temperature.

(2) Pure Si doped with trivalent impurities gives a p-type semiconductor.

(3) Majority carriers in a n-type semiconductor are holes .

(4) Minority carriers in a p-type semiconductor are electrons.

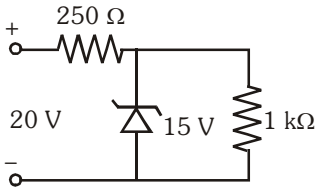
13. To get an output Y = 1 in given circuit which of the following input will be correct:



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

AIPMT 2011

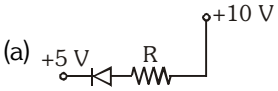
14. A zener diode, having breakdown voltage equal to 15 V, is used in a voltage regulator circuit shown in figure. The current through the zener diode is :-

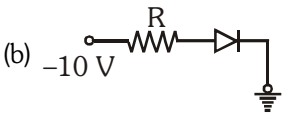


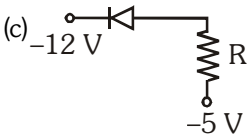
(1) 5 mA (2) 10 mA

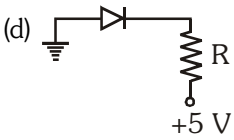
(3) 15 mA (4) 20 mA

15. In the following figure, the diodes which are forward biased, are :-

(a) 

(b) 

(c) 

(d) 

(1) (a), (b) and (d) (2) (c) only

(3) (a) and (c) (4) (b) and (d)

16. Pure Si at 500 K has equal number of electron (n_e) and hole (n_h) concentrations to 1.5×10^{16} m^{-3}. Doping by indium increases n_h to 4.5×10^{22} m^{-3}. The doped semiconductor is of :-

(1) p-type having electron concentrations $n_e = 5 \times 10^9$ m^{-3}

(2) n-type with electron concentration $n_e = 5 \times 10^{22}$ m^{-3}

(3) P-type with electron concentration $n_e = 2.5 \times 10^{10}$ m^{-3}

(4) n-type with electron concentration $n_e = 2.5 \times 10^{23}$ m^{-3}

17. A transistor is operated in common emitter configuration at $V_C = 2$ V such that a change in the base current from 100 μA to 300 μA produces a change in the collector current from 10 mA to 20 mA. The current gain is :-

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

18. In forward biasing of the p–n junction :-

(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.

19. If a small amount of antimony is added to germanium crystal :

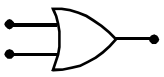
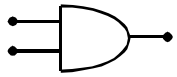
(1) it becomes a p-type semiconductor

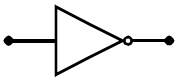
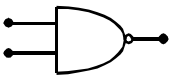
(2) the antimony becomes an acceptor atom

(3) there will be more free electrons than holes in the semiconductor

(4) its resistance is increased

20. Symbolic representation of four logic gates are shown as :-

(i)  (ii) 

(iii)  (iv) 

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

(1) (ii), (iii) and (iv) (2) (iii), (ii) and (i)

(3) (iii), (ii) and (iv) (4) (ii), (iv) and (iii)

AIPMT 2012

21. In a CE transistor amplifier, the audio signal voltage across the collector resistance of 2 kΩ is 2 V. If the base resistance is 1kΩ and the current amplification of the transistor is 100, the input signal voltage is:-

(1) 1 mV (2) 10 mV

(3) 0.1 V (4) 1.0 V

22. C and Si both have same lattice structure, having 4 bonding electrons in each. However, C is insulator where as Si is intrinsic semiconductor. This is because :

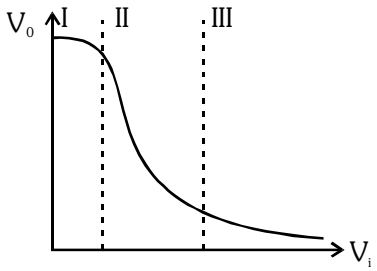
(1) The four bonding electrons in the case of C lie in the second orbit, whereas in the case of Si they lie in the third.

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

(3) In case of C the valence band is not completely filled at absolute zero temperature.

(4) In case of C the conduction band is partly filled even at absolute zero temperature

23. 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.



(1) in region II (2) in region I

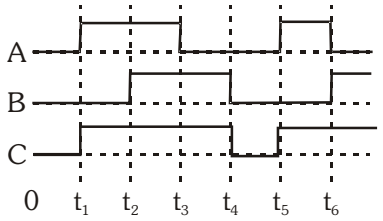
(3) in region III (4) both in region (I) & (III)

24. The input resistance of a silicon transistor is 100 Ω. Base current is changed by 40 μA 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 kΩ. The voltage gain of the amplifier is :

(1) 4000 (2) 1000

(3) 2000 (4) 3000

25. The figure shown a logic circuit 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:



(1) AND gate (2) NAND gate

(3) OR gate (4) NOR gate

NEET-UG 2013

26. 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 :

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

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

27. In a n-type semiconductor, which of the following statement is true:

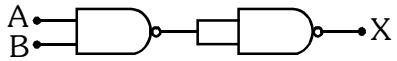
(1) Holes are majority carriers and trivalent atoms are dopants.

(2) Electrons are majority carriers and trivalent atoms are dopants.

(3) Electron are minority carriers and pantavalent atoms are dopants.

(4) Holes are minority carriers and pentavalent atoms are dopants.

28. The output (X) of the logic circuit shown in figure will be :

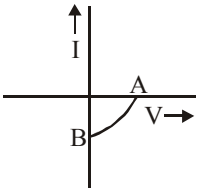


(1) $X = \overline{A + B}$ (2) $X = \overline{\overline{A}.\overline{B}}$

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

AIPMT 2014

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



Which of the following statement is **correct** ?

(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 a for a solar cell and point 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.

30. The barrier potential of a p-n junction depends on:

(a) type of semiconductor material

(b) amount of doping

(c) temperature

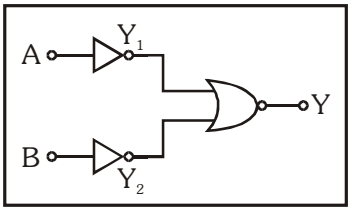
Which one of the following is correct ?

(1) (a) and (b) only (2) (b) only

(3) (b) and (c)only (4) (a), (b) and (c)

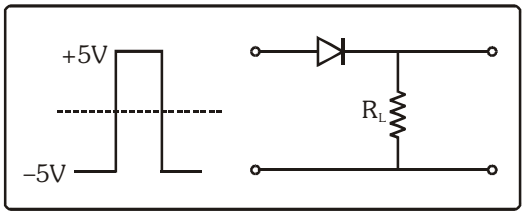
AIPMT-2015

31. Which logic gate is represented by the following combination of logic gates ?

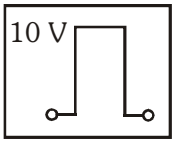


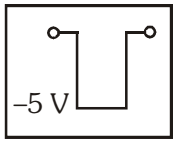
(1) NAND (2) AND (3) NOR (4) OR

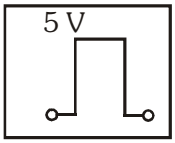
32. If in a p-n junction, a square input signal of 10 V is applied as shown,

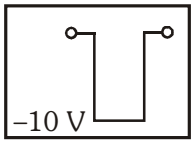


then the output across R_L will be :

(1) 

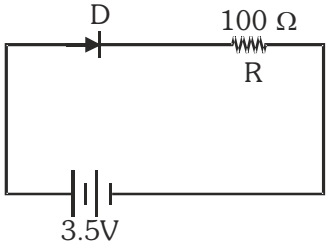
(2) 

(3) 

(4) 

RE–AIPMT-2015

33. In the given figure, a diode D is connected to an external resistance R =100 Ω 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 :



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

34. 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 -

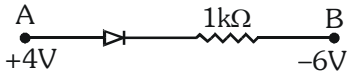
(1) $300\cos\left(15t+\frac{4\pi}{3}\right)$ (2) $300\cos\left(15t+\frac{\pi}{3}\right)$

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

SC0159

NEET-I 2016

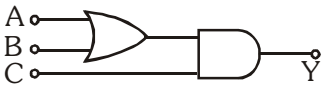
35. Consider the junction diode as ideal. The value of current flowing through AB is :



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

36. A npn transistor is connected in common emitter configuration in a given amplifier. A load resistance of 800 Ω 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 :
(1) 4, 3.84 (2) 3.69, 3.84
(3) 4, 4 (4) 4, 3.69

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

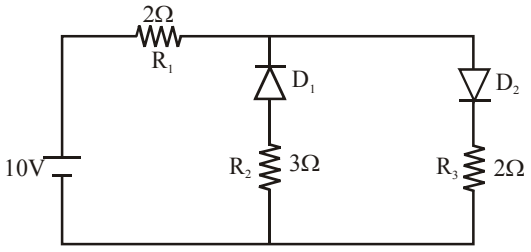


(1) A = 0, B = 1, C = 0
(2) A = 1, B = 0, C = 0
(3) A = 1, B = 1, C = 0
(4) A = 1, B = 0, C = 1

NEET-II 2016

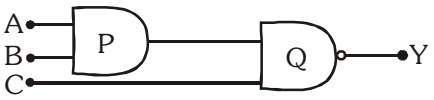
38. For CE transistor amplifier, the audio signal voltage across the collector resistance of 2 kΩ is 4 V. If the current amplification factor of the transistor is 100 and the base resistance is 1 kΩ, then the input signal voltage is :-
(1) 30 mV (2) 15 mV
(3) 10 mV (4) 20 mV

39. The given circuit has two ideal diodes connected as shown in the figure below. The current flowing through the resistance R_1 will be :-



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

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



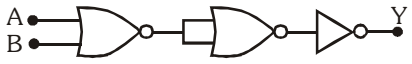
(1) 1,0 (2) 1,1
(3) 0,1 (4) 0.0

NEET(UG) 2017

41. In a common emitter transistor amplifier the audio signal voltage across the collector is 3V. The resistance of collector is 3 kΩ. If current gain is 100 and the base resistance is 2 kΩ, the voltage and power gain of the amplifier is :-

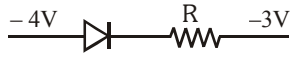
(1) 15 and 200 (2) 150 and 15000
(3) 20 and 2000 (4) 200 and 1000

42. The given electrical network is equivalent to :



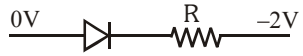
(1) OR gate (2) NOR gate
(3) NOT gate (4) AND gate

43. Which one of the following represents forward bias diode ?

(1) 

(2) 

(3) 

(4) 

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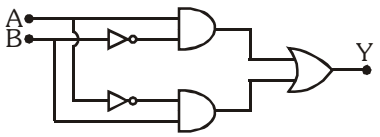
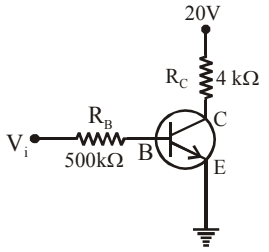
44. In the combination of the following gates the output Y can be written in terms of inputs A and B as :-



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

45. 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 :-



(1) I_B = 40 μA, I_C = 10 mA, β = 250
(2) I_B = 25 μA, I_C = 5 mA, β = 200
(3) I_B = 20 μA, I_C = 5 mA, β = 250
(4) I_B = 40 μA, I_C = 5 mA, β = 125

46. In a p-n junction diode, change in temperature due to heating :-

(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

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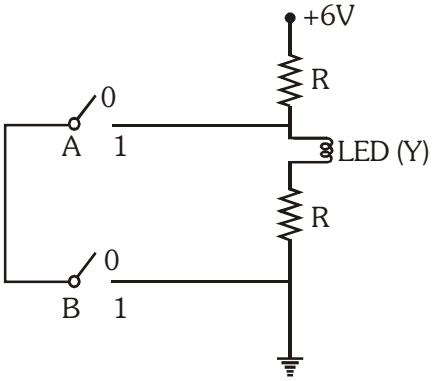
47.



The correct Boolean operation represented by the circuit diagram drawn is :

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

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

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

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49. An LED is constructed from a p-n junction diode using GaAsP. The energy gap is 1.9 eV. The wavelength of the light emitted will be equal to :-

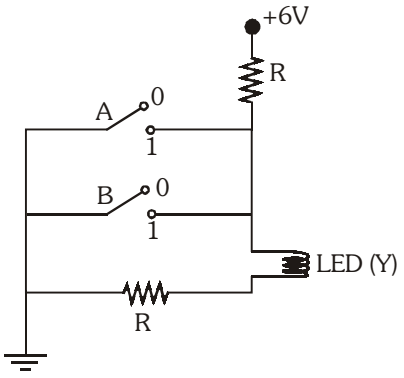
(1) 10.4×10^{-26} m

(2) 654 nm

(3) 654 Å

(4) 654×10^{-11} m

50. The circuit diagram shown here corresponds to the logic gate,



(1) NOR

(2) AND

(3) OR

(4) NAND

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**3**	**1**	**2**	**4**	**1**	**4**	**2**	**1**	**1**	**4**	**3**	**3**	**4**	**1**	**3**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**1**	**1**	**4**	**4**	**4**	**2**	**1**	**4**	**3**	**3**	**2**	**4**	**2,4**	**1**	**4**
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	**2**	**3**	**2**	**1**	**2**	**1**	**4**	**4**	**3**	**1**	**2**	**2**	**4**	**2**	**4**
Que.	46	47	48	49	50										
Ans.	**4**	**3**	**2**	**2**	**1**										