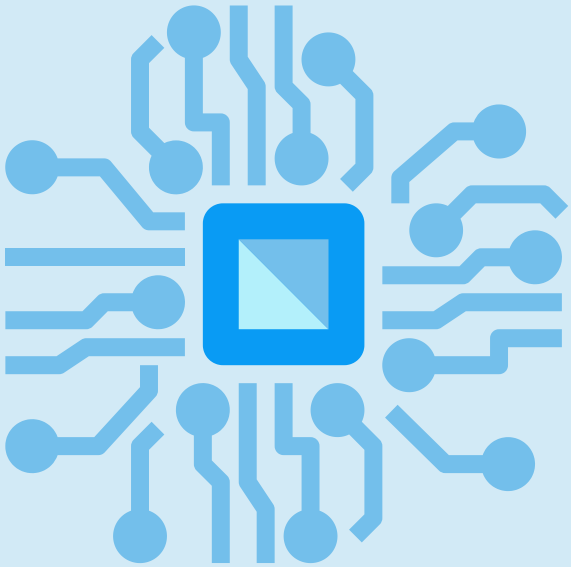
PRE-MEDICAL

PHYSICS

ENTHUSIAST | LEADER | ACHIEVER



EXERCISE

Semiconductor & Digital Electronics

ENGLISH MEDIUM

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

SC0001

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.

SC0002

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

SC0003

4. The atomic bonding is same for which of the following pairs :–

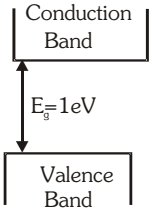
(1) Ag and Si (2) Ge and Si

(2) Ne and Ge (4) NaCl and Ge

SC0004

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

(1)



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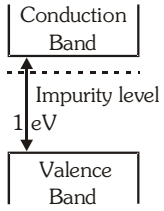

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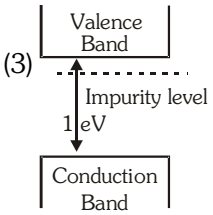

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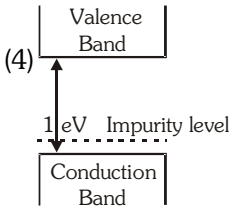


SC0005

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) $n_p \neq n_e$

SC0006

7. A p-type semiconductor is :–

(1) positively charged

(2) negatively charged

(3) uncharged

(4) uncharged at 0K but charged at higher temperatures

SC0007

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

SC0008

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

SC0009

10. When we convert pure semiconductor into N type the number of hole :–

(1) Increases (2) Decreases

(3) Remains constant (4) None

SC0010

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

SC0011

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) $n_e = n_h$

SC0012

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 semicondcutor.

SC0013

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

SC0014

15. In an intrinsic semiconductor, number of electrons and holes at room temperature are :–

(1) equal (2) zero

(3) unequal (4) infinity

SC0015

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

SC0016

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}

SC0017

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

SC0018

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.

SC0019

20. In a p-type semicondutor, there are mainly :–

(1) free electrons (2) holes

(3) both (1) and (2) (4) none of these

SC0020

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

SC0021

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.

SC0022

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) $(E_g)_C < (E_g)_{Si}$

SC0023

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) $\mu_e < 0; \mu_h > 0$

SC0024

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

SC0025

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

SC0026

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

SC0027

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

SC0028

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

SC0029

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.

SC0030

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

SC0031

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

SC0032

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

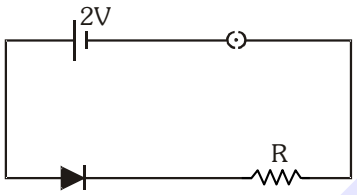
SC0033

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

SC0034

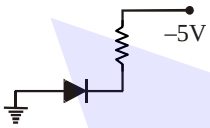
35. A 2 V battery forward biases a diode however there is a drop of 0.5 V across the diode which is independent of current. Also a current greater then 10 mA produces large joule loss and damages diode. If diode is to be operated at 5 mA, the series resistance to be put is :–



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

SC0035

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

(1) 

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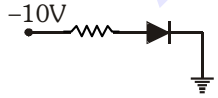
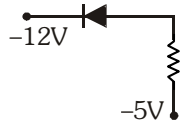
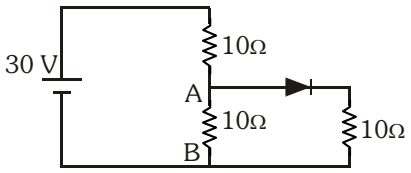
(3) 

(4) 

SC0036

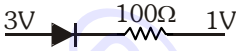
37. Find V_{AB} :–



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

SC0037

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

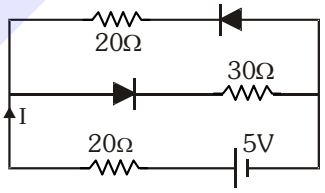
SC0038

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

SC0039

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

SC0040

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}

SC0041

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.

SC0042

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

SC0043

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.

SC0044

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.

SC0045

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

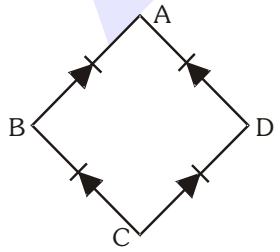
SC0046

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.

SC0047

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 .....



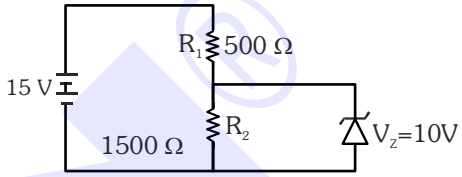
(1) A, C, B, D (2) B, D, A, C
(3) A, B, C, D (4) C, A, D, B

SC0048

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

SC0049

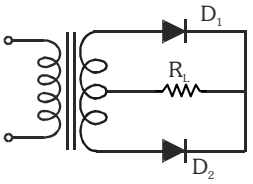
50. In the circuit given the current through the zener diode is :-

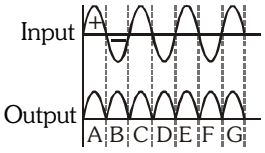


(1) 10 mA (2) 6.67 mA
(3) 5 mA (4) 3.33 mA

SC0050

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

SC0051

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

SC0052

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

SC0053

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

SC0055

55. Efficiency of a half wave rectifier is nearly :–

(1) 80 % (2) 60 % (3) 40 % (4) 20 %

SC0056

56. Zener dode is used for :–

(1) rectification

(2) stabilization

(3) amplification

(4) producing oscillations in an oscillator

SC0057

TRANSISTOR

57. A transistor is used in the common emitter mode as an amplifier then :–

(A) the base emitter junction is forward baised.

(B) the base emitter junction is reverse baised.

(C) the input signal is connected in series with the voltage applied to bias the base emitter junction.

(D) the input signal is connected in series with the voltage applied to bias the base collector junction.

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

SC0058

58. In a transistor :–

(1) the emitter has the least concentration of impurity.

(2) the collector has the least concentration of impurity.

(3) the base has the least concentration of impurity.

(4) all the three regions have equal concentration of impurity.

SC0059

59. In transistor symbols, the arrows shows the direction of :-

(1) current in the emitter

(2) electron current in the emitter

(3) holes current in the collector

(4) electron current in the collector

SC0060

60. The region of transistor in which extra impurity is doped to obtain a large number of majority carrier is called as :–

(1) emitter

(2) base

(3) collector

(4) any one of these depending upon the transistor

SC0061

61. An oscillator is nothing but an amplifier with :–

(1) positive feedback

(2) high gain

(3) no feedback

(4) negative feedback

SC0062

62. Input resistance of common emitter transistor compare with output resistance is :–

(1) less (2) more

(3) less and more (4) none of these

SC0063

63. The current gain β of a transistor is 50. The input resistance of the transistor, when used in the common emitter configuration, is 1 kΩ. The peak value of the collector a.c. current for an alternating peak input voltage 0.01 V is :–

(1) 100 μA (2) 250 μA

(3) 500 μA (4) 800 μA

SC0064

64. A transistor is operated in CE configuration at V_{cc}=2 V such that a change in base current from 100 μA to 200 μA produces a change in the collector current from 9 mA to 16.5 mA. The value of current gain, β is :–

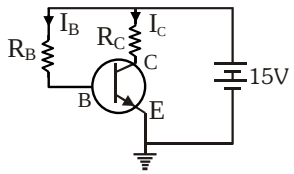
(1) 45 (2) 50 (3) 60 (4) 75

SC0065

65. The input resistance of a silicon transistor is 1 kΩ. If base current is changed by 100 μA, it causes the change in collector current by 2 mA. This transistor is used as a CE amplifier with a load resistance of 5 kΩ. What is the ac voltage gain of amplifier ?
(1) 10 (2) 100 (3) 500 (4) 200
SC0066

66. For a transistor amplifier power gain and voltage gain are 7.5 and 2.5 respectively. The value of the current gain will be :–
(1) 0.33 (2) 0.66 (3) 0.99 (4) 3
SC0067

67. In the following common emitter circuit if $\beta = 100$, $V_{CE} = 7$ V, V_{BE} = negligible, $R_C = 2$ kΩ then I_B is :-



(1) 0.01 mA (2) 0.04 mA
(3) 0.02 mA (4) 0.03 mA
SC0068

68. When a transistor is used in a circuit :
(1) both junctions are forward biased.
(2) emitter base junction is forward biased and the base collector junction is reverse biased.
(3) emitter base junction is reverse biased and the base collector junction is forward biased.
(4) both junctions are reverse biased.
SC0069

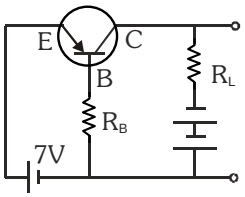
69. What is the voltage gain in a common emitter amplifier where input resistance is 3 Ω and load resistance is 24 Ω and current gain $\beta = 6$?
(1) 2.2 (2) 1.2 (3) 4.8 (4) 48
SC0070

70. In a n-p-n transistor circuit, the collector current is 10 mA. If 90% of the electrons emitted reach the collector then the emitter current (I_E) and base current (I_B) are given by :–
(1) $I_E = 1$ mA; $I_B = 11$ mA
(2) $I_E = 11$ mA ; $I_B = 1$ mA
(3) $I_E = -1$ mA; $I_B = 9$ mA
(4) $I_E = 9$ mA ; $I_B = -1$ mA
SC0071

71. In a transistor, the base is made very thin and lightly doped with an impurity :–
(1) to save the transistor from heating effect
(2) to enable the emitter to emit small number of electrons and holes
(3) to enable the collector to collect 95% of the holes or electron coming from the emitter side
(4) none of the above
SC0072

72. In CB configuration of transistor ac current gain is $\frac{\Delta i_C}{\Delta i_E} = 0.98$, determine current gain of CE configuration :–
(1) 49 (2) 98
(3) 4.9 (4) 24.5
SC0073

73. In the given transistor circuit, the base current is 35 μA. The value of R_B is (V_{BE} is assumed to negligible)



(1) 100 kΩ (2) 300 kΩ
(3) 200 kΩ (4) 400 kΩ
SC0074

74. In an n-p-n transistor :–
(1) holes move from emitter to base
(2) electrons moves from emitter to base
(3) holes move from base to collector
(4) electrons move from collector to base
SC0075

75. In the study of transistor as amplifier if $\alpha = \frac{I_C}{I_E}$ and $\beta = \frac{I_C}{I_B}$ where I_C, I_B, and I_E are the collector, base and emitter current, then :–
(1) $\beta = \frac{\alpha}{1+\alpha}$ (2) $\beta = \frac{\alpha}{1-\alpha}$
(3) $\beta = \frac{1+\alpha}{\alpha}$ (4) $\beta = \frac{1-\alpha}{\alpha}$
SC0076

76. In the CB mode of a transistor, when the collector voltage is changed by 0.5 volt, the collector current changes by 0.05 mA. the output resistance will be
(1) 10 kΩ (2) 20 kΩ
(3) 5 kΩ (4) 2.5 kΩ

SC0077

77. A n-p-n transistor conducts when :–
(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.

SC0078

78. In the case of constants α and β of a transistor :–
(1) $\alpha = \beta$ (2) $\beta < 1 \quad \alpha > 1$
(3) $\alpha\beta = 1$ (4) $\beta > 1 \quad \alpha < 1$

SC0079

79. For a transistor in a common emitter arrangement the alternating current gain β is given by :–
(1) $\beta = \left[\frac{\Delta I_C}{\Delta I_E}\right]_{V_{CE}}$ (2) $\beta = \left[\frac{\Delta I_B}{\Delta I_C}\right]_{V_{CE}}$
(3) $\beta = \left[\frac{\Delta I_C}{\Delta I_B}\right]_{V_{CE}}$ (4) $\beta = \left[\frac{\Delta I_E}{\Delta I_C}\right]_{V_{CE}}$

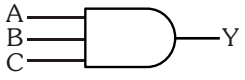
SC0080

80. Consider an n–p–n transistor amplifier in common–emitter configuration. The current gain of the transistor is 100. If the collector current changes by 1 mA, what will be the change in emitter current ?
(1) 1·1 mA (2) 1·01 mA
(3) 0·01 mA (4) 10 mA

SC0081

LOGIC GATE

81. 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



SC0082

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

SC0083

83. 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) $\bar{1} + \bar{1} = 1$

SC0084

84. 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) $\overline{\bar{A}.0}$

SC0085

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

SC0086

86. The truth table shown below is for which of the following gates :–
(1) XNOR
(2) AND
(3) XOR
(4) NOR

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

SC0087

87. 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

SC0088

88. 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

SC0089

89. 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

SC0090

90. The output of a two input NOR gate is in state 1 when :–

(1) either input terminals is at 0 state

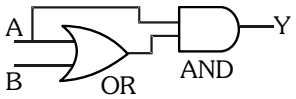
(2) either input terminals is at 1 state

(3) both input terminals are at 0 state

(4) both input terminals are at 1 state

SC0091

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



(1) A

(2) $\bar{A}$

(3) A + B

(4) AB

SC0092

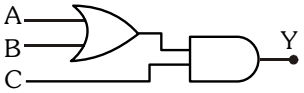
92. What would be the output of the circuit whose Boolean expression $Y = A\bar{B} + AB$ when A = 1, B = 0 :–

(1) 1 (2) 0

(3) both (1) & (2) (4) none of these

SC0093

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



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

SC0094

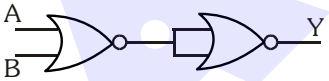
94. The output of 2 input gate is 1 only if its inputs are equal. It is true for :–

(1) NAND (2) AND

(3) EX-NOR (4) EX-OR

SC0095

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



(1) OR gate (2) AND gate

(3) NOT gate (4) NAND gate

SC0096

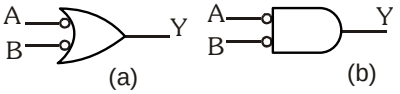
96. A two-input NAND gate is followed by a single-input NOR gate. This logic circuit will function as :–

(1) an AND gate (2) an OR gate

(3) a NOT gate (4) a NOR gate

SC0097

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



(1) (a) AND and (b) OR gate

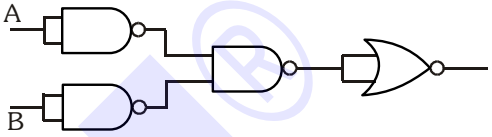
(2) (a) NOR and (b) NAND gate

(3) (a) OR and (b) AND gate

(4) (a) NAND and (b) NOR gate

SC0098

98. The combination of the gates shown will produce

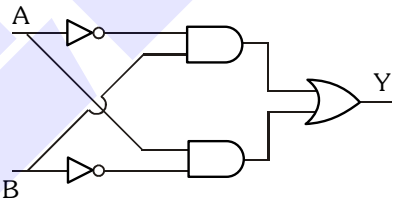


(1) OR gate (2) AND gate

(3) NOR gate (4) NAND gate

SC0099

99. The combination of the gates shown will produce

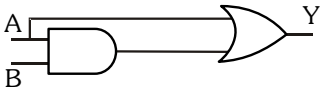


(1) AND gate (2) NAND gate

(3) NOR gate (4) XOR gate

SC0100

100. 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

SC0101

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

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

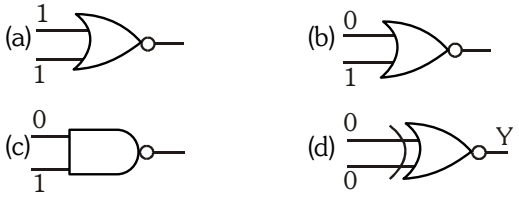
(3) A . B (4) $\bar{A}.B$

SC0102

102. How many NOR gates are required to form NAND gate :–
(1) 1 (2) 3 (3) 2 (4) 4
SC0103

103. How many NAND gates are used to form AND gate :–
(1) 3 (2) 2 (3) 1 (4) 4
SC0104

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



(1) (a) and (b) (2) (b) and (c)
(3) (c) and (d) (4) (a) and (d)
SC0105

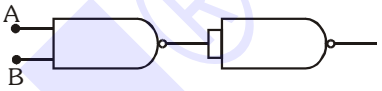
105. The logic behind 'NOR' gate is that it gives :–
(1) high output when both inputs are high
(2) high output when both inputs are low
(3) low output when both inputs are low
(4) none of these
SC0106

106. Logic gates are the building blocks of a :–
(1) abacus system (2) analog system
(3) digital system (4) none of these
SC0107

107. Boolean algebra is essentially based on :–
(1) logic (2) truth
(3) numbers (4) symbol
SC0108

108. Out of the following, universal gate is :–
(1) NOT (2) OR
(3) AND (4) NAND
SC0109

109. Identify the logic operation of the following logic circuit



(1) NAND (2) AND
(3) NOR (4) OR
SC0110

EXERCISE-I (Conceptual Questions) ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**2**	**2**	**3**	**2**	**2**	**4**	**3**	**2**	**1**	**2**	**3**	**1**	**4**	**1**	**1**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**3**	**3**	**1**	**1**	**2**	**4**	**1**	**2**	**1**	**2**	**4**	**4**	**3**	**2**	**3**
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	**1**	**2**	**1**	**2**	**3**	**3**	**1**	**2**	**4**	**2**	**3**	**1**	**4**	**2**	**1**
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	**3**	**1**	**2**	**2**	**4**	**2**	**4**	**1**	**2**	**3**	**2**	**3**	**3**	**1**	**1**
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	**1**	**1**	**3**	**4**	**2**	**4**	**2**	**2**	**4**	**2**	**3**	**1**	**3**	**2**	**2**
Que.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Ans.	**1**	**2**	**4**	**3**	**2**	**4**	**2**	**4**	**4**	**4**	**1**	**1**	**2**	**4**	**3**
Que.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
Ans.	**1**	**1**	**1**	**3**	**1**	**1**	**4**	**3**	**4**	**1**	**2**	**4**	**2**	**3**	**2**
Que.	106	107	108	109											
Ans.	**3**	**1**	**4**	**2**											

EXERCISE-II (Previous Year Questions) AIPMT/NEET

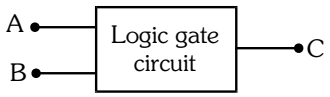
AIPMT 2006

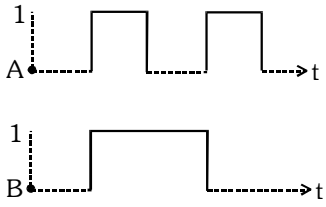
1. A transistor-oscillator using a resonant circuit with an inductor L (of negligible resistance) and a capacitor C in series produce oscillations of frequency f. If L is doubled and C is changed to 4C, the frequency will be :-

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

SC0111

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 -





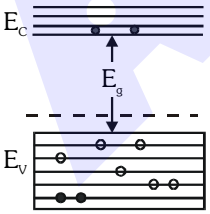
(1)  (2) 

(3)  (4) 

SC0112

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

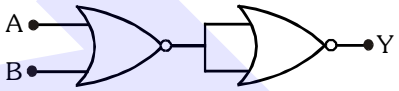
SC0118

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

SC0119

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

SC0120

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 :-

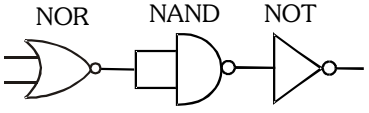
(1) 1×10^{14} Hz (2) 20×10^{14} Hz
(3) 10×10^{14} Hz (4) 5×10^{14} Hz

SC0121

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

SC0122

8. The circuit 

is equilvalent to:-

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

SC0123

AIPMT 2009

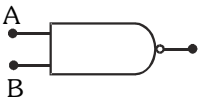
9. A p-n photodiode is fabricated from a semiconductor with a band gap of 2.5 eV. It can detect a signal of wavelength :-

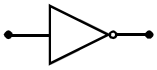
(1) 4000 Å (2) 6000 Å

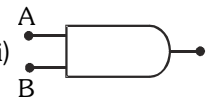
(3) 4000 nm (4) 6000 nm

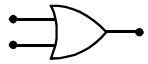
SC0124

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)

SC0125

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.

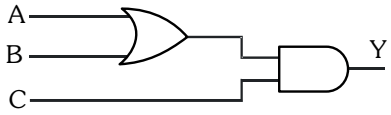
(2) Pure Si doped with trivalent impurities gives a p-type semiconductor.

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

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

SC0127

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

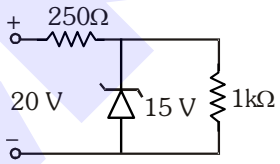


	A	B	C
(1)	1	1	0
(2)	0	1	0
(3)	1	0	0
(4)	1	0	1

SC0128

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 :-

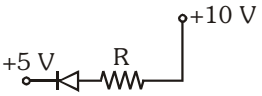


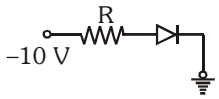
(1) 5 mA (2) 10 mA

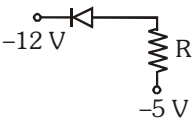
(3) 15 mA (4) 20 mA

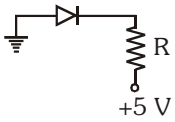
SC0132

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)

SC0133

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}

SC0134

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

SC0135

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.

SC0136

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

(1) it becomes a p-type semiconductor

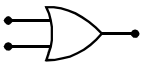
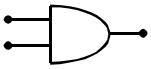
(2) the antimony becomes an acceptor atom

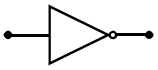
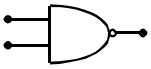
(3) there will be more free electrons than holes in the semiconductor

(4) its resistance is increased

SC0137

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)

SC0138

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

SC0140

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.

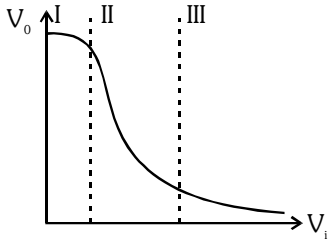
(2) The four bonding electrons in the case of C lie in the third orbit, whereas for Si they lie in the fourth orbit.

(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

SC0141

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)

SC0142

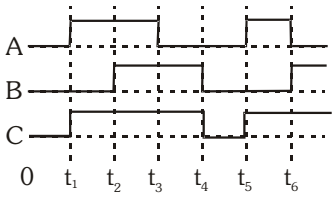
24. The input resistance of a silicon transistor is 100 Ω. Base current is changed by 40 μA which results in a change in collector current by 2 mA. This transistor is used as a common emitter amplifier with a load resistance of 4 kΩ. The voltage gain of the amplifier is :

(1) 4000 (2) 1000

(3) 2000 (4) 3000

SC0143

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

SC0144

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

SC0148

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

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

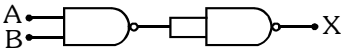
(2) Electrons are majority carriers and trivalent atoms are dopants.

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

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

SC0149

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



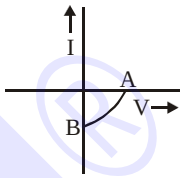
(1) $X = \overline{A+B}$ (2) $X = \overline{\overline{A}.\overline{B}}$

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

SC0150

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.

SC0152

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 ?

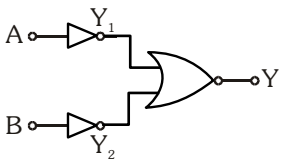
(1) (a) and (b) only (2) (b) only

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

SC0153

AIPMT-2015

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

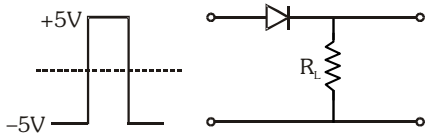


(1) NAND (2) AND

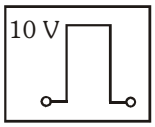
(3) NOR (4) OR

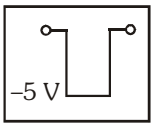
SC0156

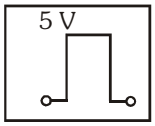
32. If in a p-n junction, a square input signal of 10 V is applied as shown,

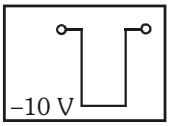


then the output across R_L will be :

(1) 

(2) 

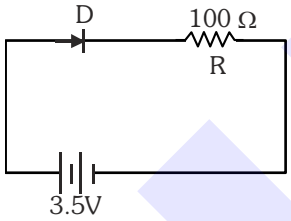
(3) 

(4) 

SC0157

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

SC0158

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

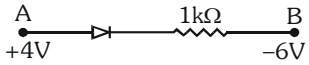
(3) $75\cos\left(15t+\frac{2\pi}{3}\right)$

(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

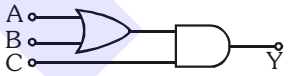
SC0165

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

SC0166

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

SC0167

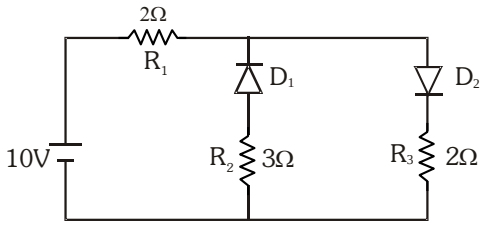
NEET-II 2016

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

SC0168

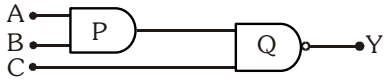
39. The given circuit has two ideal diodes connected as shown in the figure below. The current flowing through the resistance R_1 will be :-



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

SC0169

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

SC0170

NEET(UG) 2017

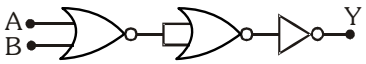
41. In a common emitter transistor amplifier the audio signal voltage across the collector is 3V. The resistance of collector is 3 kΩ. If current gain is 100 and the base resistance is 2 kΩ, the voltage and power gain of the amplifier is :-

(1) 15 and 200 (2) 150 and 15000

(3) 20 and 2000 (4) 200 and 1000

SC0177

42. The given electrical network is equivalent to :

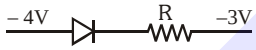


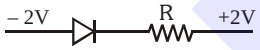
(1) OR gate (2) NOR gate

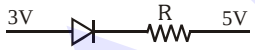
(3) NOT gate (4) AND gate

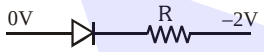
SC0178

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

(1) 

(2) 

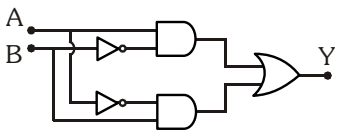
(3) 

(4) 

SC0179

NEET(UG) 2018

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

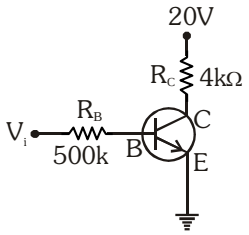


(1) $\overline{A \cdot B}$ (2) $A \cdot \overline{B} + \overline{A} \cdot B$

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

SC0183

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

SC0184

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

(1) affects only reverse resistance

(2) affects only forward resistance

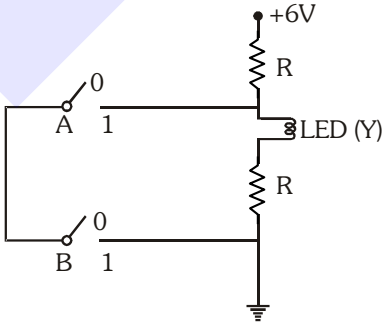
(3) does not affect resistance of p-n junction

(4) affects the overall V – I characteristics of p-n junction

SC0185

NEET(UG) 2019

47.



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

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

SC0265

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.

SC0266

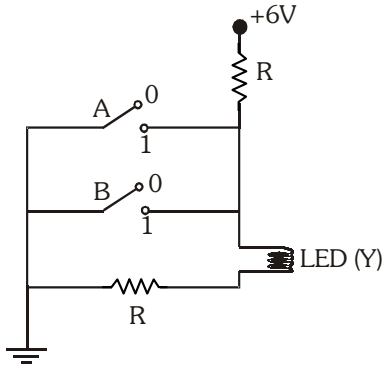
NEET(UG) 2019 (Odisha)

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

SC0267

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



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

SC0268

NEET(UG) 2020

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

(1) The base region must be very thin and lightly doped.

(2) Base, emitter and collector regions should have same doping concentrations.

(3) Base, emitter and collector regions should have same size.

(4) Both emitter junction as well as the collector junction are forward biased.

SC0269

52. 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

SC0270

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

(1) insulators and semiconductors

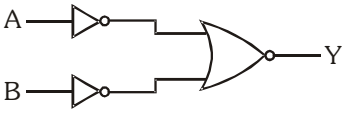
(2) metals

(3) insulators only

(4) semiconductors only

SC0271

54. 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

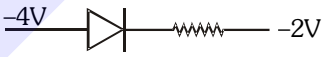
(4)

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

SC0272

NEET(UG) 2020 (COVID-19)

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

(1) 

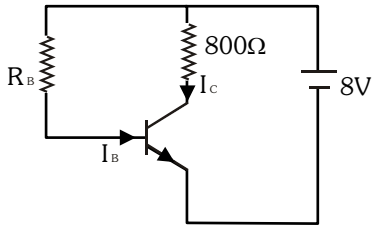
(2) 

(3) 

(4) 

SC0273

56. A n-p-n transistor is connected in common emitter configuration (see figure) in which collector voltage drop across load resistance (800 Ω) connected to the collector circuit is 0.8 V. The collector current is :



(1) 2 mA (2) 0.1 mA
(3) 1 mA (4) 0.2 mA

SC0274

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

(1) OR gate (2) AND gate

(3) NAND gate (4) NOT gate

SC0275

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

(1) Phosphorous (2) Aluminium

(3) Silver (4) Germanium

SC0276

NEET(UG) 2021

59. 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

SC0277

60. 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.

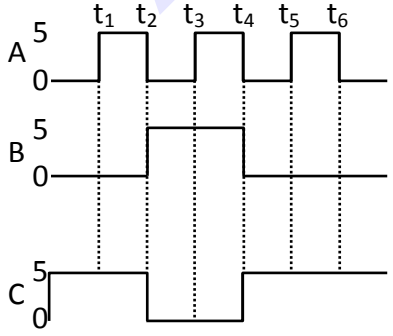
(2) **(A)** and **(B)** both are incorrect.

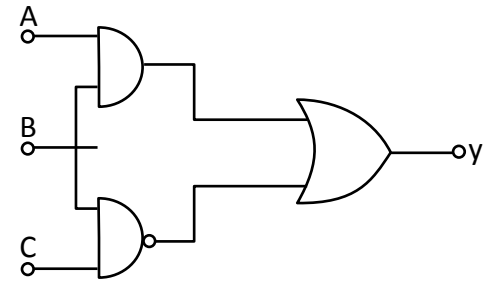
(3) **(A)** is correct and **(B)** is incorrect.

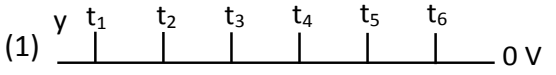
(4) **(A)** is incorrect but **(B)** is correct.

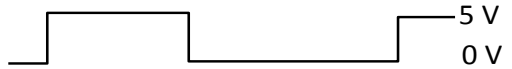
SC0278

61. 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) 

SC0279

NEET(UG) 2021(Paper-2)

62. A gate has the following truth table.

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

The gate is

(1) NOR (2) NAND

(3) AND (4) XOR

SC0280

63. For a transistor, if parameter $\alpha = 0.9$ and transistor is connected in common emitter configuration. The change in the collector current when the base current change by 4 mA is

(1) 4 mA (2) 3.6 mA

(3) 12 mA (4) 36 mA

SC0281

64. When p-n junction is in forward bias

(1) Diffusion current = Drift current, net current =0

(2) Diffusion current > Drift current, net current from p to n

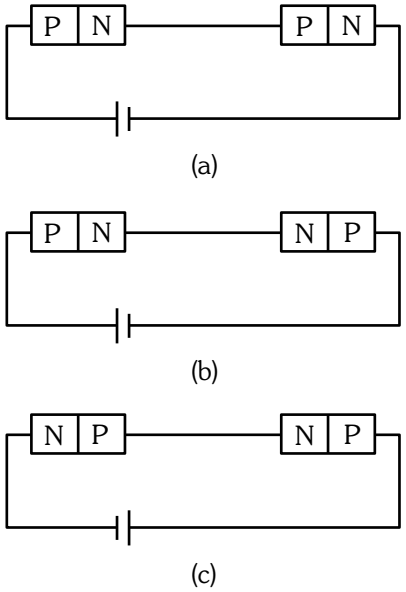
(3) Diffusion current > Drift current, net current from n to p

(4) Diffusion current < Drift current, net current from n to p

SC0282

NEET(UG) 2022

65.



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

(1) Circuit (b) only

(2) Circuit (c) only

(3) Both circuits (a) and (c)

(4) Circuit (a) only

SC0283

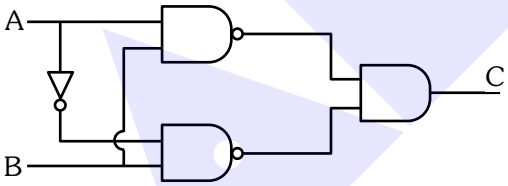
66. In half wave rectification, if the input frequency is 60 Hz, then the output frequency would be :

(1) 30 Hz (2) 60 Hz

(3) 120 Hz (4) Zero

SC0284

67.



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

SC0285

NEET(UG) 2022 (Overseas)

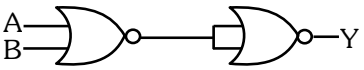
68. Two amplifiers of voltage gain 20 each, are cascaded in series. If 0.01 volt a.c. input signal is applied across the first amplifier, the output a.c. signal of the second amplifier in volt is:

(1) 4.0 (2) 0.01

(3) 0.20 (4) 2.0

SC0286

69.



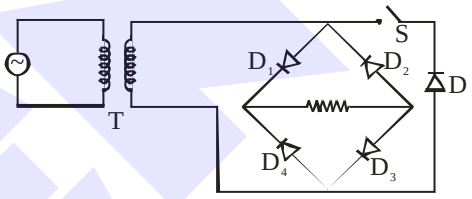
The output of the logic circuit shown is equivalent to a/an:

(1) NOR gate (2) AND gate

(3) NAND gate (4) OR gate

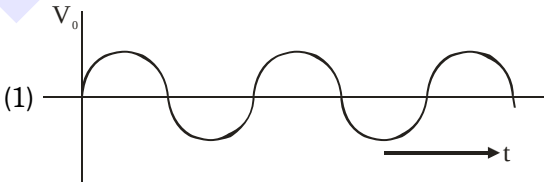
SC0287

70.

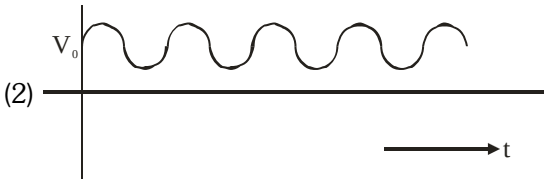


The circuit represents a full wave bridge rectifier when switch S is open. The output voltage (V_0) pattern across R_L when S is closed is:

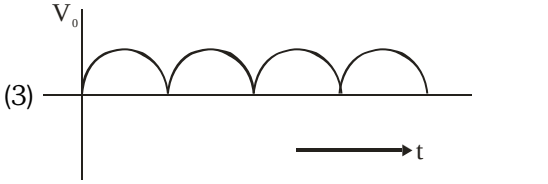
(1)



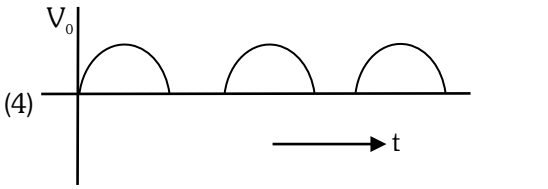
(2)



(3)



(4)



SC0288

Re-NEET(UG) 2022

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

(1) Zener voltage remains constant at breakdown

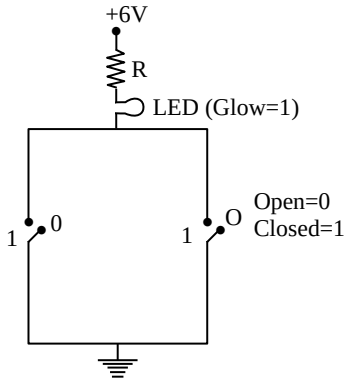
(2) It is designed to operate under reverse bias

(3) Depletion region formed is very wide

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

SC0289

72.



Identify the equivalent logic gate represented by the given circuit :

(1) OR (2) NOR

(3) AND (4) NAND

SC0290

73. 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:

(1) 6 mA and leaving the base

(2) 3 mA and leaving the base

(3) 6 mA and entering the base

(4) 3 mA and entering the base

SC0291

EXERCISE-II (Previous Year Questions) ANSWER KEY

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**	**3**	**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	51	52	53	54	55	56	57	58	59	60
Ans.	**4**	**3**	**2**	**2**	**1**	**1**	**3**	**1**	**2**	**4**	**3**	**3**	**1**	**3**	**3**
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73		
Ans.	**3**	**4**	**4**	**2**	**3**	**2**	**2**	**1**	**4**	**4**	**3**	**1**	**3**		

EXERCISE-III (Analytical Questions) Master Your Understanding

1. An electric field is applied to a semiconductor. Let the number of charge carriers density is 'n' and the average drift speed be v. If the temperature is increased :–

(1) both n and v will increase

(2) n will increase but v will decrease

(3) v will increase but n will decrease

(4) both n and v will decrease

SC0201

2. What will be conductivity of pure silicon crystal at 300 K temperature. If electron hole pairs per cm^3 is 1.072×10^{10} at this temperature, μ_e = 1350 cm^2/volt-s and μ_h = 480 cm^2/volt-s :–

(1) 3.14×10^{-6} mho/cm

(2) 3×10^{6} mho/cm

(3) 10^{-6} mho/cm

(4) 10^{6} mho/cm

SC0202

3. In sample of pure silicon 10^{13} atom/cm^3 is mixed of phosphorus. If all donar atoms are active then what will be resistivity at 20^0C if mobility of electron is 1200 cm^2/volt-s :–

(1) 0.5209 ohm cm (2) 5.209 ohm cm

(3) 52.09 ohm cm (4) 520.9 ohm cm

SC0203

4. Mobility of electrons in N-type Ge is 5000 cm^2/volts and conductivity 5 mho/cm. If effect of holes is negligible then impurity concentration will be :–

(1) $6.25 \times 10^{15}/cm^3$ (2) $9.25 \times 10^{14}/cm^3$

(3) $6 \times 10^{13}/cm^3$ (4) $9 \times 10^{13}/cm^3$

SC0204

5. If the two ends of a p-n junction are joined by a wire :–

(1) there will not be a steady current in the circuit.

(2) there will be a steady current from the n-side to the p-side.

(3) there will a steady current from the p-side to the n-side.

(4) there may or may not be a current depending upon the resistance of the connecting wire.

SC0205

6. A hole diffuses from the p-side to the n-side in a p-n junction. This means that :–

(1) a bond is broken on the n-side and the electron freed from the bond jumps to the conduction band.

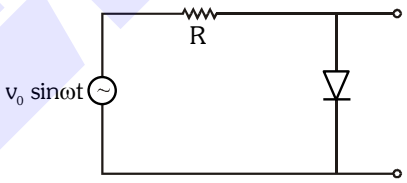
(2) a conduction electron on the p-side jumps to a broken bond to complete it.

(3) a bond is broken on the n-side and the electron free from the bond jumps to a broken bond on the p-side to complete it.

(4) a bond is broken on the p-side and the electron free from the bond jumps to a broken bond on the n-side to complete it.

SC0206

7. The output across the diode in the given circuit in figure.



(1) Would be zero at all times.

(2) Would be like a half wave rectifier with positive cycles in output.

(3) Would be like a half wave rectifier with negative cycles in output.

(4) Would be like that of a full wave rectifier.

SC0207

8. The energy of radiation emitted by LED is :-

(1) greater than the band gap of the semiconductor used.

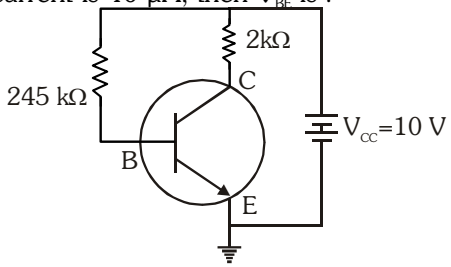
(2) always less than the band gap of the semiconductor used.

(3) always equal to the band gap of the semiconductor used.

(4) equal to or less than the band gap of the semiconductor used.

SC0210

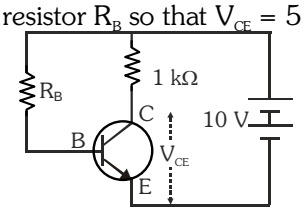
9. In a common emitter transistor circuit, the base current is 40 μA, then V_{BE} is :–



(1) 2 V (2) 0.2 V (3) 0.8 V (4) Zero

SC0211

10. In the circuit shown the transistor used has current gain β = 100. What should be the base resistor R_B so that V_{CE} = 5 V, V_{BE} =0



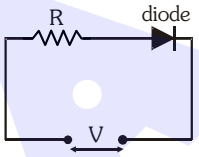
(1) $1 \times 10^3\ \Omega$ (2) 500 Ω
(3) $200 \times 10^3 \Omega$ (4) $2 \times 10^3\ \Omega$

SC0212

11. Two similar blocks of intrinsic silicon are separately doped uniformly to obtain same dopant densities $N_D = N_A$ per m^3. The *n*-type and *p*-type samples thus obtained are arranged in parallel to each other and a current is passed through the combination Then
(1) same current passes through each sample
(2) current through *n*-type sample is more
(3) current through *p*-type sample is more
(4) current through *p*-type sample is twice that through the *n*-type sample

SC0213

12. For the given circuit of p-n junction diode which is correct :–



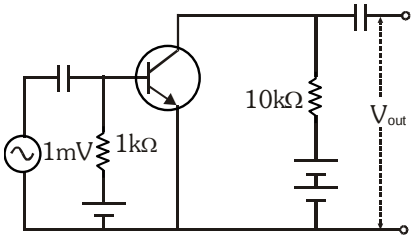
(1) in F.B. the voltage across R is V
(2) in R.B. the voltage across R is V
(3) in F.B. the voltage across R is 2 V
(4) in R.B. the voltage across R is 2 V

SC0214

13. The intrinsic carrier density in germanium crystal at 300 K is 2.5×10^{13} per cm^2. If electron density in an *n*-type germanium crystal at 300 K be 0.5×10^{17} per cm^3, a hole density (per cm^3) in this *n*-type crystal at 300 K would be expected around
(1) 2.5×10^{13} (2) 5×10^6
(3) 1.25×10^{10} (4) 0.2×10^4

SC0215

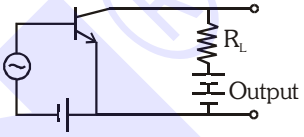
14. In the following common emitter configuration an 'npn' transistor with current gain β = 100 is used the output voltage of amplifier will be :–

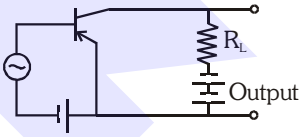


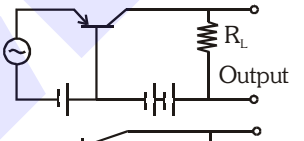
(1) 10 mV (2) 0.1 V (3) 1.0 V (4) 10 V

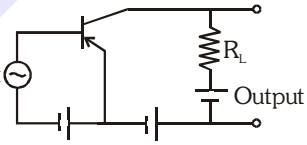
SC0216

15. The correct circuit for a pnp transistor amplifier in common emitter configuration :-

(1) 

(2) 

(3) 

(4) 

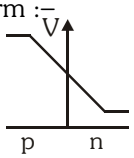
SC0217

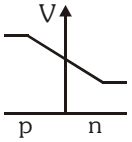
16. In half wave rectifier peak value of sinusodial signal is 10 V. Determine D.C. component at output :–

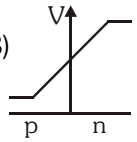
(1) $\frac{10}{\sqrt{2}}$V (2) $\frac{10}{\pi}$V
(3) 10 V (4) $\frac{20}{\pi}$V

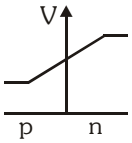
SC0218

17. In a forward biased p-n junction diode, the potential barrier in the depletion region is of the form :–

(1) 

(2) 

(3) 

(4) 

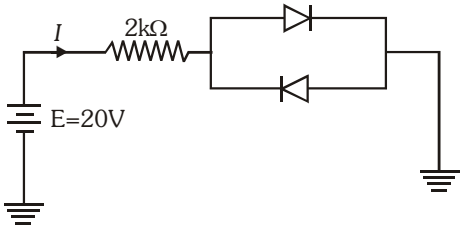
SC0219

18. The number of charge carrier concentration in silicon at 300 K is $1.56 \times 10^{16}/m^3$. If the electron and hole mobilities are respectively 0.135 and 0.065 (SI units) the resistivity of the material is (in SI units) approximately :-

(1) 2500 (2) 2000
(3) 3600 (4) 1350

SC0220

19. Assuming the diodes to be of silicon then current I in the following circuit is :-



(1) 0 (2) 9.65 mA
(3) 10 mA (4) 10.36 mA

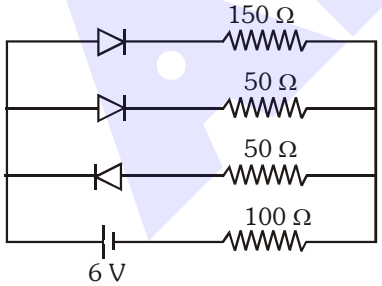
SC0221

20. An npn transistor is baised to work as an amplifier Which of the following statement is false ?

(1) The electrons go from base region to the collector region
(2) The electrons go from the collector region to the base region
(3) The electrons go from emitter region to the base region
(4) The holes go from base region to the emitter region

SC0222

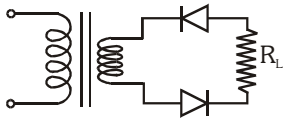
21. The circuit shown in the figure contains three diodes each with forward resistance of 50 ohms and with infinite backward resistance. If the battery voltage is 6 V, the current through the 100 ohm resistance is :-

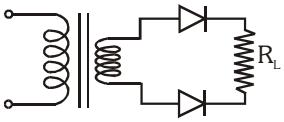


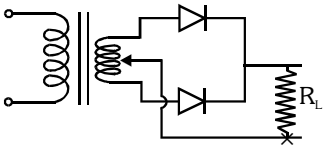
(1) 0 (2) 36 mA
(3) 43 mA (4) 50 mA

SC0223

22. Which of the following is not a rectifer circuit ?

(1) 

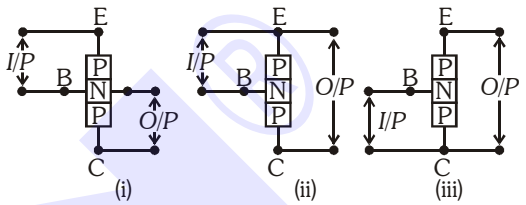
(2) 

(3) 

(4) None of these

SC0224

23. Three circuit connections of a PNP–transistor are given below :-

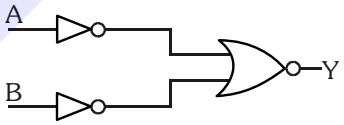


Which of the above represents the Common-Emitter Configuration ?

(1) (i) (2) (ii) (3) (iii) (4) None

SC0225

24. Which logic gate is represented by the following combination of logic gate :-



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

SC0226

25. Given truth table is related with :–

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

(1) NOT Gate
(2) OR Gate
(3) XOR Gate
(4) NAND Gate

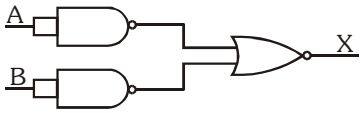
SC0227

26. Two NOT gates are connected at the two inputs of a NAND gate. This combination will behave like :-

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

SC0228

27. The truth table for the gate shown in the following figure will be :-



(1)

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

(2)

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

(3)

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

(4)

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

SC0229

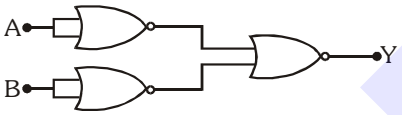
28. The truth table given below belongs for which gates?

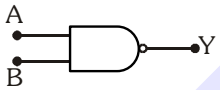
(1) OR gate
(2) XOR gate
(3) AND gate
(4) NAND gate

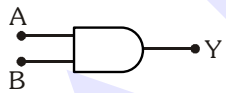
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

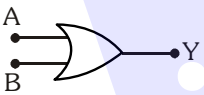
SC0230

29. The following combination of gates is equivalent to :-



(1) 

(2) 

(3) 

(4) 

SC0231

30. The output of gate is low when at least one of its input is high. This is true for :–

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

SC0232

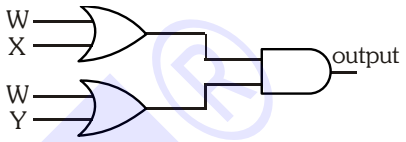
31. 'Output is LOW if and only if all the inputs are HIGH'

Indicate the logic gate for which the above statement in ture :–

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

SC0233

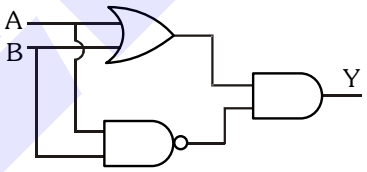
32. The diagram of a logic circuit is given below. The output of the circuit is represented by :–



(1) W. (X + Y) (2) X. (X.Y)
(3) W + (X + Y) (4) W + (X.Y)

SC0234

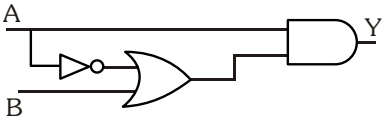
33. The following configuration of gates is equivalent to:-



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

SC0235

34. The combination of the gates shown represents:–



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

SC0236

EXERCISE-III (Analytical Questions) ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**2**	**1**	**4**	**1**	**1**	**3**	**3**	**4**	**2**	**3**	**2**	**1**	**3**	**3**	**2**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**2**	**4**	**2**	**2**	**2**	**2**	**2**	**2**	**3**	**4**	**3**	**4**	**2**	**2**	**1**
Que.	31	32	33	34											
Ans.	**4**	**4**	**3**	**1**											