PHYSICS

BOOKS - NIKITA PHYSICS (HINGLISH)

SEMICONDUCTORS

Mcqs

1. The main distinction between conductors, semiconductors and insulators is concerned with

A. binding energy of free electrons

B. work function of free electrons

C. width of forbidden energy band

D. temperature coefficient of resistance

Answer: C

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2. In an insulator

A. The valence band is partially filled with electrons

B. conduction band is partially filled withelectrons

C. conduction band is empty and the valence band is filled with electrons

D. conduction band is filled with electrons and valence band empty

Answer: C

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3. If copper and germanium are cooled to 70 K from room temperature, then

A. Resistance of copper increases while that of germanium decreases

B. resistance of copper decreases while that to germanium increases

C. resistance of both decreases

D. resistance of both increases

Answer: B

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4. The electrons in the atoms of an element, which determine its chemical and electricalproperties are called

A. valence electrons

B. conduction electrons

C. free electrons

D. bound electrons

Answer: A

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5. What is the order of forbidden energy gap in eV in the energy bands of silicon ?

A. 0.5 eV

B. 1.1 eV

C. 2.1 eV

D. 3.5 eV

Answer: B

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6. The energy gap between conductionband and valence band is of the order of 0.07 eV. It is a/an

A. a conductor

B. semiconductor

C. an insulator

D. a super conductor

Answer: B

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7. When a metal is heated, it emits predominantly

A. mesons

B. protons

C. neutrons

D. electrons

Answer: D

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8. Generally, the number of electrons in the valence shell of good conductors is

A. equal to 4

B. less than 3

C. more than 3

D. more than 8

Answer: D

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9. In a crystal, the permitted energy states of electrons are present

A. in the conduction band and the forbidden gap

B. only in the forbidden gap

C. in the valence band and conduction band

D. in the forbidden gap and the valence band

Answer: C

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10. There is no hole current in good conductors, because

A. they do not have valence band

B. they do not have conduction band

C. their valence and conduction bands overlap

D. their valence bands overlap only

Answer: C

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11. The energy band gap is maximum in

A. copper

B. an insulator

C. germanium

D. a super conductor

Answer: B

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12. The forbidden energy gap in an intrinsic semiconductor is

A. very large

B. zero

C. very small

D. half of the forbidden gap in a conductor

Answer: C

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13. In a good conductor, the energy levels in a valence band

A. are partially filled

B. are completely filled

C. overlap with conduction band

D. both 'a' and 'c

Answer: D

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14. Solids having highest energy level partially filled with electrons are

A. an insulator

B. a semiconductor

C. a conductor

D. none of these

Answer: C

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15. At ordinary temperature, an increase in temperature, increases the conductivity of

A. a semiconductor

B. a conductor

C. a super conductor

D. an insulator

Answer: A

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16. The width of the forbidden band will be small in

A. metals

B. insulators

C. semiconductors

D. good conductors

Answer: C

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17. Electrons in the outermost shell of an atom are called

A. conduction electrons

B. valence electrons

C. donor electrons

D. active electrons

Answer: B

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18. In intrinsic semiconductor at room temperature, the number of electrons and holes are

A. equal

B. zero

C. unequal

D. infinite

Answer: A

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19. Fermi energy is the

A. minimum energy of electrons in a metal

at 0 K

B. maximum energy of electrons in a metal

at 0 K

C. minimum energy of electrons in a metal

at $0^{\circ}C$

D. maximum energy of electrons in a metal

at $0^{\circ}C$

Answer: B

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20. In which of the following band an electron cannot lie in a crystal ?

A. Conduction band

B. Forbidden band

C. Valence band

D. All of these

Answer: B

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21. In a pure conductor, the value of the forbidden energy gap is

A. 0.5 ev

B. 1.1 ev

C. zero

D. 2.3 ev

Answer: C

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22. The forbidden energy gap in a semiconductor is of the order of

A. 0.1 ev

B. 0.5 eV

C. 1eV

D. 10 eV

Answer: C

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23. If there is no hole current in a substance, if must be

A. an insulator

B. a conductor

C. an n-type semiconductor

D. a p-type semiconductor

Answer: B

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24. Which one of the following is an amorphous solid?

A. Rubber

B. plastic

C. Glass

D. All of these

Answer: D

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25. In an insulator, the forbidden energy gap between the valence band and conduction band is of the order of

A. 5 ev

B. 10 eV

C. 2 MeV

D. 5 MeV

Answer: A

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26. What is the forbidden energy gap (in joule) for a Germanium crystal ?

A. 0.067 ev

B. 6.57 ev

C. 2.67 eV

D. 0.67 eV

Answer: C

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27. The band of maximum energy in which electrons are present is called the

A. conduction band

B. valence band

C. forbidden band

D. none of these

Answer: B

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28. The for bidden gap in the energy bands of sillcon is

A. 0.5 ev

B. 1.1 eV

C. 4 eV

D. 2.6 eV

Answer: B

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29. At absolute zero temperature the forbidden gap of conductor is

A. zero

B. 0,67 eV

C. 1.1 eV

D. 6 eV

Answer: A

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30. There is a small energy gap between the conduction and valence bands of

A. copper

B. silver

C. silicon

D. aluminium

Answer: C

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31. If the temperature of semiconductor is increased the number of electrons in the valence band will

A. increase

B. same

C. decrease

D. either 'a' or 'b'

Answer: C

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32. In a good conductor, what is the energy gap between the conduction band and the valence band.?

A. zero

B. one

C. infinite

D. very large

Answer: A

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33. If the temperature of semiconductor will increase then the forbiddengap will

A. increase

B. remain same

C. decrease

D. either 'a' or 'b'

Answer: C

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34. The level formed due to impurity atom, in the for hidden energy gap, very near to the valence band in a p-type semiconductor is called

A. Conduction level

B. Forbidden level

C. Donor level

D. Acceptor level

Answer: D

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35. The valence band and the conduction band of a substance overlap at ordinary temperatures The substance may be

A. a p-type semiconductor

B. a conductor

C. an insulator

D. an n-type semiconductor

Answer: B

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36. The Ge behaves as semiconductor even though all electrons in the valence band form covalent bonds ? It is caused by the large width of

A. valence band

B. conduction band

C. forbidden band

D. none of these

Answer: C

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37. The most commonly used semiconductors are

A. wool and glass

B. copper and brass

C. glass and ebonite

D. germanium and silicon

Answer: D

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38. The behavior of pure Ge crystal, at absolute zero temperature is that it behaves as

A. perfect conductor

B. perfect insulator

C. semiconductors

D. none of these

Answer: B

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39. The conductivity of semiconductors

A. is independent of temperature

B. decrease with increase of temperature

C. increases with increases of temperature

D. varies unpredictably with temperature

Answer: C

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40. The free electron model of metallic solid does not explain

A. range of resistivities

B. behaviour of insulators

C. behaviour of semiconductors

D. creation of holes on crytstals

Answer: A

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41. A pure semiconductor

A. has low resistance

B. allows adequate current to pass through it

C. is an intrinsic semiconductor

D. all of these

Answer: C

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42. Majority carries in semiconductor are

A. holes in n-type and p-type both

B. electron in n-type and p-type both

C. holes in n-type and electron in p-type

D. holes in p-type and electrons in n-type

Answer: D

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43. In a semiconductor, the mobility of holes is

A. less than that of electrons

B. equal to that of electrons

C. greater than that of electrons

D. not related to the movement of electrons

Answer: A

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44. Which of the following is a typical example of a semiconductor ?

A. Mica

B. Quartz

C. Platinum

D. Germanium

Answer: D

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45. A hole in semiconductor is different from an electron, because it is

A. massless

B. an antiparticle

C. negatively charged vacancy

D. positively charged vacancy

Answer: D

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46. Doping materials are called impurities, because they

A. make semiconductor less pure

B. change chemical properties

C. alter the crystal structure

D. change the number of charge carriers

Answer: B

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47. The movement of a hole is brought about by the vacancy being filled by a/an

A. free electron

B. valence electron

C. atomic core

D. none of these

Answer: B

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48. The electrical conductivity of p-type semiconductor is determined by the number of

A. holes

B. electrons

C. valence band

D. conduction band

Answer: A

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49. The electrical conductivity of intrinsic and p-type semiconductor increases with increase in

A. volume

B. density

C. pressure

D. temperature

Answer: D

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50. In germanium crystal, a hole is provided by an impurity of

A. covalent

B. monovalent

C. trivalent

D. tetravalent

Answer: C

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51. When N-type of semiconductor is heated

A. number of electrons increases while that of holes decreases

B. Number of holes increases while that of electrons decreases

C. number of electrons and holes remain same

D.

Answer: D

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52. The number of electrons in the valence shell of a semiconductor is

A. 1

B. 2

C. 3

D. 4

Answer: D

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53. The resistivity of a semiconductor at room temperature is in between

A. 10^{10} to $10^{12}\Omega$ cm

B. 10^{6} to $10^{8}\Omega$ cm

C. 10^{-3} to $10^{6}\Omega$ cm

D. 10^{-2} to $10^{-5}\Omega$ cm

Answer: C

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54. Which of the following is correct about the nature of net charge on n-type semiconductor ?

A. it is negative nature

B. it is positive nature

C. it is neutral

D. either 'a' or 'b'

Answer: C

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55. A pure semiconductor has

A. an infinite resistance at 0° C

B. a finite resistance which does not depend upon temperature

C. a finite resistance which decrease with temperature

D. a finite reststance which increases with temperature

Answer: C

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56. The majority charge carriers in P -type semiconductor are

A. holes

B. neutrons

C. electrons

D. positrons

Answer: A

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57. To obtain a P-type germanium semiconductor, it must be dopped with

A. arsenic

B. antimony

C. indium

D. phosphorus

Answer: C

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58. An n-type semiconductor is

A. neutral

B. positively charged

C. negatively charged

D. none of these

Answer: A

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59. An n-type germanium is obtained, on doping intrinsic germaniurn, by

A. silicon

B. sulphur

C. aluminium

D. phosphorous

Answer: D

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60. In an n-type semiconductor, the concentration of minority carriers mainly depends upon

A. doping technique

B. number of donor atoms

C. temperature of the material

D. quality of intrinsic material

Answer: C

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61. When arsenic is added as an impurity to silicon, the resulting material is

A. n-type semiconductor

B. p-type semiconductor

C. n-type semiconductor

D. none of these

Answer: A

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62. Semiconductor of both p-type and n-type are produced by

A. ionic solids

B. metallic solids

C. covalent solids

D. molecular solids

Answer: C

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63. Semiconductor is damaged by the strong current due to

A. lack of free electron

B. excess of electrons

C. excess of protons

D. none of these

Answer: B

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64. A p-type semiconductor is

(i) a silicon crystal doped with arsenic impurity

(ii) a silicon crystal doped with aluminium impurity

(iii) a germanium crystal doped with boron impurity

(iv) a germanium crystal doped with phosphorus impurities.

A. (i) and (ii) are correct

B. (ii) and (iii) are correct

C. (i) and (iv) are correct

D. only (i) is correct

Answer: B

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65. A hole in a P - type semiconductor is

A. an excess electron

B. a missing electron

C. a missing atom

D. a donor level

Answer: B

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66. In an n-type semiconductor donor level is

A. above the conduction band of the host crystal

B. below the valence band of the host crystal

C. close to the conduction band of the host crystal

D. close to the valence band of host crystal

Answer: C

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67. In a n-type semiconductor, which of the following statement is true?

A. n-type semiconductors have free electrons in majority
B. n-type semiconductors have holes in majority
C. the concentrations of electrons and holes are equal in both n-type and p-type semiconductors
D. n-type semiconductor has excess negative-charge

Answer: A

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68. The forbidden energy gap is maximum in

A. metals

B. super conductors

C. insulators

D. semiconductor

Answer: C

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69. When boron is added as an impurity to silicon,the resulting material is

A. n-type conductor

B. n- type semiconductor

C. p-type conductor

D. p-type semiconductor

Answer: D

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70. In P-type semiconductor the majority and minorty charge carriers are respectively

A. protons and electrons

B. electrons and protons

C. electrons and holes

D. holes and electrons

Answer: D

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71. When a p-n junction diode is reverse biased the flow of current across the junction is mainly due to

A. drift of charges

B. diffusion of charges

C. both drift and diffusion of of charges

D. depends on the nature of the material

Answer: B

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72. If the forward voltage in a diode is increased, the width of the depletion region-

A. decrease

B. increase

C. not change

D. increase slightly

Answer: A

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73. For rectifying an action, we use

A. choke

B. diode

C. transformer

D. condenser

Answer: B

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74. In a semiconductor diode, reserve bias current is due to drift of free electrons and holes caused by

A. impurity atoms

B. crystal structure

C. thermal excitations

D. none of these

Answer: A

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75. The depletion layer in $P-N$ junction region is caused by

A. drift of holes

B. drift of electrons

C. diffusion of carriers

D. migration a impurity ions

Answer: C

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76. A p-n junction diode is said to be forward biased, when a potential difference is p and n-regions and making applied across

A. p region positive and n region negative

B. making p region negative and n region positive

C. both p and n regions positive

D. both p and n regions negative

Answer: A

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77. A diode converts A.C. voltage into

A. an A.C. voltage with a different peak value .

B. a D.C. voltage with a constant value

C. a two directional pulsating voltage with a constant r.m.s. value

D. an unidirectional pulsating voltage that keeps on dropping to zero in between

Answer: D

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78. A p-n junction diode can not be used

A. as a rectifier

B. for amplifying an A.C. signal

C. for getting radiation of light

D. as a detection of light intensity

Answer: B

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79. When a p-n junction diode is reverse biased the flow of current across the junction is mainly due to

A. diffusion of charges

B. drift of charges

C. both drift and diffusion of charge

D. depends upon the nature of the material

Answer: B

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80. In an unblased p-n junction, holes diffuse from the p - region to n- region because

A. the free electrons in the n-region attract them

B. they are swept across the junction by the potential difference

C. there is greater concentrated of holes in the p-region then the n-region.

D.

Answer: C

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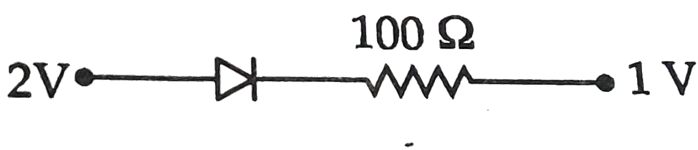
81. Assuming that the junction diode is ideal, the current in arrangement shown in figure is



A. 2 mA

B. 5 mA

C. 10 mA

D. 20 mA

Answer: C

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82. The depletion region of a p-n junction contains :-

A. impurity ions

B. minority carriers

C. majority carriers

D. no charged bodies

Answer: D

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83. If the forward voltage in a diode is increased, the width of the depletion region-

A. increase

B. decrease

C. remain constant

D. either 'a' or 'b'

Answer: B

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84. What is the number of junctions in a semiconductor diode ?

A. One

B. Two

C. Three

D. infinite

Answer: A

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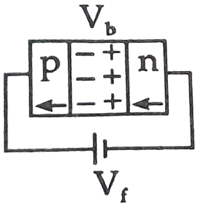
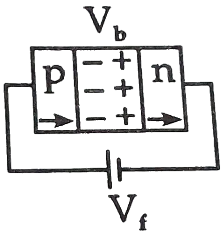
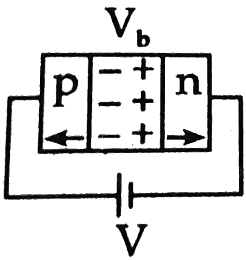
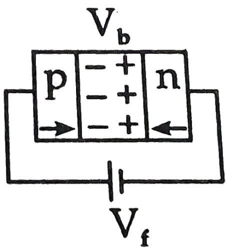
85. In the case of forward biasing of PN-junction, which one of the following figures correctly depicts the direction of flow of carriers?

A. 

B. 

C. 

D. 

Answer: D

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86. In a p-n junction , when p-channel is connected to the +ve terminal and n-channel is connected to the -ve terminal of a battery , then the set up is called

A. unbiased

B. backward biased

C. forward biased

D. negatively biased

Answer: C

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87. With forward biased mode, the p-n junction diode

A. drift of charges

B. diffusion of charges

C. diffusion of drift of charges

D. All of these

Answer: B

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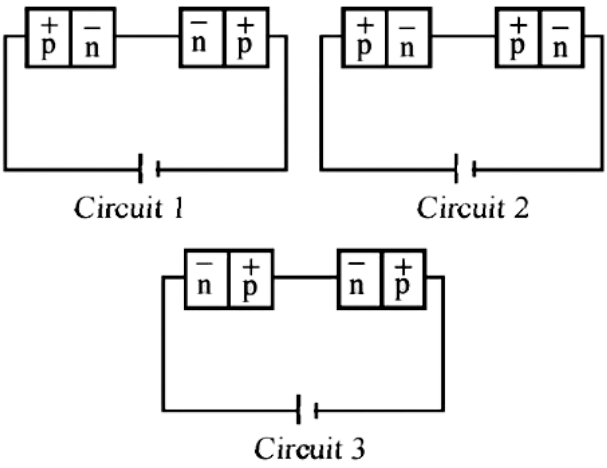
88. Two identical p-n junctions may be connected in series in which a battery in three ways , fig . The potential drops across the two p - n junctions are equal in



A. circuit 1 only

B. circuit 1 and circuit 2

C. circuit 2 and circuit 3

D. all of these circuits.

Answer: C

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89. The potential barrier at a p-n junction is due to charges on either side of the junction. These charges are

A. fixed donor

B. fixed acceptor

C. infinite donor

D. both a and b

Answer: D

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90. In a p-n junction diode, if the junction current is zero, it means that

A. the potential barrier has disappeared altogether

B. there are no carriers crossing the junction from one end to another

C. number of majority carriers and minority carriers crossing the junction are equal

D. number of majority carriers exceed the minority carriers closing the junction

Answer: C

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91. In a semiconductor diode p-side is earthed and N-side is applied a potential of -2V, the diode shall

A. not conduct

B. conduct

C. partially conduct

D. breakdown

Answer: B

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92. Diode current is a function of

A. temperature

B. holes

C. electrons and holes

D. none of these

Answer: A

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93. In a p-n junction there is no appreciable current if

A. p-section is made positive and n-section negative

B. a potential difference is applied across the junction making p-section negative and n-section positive.

C. a potential difference is applied across the junction

D. it is impossible

Answer: B

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94. When a p-n junction diode is reverse biased

A. electrons and holes are attracted towards each other and move towards the depletion region.

B. electrons and holes move away form the deplection region.

C. height of the potential barrier decreases

D. no change in the current takes place

Answer: B

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95. In the depletion region of an unbiased p-n junction diode there are

A. only holes

B. both electrons and holes

C. only fixed ions

D. none of these

Answer: B

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96. On increases the reverse biase to a large value of in a PN- junction diode, current.

A. increase , slowly

B. increase suddenly

C. remains fixed

D. decreases slowly

Answer: B

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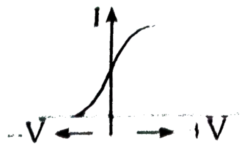
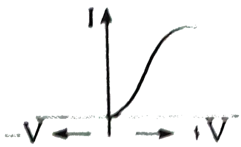
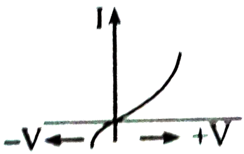
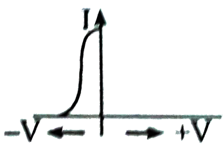
97. Applying different potential at the ends of p-n junction , current is measured for increasing potential. Which curve shows the relationship between current and potential.

A. 

B. 

C. 

D. 

Answer: C

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98. The dominant mechanisms for motion of charge carriers in forward and reverse biased silicon P-N juntions are-

A. drift in forward bias diffusion in reverse

B. diffusion in forward bias and drift in reverse bias.

C. diffusion in both forward and reverse bias

D. drift in both forward and reverse bias

Answer: B

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99. Avalanche breakdown is obtained in a p-n junction when there is

A. forward bias

B. reverse bias

C. zero bias

D. very high bias

Answer: B

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100. In a p- n junction diode not connected to any circuit,

A. the potential is the same everywhere

B. the p-type side is at 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 form the p-type side to the n-type side

Answer: C

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101. The cause of the potential barrier in a p-n diode is:

A. depletion of positive charges near the junction

B. concentration of positive charge near the junction

C. deplection of negative charges near the junction

D. concentration of positive and negative charges near the junction.

Answer: D

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102. A semiconducting device is connected in a series circuit with a battery and a resistance.A current is found 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. a n-type semiconductor

Answer: A

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103. In a half wave rectifier, the r.m.s value of the A.C. component of the wave is

A. less than zero

B. less than D.C. Value

C. equal to D.C. value

D. greater than D.C. value

Answer: D

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104. The current obtained from a simple filterless reactifier is

A. varying direct current

B. constant direct current

C. direct current mixed with alternating current

D. eddy current

Answer: C

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105. A rectifier is used to convert

A. high current into low current

B. low current into high current

C. D.C. current into A.C. current

D. A.C. current into D.C. current

Answer: D

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106. When two semiconductor of p and n type are brought in to contact, they from a p-n junction which acts like a :-

A. conductor

B. oscillator

C. amplifier

D. rectifier

Answer: D

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107. The diode is also used as

A. an amplifier

B. a modulator

C. a rectifier

D. an oscillator

Answer: C

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108. When out put current is in one direction only, but is continuously varying in value, then it is called

A. anode current

B. direction current

C. alternating current

D. pulsating direct current

Answer: D

109. A half-wave rectifier is being used to rectify an alternating voltage of frequency 50 Hz. The number of pulses of rectified current obtained in one second is

A. 20

B. 30

C. 50

D. 150

Answer: C

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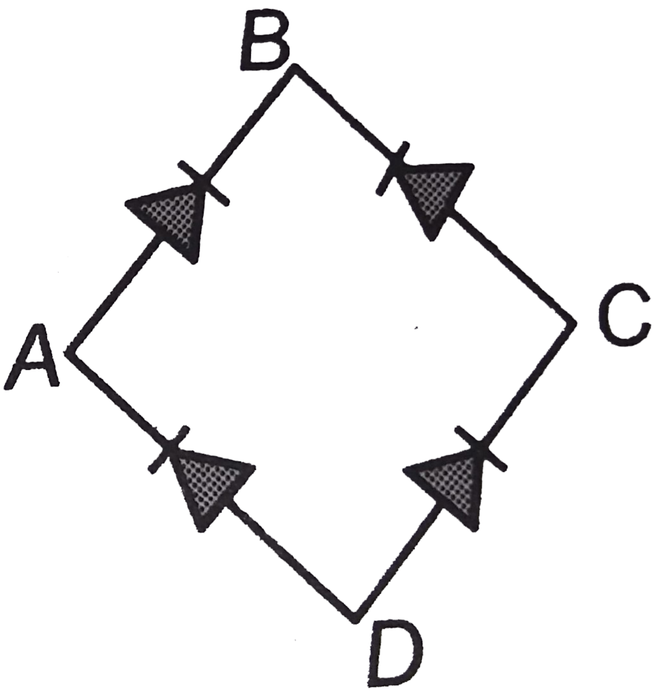
110. In the diagram, the input is across the terminals A and C and the output is across the terminals B and D, then the outputs is



A. zero

B. same as input

C. full-wave rectified

D. half-wave rectified

Answer: C

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111. When there is current during only one-half of the A.C. input cycle in a ciruit, then it is called

A. an amplifier

B. an oscillator

C. full-wave rectified

D. half-wave rectified

Answer: D

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112. Avalanche breakdown in a semi conductor diode occurs when

A. the forward current exceeds a certain value

B. forward bias exceeds a certain value

C. reverse bias exceeds a certain value

D. the depletion region is reduced to zero

Answer: C

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113. A Zener diode when used as a voltage regulator is connected

(a) in forward bias

(b) in reverse bias

(c) in parallel to the load

(d) in series to the load.

A. 1 and 3 are correct

B. 2 and 4 are correct

C. 1 and 4 are correct

D. 2 and 3 are correct

Answer: B

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114. Zener diode is used for

A. rectification of voltage

B. stabilisation of voltage

C. amplification of voltage

D. producing electromagnetic oscillation

Answer: B

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115. Zener breakdown occurs only when

A. it is lightly doped

B. the temperature is increased

C. it is forward biased

D. it is reverse biased

Answer: D

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116. For the proper functioning of a zener diode as a voltage stabiliser it should be always

A. forward biased

B. reverse biased

C. lightly biased

D. connected in series with the load resistance

Answer: B

Watch Video Solution

117. The value of the zener current

A. is determined by the zener current

B. is always in the a microampere range

C. does not depends upon the temperature

D. is limited by the external circuit resistance

Answer: D

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118. Once a zener diode is taken in its breakdown region, there is not much change in its

A. current

B. resistance

C. voltage

D. capacitance

Answer: C

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119. A general purpose diode is more likely to suffer avalanche breakdown rather than zener breakdown because

A. its leakage current is small

B. it has low reverse resistance

C. it has strong co-valent bonds

D. it is lightly doped

Answer: D

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120. Zener diode is operated in the

A. forward region

B. breakdown region

C. deplection region

D. none of the above

Answer: B

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121. Zener breakdown occurs

A. mostly in intrinsic semiconductors

B. due to rupture of covalent bonds

C. in lightly doped junctions

D. due to thermally generated majority carries

Answer: B

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122. Zener breakdown takes place if

A. impurity level is high

B. impurity level is low

C. impurity is less in n side

D. impurity is less n p side

Answer: B

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123. Zener diode is used as

A. as a amplifier

B. as a rectifier

C. as a oscillator

D. as a voltage regulator

Answer: D

Watch Video Solution

124. A p-n junction diode which has sharp breakdown

A. zener diode

B. photo diode

C. varacator diode

D. pin diode

Answer: A

Watch Video Solution

125. Symbol of zener diode-

A. 

B. 

C. 

D. 

Answer: A

Watch Video Solution

126. Avalanche breakdown is due to

A. collision of minority charge carrier

B. depletion layer thickness increase

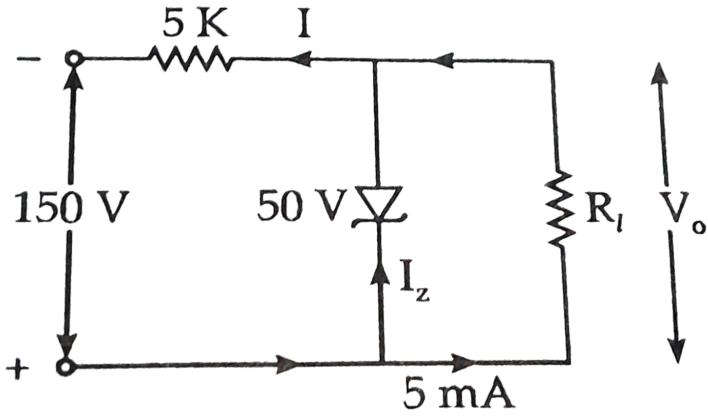
C. DL thickness decrease

D. none of the above

Answer: A

Watch Video Solution

127. What is the zener current in the following circuit ?



A. 10 mA

B. 15 mA

C. 20 mA

D. 25 mA

Answer: B

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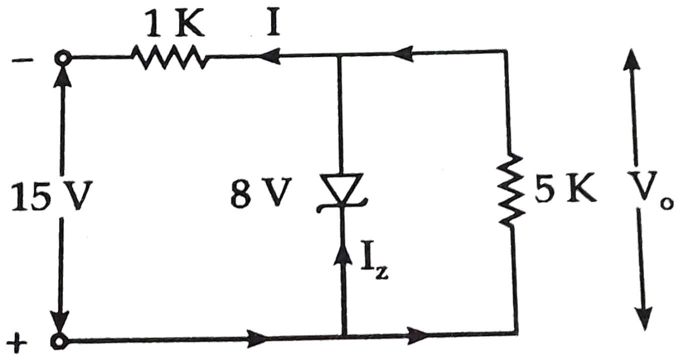
128. What is the value of the output vot-tage V_0 in the following ze-ner circuit ?



A. 7 V

B. 8 V

C. 15 V

D. 23 V

Answer: B

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129. A pn junction diode in which current carriers are generated by

A. photes

B. LED

C. solar cell

D. zener diode

Answer: A

View Text Solution

130. A pn junction diode in which light in allowed to fall in its junction is

A. zener diode

B. LED

C. solar cell

D. photo diode

Answer: D

Watch Video Solution

131. Photodiode is always operated in

A. forward bias

B. reverse bias

C. unbiased

D. none of these

Answer: B

Watch Video Solution

132. In photodiode current depends on

A. frequency

B. intensity

C. doping

D. pressure

Answer: B

Watch Video Solution

133. Photo diodes are used is

A. demodulation of optical signals

B. electronic counters

C. sensors in remote controlled receivers

D. all of these

Answer: D

Watch Video Solution

134. Which of the followign devices is used in optocouplers

A. zener diode

B. photo diode

C. solar cell

D. LED

Answer: B

Watch Video Solution

135. An LED is a

A. forward biased p-n junction diode

B. reverse biased p-n junction diode

C. photodiode

D. pin diode

Answer: A

Watch Video Solution

136. Colour of light emitted by LED depends upon

A. its forward bias

B. its reverse bias

C. the material of semiconductor

D. the amount of forward or reverse current

Answer: C

Watch Video Solution

137. A solar cell converts solar energy into

A. heat energy

B. chemical energy

C. electric energy

D. light energy

Answer: C

Watch Video Solution

138. GaAs is used to prepare

A. a zener diode

B. a light emitting diode

C. a transistor

D. a half wave rectifier

Answer: B

Watch Video Solution

139. A solar cell works on the principle of

A. photoelectricity

B. photographic camera

C. photovoltaic conversion

D. photosynthesis

Answer: C

Watch Video Solution

140. The most commonly used semiconducting material used to prepare a solar cell is

A. Gallium arsenide

B. Indium arsenide

C. Cadmium arsenide

D. Silicon

Answer: D

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141. LEDS used for giving infrared radiations are prepared from

A. silicon dioxide

B. gallium arsenide [Ga As]

C. gallium phosphide [Ga P]

D. gallium arsenide phosphide [Ga As P]

Answer: B

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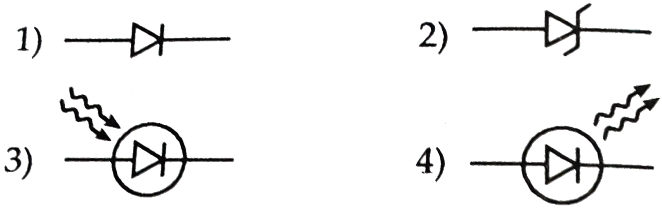
142. A light emitting diode is shown as



A. 3

B. 4

C. 2

D. 1

Answer: B

Watch Video Solution

143. A light emitting diode is

A. always used in forward biased condition

B. always used in reverse biased condition

C. never used in forward biased condition

D. used in both forward and reverse biased position depending upon its application

Answer: A

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144. The on/off time or switching time of light emitting diodes is the order of

A. a micro second

B. a nano second

C. a milli second

D. one second

Answer: B

Watch Video Solution

145. A solar cell is p-n junction operating in

A. reverse bias condition

B. unbiased condition

C. forward bias condition

D. in both forward and reverse bias condition

Answer: B

Watch Video Solution

146. Barrier potential of Ga-As-P LED is

A. 0.7 V

B. 1.0 V

C. 0.3 V

D. 1.5 V

Answer: D

147. V-I characteristics of LED is similar to forward bias characteristics of

A. zener diode

B. pn junction diode

C. solar cell

D. photo diode

Answer: B

Watch Video Solution

148. Which of the following is advantage of LED ?

A. low cost

B. low operating voltage

C. longer working life and instant starting

D. all of these

Answer: D

Watch Video Solution

149. Which of the following material is used to produce infrared LED's ?

A. Ga As

B. Ga P

C. Ga As P

D. all of these

Answer: A

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150. The emitter of transistor is doped the heaviest because it

A. receives the input

B. is supplier of charge carriers

C. dissipates minimum power

D. should have low resistance

Answer: B

Watch Video Solution

151. A transistor is preferable to a triode valve when used in amplifier because it

i) Can withstand large changes in tempratures

ii) has a higher input impedance

iii)can handle larger powers

(iv) does not require powers

Which of the above statements is correct?

A. (i), (ii) and (iii) are correct

B. (i) and (iii) are correct

C. (ii) and (iv) are correct

D. (iv) is correct

Answer: D

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152. The current gain of a transistor is defined as

A. the ratio of change in collector current to be change in emitter current for a constant value of collector voltage in a common base arrangement

B. The ratio of charge in collector current to the change in base current for constant collector voltage in a common emitter arrangement

C. the ratio of change in collector current to the change in base current for constant collector voltage in a common for constant arrangement

D. The ratio of change in emitter current to the change in collector current for a constant emitter voltage in a common emitter arrangement

Answer: A

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153. Transistors may not replace vacuum tubes in all uses because

A. transistors require longer warm-ups than vaccum tubes

B. vacuum tubes are more resistance to shock and vibration tubes transistors

C. vacuum tubes can handle greater power than transistors

D. transistors use high voltage

Answer: C

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154. In n-p-n transistor, the p-type crystal acts as

A. base only

B. collector only

C. emitter only

D. all of these

Answer: A

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155. A transistor is used in the common emitter mode as an amplifier . Then

A. the base-emitter junction is reverse biased

B. base-collected junction is reverse biased

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

D. all of these

Answer: D

Watch Video Solution

156. Which of the following element is used in making transistors ?

A. silicon

B. Cadmium

C. Tungsten

D. Molybdenum

Answer: A

Watch Video Solution

157. In transistor symbols, the arrows shows the direction of-

A. holes flow in the emitter region

B. electrons flow in the emitter region

C. minority carrier flow in the emitter region

D. majority carrier flow in the emitter region

Answer: A

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158. In an n-p-n transistor, the emitter current is always less than the emitter current, because

A. equal to the base current

B. slightly more than the collector current

C. equal to the collector current

D. slightly less than the collector current

Answer: B

Watch Video Solution

159. In case of an n-p-n transistor, the collector current is always less than the emitter current, because

A. emitter side is forward biased

B. collector side is reverse biased

C. a few electrons are lost in the base

D. a few electrons are lost in the emitter

Answer: C

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160. In a transistor circuit, the emitter current is 50 mA and base current in 2 mA. The collector current is

A. 25 mA

B. 48 mA

C. 100mA

D. 552 mA

Answer: B

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161. In p-n-p transistor , the p type crystal acts as

A. base only

B. collector only

C. emitter only

D. either 'b' and 'c'

Answer: D

Watch Video Solution

162. npn transistors are preferred to pnp transistors because they have

A. low cost

B. low dissipation of energy

C. capable of handling large power

D. electrons have high mobility than holes and hence high mobility of energy

Answer: D

Watch Video Solution

163. How is the emitter base junction in the transistor biasing ?

A. Forward biased

B. Reverse biased

C. first 'a' and 'b'

D. first 'b' then 'a'

Answer: A

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164. In a transistor with normal bias, the emitter base junction

A. high resistance

B. low resistance

C. infinite resistance

D. no resistance

Answer: B

Watch Video Solution

165. The main current, crossing the collector junction in a normally biased n-p-n transistor, is

A. hole current

B. drift current

C. base current

D. diffusion current

Answer: B

Watch Video Solution

166. Which of the following is not the disadvantage of transistor over a triode ?

A. Low efficiency

B. Higher efficiency

C. Higher noise level

D. Higher sensitivity

Answer: B

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167. A radio or T.V. set which uses valves does not start operating immediately when it is switched on, whereas a set containing only transistors does operate immediately because

A. transistor set has a lower resistance

B. valve set operates at higher voltage

C. filaments of valves take time to heat up

D. all of these are true

Answer: C

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168. The emitter base junction is forward biased and the base collector junction is reverse biased, in order to use a transistor as

A. Choke

B. rectifier

C. amplifier

D. transformer

Answer: C

Watch Video Solution

169. The part of a transistor which is heavily doped to produce a large number of majority carriers, is

A. base

B. emitter

C. collector

D. none of these

Answer: B

Watch Video Solution

170. In a transistor, I_c = 20 mA, I_b =1 mA. What will be the value of α ?

A. 20/21

B. $1/20$

C. 21/20

D. 20

Answer: A

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171. In a p-n-p transistor the emitter current is 10 mA and the collector current is 9 mA . Then the base current is

A. 19 mA

B. 10 mA

C. 9 mA

D. 1 mA

Answer: D

Watch Video Solution

172. In a p-n-p transistor, the n-type crystal works as a

A. gate

B. base

C. collector

D. emitter

Answer: B

Watch Video Solution

173. In p-n-p transistor the base current is 1 mA and the collector current is 10 mA . The emitter current is

A. 9 mA

B. 10 mA

C. 11 mA

D. 12 mA

Answer: C

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174. In n-p-n transistor the emitter current will be equal to

A. collector current

B. base current

C. sum of the collector and base current

D. difference of collector and base current

Answer: C

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175. The relationship between α and β is given by

A. $\alpha = b$

B. $\alpha = \frac{1}{\beta}$

C. $\beta = \frac{\alpha}{1 - \alpha}$

D. $\beta = \frac{\alpha}{1 + \alpha}$

Answer: C

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176. For a transistor, working as common emitter amplifier , the current gain is 45. What will be the current gain when the same transistor is worked as common base amplifier

?

A. 9.8

B. 0.98

C. 0.098

D. 0.0098

Answer: B

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177. To use a transistor as an amplifier

A. no biasing voltages are required

B. both the junctions are forward biased

C. both the junction are reverse biased

D. the emitter base junction is forward biased and the base collector junction is reverse biased

Answer: D

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178. The difference in the working of an amplifier and a step up transformer is

A. amplifier increases the power where as the transformer does not

B. amplifier decreases the power where as the transformer does not

C. amplifier keeps the power constant where as the transformer decreases the power

D. amplifier keeps the power constant where as the transformer increases the power

Answer: A

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179. The transistor working as common base amplifier, current gasin is 0.97 and base current is 0.12 mA.

A. 5 mA

B. 3.88 mA

C. 3 mA

D. 0.12 mA

Answer: A

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180. Which of the following is not a parameter defined for a transistor amplifier ?

A. Current gain

B. Energy gain

C. Power gain

D. Resistance gain

Answer: B

Watch Video Solution

181. In a silicon transistor, a change of $7.89mA$ in the emitter current produce a change of 7.8 mA in the collector current. What change in the base current is necessary to produce an equivalent change in the collector current?

A. 0.9 μA

B. $9 \mu A$

C. $90 \mu A$

D. 900 μA

Answer: C

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182. The value of current gain (β)

A. is always less than 1

B. is always infinity

C. is always greater than 150

D. lies between 50 and 150

Answer: D

Watch Video Solution

183. The current gain β may be defined as, the ratio of change in collector current to the change in base current at constant collector voltage, in an arrangement of

A. common base

B. common emitter

C. common collector

D. none of these

Answer: B

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Watch Video Solution

184. In a transistor , the value of α is always

A. less than 1

B. equal to 1

C. greater than 1

D. unpredicatable

Answer: A

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185. For a transistor , in a common base arrangement the alternating current gain α is given by such that , V_c = constant

A. $\dfrac{\Delta I_c}{\Delta I_b}$

B. $\dfrac{\Delta I_b}{\Delta I_c}$

C. $\dfrac{\Delta I_c}{\Delta I_e}$

D. $\dfrac{\Delta I_e}{\Delta I_c}$

Answer: C

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186. In which of the configuration of a transistor , the power gain is highest ?

A. common base

B. common emitter

C. common collector

D. same in all of three

Answer: B

Watch Video Solution

187. When npn transistor is used as an amplifier

A. electrons move from base to collector

B. electrons move form emitter to base

C. electrons move from collector to base

D. holes move from base to emitter

Answer: B

Watch Video Solution

188. In a common emitter amplifier , the input resistance is 200 Ω and load resistance is 40 $K\Omega$. If the current gain is 80, the voltage gasin of the amplifier is

A. 1.6×10^2

B. 1.6×10^3

C. 1.6×10^4

D. 1.6×10^5

Answer: C

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Watch Video Solution

189. In which of the transistor configurations, the voltage gain is highest ?

A. common base

B. common emitter

C. common collector

D. All of these

Answer: A

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190. In a common emitter amplifier , the input resistance is 1 Ω and load resistance is 10 $K\Omega$. If the current gain is 100, the voltage gasin of the amplifier is

A. 1000

B. 100

C. 10000

D. 10

Answer: A

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191. For a transistor, the current amplification factor is 4. when the transistor is connected in common emitter configuration, the change in collector current, when the base current changes by 6mA, is

A. 2.4 mA

B. 3.6 mA

C. 24 mA

D. 36 mA

Answer: C

Watch Video Solution

192. For a transistor in common emitter configuration, the current amplification factor is 4 . If the transistor is connected in the common base connected and change in emitter current be $6mA$, then the collector current will be

A. 2.4 mA

B. 3.6 mA

C. 4.8 mA

D. 7.2 mA

Answer: C

Watch Video Solution

193. For a common emitter configuration , the base current is $60\mu A$ and the collector current is 6 mA . The current gain of transistor is

A. 30

B. 60

C. 100

D. 200

Answer: C

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194. The reverse currents corresponding to reverse voltages 10 V and 20 V are $25\mu A$ and

50 muA ` respectively . The reverse resistance is

A. 40Ω

B. $40k\Omega$

C. $400k\Omega$

D. $4\mu\Omega$

Answer: C

Watch Video Solution

195. In an n-p-n transistor , the base current is 100 μA and the collector current is

A. 1.01 mA

B. 10.1 mA

C. 0.101 mA

D. 0.0101 mA

Answer: B

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196. The knee voltage of a p-n junction diode is 0.8 V and the width of the depletion layer is $2\mu A$. The electric field in the depletion layer is

A. 4 MV/m

B. 0.4 MV/m

C. 4 KV/m

D. 0.4 KV/m

Answer: B

Watch Video Solution

197. If the forward bias voltage of a p-n junction diode is changed form 0.7 V to 2.2 V, the forward current changes by 1.5 mA , then the depletion layer is

A. 100Ω

B. 500Ω

C. 1000Ω

D. 5000Ω

Answer: C

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198. The collector supply in a common emitter amplifier is 8 V and the voltage drop across the load of 800 Ω is 0.4 V. If the current gain for common base be α=0.96 , then the base current

A. $15 \mu A$

B. $21 \mu A$

C. $25 \mu A$

D. $30 \mu A$

Answer: B

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199. In an n-p-n transistor, the current gain for common emitter configuration is 80. If the emitter current be 8.1 mA, then the base current will be

A. 0.1 μA

B. $0.01 \mu A$

C. $0.1 \mu A$

D. $0.01mA$

Answer: C

Watch Video Solution

200. The current gain of a transistor in common emitter configuration is 80. If the emitter current be 8.1 mA , then the collector current will be

A. 8.1 mA

B. 8.0 mA

C. 0.1 mA

D. 1.0 mA

Answer: B

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201. In a transistor 10^8 electrons enter at the emitter in 10^{-4} s, out of which 2% electron go to the base. The current transfer ratio in common base configuration is

A. 98

B. 2

C. 0.98

D. 0.2 mA

Answer: C

Watch Video Solution

202. In the common emitter configuration of n-p-n transistor 10^{10} electrons enter the emitter in $1 \mu s$ and 2% of the electrons are lost of the base. The current gain of the amplifier is

A. 2

B. 98

C. 1

D. 49

Answer: D

Watch Video Solution

203. The current gain of the amplifier in the common emitter configuration is 80. What is its current gain in common base configuration ?

A. 0.399

B. 0.609

C. 0.708

D. 0.988

Answer: D

Watch Video Solution

Watch Video Solution

204. A common emitter amplifier has current gain 70. Its load resistance is 5 $k\Omega$ and input resistance is 500 Ω . The voltage gain is

A. 500

B. 700

C. 1000

D. 1400

Answer: B

Watch Video Solution

205. In a common base transistor circuit, the current gain is 0.98. On changing the emitter current by 5.00 mA, the change in collector current is

A. 0.196 mA

B. 2.45 mA

C. 4.9 mA

D. 3.1 mA

Answer: C

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206. When transistor is operated in cut off region or in saturation, region , it works as a

A. switch

B. rectifier

C. amplifier

D. oscillator

Answer: A

Watch Video Solution

207. Transistor as a switch is used for controlling high power devices in

A. motors

B. rectifier

C. cars

D. buses

Answer: A

Watch Video Solution

208. When transistor is used as switch , in saturation region of transistor both junctions are

A. forward biased

B. reverse biased

C. unbiased

D. none of these

Answer: A

Watch Video Solution

209. When transistor is used as switch , in cut off region of transistor both junctions are

A. reverse biased

B. forward biased

C. unbiased

D. none of these

Answer: A

Watch Video Solution

210. Transistor switches have the advantage of

A. high speed operation

B. low speed operation

C. low cost

D. low working life

Answer: A

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211. An amplifier is nothing but an oscillator with-

A. negative feedback

B. positive feedback

C. larger gain

D. positive or negative feedback

Answer: B

Watch Video Solution

212. i) An amplifier is necessarily an oscillator too

ii) An oscillator is necessarily an amplifier too

Then

A. only 'a' is correct

B. both 'a' and 'b' are correct

C. both 'a' and 'b' are wrong

D. only 'b' is correct

Answer: D

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213. An electronic device which converts ac into dc is called

A. amplifier

B. rectifier

C. oscillator

D. induction coil

Answer: B

Watch Video Solution

214. An electronic device that generates oscillations of desired frequency is

A. oscillator

B. transformer

C. voltage regulator

D. rectifier

Answer: A

Watch Video Solution

215. Which of the following is the part of oscillator ?

A. Tank circuit

B. Amplifier

C. Feedback circuit

D. All of these

Answer: D

Watch Video Solution

216. Tank circuit of oscillator consists of

A. L and C in parallel

B. RC in series

C. L and C in series

D. RC in parallel

Answer: A

Watch Video Solution

217. The frequency of oscillation in an oscillation

A. $f = \frac{1}{\sqrt{2\pi LC}}$

B. $f = \frac{1}{2\pi\sqrt{LC}}$

C. $f = \frac{\sqrt{LC}}{2\pi}$

D. $f = \frac{1}{R}\sqrt{\frac{L}{C}}$

Answer: B

218. In oscillator feedback circuit is used to minimise

A. energy losses

B. eddy currents

C. resistance

D. none of these

Answer: A

219. In transistor as an oscillator which of the following feedback is used

A. positive feedback

B. negative feedback

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: A

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220. In an oscillator when the signal from the output circuit is applied to input of the circuit then it called

A. feedback

B. ripple factor

C. form factor

D. refractive index

Answer: A

Watch Video Solution

221. If phase of feedback is in phase with input then it is called

A. positive feedback

B. negative feedback

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: A

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222. The condition to sustained oscillation is given by

A. Barkhausen criterion of oscillation

B. Rayleigh criterior of oscillation

C. Planck's criterion of oscillation

D. Compton criterior of oscillation

Answer: A

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223. For sustained oscillation the product of gain of amplifier (A) and feedback factor (β) is

A. equal to 1

B. less than 1

C. greater than 1

D. cannot be predicted

Answer: A

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224. Which of the following is condition for damped oscillation ?

A. $A.\beta = 1$

B. $A\beta > 1$

C. $A\beta < 1$

D. both 'b' and 'c'

Answer: D

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225. Which of the following is advantage of oscillator over alternators ?

A. It has high efficiency

B. The frequency of oscillation can be easily changed

C. It has wide range i.e. , from 20 Hz to 100 MHz

D. All of these

Answer: D

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226. Oscillators are used in

A. T.V. transmiters and receivers

B. radio transmitter and receivers

C. telecommunication applications

D. all of these

Answer: D

Watch Video Solution

227. In an oscillator circuit $L = 10^{-3}$ H, and C =$2\mu F$. The frequency of oscillation is

A. 3.5 KHz

B. 2.5 KHz

C. 10 KHz

D. 15 KHz

Answer: A

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228. In the circuit of transistor as an amplifier,tank circuit consists of inductance of 450 mH and capacitance of 9 μF. The frequency of oscillation is nearly

A. 80 Hz

B. 40 Hz

C. 80 KHz

D. 40 KHz

Answer: A

Watch Video Solution

229. Block diagram of oscillator consists of

A. Tank circuit

B. amplifier circuit

C. feed back circuit

D. all of these

Answer: D

Watch Video Solution

230. In boolean algebra, if $A = 1$ and $B = 0$ then the value of $A + \overline{B}$ is

A. A

B. B

C. $\overline{A}$

D. $\overline{A + B}$

Answer: A

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231. In the Boolean algebra, which gate is expressed as $Y = \overline{A + B}$.

A. OR gate

B. NAND gate

C. AND gate

D. NOR gate

Answer: D

Watch Video Solution

232. In Boolean expression which gate is expressed as $y = \overline{AB}$?

A. NOT gate

B. AND gate

C. NAND gate

D. NOR gate

Answer: C

Watch Video Solution

233. To which logic gate does the truth table given below correspond ?

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

A. OR gate

B. AND gate

C. NAND gate

D. NOR gate

Answer: B

Watch Video Solution

234. To which logic gate does the truth table given below correspond ?

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

A. OR gate

B. AND gate

C. NAND gate

D. NOR gate

Answer: C

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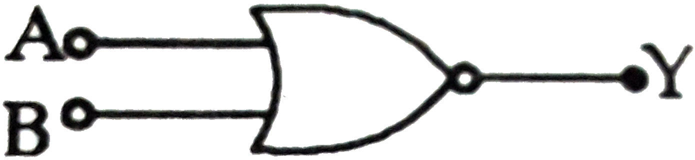
235. Which gate is represeneted by the symbolic diagram given here



A. AND gate

B. NAND gate

C. OR gate

D. NOR gate

Answer: D

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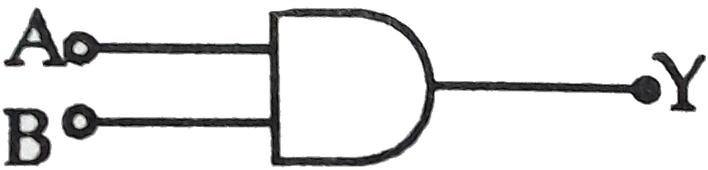
236. Which gate is represeneted by the symbolic diagram given here



A. AND gate

B. OR gate

C. NOT gate

D. NAND gate

Answer: A

237. Digital circuit can be made by repetitive use of

A. OR gate

B. NOT gate

C. AND gate

D. NAND gate

Answer: D

238. The value of $\overline{A}+A$ in the Boolean algebra is

A. 0

B. 1

C. A

D. $\overline{A}$

Answer: B

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239. The value of $A.\overline{A}$ in Boolean algebra is.

A. 0

B. 1

C. A

D. $\overline{A}$

Answer: A

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240. Which of the following is not equal to 1 in Boolean algebra ?

A. A+1

B. $A + \overline{A}$

C. $A . \overline{A}$

D. none of these

Answer: C

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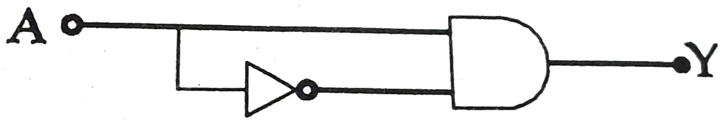
241. What is Boolean expression for the gate circuit shown in figure ?



A. A.0=0

B. $A.\overline{A} = 0$

C. $A - 1 = A$

D. A.A=A

Answer: B

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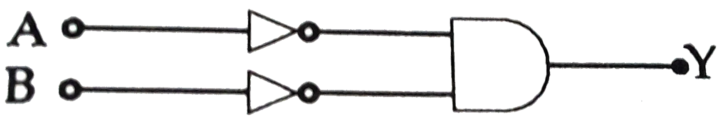
242. What is the output Y of the gate circuit shown in figure ?



A. $\overline{AB}$

B. $\overline{A}.\overline{B}$

C. $\overline{\overline{A}B}$

D. $\overline{A.\overline{B}}$

Answer: B

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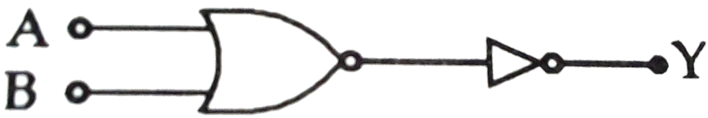
243. What is the name of the gate obtained by the combination shown in figure ?



A. NAND

B. OR

C. NOT

D. XOR

Answer: B

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244. What is the name of the gate obtained by the combination shown in figure ?

A. NAND

B. NOR

C. NOT

D. XOR

Answer: A

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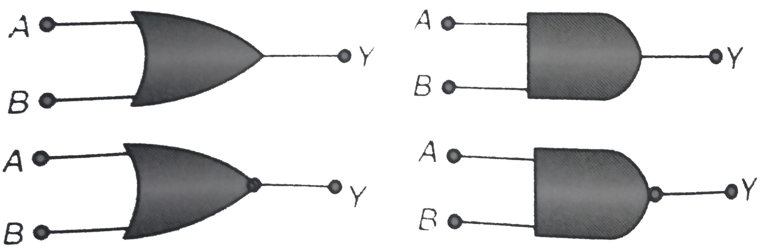
245. Given below are four logic tage symboles.

Those for OR, NOR and $NAND$ are respectively:



A. 1,4,3

B. 4,1,2

C. 1,3,4

D. 4,2,1

Answer: C

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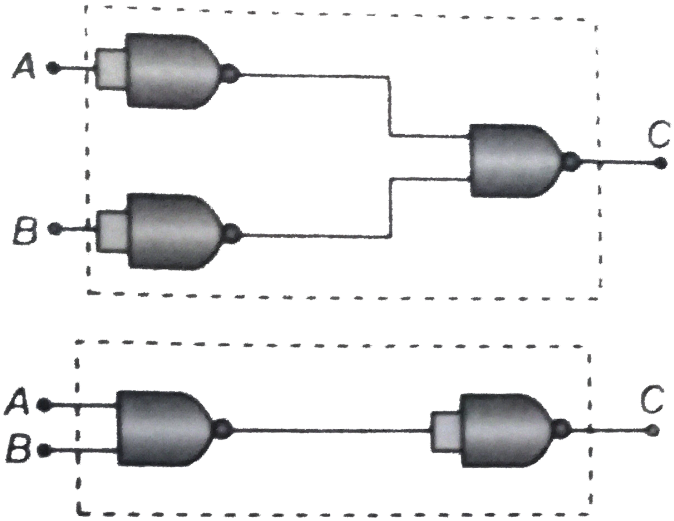
246. The combination of $'NAND'$ gates shown here under (figure) are equivalent to



A. an OR gate and an AND gate respectively

B. an AND gate and a NOT gate respectively

C. an AND gate and an OR gate respectively

D. an OR gate and a NOT gate respectively

Answer: A

247. How many $NAND$ gate are used to from AND gate?

A. 1

B. 2

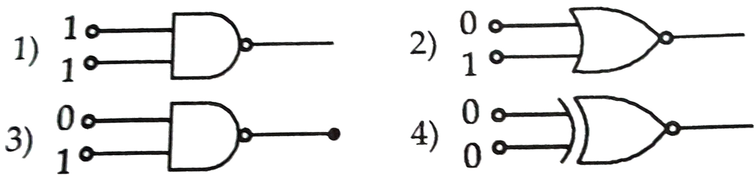
C. 3

D. 4

Answer: B

248. Which of the following gates will have an

output



A. 4

B. 1

C. 2

D. 3

Answer: C

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

- 0,0
- 0,1
- 1,0
- 1,1

Answer: D

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250. The following truth table corresponds to the logic gate

$$\left|\begin{array}{ccccc} A & 0 & 0 & 1 & 1 \\ B & 0 & 1 & 0 & 1 \\ X & 0 & 1 & 1 & 1 \end{array}\right|$$

A. NAND

B. OR

C. AND

D. XOR

Answer: B

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251. Boolean algebra is essentially based on

A. truth

B. logic

C. symbol

D. numbers

Answer: B

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252. The logic behind 'NOR' gate is that it gives

A. high output when both the inputs its gives

B. low output when both the inputs are low

C. high output when both the inputs are high

D. none of these

Answer: A

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253. 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. alternative between 0 and 1 values

Answer: A

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254. How many NAND gates are required to realise (i) OR gates and (ii) AND gate.

A. 1

B. 4

C. 2

D. 3

Answer: D

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255. How many NOR gates are used to form an AND gate

A. 1

B. 2

C. 3

D. 4

Answer: C

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256. What will be the input of A and B for the Boolean expression $\overline{(A+B)}.\overline{(A.B)}=1$?

A. 0,0

B. 0,1

C. 1,0

D. 1,1

Answer: A

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257. 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

Answer: B

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258. The boolean equation of NOR gate is-

A. C=A+B

B. $C = \overline{A + B}$

C. C=A.B

D. $C = \overline{A. B}$

Answer: B

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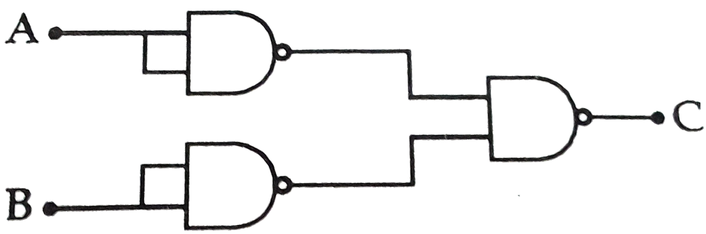
259. The combination of the gates shown in the figure below produces



A. NOR gate

B. OR gate

C. AND gate

D. XOR gate

Answer: B

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260. The output of a $NAND$ gate is 0

A. if both inputs are 0

B. if one input is 0 and the other input is 1

C. if both inputs are 1

D. either if both inputs are 1 or if one of the inputs is 1 and the other 0

Answer: C

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261. 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

Answer: C

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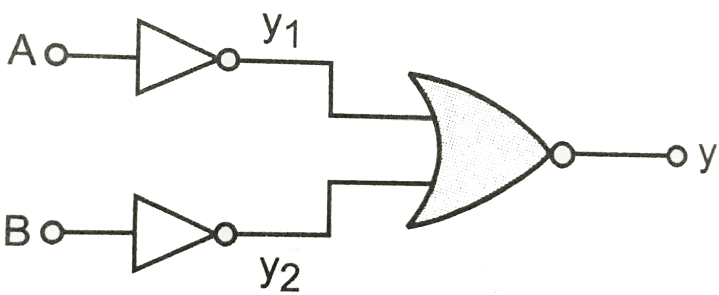
262. Which logic gate is represented by the following combination of logic gates



A. OR

B. NAND

C. AND

D. NOR

Answer: C

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263. 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

Answer: B

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264. Which of the following logic gates is an universal gate?

A. OR

B. NOT

C. AND

D. NOR

Answer: D

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265. NAND gate is the combination of

A. AND gate and NOT gate

B. AND gate and OR gate

C. OR gate and NOT gate

D. NOT gate and NOT gate

Answer: A

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266. Th truth table

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

corresponds to

A. NAND gate

B. NOR gate

C. AND gate

D. NOT gate

Answer: B

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267. Which one of the following gates can be served as a building block for any digital circuit ?

A. OR

B. AND

C. NOT

D. NAND

Answer: D

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268. The logic behind 'NAND' gate is that it gives

A. high output when both the inputs are low

B. low output when both are inputs are high

C. high output when both the inputs are high

D. none of these

Answer: B

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269. An electronic circuit with one or more than one input but only output is

A. logic gate

B. canada gate

C. oscillator

D. rectifier gate

Answer: A

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270. If A and B are two inputs in OR gate , then OR gate has an output of 0 when the value 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

Answer: A

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271. The Boolean equation of OR gate is

A. C=A+B

B. $C = \overline{A + B}$

C. $C = A.\,B$

D. $C = \overline{A.\,B}$

Answer: A

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272. NOR gate is a combination of

A. OR gate and NOT gate

B. OR gate and AND gate

C. OR gate and OR gate

D. none of these

Answer: A

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273. The given truth table is for

A	X
0	1
1	0

A. OR gate

B. AND gate

C. NOT gate

D. none of these

Answer: C

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274. The only function of a NOT gate is to

A. stop a signal

B. replacement of a signal

C. invert an input signal

D. act as a universal gate

Answer: C

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275. The output of a 2-input OR gate is zero only when its

A. either input is one

B. both inputs are one

C. either input is zero

D. both inputs are zero

Answer: D

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276. An AND gate

A. implements logic addition

B. is equivalent to a series switching circuit

C. is equivalent to a parallel switching circuit

D. is a universal gate

Answer: B

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277. Digital circuit can be made by repetitive use of

A. AND gates

B. OR gate

C. NOT gates

D. NOR gates

Answer: D

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278. To get NOT gate from NAND gate, we need

A. one NAND gate

B. two NOT gates obtained from NAND gates

C. one NAND gate and one NOT gate obtained from NAND gate

D. 3 NAND gates and one NOT gate obtained from NAND gate

Answer: A

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279. In an unbiased p-n junction diode the thickness of the deplection layer is 7×10^{-6} m and the potential barrier is 0.7 V . The electric field in this region is

A. $10^{6} Vm^{-1}$

B. $10^{5} Vm^{-1}$

C. $10^{-4} Vm^{-1}$

D. $10^{3} Vm^{-1}$

Answer: B

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280. In silicon diode, the reverse current increases from 10A to $20\mu A$. When the reverse voltage change from 2V to 4V . Find the reverse a.c. resistance of the diode

A. $3 \times 10^{-5}\Omega$

B. $2 \times 10^{5}\Omega$

C. $1 \times 10^{5}\Omega$

D. $4 \times 10^5 \Omega$

Answer: B

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281. A $P - N$ junction diode can withstand currents up to $10mA$. Under forward bias, The diode has a potential drop of $0.5V$ across it which is assumed to be independent of current. The maximum voltage of the battery used to forward bias the diode when a resistance of 200Ω is connected in series with it is

A. 3.5 V

B. 2.5 V

C. 6.5 V

D. 4.5 V

Answer: B

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282. An a.c. voltage of peak value 20 V is connected in series with a silicon diode and a load resistance of 500 G. The forward resistance of the diode is 10 G and the barrier voltage is 0.7 V. Find the peak current through diode and the peak voltage across the load.

A. 37.8 mA, 18.9 V

B. 5 mA, 30 V

C. 30 mA, 5 V

D. 2 mA, 2 V

Answer: A

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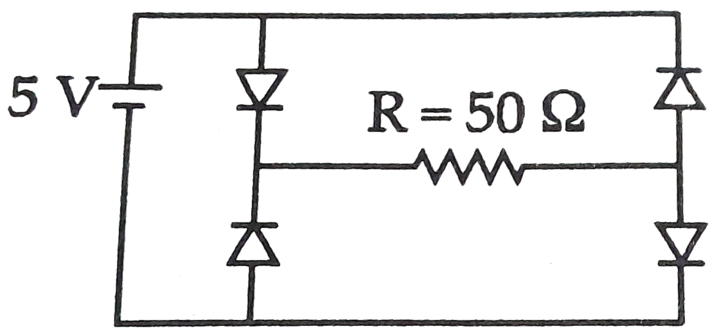
283. Four silicon diodes are connected as shown in the figure. Assuming the diodes to be ideal. The current through the resistor R is



A. 0.2 A

B. 0.1 A

C. 0.3 A

D. 0.5 A

Answer: B

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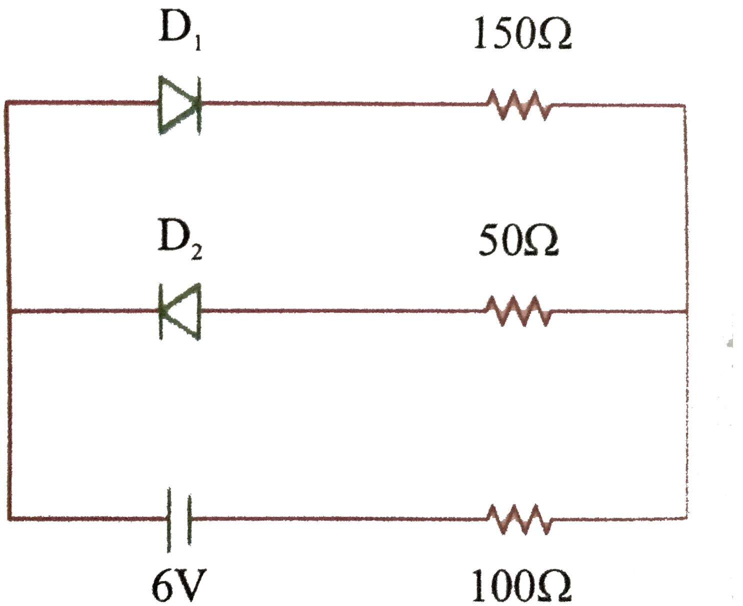
284. The circuit shown in figure (1) Contains two diodes each with a forward resistance of $50 ohm$ and with infinite reverse resistance. If the battery voltage is $6V$, the current through

the $100ohm$ resistance is.



A. 0.01 A

B. 0.02 A

C. 0.03 A

D. 0.04 A

Answer: B

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285. In a half wave rectifier output is taken across a $90 ohm$ load resistor. If the resistance of diode in forward biased condition is $10 ohm$, the efficiency of rectification of ac power into dc power is.

A. 0.406

B. 0.812

C. 0.7308

D. 0.3654

Answer: D

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286. In a full wave rectifier output is taken across a load resistor of $800 ohm$. If the resistance of diode in forward biased condition is $200 ohm$, the efficiency of rectification of ac power into dc power is.

A. $64.96\ \%$

B. $40.6\ \%$

C. $81.2\ \%$

D. $80\ \%$

Answer: A

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287. If a change of $100\mu A$ in the base current of an $n-p-n$ transistor in CE causes a change of $10mA$ in the collector current, the ac current gain of the transistor is

A. 100

B. 200

C. 300

D. 400

Answer: A

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288. A transistor connected in common emitter mode, the voltage drop across the collector is 2 V and β is 50, the base current if R_C is $2k\Omega$ is

A. $10\mu A$

B. $15\mu A$

C. $20\mu A$

D. $25\mu A$

Answer: D

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289. In a $n-p-n$ transistor 10^{10} electrons enter the emitter in $10^{-6}s$. 2% of the elecrons are lost in the base. The current transfer ratio and the current amplification factor will be

A. 0.88

B. 0.98

C. 0.78

D. 0.87

Answer: B

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290. A$p-n-p$ transistor is used in common-emitter mode in an amplifier circuuit. A change of $40\mu A$ in the base current brings a change of $2mA$ in collector current and $0.04V$ in base-emitter volatage. Find the

(a) input resistance r_i and

(b) the base current amplification factor (β).

(c) if a load of $6k\Omega$ is used, then also find the voltage gain of the amplifier.

A. $1000\Omega, 50$

B. $2000\Omega, 40$

C. $5000\Omega, 20$

D. none of these

Answer: A

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291. The current gain 'a' of a transistor is 0.95 . What would be the change in collector currnet corresponding to a change of 0.4 mA in the base current in a common emittter arrangement ?

A. 7.6 mA

B. 6.6 mA

C. 5.6 mA

D. 8.6 mA

Answer: A

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292. A transistor connected in common emitter configuration has input resistance $R_{\text{in}} = 2K\Omega$ and load resistance of $5K\Omega$. If $\beta = 60$ and an input signal 12 mV is applied , calculate the resistance gain, voltage gain and power gain.

A. 2.5,150,9000

B. 4.5,150,9000

C. 2.5,200,9000

D. 2.5,150,9500

Answer: A

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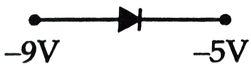
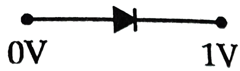
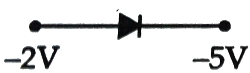
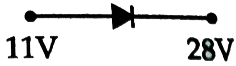
293. Which of the following diodes is forward biased ?

A. 

B. 

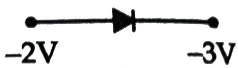
C. 

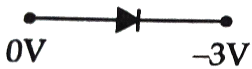
D. 

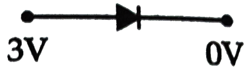
Answer: C

294. Which of the following diodes is reverse biased?

A. 

B. 

C. 

D. 

Answer: A

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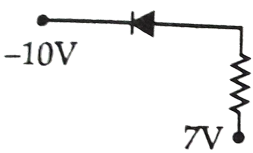
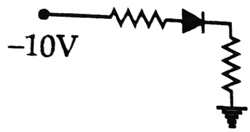
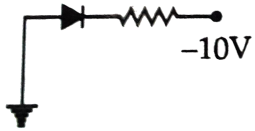
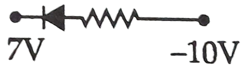
295. In which of the following figure the junction diode is reverse biased ?

A. 

B. 

C. 

D. 

Answer: B

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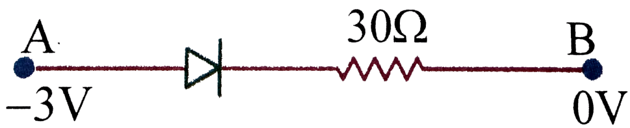
296. In the figure shown, current passing through the diode is



A. 0.1 A

B. 0.02A

C. zero

D. 0.01

Answer: C

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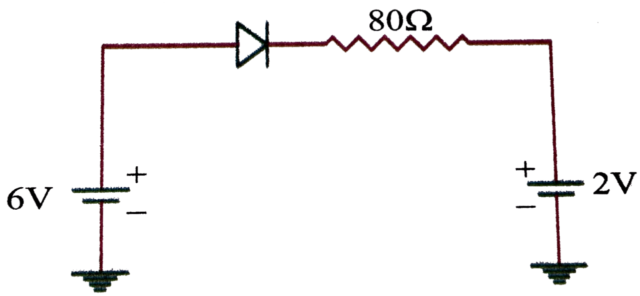
297. The resitance of the diode in forward bias condition is 20Ω and infinity in the reverse biased condition. The current in the circuit is



A. 0.08 A

B. 0.1 A

C. 0.04A

D. zero

Answer: C

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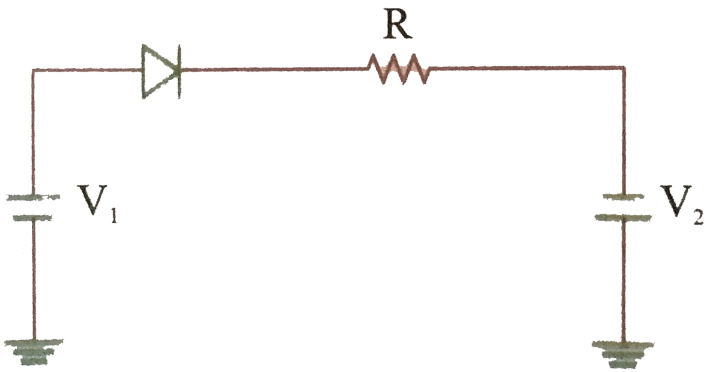
298. If $V_1 > V_2$, r is resistance offered by diode in forward bias then current through the diode is.



A. 0

B. $\dfrac{V_1 + V_2}{R + r}$

C. $\dfrac{V_1 - V_2}{R + r}$

D. none of these

Answer: C

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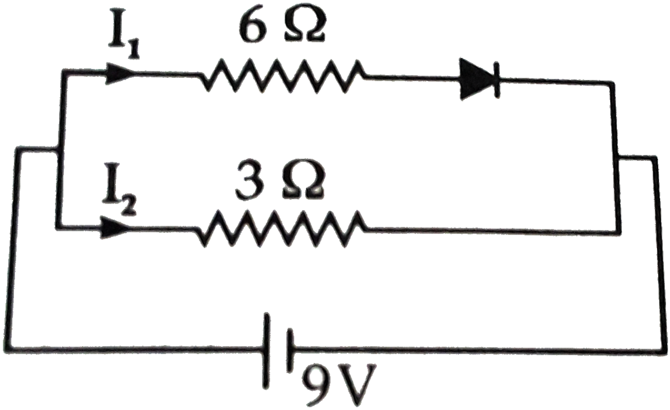
299. If an ideal diode is used in the given circuit, find the current through each resistance



A. $I_1 = \frac{9}{6}A, I_2 = 3A$

B. $I_1 = 3A, I_2 = \frac{3}{2}A$

C. $I_1 = \frac{2}{3}A, I_2 = \frac{1}{3}A$

D. $I_1 = \frac{1}{3}A, I_2 = \frac{2}{3}A$

Answer: A

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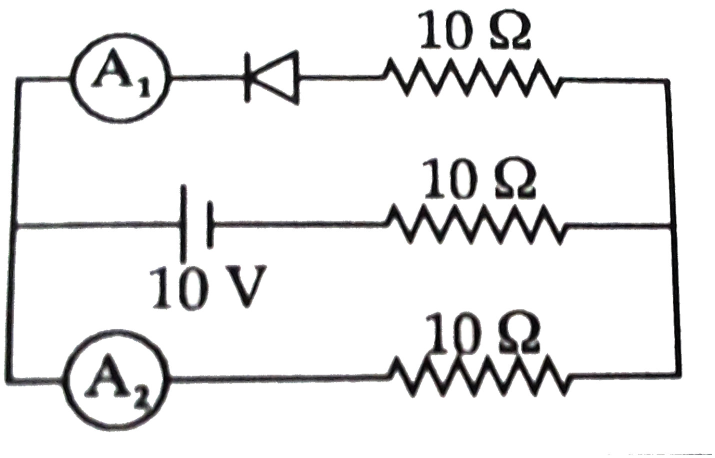
300. In the figure shown the readings of the ammeters A_1 and A_2 are respectively.



A. $\frac{1}{3}A$ and $\frac{1}{3}A$

B. Zero and 1 A

C. zero and 0.5 A

D. 0.5 A and Zero

Answer: C

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301. In an n-p-n transistor circuit, the collector current ia 10 mA. If 90% of the electrons emitted reach the collector.

A. $I_B = -1 mA$

B. $I_C = 1mA$

C. $I_E = 11mA$

D. $I_E = 9mA$

Answer: C

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302. In a p-n-p transistor circuit, the collector current is 10mA , If 95% of the electrons emitted reach the collector , what is base current ?

A. 0.35 mA

B. 0.25 mA

C. 0.4 mA

D. 0.5 mA

Answer: D

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303. In a p-n-p transistor in CB circuit, the emitter current changes from 0.6 mA to 0.4 mA , when the bae emitter voltage is changed from 0.68 V to 0.64 V. The input resistance of the transistor is

A. 100Ω

B. 200Ω

C. 300Ω

D. 400Ω

Answer: B

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304. The input resistance of a silicon transistor is 665Ω. Its base current is changed by $15\mu A$ which results in the change in collector current by $2mA$. This transistor is used as a common emitter amplifier with a load resistance of $5k\Omega$. What is the voltage gain of the amplifier.

A. 1002

B. 1004

C. 1006

D. 1008

Answer: A

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305. A silicon diode is forward biased, as shown in figure by connecting it to a battery of 3 V , 100 mA. If knee voltage of 0.7 V and current of 20 mA is passing through the diode , then value of the diode resistance is

A. 100Ω

B. 110Ω

C. 105Ω

D. 35Ω

Answer: D

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306. In a p-n-p transistor operating as amplifier with common emitter configurations a change in base current from $100\mu A$ to

$200\mu A$ produces to change in collector current grain of transistor

A. 12.5×10^{-3}

B. 25×10^{-3}

C. 80

D. 98

Answer: C

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307. A p-n-p transistor is used as common base amplifier as $V_{eb} = 3V$. When its emitter current changes from 13.4 mA to 20.14 mA its collector current changes from 13.4 mA to 19.9 mA. Its current gain will be

A. 9.849

B. 0.8489

C. 98.49

D. 0.9849

Answer: D

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308. A full-wave rectifier circuit is operating at n Hz mains frequency . The fundamental frequency in the ripple would be

A. n Hz

B. n/2 Hz

C. 2n Hz

D. 4n Hz

Answer: C

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309. A cell of emf. $4.5V$ is connected to a junction diode whose barrier potential is $0.7V$. If the external resistance in the circuit is 190Ω. The current in the circuit is

A. 20 mA

B. 2 mA

C. 0.2 mA

D. 0.02 mA

Answer: A

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310. The barrier potential in a p-n junction diode is 0.3 volts . The current required is 6 mA. If a resistance of 200Ω is connected in series with the junction diode then the e.m.f. of the cell required for use in the circuit is

A. 0.3 V

B. 1.2 V

C. 0.9 V

D. 1.5 V

Answer: D

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311. A diode made of silicon has a barrier potential of $0.7V$ and a current of $20mA$ passes through the diode when a battery of $emf\ 3V$ and a resistor is connected to it. The wattage of the resistor and diode are

A. 46 W

B. 45 W

C. 14 W

D. 14 mW

Answer: B

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312. In CE configuration of a transistor, input resistance is 2 $K\Omega$, load resistance is $5k\Omega$, current 32 gain is 60. An input signal of 12 mV is applied to the transistor, calculate the voltage gain

A. 15

B. 150

C. 1500

D. 1.5

Answer: B

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313. In a common emitter amplifier, using output reisistance of 5000 ohm and input resistance fo 2000ohm, if the peak value of input signal voltage is $10mV$ and $\beta = 50,$ then the peak value of output voltage is

A. 1.25 V

B. 12.5 V

C. 125V

D. 1250 V

Answer: A

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314. In a common base transistor amplifier if the input resistance R_i is 200 Ω and load resistance R_L is $20K\Omega$, find voltage gain $(\alpha = 0.95)$

A. 86

B. 98

C. 95

D. 190

Answer: C

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315. The major constituent of transistor are

A. salts

B. transistor

C. conductors

D. semiconductors

Answer: D

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316. If the current gain is 100, then the emitter current in a transistor for a base current of 5 mA, is

A. 0.505 A

B. 1.505A

C. 2.505 A

D. 3.505 A

Answer: A

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317. Rectification is the process for the conversion of

A. a.c into d.c.

B. d.c. into a.c.

C. low a.c. into high a.c.

D. low d.c. into high d.c.

Answer: A

318. Why is the semiconductor damaged by a strong current?

A. excess of electrons

B. decreases in electrons

C. lack of free electrons

D. none of these

Answer: A

319. In the working of n-p transistor, the number of free electrons which recombine with holes in the base layer is about.

A. 97% of the number injected into the base

B. 50% of the number injected into the base

C. 3% of the number injected into the base

D. 25% of the number injected into the base

Answer: C

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320. The carriers in base region of a p-n-p transistor are

A. minority carriers

B. majority carriers

C. both 'a' and 'b'

D. electrons

Answer: D

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321. What is the process of introduction of impurity in semiconductor ?

A. Drooping

B. Doubling

C. Doping

D. Duping

Answer: C

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322. In a p-n junction , numbers of junction are

A. 1

B. 0

C. 2

D. 4

Answer: A

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323. Bond in n and p-type semiconductor is

A. covalent

B. ionic

C. metallic bond

D. co-ordinate bond

Answer: A

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324. in common emitter amplifier, the emitter base junction is

A. forward bias

B. reverse bias

C. insulator

D. none of these

Answer: A

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325. p-type semicondutor and n-type semicondutor are formed by

A. metallic ions

B. molecular solids

C. covalent solids

D. ionic solids

Answer: C

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326. Freuency of given AC signal is 50 Hz. When it connected to a half - wave rectifier, then what is the number of output pulses given by rectifier within one second ?

A. 50

B. 25

C. 100

D. 150

Answer: A

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327. What is amount of doping tansistor ?

A. Emitter is moderately doped, collector is heavily doped and base is lightly doped

B. Emitter is moderately doped, collector is lightly doped and base is heavily doped

C. Emitter is heavily doped, collector is lightly doped and base is moderately doped

D. Emitter is heavily doped, collector is moderatly doped and base is lightly doped

Answer: D

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328. To obtain n-type semiconductor , the impurity introduced is

A. Arsenic

B. Aluminium

C. Silicon

D. Indium

Answer: A

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329. Emitter base and collector base junction in n-p-n transistor are

A. forward biased and reverse biased respectively

B. reverse biased and forward biased respectively

C. both forward biased

D. both reverse biased

Answer: A

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330. Rectifier is used to

A. convert dc to ac

B. amplify a weak signal

C. convert ac to dc

D. generate intermittent voltage

Answer: C

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331. How many electrodes are there in a transistor ?

A. 2

B. 3

C. 4

D. 5

Answer: B

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332. Increase in temperature of a semiconductor , will be

A. increase the conductivity

B. decrease the conductivity

C. not effect the conductivity

D. reduce the conductivity to zero

Answer: A

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333. The element that can be used as acceptor impurity to dope silicon is

A. antimony

B. arsenic

C. boron

D. phosphorus

Answer: C

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334. In a p-n-p transistor, the n-type crystal works as a

A. collector only

B. emitter only

C. base only

D. either collector or emitter

Answer: C

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335. A pure semiconductor

A. extrinsic semiconductor

B. intrinsic semiconductor

C. p-type semiconductor

D. n-type of semiconductor

Answer: B

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336. In a semiconductor , acceptor impurity is

A. antimony

B. indium

C. phosphorous

D. arsenic

Answer: B

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337. Avalanche breakdown in a Zener diode takes place due to

A. thermal enregy

B. light energy

C. magnetic field

D. accelerated minority charge carriers

Answer: D

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338. The energy band gap (difference between conductor band and valance band) in semiconductors is

A. 0 eV

B. 1 eV

C. 5 eV

D. none of these

Answer: A

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339. LED is a p-n junction diode which is

A. forward biased

B. either forward biased or reverse biased

C. reverse biased

D. neither forward biased nor reverse biased

Answer: A

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340. Which of the following is not necessary nor oscillator ?

A. extenal input source

B. amplifier

C. feed back circuit

D. tank circuit

Answer: A

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341. In revers bias pn-junction diode depletion layer width

A. decreases

B. increases

C. remains constant

D. can not be predicted

Answer: B

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342. In an insulator

A. the valance band is partially filled with electrons

B. conduction band is partially filled with electrons

C. conduction band is empty and the valence band is filled with electrons

D. conduction band is filled with electrons and valence band empty

Answer: C

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343. If the Output of two NAND gates is given to input of a NAND gate. Then the truth table will be of

A. NOR gate

B. OR gate

C. AND gate

D. XOR gate

Answer: B

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344. In a n-type semiconductor, which of the following statement is true?

A. electrons are minority carriers and pentavalent atoms are dopants

B. holes ar majority carriers and pentavalent atoms are dopants

C. holes are majority carriers aned trivalent atoms are dopants

D. electrons are majority carriers and trivalent atoms are dopants

Answer: B

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345. In a common emitter (CE) amplifier having a voltage gain G, the transistor used has transconductor 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

A. 1.5 G

B. $\frac{1}{3}$ G

C. $\frac{5}{4}$ G

D. $\frac{2}{3}$ G

Answer: D

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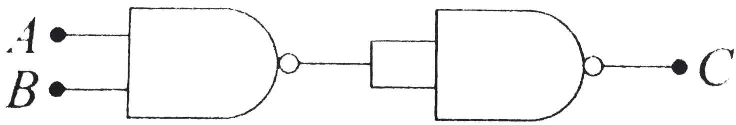
346. The output (X) of the logic circuit shown in figure will be



A. $X = \overline{A \cdot B}$

B. $X = A \cdot B$

C. $X = \overline{A + B}$

D. $X = \overline{\overline{A}} \cdot \overline{\overline{B}}$

Answer: B

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347. In insulators (CB is conduction band and VB is valence band)

A. V.B. is partially filled with electrons

B. C.B. is partially filled with electrons

C. C.B. is empty and V.B. is filled with electrons

D. C.B. is filled with electrons and V.B. is empty

Answer: C

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348. In common base circuit of a transistor, current amplification factor is 0.95. Calculate the emitter current, if base current is 0.2 mA

A. 2 mA

B. 4 mA

C. 6 mA

D. 8 mA

Answer: B

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349. Which logic gate produces LOW output when any of the inputs in HIGH

A. AND

B. OR gate

C. NAND

D. NOR

Answer: D

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350. For a transitor the current ratio α_{DC} is 69/70 the current gain β_{DC} is

A. 66

B. 67

C. 69

D. 71

Answer: C

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