Exercise - I (Conceptual Questions) Build Up Your Understanding

SEMICONDUCTORS

1. On increasing the temperature the specific resistance of a semiconductor :–
(1) increases
(2) decreases
(3) does not change
(4) first decreases and then increases

PSE001

2. Platinum and silicon are cooled after heating up to 25° C then :–
(1) resistance of platinum will increase and that of silicon decreases.
(2) resistance of silicon will increase and that of platinum decreases.
(3) resistance of both will decrease.
(4) resistance of both increases.

PSE002

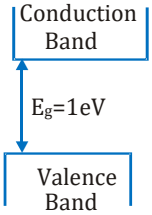
3. Electric conduction in a semiconductor takes place due to :–
(1) electrons only
(2) holes only
(3) both electrons and holes
(4) neither electrons nor holes

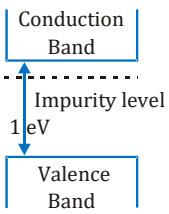
PSE003

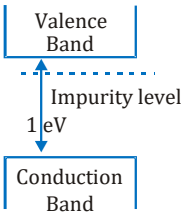
4. The atomic bonding is same for which of the following pairs :–
(1) Ag and Si (2) Ge and Si
(2) Ne and Ge (4) NaCl and Ge

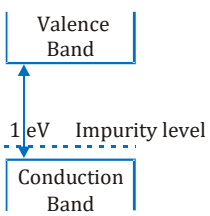
PSE004

5. Which of the following energy band diagram shows the n-type semiconductor :–

(1) 

(2) 

(3) 

(4) 

PSE005

6. Let n_p and n_e be the numbers of holes and conduction electrons in an extrinsic semiconductor.
(1) $n_p > n_e$ (2) $n_p = n_e$
(3) $n_p < n_e$ (4) $n_p \neq n_e$

PSE006

7. A p-type semiconductor is :–
(1) positively charged
(2) negatively charged
(3) uncharged
(4) uncharged at 0K but charged at higher temperatures

PSE007

8. Which statement is correct for p-type semiconductor
(1) the number of electrons in conduction band is more than the number of holes in valence band at room temperature
(2) the number of holes in valence band is more than the number of electrons in conduction band at room temperature
(3) there are no holes and electrons at room temperature
(4) number of holes and electrons is equal in valence and conduction band

PSE008

9. When an impurity is doped into an intrinsic semiconductor, the conductivity of the semiconductor :
(1) increases (2) decreases
(3) remains the same (4) become zero

PSE009

10. When we convert pure semiconductor into N type the number of hole :–
(1) Increases (2) Decreases
(3) Remains constant (4) None

PSE010

11. A semiconductor is damaged by a strong current, because :–
(1) lack of free electrons
(2) decrease in electrons
(3) excess of electrons
(4) none of these

PSE011

12. If n_e and n_h are the number of electrons and holes in a semiconductor heavily doped with phosphorus, then :–
(1) $n_e > > n_h$ (2) $n_e < < n_h$
(3) $n_e \leq n_h$ (4) $n_e = n_h$
PSE012

13. Two wires P and Q made up of different materials have same resistance at room temperature. When heated, resistance of P increases and that of Q decreases. We conclude that:–
(1) P and Q both are conductors but because of being made of different materials it happens so.
(2) P is n-type semiconductor and Q is p-type semiconductor.
(3) P is semiconductor and Q is conductor.
(4) P is conductor and Q is semiconductor.
PSE013

14. When the conductivity of a semiconductor is only due to breaking of covalent bonds, the semiconductor is called :–
(1) intrinsic (2) extrinsic
(3) p-type (4) n-types
PSE014

15. In an intrinsic semiconductor, number of electrons and holes at room temperature are :-
(1) equal (2) zero
(3) unequal (4) infinity
PSE015

16. A semiconductor wire is connected in an electric circuit in series and temperature of semiconductor increased then the current in the circuit :–
(1) decreases (2) constant
(3) increases (4) will not flow
PSE016

17. In germanium crystal, the forbidden energy gap in joule is :–
(1) 1.6×10^{-19} (2) zero
(3) 1.12×10^{-19} (4) 1.76×10^{-19}
PSE017

18. In semiconductor, at room temperature :–
(1) valence band are partially empty and conduction band are partially filled
(2) valence band are fully filled and conduction band are partially empty
(3) valence band are fully filled
(4) conduction band are fully empty
PSE018

19. The probability of electrons to be found in the conduction band of an intrinsic semiconductor at a finite temperature :–
(1) decreases exponentially with increasing band gap.
(2) increases exponentially with increasing band gap.
(3) decrease with increasing temperature.
(4) is independent of the temperature and the band gap.
PSE019

20. In a p-type semiconductor, there are mainly :-
(1) free electrons (2) holes
(3) both (1) and (2) (4) none of these
PSE020

21. A conducting wire of Copper and Germanium are cooled from room temperature to temperature 80K, then their resistance will :–
(1) increase
(2) decrease
(3) copper's increase and Germanium's decrease
(4) copper's decrease and Germanium's increase
PSE021

22. Choose the false statement from the following :-
(1) the resistivity of a semiconductor increases with increase in temperature.
(2) substances with energy gap of the order of 10 eV are insulators.
(3) in conductors the valence and conduction bands may overlap.
(4) the conductivity of a semiconductor increases with increases in temperature.
PSE022

23. Carbon, Silicon and Germanium atoms have four valence electrons each. Their valence and conduction bonds 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 :–
(1) $(E_g)_C < (E_g)_{Ge}$ (2) $(E_g)_C > (E_g)_{Si}$
(3) $(E_g)_C = (E_g)_{Si}$ (4) $(E_g)_C < (E_g)_{Si}$
PSE023

24. In semiconducting material the mobilities of electrons and holes are μ_e and μ_h respectively. Which of the following is true :–
(1) $\mu_e > \mu_h$ (2) $\mu_e < \mu_h$
(3) $\mu_e = \mu_h$ (4) $\mu_e < 0; \mu_h > 0$
PSE024

25. Impurity energy level of n-type semiconductor lies in:-
(1) just above valence band
(2) just below conduction band
(3) between valence and conduction band
(4) none of these
PSE025

26. What is the energy gap in Si semiconductor?
(1) 4.4 eV (2) 0.3 eV
(3) 0.7 eV (4) 1.1 eV
PSE026

PN JUNCTION & BIASING OF DIODE

27. Region which have no free electrons and holes in a p-n junction is :–
(1) p - region (2) n - region
(3) junction (4) depletion region
PSE027

28. In p-n junction at the near at junction there are :-
(1) positive Ions
(2) negative Ions
(3) positive and negative Ions
(4) electrons and holes
PSE028

29. Depletion layer in p-n junction region is caused by
(1) drift holes
(2) diffusion of free carriers
(3) migration of impurity ions
(4) drift of electrons
PSE029

30. In a P–N Junction diode not connected to any circuit
(1) potential is the same everywhere.
(2) the P - type side is at a higher potential than the N - type side.
(3) there is an electric field at the junction directed from the N-type side to the P-type side.
(4) there is an electric field at the junction directed from the P-type side to the N-type side.
PSE030

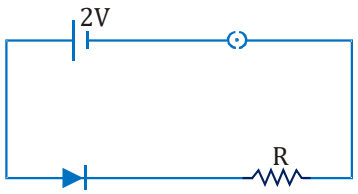
31. The minority current in a p-n junction is :–
(1) from the n-side to the p-side
(2) from the p-side to the n-side
(3) from the n-side to the p-side if the junction is forward-biased and in the opposite direction if it is reverse biased.
(4) from the p-side to the n-side if the junction is forward-biased and in the opposite direction if it is reverse biased
PSE031

32. The majority current in a p-n junction is :–
(1) from the n-side to the p-side
(2) from the p-side to the n-side
(3) from the n-side to the p-side if the junction is forward-biased and in the opposite direction if it is reverse biased
(4) from the p-side to the n-side if the junction is forward-biased and in the opposite direction if it is reverse biased
PSE032

33. Diffusion current in a p-n junction is greater than the drift current in magnitude :–
(1) if the junction is forward-biased
(2) if the junction is reverse-biased
(3) if the junction is unbiased
(4) in no case
PSE033

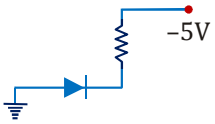
34. In a ..... biased P-N junction, the net flow holes is from N-region to the P-region :–
(1) F.B. (2) R. B.
(3) Unbiased (4) both 1 & 2
PSE034

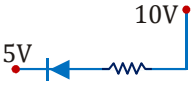
35. A 2 V battery forward biases a diode however there is a drop of 0.5 V across the diode which is independent of current. Also a current greater then 10 mA produces large joule loss and damages diode. If diode is to be operated at 5 mA, the series resistance to be put is :–

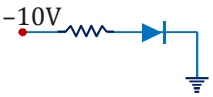


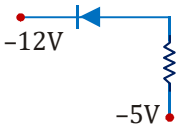
(1) 3 kΩ (2) 300 kΩ
(3) 300 Ω (4) 200 kΩ
PSE035

36. Which of the following diode is reverse biased:-

(1) 

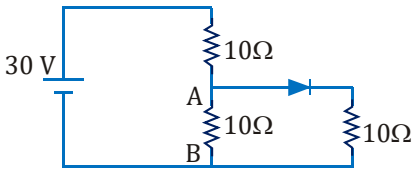
(2) 

(3) 

(4) 

PSE036

37. Find V_{AB} :–



(1) 10 V (2) 20 V (3) 30 V (4) none

PSE037

38. Assuming that the junction diode is ideal then the current through the diode is:-

(1) 200 mA (2) 20 mA (3) 2 mA (4) zero

PSE038

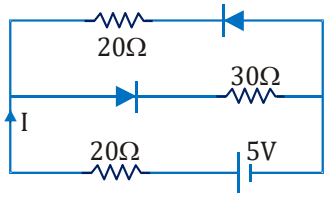
39. The resistance of a reverse biased pn junction diode is about :–

(1) 1 ohm (2) 10^2 ohm

(3) 10^3 ohm (4) 10^6 ohm

PSE039

40. Current I in the circuit will be :–



(1) $\frac{5}{40}$ A (2) $\frac{5}{50}$ A

(3) $\frac{5}{10}$ A (4) $\frac{5}{20}$ A

PSE040

41. In a p-n junction the depletion layer of thickness 10^{-6} m has potential across it is 0.1 V. The average electric field is (V/m) :–

(1) 10^7 (2) 10^{-6} (3) 10^5 (4) 10^{-5}

PSE041

42. In a unbias p-n junction :-

(1) high potential is at n side and low potential is at p side.

(2) high potential is at p side and low potential is at n side.

(3) p and n both are at same potential.

(4) undetermined.

PSE042

43. On increasing the reverse bias to a large value in p-n junction diode then value of current

(1) remains fixed

(2) increases slowly

(3) decrease slowly

(4) suddenly increase

PSE043

44. Reverse bias applied to a junction diode :–

(1) lowers the potential barrier.

(2) raises the potential barrier.

(3) increases the majority carrier current.

(4) increases the minority carrier current.

PSE044

45. Correct statement for diode is :–

(1) in full wave rectifier both diodes work alternatively.

(2) in full wave rectifier both diodes work simultaneously.

(3) efficiency of full wave rectifier and half wave rectifier is same.

(4) full wave rectifier in bidirectional.

PSE045

46. When a junction diode is reverse biased, the flow of current across the junction is mainly due to :–

(1) diffusion of charges

(2) depends upon the nature of material

(3) drift of charges

(4) both drift and diffusion of charges

PSE046

47. The width of depletion region in a p-n junction diode

(1) increases when reverse bias is applied.

(2) increases when a forward bias is applied.

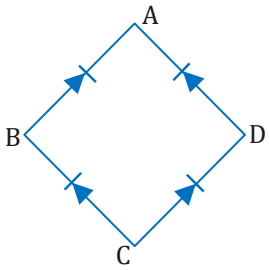
(3) decreases when a reverse bias is applied.

(4) remains the same irrespective of the bias voltage.

PSE047

SPECIAL TYPES OF DIODES

48. For the given circuit shown in fig, to act as full wave rectifier :– a.c. input should be connected across ..... and ..... the d.c. output would appear across ..... and .....



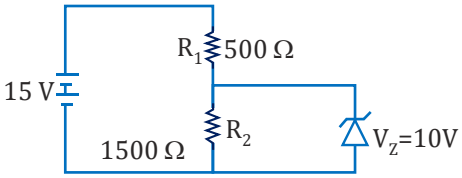
(1) A, C, B, D (2) B, D, A, C
(3) A, B, C, D (4) C, A, D, B

PSE048

49. Forbidden energy gap of Ge is 0.75 eV, maximum wave length of incident radiation of photon for producing electron - hole pair in germanium semiconductor is :–
(1) 4200 Å (2) 16500 Å
(3) 4700 Å (4) 4000 Å

PSE049

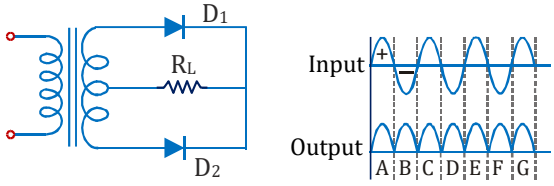
50. In the circuit given the current through the zener diode is :-



(1) 10 mA (2) 6.67 mA
(3) 5 mA (4) 3.33 mA

PSE050

51. A full wave rectifier circuit along with the input and output voltage is shown in the figure then output due to diode D_2 is :–



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

PSE051

52. If a full wave rectifier circuit is operating from 50 Hz mains, the fundamental frequency in the ripple will be :–
(1) 25 Hz (2) 50 Hz
(3) 70.7 Hz (4) 100 Hz

PSE052

53. The electrical circuit used to get smooth DC output from a rectifier circuit is called :–
(1) filter (2) oscillator
(3) logic gate (4) amplifier

PSE053

54. In p-n junction photocell electromotive force due to monochromatic light is proportional to
(1) p-n potential barrier
(2) intensity of light
(3) frequency of light
(4) p-n applied voltage

PSE054

55. Efficiency of a half wave rectifier is nearly :–
(1) 80 % (2) 60 % (3) 40 % (4) 20 %

PSE055

56. Zener dode is used for :–
(1) rectification
(2) stabilization
(3) amplification
(4) producing oscillations in an oscillator

PSE056

LOGIC GATE

57. The output of the given logic gate is 1 when inputs A, B and C are such that :–

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

PSE081

58. A two inputed XOR gate produces an high output only when its both inputs are :–
(1) same (2) different
(3) low (4) high

PSE082

59. Which of the following Boolean expression is not correct :–
(1) $\overline{\bar{A}.\bar{B}} = A + B$ (2) $\overline{\bar{A}+\bar{B}} = A \,.\, B$
(3) $\overline{\overline{A.B}} = A.B$ (4) $\bar{1}+\bar{1}=1$

PSE083

60. In Boolean algebra, which of the following is not equal to zero :–
(1) $A.\bar{A}$ (2) A.0 (3) $\overline{A+\bar{A}}$ (4) $\overline{\bar{A}.0}$

PSE084

61. Digital circuits can be made by respectative use of :–
(1) OR gate (2) AND gate
(3) NOT gate (4) NAND gate

PSE085

62. The truth table shown below is for which of the following gates :–

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

(1) XNOR (2) AND
(3) XOR (4) NOR

PSE086

63. When all the inputs of a NAND gate are connected together, the resulting circuit is :–
(1) a NOT gate (2) an AND gate
(3) an OR gate (4) a NOR gate

PSE087

64. A NAND gate followed by a NOT gate is :–
(1) an OR gate (2) an AND gate
(3) a NOR gate (4) a XOR gate

PSE088

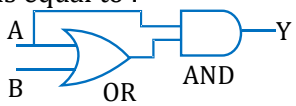
65. The NOR gate is logically equivalent to an OR gate followed by :–
(1) an inverter (2) a NOR gate
(3) a NAND gate (4) All of above

PSE089

66. The output of a two input NOR gate is in state 1 when :–
(1) either input terminals is at 0 state
(2) either input terminals is at 1 state
(3) both input terminals are at 0 state
(4) both input terminals are at 1 state

PSE090

67. The output Y of the combination of gates shown is equal to :–



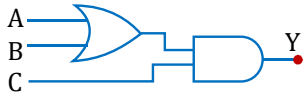
(1) A (2) $\bar{A}$ (3) A + B (4) AB

PSE091

68. What would be the output of the circuit whose Boolean expression $Y = A\bar{B} + AB$ when A = 1, B = 0 :–
(1) 1 (2) 0
(3) both (1) & (2) (4) none of these

PSE092

69. To get an output 1, the input ABC should be :–



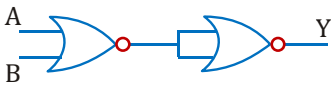
(1) 101 (2) 100 (3) 110 (4) 010

PSE093

70. The output of 2 input gate is 1 only if its inputs are equal. It is true for :–
(1) NAND (2) AND
(3) EX-NOR (4) EX-OR

PSE094

71. The circuit shown here is logically equivalent to:–



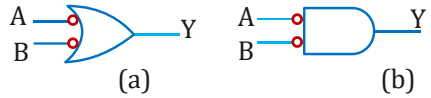
(1) OR gate (2) AND gate
(3) NOT gate (4) NAND gate

PSE095

72. A two-input NAND gate is followed by a single-input NOR gate. This logic circuit will function as :–
(1) an AND gate (2) an OR gate
(3) a NOT gate (4) a NOR gate

PSE096

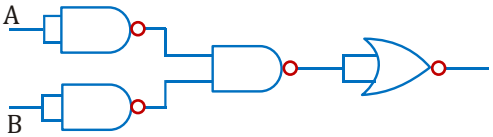
73. The logic symbols shown here are logically equivalent to :–



(1) (a) AND and (b) OR gate
(2) (a) NOR and (b) NAND gate
(3) (a) OR and (b) AND gate
(4) (a) NAND and (b) NOR gate

PSE097

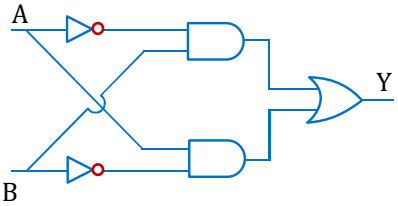
74. The combination of the gates shown will produce



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

PSE098

75. The combination of the gates shown will produce



(1) AND gate (2) NAND gate
(3) NOR gate (4) XOR gate

PSE099

76. The truth table for the following combination of gates is :-

(1)

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

PSE100

77. In the Boolean algebra $\bar{A}.\bar{B}$ equals :–

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

PSE101

78. How many NOR gates are required to form NAND gate :–

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

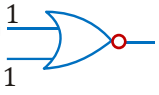
PSE102

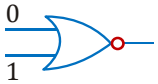
79. How many NAND gates are used to form AND gate :–

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

PSE103

80. Which of the following gates will have an output of 1 :–

(a) 

(b) 

(c) 

(d) 

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

PSE104

81. The logic behind 'NOR' gate is that it gives :–

(1) high output when both inputs are high
(2) high output when both inputs are low
(3) low output when both inputs are low
(4) none of these

PSE105

82. Logic gates are the building blocks of a :–

(1) abacus system (2) analog system
(3) digital system (4) none of these

PSE106

83. Boolean algebra is essentially based on :–

(1) logic (2) truth
(3) numbers (4) symbol

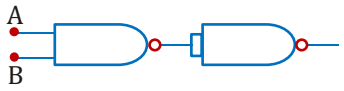
PSE107

84. Out of the following, universal gate is :–

(1) NOT (2) OR
(3) AND (4) NAND

PSE108

85. Identify the logic operation of the following logic circuit



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

PSE109

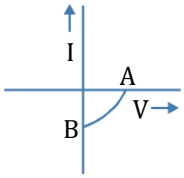
EXERCISE-I (Conceptual Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	2	2	3	2	2	4	3	2	1	2	3	1	4	1	1
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	3	3	1	1	2	4	1	2	1	2	4	4	3	2	3
Question	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Answer	1	2	1	2	3	3	1	2	4	2	3	1	4	2	1
Question	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Answer	3	1	2	2	4	2	4	1	2	3	2	4	2	4	4
Question	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Answer	4	1	1	2	4	3	1	1	1	3	1	1	4	3	4
Question	76	77	78	79	80	81	82	83	84	85					
Answer	1	2	4	2	3	2	3	1	4	2					

Exercise - II (Previous Year Questions) AIPMT/NEET

AIPMT 2014

1. 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.

PSE138

2. 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

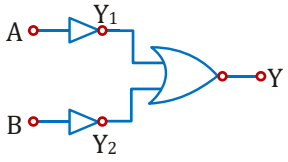
(3) (b) and (c) only

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

PSE139

AIPMT-2015

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

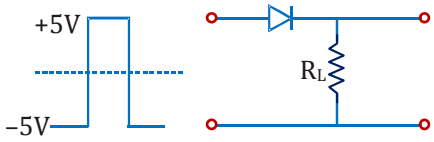


(1) NAND (2) AND

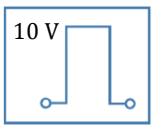
(3) NOR (4) OR

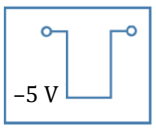
PSE140

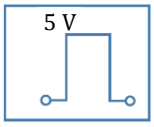
4. If in a p-n junction, a square input signal of 10 V is applied as shown,

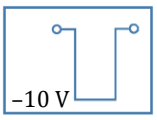


then the output across R_L will be :

(1) 

(2) 

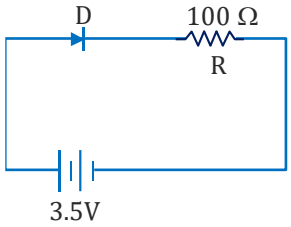
(3) 

(4) 

PSE141

RE–AIPMT-2015

5. 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 :



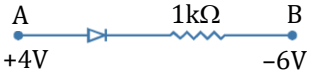
(1) 35 mA (2) 30 mA

(3) 40 mA (4) 20 mA

PSE142

NEET-I 2016

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

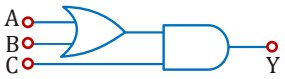


(1) 0 A (2) 10^{-2} A

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

PSE144

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

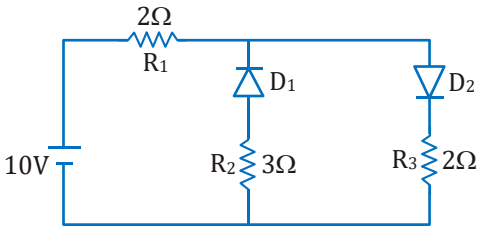


(1) A = 0, B = 1, C = 0
(2) A = 1, B = 0, C = 0
(3) A = 1, B = 1, C = 0
(4) A = 1, B = 0, C = 1

PSE146

NEET-II 2016

8. 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

PSE148

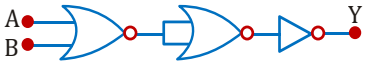
9. What is the output Y in the following circuit, when all the three inputs A, B, C are first 0 and then 1 ?

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

PSE149

NEET(UG) 2017

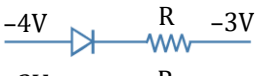
10. The given electrical network is equivalent to :

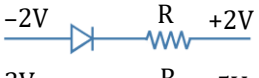


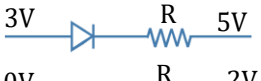
(1) OR gate (2) NOR gate
(3) NOT gate (4) AND gate

PSE151

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

(1) 

(2) 

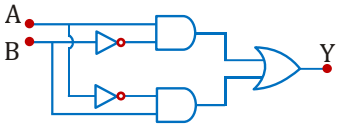
(3) 

(4) 

PSE152

NEET(UG) 2018

12. 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) $\overline{A + B}$

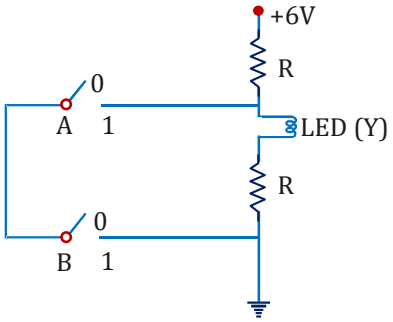
PSE153

13. 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

PSE155

NEET(UG) 2019

14.



The correct Boolean operation represented by the circuit diagram drawn is :
(1) AND (2) OR (3) NAND (4) NOR

PSE156

15. 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.

PSE157

NEET(UG) 2019 (Odisha)

16. 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

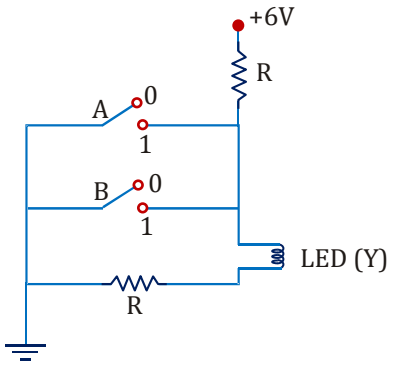
(2) 654 nm

(3) 654 Å

(4) 654×10^{-11} m

PSE158

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



(1) NOR (2) AND

(3) OR (4) NAND

PSE159

NEET(UG) 2020

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

(1) increase in forward current

(2) forward bias only

(3) reverse bias only

(4) both forward bias and reverse bias

PSE161

19. The solids which have the negative temperature coefficient of resistance are :

(1) insulators and semiconductors

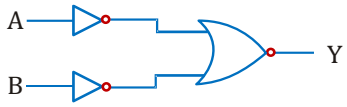
(2) metals

(3) insulators only

(4) semiconductors only

PSE162

20. For the logic circuit shown, the truth table is :



(1)

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

(2)

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

(3)

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

(4)

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

PSE163

NEET(UG) 2020 (COVID-19)

21. Out of the following which one is a forward biased diode ?

(1) 

(2) 

(3) 

(4) 

PSE164

22. Which of the following gate is called universal gate?

(1) OR gate (2) AND gate

(3) NAND gate (4) NOT gate

PSE166

23. An intrinsic semiconductor is converted into n-type extrinsic semiconductor by doping it with :-

(1) Phosphorous (2) Aluminium

(3) Silver (4) Germanium

PSE167

NEET(UG) 2021

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.

(1) current in n-type = current in p-type

(2) current in p-type > current in n-type

(3) current in n-type > current in p-type

(4) No current will flow in p-type, current will only flow in n-type

PSE168

25. 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.

(1) **(A)** and **(B)** both are correct.

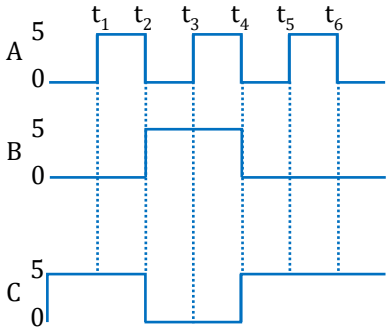
(2) **(A)** and **(B)** both are incorrect.

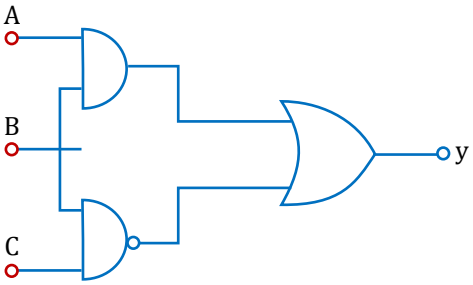
(3) **(A)** is correct and **(B)** is incorrect.

(4) **(A)** is incorrect but **(B)** is correct.

PSE169

26. 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 ?





(1) 

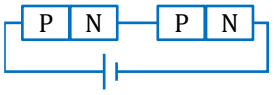
(2) 

(3) 

(4) 

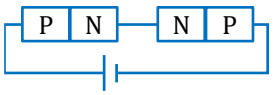
PSE170

NEET(UG) 2022

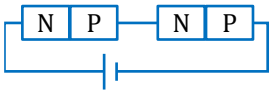


(a)

27.



(b)



(c)

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

(1) (b) only

(2) (c) only

(3) Both (a) and (c)

(4) (a) only

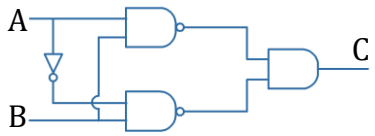
PSE171

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

(1) 30 Hz (2) 60 Hz

(3) 120 Hz (4) Zero

PSE172

29. 

The truth table for the given logic circuit is :

(1)

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

(2)

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

(3)

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

(4)

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

PSE173

RE-NEET(UG) 2022

30. The incorrect statement about the property of a Zener diode is :-

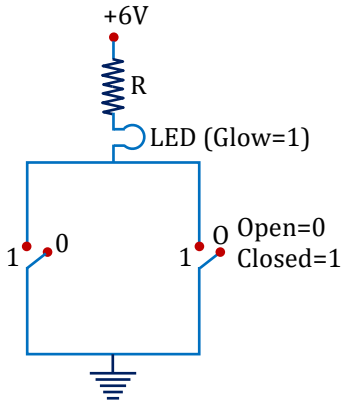
(1) Zener voltage remains constant at breakdown

(2) It is designed to operate under reverse bias

(3) Depletion region formed is very wide

(4) p and n regions of zener diode are heavily doped

PSE174

31. 

Identify the equivalent logic gate represented by the given circuit :

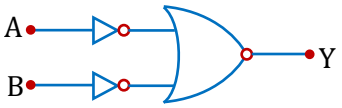
(1) OR (2) NOR

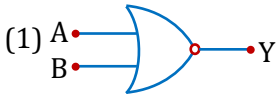
(3) AND (4) NOT

PSE175

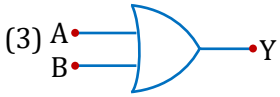
RE-NEET(UG) 2023

32. The given circuit is equivalent to :



(1) 

(2) 

(3) 

(4) 

PSE185

33. A p-type extrinsic semiconductor is obtained when Germanium is doped with:

(1) Antimony

(2) Phosphorous

(3) Arsenic

(4) Boron

PSE186

NEET(UG) 2024

34. 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 for the output Y is

(1) $A.B+\bar{A}$

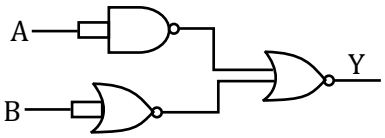
(2) $A.\bar{B}+\bar{A}$

(3) $\bar{B}$

(4) B

PSE187

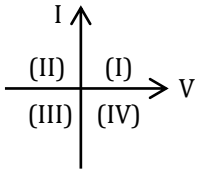
35. The output (Y) of the given logic gate is similar to the output of an/a :



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

PSE188

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



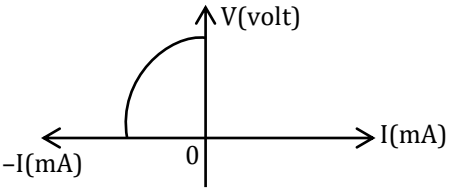
A. For a solar-cell, the I-V characteristics lies in the IV quadrant of the given graph.
B. In a reverse biased pn junction diode, the current measured in (μA), is due to majority charge carriers.

(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.

PSE189

RE-NEET(UG) 2024

37.



The I - V characteristics shown above are exhibited by a:
(1) light emitting diode
(2) zener diode
(3) photodiode
(4) solar cell

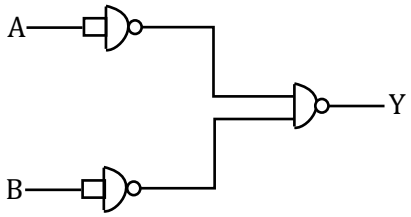
PSE190

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

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

PSE191

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



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

PSE192

EXERCISE-II (Previous Year Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	1	4	2	3	2	2	4	3	1	2	4	2	4	3	2
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	2	1	3	1	2	4	3	1	3	3	3	3	2	2	3
Question	31	32	33	34	35	36	37	38	39						
Answer	1	4	4	3	4	1	4	2	3						

Exercise - III (Analytical Questions) Master Your Understanding

1. Given blow are two statements:

Statement-I : Doping of indium in Si crystal leads to p-type semiconductor.

Statement-II : Indium is a pentavalent atom.

In light of above statement choose the most **appropriate** answer from the options given below:

(1) Both statement I and statement II are correct.

(2) Statement I is correct and statement II is incorrect.

(3) Statement I is incorrect and statement II is correct.

(4) Both statements I and statements II are incorrect.

PSE177

2. Match the column-I of special diodes with their utilization given in column-II:

Column I	**Column II**
(a) Zener diode	(1) As a light sensor
(b) LED	(2) Voltage regulator circuit
(c) Photodiode	(3) As a bulb of light

(1) $a \rightarrow 3, b \rightarrow 2, c \rightarrow 1$

(2) $a \rightarrow 3, b \rightarrow 1, c \rightarrow 2$

(3) $a \rightarrow 1, b \rightarrow 3, c \rightarrow 2$

(4) $a \rightarrow 2, b \rightarrow 3, c \rightarrow 1$

PSE178

3. Given below are two statements: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R).**

Assertion (A) : The number of electrons in n-type silicon semiconductor is higher than the number of electrons in a pure silicon semiconductor.

Reason (R) : The law of mass action is applicable only to n-type semiconductors.

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

(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.

(2) Both **(A)** and **(R)** are true and **(R)** is NOT the correct explanation of **(A)**.

(3) **(A)** is true but **(R)** is false.

(4) **(A)** is false but **(R)** is true.

PSE180

4. Given below are two statements: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R).**

Assertion (A) : Temperature coefficient of resistance for semiconductor is negative

Reason (R) : Conductivity of semiconductor increases with increment in temperature.

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

(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.

(2) Both **(A)** and **(R)** are true and **(R)** is NOT the correct explanation of **(A)**.

(3) **(A)** is true but **(R)** is false.

(4) **(A)** is false but **(R)** is true.

PSE182

5. Given below are two statements: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R).**

Assertion (A) : The OR gate function corresponds to switches in parallel.

Reason (R) : The AND gate function corresponds to switches in series.

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

(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.

(2) Both **(A)** and **(R)** are true and **(R)** is NOT the correct explanation of **(A)**.

(3) **(A)** is true but **(R)** is false.

(4) **(A)** is false but **(R)** is true.

PSE183

6. Given below are two statements: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R).**

Assertion (A) : In an unbiased p–n junction, holes diffuse from the p–region to n–region.

Reason (R) : Hole concentration in p–region is more as compared to n–region.

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

(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.

(2) Both **(A)** and **(R)** are true and **(R)** is NOT the correct explanation of **(A)**.

(3) **(A)** is true but **(R)** is false.

(4) **(A)** is false but **(R)** is true.

PSE184

EXERCISE-III (Analytical Questions) ANSWER KEY

Question	1	2	3	4	5	6
Answer	2	4	3	1	2	1