NEET : CHAPTER WISE TEST-11

SUBJECT :- PHYSICS **DATE.....**
CLASS :- 12th **NAME.....**
CHAPTER :- SEMICONDUCTOR **SECTION.....**

(SECTION-A)

1. In a semiconductor
(A) There are no free electrons at any temperature
(B) The number of free electrons is more than that in a conductor
(C) There are no free electrons at 0 *K*
(D) None of these

2. When a semiconductor is heated, its resistance
(A) Decreases
(B) Increases
(C) Remains unchanged
(D) Nothing is definite

3. The valence of the impurity atom that is to be added to germanium crystal so as to make it a *N*-type semiconductor, is
(A) 6 (B) 5 (C) 4 (D) 3

4. Silicon is a semiconductor. If a small amount of *As* is added to it, then its electrical conductivity
(A) Decreases
(B) Increases
(C) Remains unchanged
(D) Becomes zero

5. Which statement is correct
(A) *N*-type germanium is negatively charged and *P*-type germanium is positively charged
(B) Both *N*-type and *P*-type germanium are neutral
(C) *N*-type germanium is positively charged and *P*-type germanium is negatively charged
(D) Both *N*-type and *P*-type germanium are negatively charged

6. In *P*-type semiconductor the majority and minority charge carriers are respectively
(A) Protons and electrons
(B) Electrons and protons
(C) Electrons and holes
(D) Holes and electrons

7. If n_e and n_h are the number of electrons and holes in a semiconductor heavily doped with phosphorus, then
(A) $n_e >> n_h$ (B) $n_e << n_h$
(C) $n_e \le n_h$ (D) $n_e = n_h$

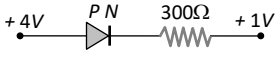
8. The mobility of free electron is greater than that of free holes because
(A) The carry negative charge
(B) They are light
(C) They mutually collide less
(D) They require low energy to continue their motion

9. The maximum energy of the electrons released in photocell is independent of
(A) Frequency of incident light.
(B) Intensity of incident light.
(C) Nature of cathode surface.
(D) None of these.

10. In the forward bias arrangement of a *PN*-junction diode
(A) The *N*-end is connected to the positive terminal of the battery
(B) The *P*-end is connected to the positive terminal of the battery
(C) The direction of current is from *N*-end to *P*-end in the diode
(D) The *P*-end is connected to the negative terminal of battery

11. The electrical resistance of depletion layer is large because
(A) It has no charge carriers
(B) It has a large number of charge carriers
(C) It contains electrons as charge carriers
(D) It has holes as charge carriers

12. In the circuit given below, the value of the current is



(A) 0 *amp* (B) 10^{-2} *amp*

(C) 10^{2} *amp* (D) 10^{-3} *amp*

13. On increasing the reverse bias to a large value in a *PN*-junction diode, current
(A) Increases slowly
(B) Remains fixed
(C) Suddenly increases
(D) Decreases slowly

14. In a *PN*-junction diode not connected to any circuit
(A) The potential is the same everywhere
(B) The *P*-type is a higher potential than the *N*-type side
(C) There is an electric field at the junction directed from the *N*- type side to the *P*-type side
(D) There is an electric field at the junction directed from the *P*-type side to the *N*-type side

15. The reason of current flow in *P-N* junction in forward bias is
(A) Drifting of charge carriers
(B) Minority charge carriers
(C) Diffusion of charge carriers
(D) All of these

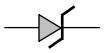
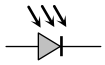
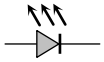
16. Avalanche breakdown is due to
(A) Collision of minority charge carrier
(B) Increase in depletion layer thickness
(C) Decrease in depletion layer thickness
(D) None of these

17. Zener breakdown in a semi-conductor diode occurs when
(A) Forward current exceeds certain value
(B) Reverse bias exceeds certain value
(C) Forward bias exceeds certain value
(D) Potential barrier is reduced to zero

18. Function of rectifier is
(A) To convert *ac* into *dc*
(B) To convert *dc* into *ac*
(C) Both (A) and (B)
(D) None of these

19. Consider the following statements *A* and *B* and identify the correct choice of the given answers
(A) A zener diode is always connected in reverse bias
(B) The potential barrier of a *PN* junction lies between 0.1 to 0.3 *V* approximately
(A) *A* and *B* are correct
(B) *A* and *B* are wrong
(C) *A* is correct but *B* is wrong
(D) *A* is wrong but *B* is correct

20. Symbolic representation of photodiode is

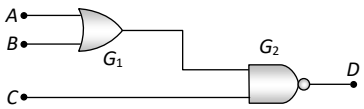
(A)  (B) 
(C)  (D) 

21. The following truth table corresponds to the logic gate

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

(A) NAND (B) OR
(C) AND (D) XOR

22. For the given combination of gates, if the logic states of inputs *A*, *B*, *C* are as follows *A* = *B* = *C* = 0 and *A* = *B* = 1, *C* = 0 then the logic states of output *D* are

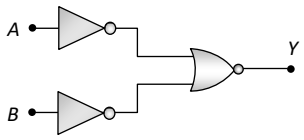


(A) 0, 0 (B) 0, 1
(C) 1, 0 (D) 1, 1

23. The logic behind 'NOR' gate is that it gives
(A) High output when both the inputs are low
(B) Low output when both the inputs are low
(C) High output when both the inputs are high
(D) None of these

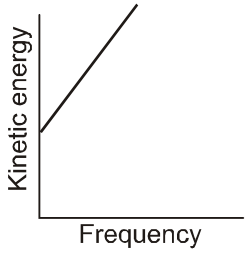
24. If *A* and *B* are two inputs in AND gate, then AND gate has an output of 1 when the values of *A* and *B* are
(A) *A* = 0, *B* = 0 (B) *A* = 1, *B* = 1
(C) *A* = 1, *B* = 0 (D) *A* = 0, *B* = 1

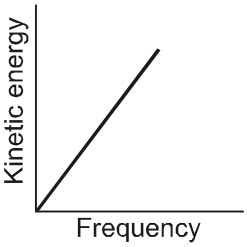
25. Which logic gate is represented by the following combination of logic gates

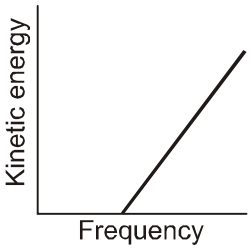


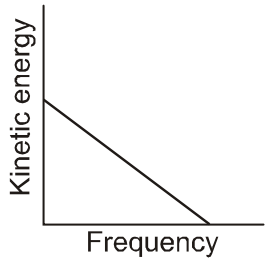
(A) OR (B) NAND
(C) AND (D) NOR

26. According to Eistein's photoelectric equation, the graph between the kinetic energy of photoelectrons ejected and the frequency of incident radiation is

(A) 

(B) 

(C) 

(D) 

27. The output of OR gate is 1

(A) If both inputs are zero

(B) If either or both inputs are 1

(C) Only if both input are 1

(D) If either input is zero

28. A gate in which all the inputs must be low to get a high output is called

(A) A NAND gate (B) An inverter

(C) A NOR gate (D) An AND gate

29. How many NAND gates are used to form an AND gate

(A) 1 (B) 2

(C) 3 (D) 4

30. A logic gate is an electronic circuit which

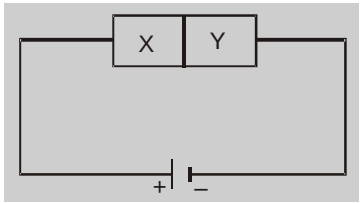
(A) Makes logic decisions

(B) Allows electrons flow only in one direction

(C) Works binary algebra

(D) Alternates between 0 and 1 values

31. A semi-conductor X is made by doping a germanium crystal with arsenic (Z = 33). A second semi-conductor Y is made by doping germanium with indium (Z = 49). The two are joined end to end and connected to a battery as shown. Which of the following statements is correct-



(A) X is p-type, Y is n-type and the junction is forward biased.

(B) X is n-type, Y is p-type and the junction is forward biased.

(C) X is p-type, Y is n-type and the junction is reverse biased.

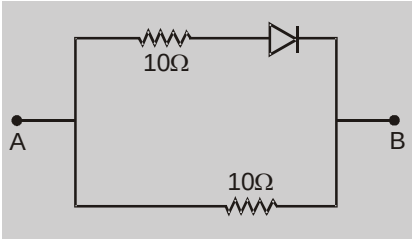
(D) X is n-type, Y is p-type and the junction is reverse biased.

32. In good conductors of electricity, the type of bonding that exists is :

(A) Ionic (B) Vander Waals

(C) Covalent (D) Metallic

33. If V_A and V_B denote the potentials of A and B, then the equivalent resistance between A and B in the adjoint electric circuit is-



(A) 10 ohm if $V_A > V_B$
(B) 5 ohm if $V_A < V_B$
(C) 5 ohm if $V_A > V_B$
(D) 20 ohm if $V_A > V_B$

34. The value of barrier potential of P-N junction or N-P junction in Ge is-
(A) 0.03 volt in the direction of forward current
(B) 0.3 volt in the direction opposite of the forward current
(C) 25 volt in the direction opposite to the forward current
(D) 25 volt in the direction of the forward current

35. The drift current in a P-N junction is-
(A) from the N-side to the P-side
(B) from the P-side to the N-side
(C) from the n-side to the P-side if the junction is forward-biased and in the oposite direction if it is reverse biased.
(D) from the P-side to the N-side if the junction is forward-baised and in the opposite direction if it is reverse baised.

(SECTION-B)

36. The maximum efficiency of full wave rectifier is

(A) 100 % (B) 25.20 %
(C) 40.2 % (D) 81.2 %

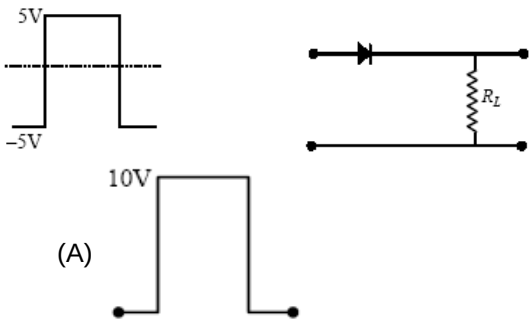
37. In P-N junction at the near junction there are-
(A) only positive ions
(B) only negative ions
(C) positive and negative ion both
(D) elerctron and holes both

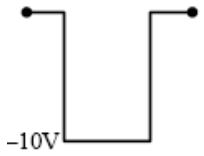
38. The cause of the potential barrier in a p-n diode is :
(A) depletion of positive charges near the junction
(B) concentration of positive charges near the junction
(C) depletion of negative charges near the junction
(D) concentration of positive and negative charges near the junction

39. A semi-conducting device is connected in a series in circuit with a battery and a resistance. A current is allowed to pass through the circuit. If the polarity of the battery is reversed, the current drops to almost zero. The device may be :
(A) a p-n junction
(B) an intrinsic semiconductor
(C) a p-type semiconductor
(D) an n-type semiconductor

40. In the middle of the depletion layer of reverse biased p - n juction,the
(A) electric field is zero
(B) potential is maximum
(C) electric field is maximum
(D) Potential is zero

41. If in p-n junction diode, a square input signal of 10 V is applied as shown. Then the output signal across *R* will be



(B)


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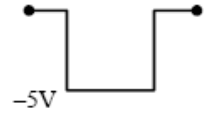

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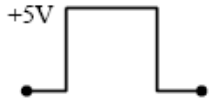
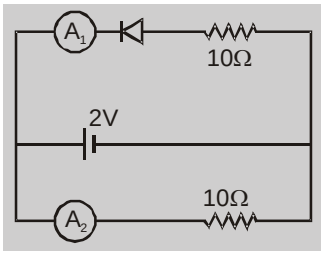


42. In the following circuit readings in ammeters A_1 and A_2 will be-

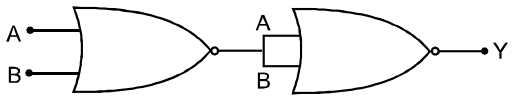


(A) 0.2 A, zero (B) Zero , 0.2 A
(C) 0.2 A, 0.2 A (D) 0.2 A, 0.4 A

43. A light emitting diode has a voltage drop of 2 v across it and passes a current of 10 μA. when it operates with a 6 v battery through a limiting resistor R, the value of R is

(A) 40 kΩ (B) 4 kΩ
(C) 200 kΩ (D) 400 kΩ

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



	A	B	Y
	0	0	0
(A)	0	1	0
	1	0	0
	1	1	1

	A	B	Y
	0	0	1
(B)	0	1	1
	1	0	1
	1	1	0

	A	B	Y
	0	0	1
(C)	0	1	0
	1	0	0
	1	1	0

	A	B	Y
	0	0	0
(D)	0	1	1
	1	0	1
	1	1	1

45. A sinusoidal voltage of peak to peak value of 310 V is connected in series with a diode and a load resistance R so that Half-wave rectification occurs. If the diode has a negligble forwed resistance, the root mean square voltage across the load resistance is

(A) 310 V (B) 155 V
(C) 109.5 V (D) 77.5

46. **Assertion :** The Boolean expression Y = $\overline{A \cdot A}$ is for NAND gate.
Reason : The Boolean expression Y = $\overline{A \cdot A}$ is for NOT gate.
(A) If both assertion and reason are true and reason is the correct explanation of assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of assertion.
(C) If Assertion is true but reason is false.
(D) If both assertion and reason are false.

47. The device that act as a complete electronic circuit is
(A) junction diode
(B) integrated circuit
(C) junction transistor
(D) zener diode

48. Pure Si at 500K has equal number of electron (n_e) and hole (n_h) concentrations

of 1.5×10^{16} m^{-3}. Doping by indium increases n_h to 4.5×10^{22} m^{-3}. The doped semiconductor is of :

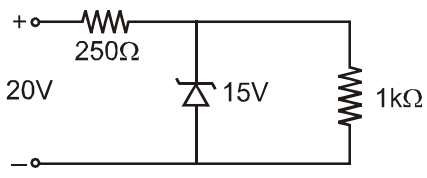
(A) n–type with electron concentration $n_e = 5 \times 10^{22}$ m^{-3}

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

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

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

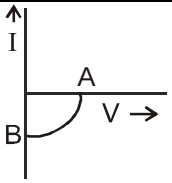
49. A zener diode, having breakdown voltage equal to 15V, is used in a voltage regulator circuit shown in figure. The current through the diode is :



(A) 10 mA (B) 15 mA

(C) 20 mA (D) 5 mA

50. The given graph represents V – I characteristic for a semiconductor device.



Which of the following statement is correct ?

(A) It is V – I characteristic for solar cell where, point A represents open circuit voltage and point B short circuit current.

(B) It is for a solar cell and points A and B represent open circuit voltage and current, respectively.

(C) It is for a photodiode and points A and B represent open circuit voltage and current respectively.

(D) It is for a LED and points A and B represent open circuit voltage and short circuit current, respectively.