PHYSICS

BOOKS - MTG GUIDE

ELECTRONIC DEVICES

Illustration

1. The number densities of electrons and holes in pure Si at $27^{\circ} C$ is $2 \times 10^{16} m^{-3}$. When it is doped with indium, the hole density increases

to $4 \times 10^{22} m^{-3}$, find the electron density in doped sillicon.

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2. In an n- type silicon, which of the following statements is true ?

(a) Electrons are majority carries and trivalent atoms are the dopants.

(b) Electrons are majority carries and pentavalent atoms are the dopants.

(c) Holes are minority carries and

paentavalent atoms are the dopants.

(d) Holes are minority carries and trivalent atoms are the dopants.

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3. In a $p-n$ junction diode having depletion layer of thickness $10^{-6}m$, the potential across it is $0.1V$. The electric field produced is

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4. If the forward voltage in a semiconductor diode is changed from 0.5V to 0.7 V, then the forward current changes by 1.0 mA. The forward resistance of diode junction will be

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5. In a full wave rectifier circuit operating from $50Hz$ mains frequency , the fundamental frequency in the ripple would be

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6. An laternativing voltage of 350 V, 60 Hz is applied on a full wave rectifier. The internal resistance of each diode is 200Ω. If $R_L = 5k\Omega$, then find

(i) the peak value of output current.

(ii) the value of output direct current.

(iii) the output dc power.

(iv) the rms value of output current.

(v) the efficiency of rectifier.

(vi) the value of peak inverse voltage (P.I.V.).

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7. The current gain of a transistor in common emitter configuration is 70. If emitter is 8.8 mA, then find

(i) base current

(ii) collector current.

(iii) the current gain in common base configuration.

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8. A transistor having $\alpha = 0.99$ is used in a common base amplifier. If the load resistance is $4.5k\Omega$ and the dynamic resistance of the emitter junction is 50Ω, find

(i) voltage gain

(ii) power gain

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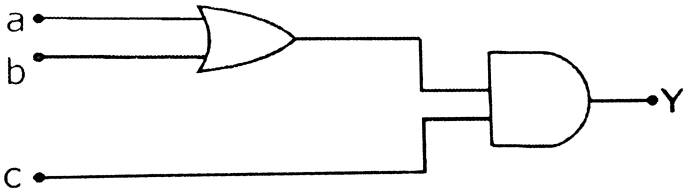
9. To get an output 1 from the circuit shown in figure the input must be :



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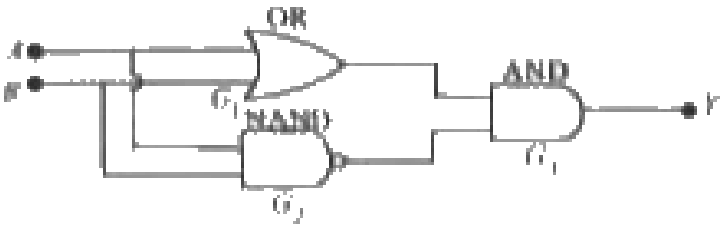
10. The following configuration of gate is equivalent to which gate? Write its truth table.



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11. Two inputs of NAND gates are shorted, what is the equivalent logic gate for this configuration?

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1. The manifestation of band structure in solids is due to

A. Heisenberg uncertainty principle

B. Pauli exclusion principle

C. Bohr's correspondence principle

D. Boltzmann law

Answer: B

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2. Find the wavelength of light that may excite an electron in the valence band of diamond to the conduction band. The energy gap is 5.50 eV

A. 226 nm

B. 312 nm

C. 432 nm

D. 550 nm

Answer: A

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3. If the energy gap between valence band and conduction band is 5 eV, then it is

A. a conductor

B. an insulator

C. a semiconductor

D. a superconductor

Answer: B

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4. Carbon , silicon and germanium have four valence elcectrons each . These are characterised by valence and conduction

bands separated by energy band - gap respectively equal to $(E_g)_c (E_g)_{si}$ and $(E_g)_{Ge}$. Which of the following statements ture ?

A. $(E_g)_{Si} < (E_g)_{Ge} < (E_g)_C$

B. $(E_g)_{<} (E_g)_{Ge} < (E_g)_{Si}$

C. $(E_g)_{>} (E_g)_{Si} > (E_g)_{Ge}$

D. $(E_g)_C = (E_g)_{Si} = (E_g)_{Ge}$

Answer: C

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5. The electricity conductivity of a semiconductor increases when electromagnetic radiation of wavelength shorter than 2480nm is incident on it. The band gap (in eV) for the semiconductor is

A. 0.9

B. 0.7

C. 0.5

D. 0.1

Answer: C

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6. At absolute zero temperature, a semiconductor acts as a/an

A. conductor

B. insulator

C. dielectric

D. none of these

Answer: B

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7. A silicon specimen is made into a P-type semiconductor by dopping, on an average, one helium atoms per 5×10^7 silicon atoms. If the number density of atoms in the silicon specimen is $5 \times 10^{28} atom/m^3$ then the number of acceptor atoms in silicon per cubic centimeter will be

A. $2.5 \times 10^{30} \ \text{atom/cm}^3$

B. $1.0 \times 10^{15} \ \text{atom/cm}^3$

C. $1.0 \times 10^{13} \ \text{atom/cm}^3$

D. $2.5 \times 10^{34} \quad \text{atom/cm}^3$

Answer: B

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8. Which of the following statements is correct?

A. 7-type germanium is negatively charged and p-type germanium is positively charged

B. n - type germanium is positively charged and p-type germanium is negatively charged.

C. Both n-type and p-type germanium are negatively charged.

D. Both n-type and p-type germanium are electrically neutral.

Answer: D

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9. A small impurity is added to germanium to get a n-type seiniconductor. This impurity is a

A. trivalent substance

B. pentavalent substance

C. bivalent substance

D. monovalent substance

Answer: B

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10. The impurity atom added to germenium to make it N-type semiconductor is

A. aluminium

B. gallium

C. iridium

D. phosphorous

Answer: D

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11. What is the conductivity of a semiconductor (in $\Omega^{-1}m^{-1}$) if electron density $= 5 \times 10^{12} cm^{-3}$ and hole density $= 8 \times 10^{13} cm^{-3}$?

$(\mu_e = 2.3 V^{-1}s^{-1}m^2, \mu_h = 0.01 m^2 V^{-1}s^{-1})$

A. 5.634

B. 1.968

C. 3.421

D. 8.964

Answer: B

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12. If the ratio of the concentration of electron to that of holes in a semiconductor is $\frac{7}{5}$ and the ratio of current is $\frac{7}{4}$ then what is the ratio of their drift velocities ?

A. $\frac{4}{7}$

B. $\frac{5}{8}$

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

D. $\frac{5}{4}$

Answer: D

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13. For a p-type semiconductor, which of the following statements is true?

A. Electrons are majority carriers and trivalent atoms are the dopants.

B. Electrons are minority carriers and pentavalent atoms are the dopants.

C. Holes are minority carriers and pentavalent atoms are the dopants.

D. Holes are majority carriers and trivalent atoms are the dopants.

Answer: D

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14. In a semiconductor material $(1/5)$th of the total current is carried by the holes and the remaining is carried by the electrons. The drift

speed of electrons is twice that of holes at this temperature. Thr ratio between the number densities of electrons and holes is

A. $\frac{21}{6}$

B. 5

C. $\frac{3}{8}$

D. 2

Answer: D

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15. A block of pure silicon at $300K$ has a length of $10cm$ and an area of $1.0cm^2$. A battery of emf $2V$ is connected across it. The mobility of electron is $0.14m^2v^{-1}S^{-1}$ and their number density is $1.5 \times 10^{16}m^{-3}$. The mobility of holes is $0.05m^2v^{-1}S^{-1}$.

The electron current is

A. $6.72 \times 10^{-4}A$

B. $6.72 \times 10^{-5}A$

C. $6.72 \times 10^{-6}A$

D. $6.72 \times 10^{-7}A$

Answer: D

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16. When a solid with a band gap has a donor level just below

A. an insulator

B. a conductor

C. p-type semiconductor

D. n-type semiconductor

Answer: D

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17. A pure semiconductor has equal electron and hole concentration of $10^{16}m^{-3}$. Doping by indium increases number of hole concentration n_h to $5 \times 10^{22}m^{-3}$. Then, the value of number of electron concentration n_e in the doped semiconductor is

A. $10^6 / m^3$

B. $10^{22}/m^3$

C. $2 \times 10^9/m^3$

D. $10^{19}/m^3$

Answer: C

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18. An intrinsic semiconductor has a resistivity of 0.50 Ω m at room temperature. Find the intrinsic carrier concentration if the mobilities

of electrons and holes are $0.39 m^2 V^{-1} s^{-1}$ and $0.11 m^2 V^{-1} s^{-1}$ respectively

A. $1.2 \times 10^{18} / m^3$

B. $2.5 \times 10^{19} / m^3$

C. $1.9 \times 10^{20} / m^3$

D. $3.1 \times 10^{21} / m^3$

Answer: B

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19. p-type semiconductor is obtained by doping

A. germanium with arsenic

B. germanium with aluminium

C. germanium with antimony

D. germanium with phosphorus

Answer: B

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20. Conductivity in semiconductor is due to

A. holes only

B. electrons only

C. both electrons and holes

D. neither electrons nor holes

Answer: C

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21. Which of the following equations correctly represents the temperature variation of energy gap between the conduction and valence bands for Si?

A. $E_g(T) = 0.70 - 2.23 \times 10^{-4} TeV$

B. $E_g(T) = 0.70 + 2.23 \times 10^{4} TeV$

C. $E_g(T) = 1.10 - 3.60 \times 10^{-4} TeV$

D. $E_g(T) = 1.10 + 3.60 \times 10^{-4} TeV$

Answer: C

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22. Region which have no free electron and holes in P-N junction is

A. n-region

B. p-region

C. depletion region

D. none of these

Answer: C

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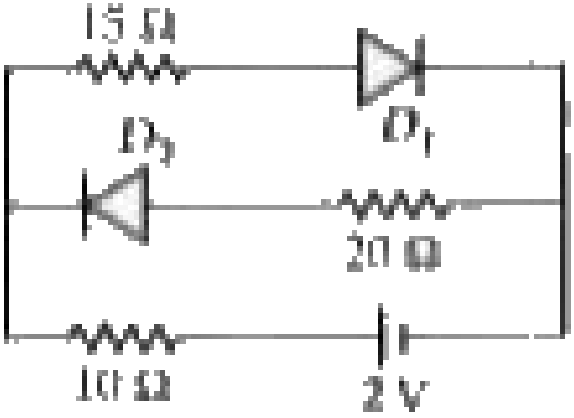
23. The current flowing through 10Ω resistor in the circuit shown in the figure is



A. 50 mA

B. 20 mA

C. 40 mA

D. 40 mA

Answer: D

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24. A potential barrier of 0.3 V exists across a p-n junction. If the depletion region is 1 μm wide, what is the intensity of electric field in this region?

A. $2 \times 10^5 Vm^{-1}$

B. $3 \times 10^5 Vm^{-1}$

C. $4 \times 10^5 Vm^{-1}$

D. $5 \times 10^5 Vm^{-1}$

Answer: B

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25. When $p-n$ junction diode is forward biased then

A. the depletion region is reduced and barrier height is increased.

B. the depletion region is widened and barrier height is reduced.

C. both the depletion region and barrier height are reduced.

D. both the depletion region and barrier height are increased.

Answer: C

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26. In an unbiased p-n junction, holes diffuse from the p-region to n-region because

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

B. they move across the junction by the potential difference.

C. hole concentration in p-region is more as compared to n-region.

D. all the above

Answer: C

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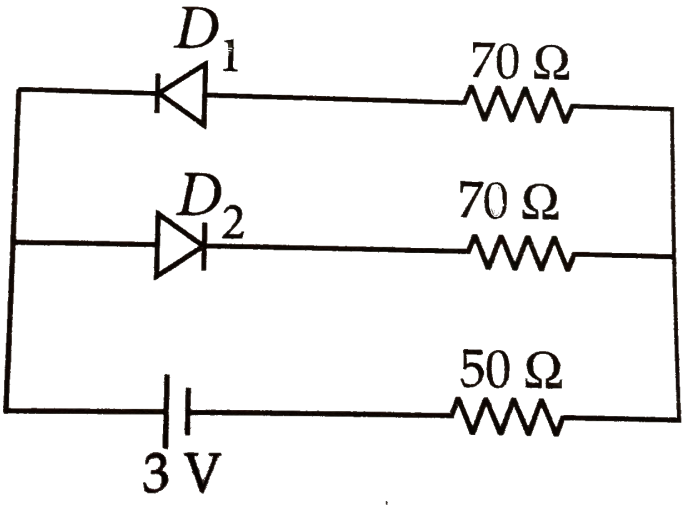
27. The circuit shown in the figure contains two diodes each with a forward resistance of 30 Ω and with infinite backward resistance. If the battery is 3 V, the current through the 50

Ω resistance (in ampere) is



A. Zero

B. 0.01

C. 0.02

D. 0.03

Answer: C

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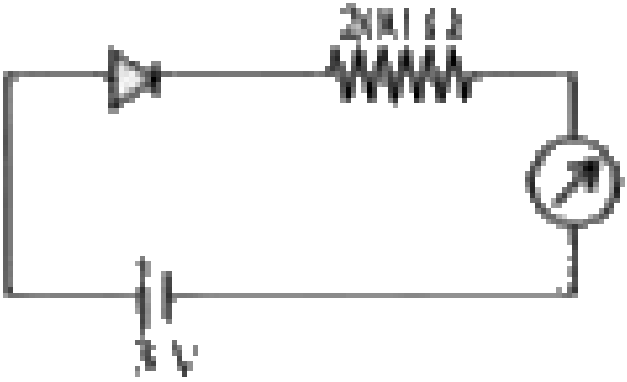
28. In the circuit shown, the reading of the ammeter if diode is not ideal, will be



A. 0

B. 15mA

C. $> 15mA$

D. $< 15mA$

Answer: D

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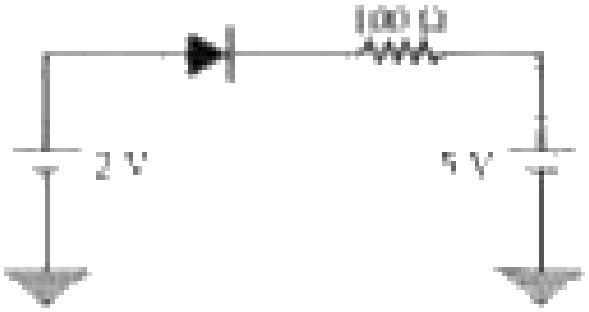
29. Current through the ideal diode as shown in figure is



A. Zero

B. 20 A

C. $\frac{1}{20}A$

D. $\frac{1}{50}A$

Answer: A

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30. The dominant mechanisms for motion of charge carriers in forward and reverse biased silicon $P-N$ junction are

A. drift in forward bias, diffusion in reverse bias

B. diffusion in forward bias, 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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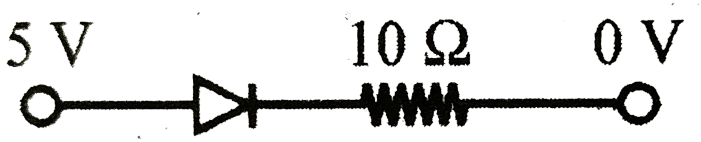
31. A junction diode has a resistance of 25 Ω when forward biased and 2500 Ω when reverse biased. What is the current in the diode, for the arrangement shown ?



A. $\frac{1}{15}A$

B. $\frac{1}{7}A$

C. $\frac{1}{25}A$

D. $\frac{1}{480}A$

Answer: B

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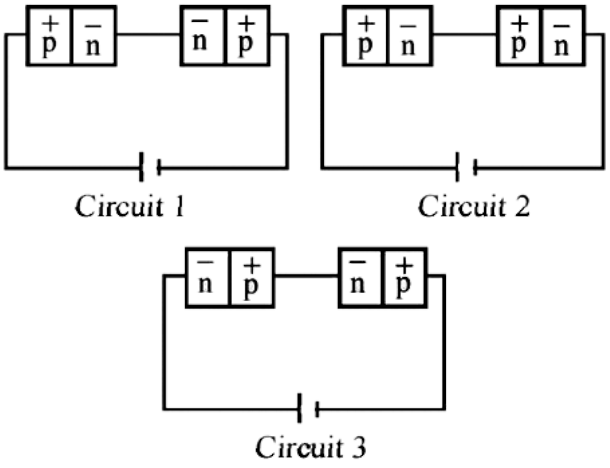
32. Two identical p-n junctions may be connected in series in which a battery in three ways , fig . The potential drops across the two p - n junctions are equal in



A. circuit 1 and circuit 2

B. circuit 2 and circuit 3

C. circuit 3 and circuit 1

D. circuit 1 only

Answer: B

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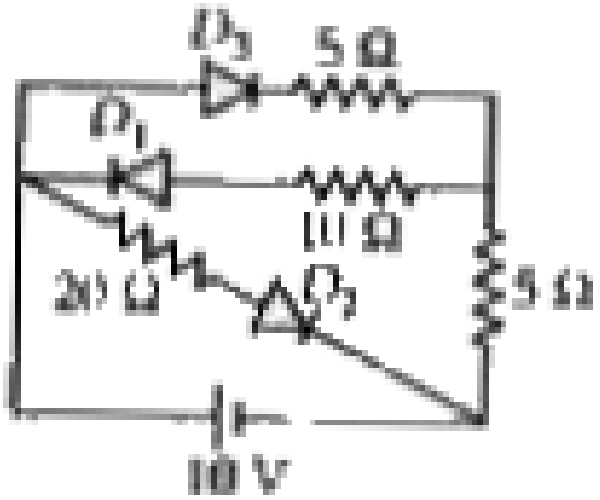
33. In the given circuit



the current through the battery is

A. 0.5 A

B. $1A$

C. 1.5 A

D. $2A$

Answer: C

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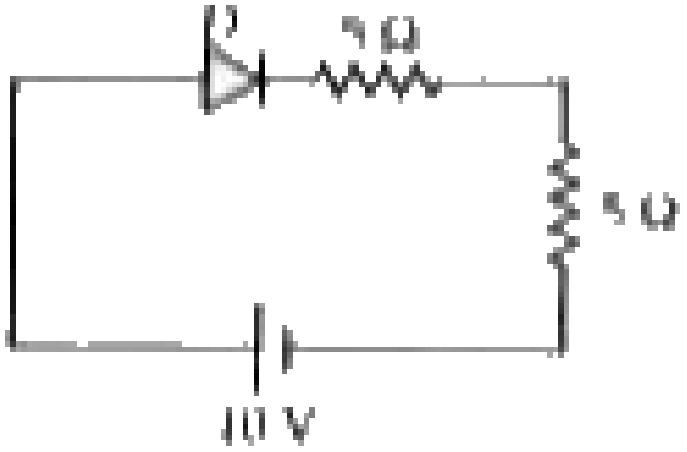
34. In the given circuit for ideal diode, the current through the battery is



A. 0.5 A

B. 1.5 A

C. 1.0 A

D. $2A$

Answer: C

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35. When the voltage drop across a $p.n$ junction diode is increased from $0.65V$ to $0.70V$, the change in the diode current is

$5mA$. What is the dynamic resistance of the diode?

A. 20Ω

B. 50Ω

C. 10Ω

D. 80Ω

Answer: C

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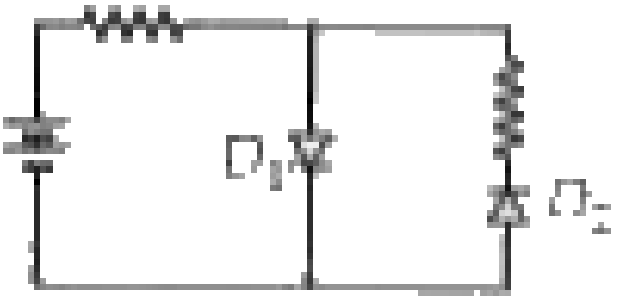
36. In the diode circuit shown in figure,



A. D_1 and D_2 are reverse biased

B. D_1 and D_2 are forward biased

C. D_1 is forward biased and D_2 is reverse biased.

D. D_1 is reverse biased and D_2 is forward biased.

Answer: C

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37. The current through the ideal diode as shown in the figure is

A. $0A$

B. 0.02 A

C. 0.04 A

D. 0.06 A

Answer: B

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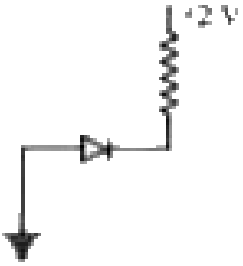
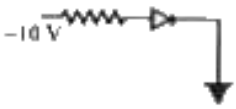
38. In which of the following figures, junction diode is forward biased?

A. 

B. 

C. 

D. 

Answer: C

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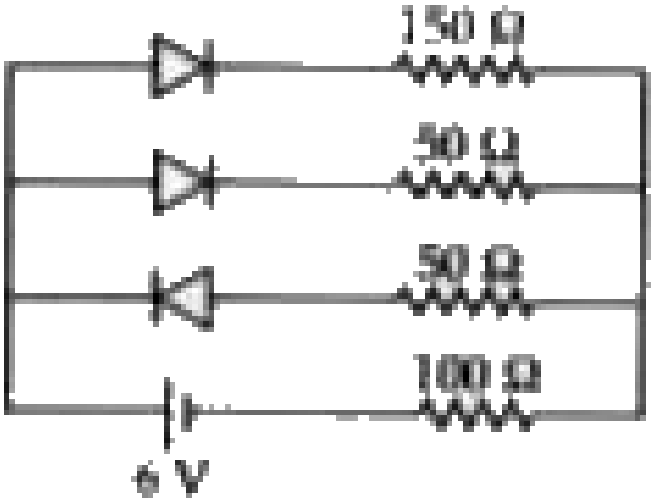
39. The circuit shown in the figure contains three diodes each with forward resistance of

50 ohms and with infinite backward resistance.

If the battery voltage is 6 V, the current through the 100 ohm resistance is



A. 0

B. 36 mA

C. 43 mA

D. 50 mA

Answer: B

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40. The vallue of ripple factor for full wave rectifier is

A. $41\ \%$

B. $141\ \%$

C. $48.2\ \%$

D. $121\ \%$

Answer: C

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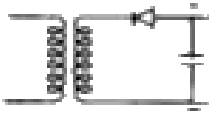
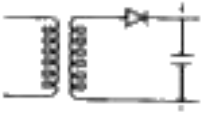
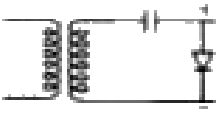
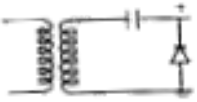
41. Which is the correct diagram of a half-wave reactifier?

A. 

B. 

C. 

D. 

Answer: B

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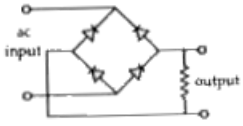
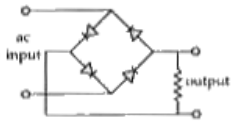
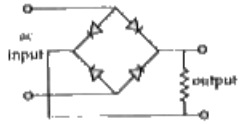
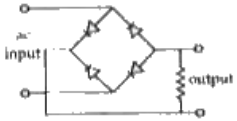
42. Which of the following circuits provides full wave rectification of an ac input?

A. 

B. 

C. 

D. 

Answer: D

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43. With an ac input from 50 Hz power line, the ripple frequency is

A. 50 Hz in the dc output of half wave as well as full wave rectifier

B. 100 Hz in the dc output of half wave as well as full wave rectifier

C. 50 Hz in the dc output of half wave and 100 Hz in dc output of full wave rectifier

D. 100 Hz in the dc output of half wave and 50 Hz in the dc output of full wave rectifier.

Answer: C

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44. In a half wave rectifier circuit operating from 50 Hz mains frequency, the fundamental frequency in the ripple would be

A. 25 Hz

B. 50 Hz

C. 70.7 Hz

D. 100 Hz

Answer: B

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45. 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. (i) and (ii) are correct

B. (ii) and (iii) are correct

C. (i) only correct

D. (iv) only correct

Answer: B

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46. A p - n photodiode is fabricated from a semiconductor with band gap of 2.8 eV. Which of the following wavelengths it can detect?

A. 950 nm

B. 850 nm

C. 580 nm

D. 440 nm

Answer: D

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47. Consider the following statements A and B and identify the correct answer

(A) A Zener diode is always connected in reverse bias to use it as voltage regulator.

(B) The potential barrier of a $p-n$ junction lies between 0.1 to $0.3V$, 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.

Answer: C

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48. A Zener diode is specified as having a breakdown voltage of 9.1 V, with a maximum power dissipation of 364 mW. What is the maximum current the diode can handle?

A. 40 mA

B. 60 mA

C. 50 mA

D. 45 mA

Answer: A

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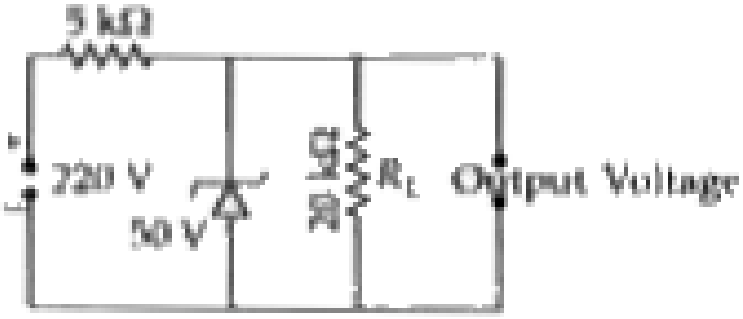
49. From the Zener diode circuit shown in figure, the current through the Zener diode is



A. 34 mA

B. 31.5 mA

C. 36.5 mA

D. 2.5 mA

Answer: B

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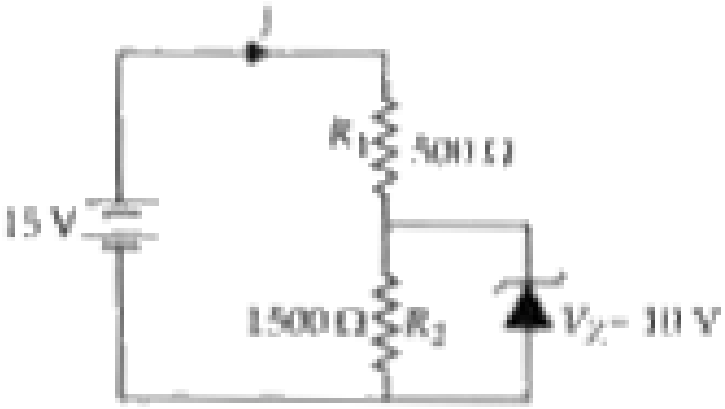
50. In the circuit given, the current through the Zener diode is



A. 10 mA

B. 6.67 mA

C. 5 mA

D. 3.33 mA

Answer: D

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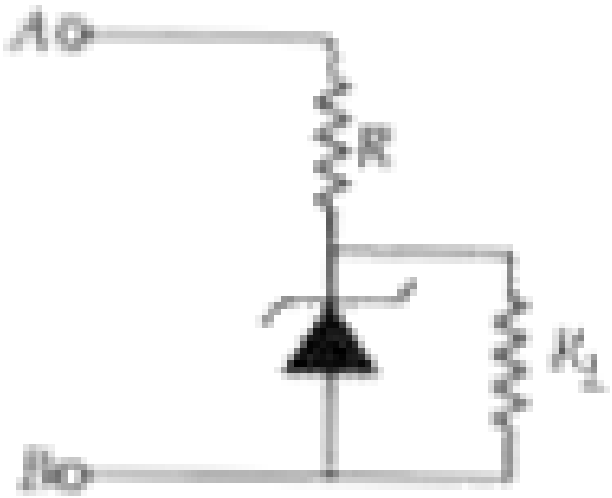
51. If the voltage between the terminals A and B is 17 V and Zener brekdown voltage is 9 V,

then the potential across R is



A. 26 V

B. 8 V

C. 9 V

D. 17 V

Answer: B

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52. GaAs (with a band gap =$1.5eV$) as an LED can emit

A. blue light

B. green light

C. infrared rays

D. X - rays

Answer: C

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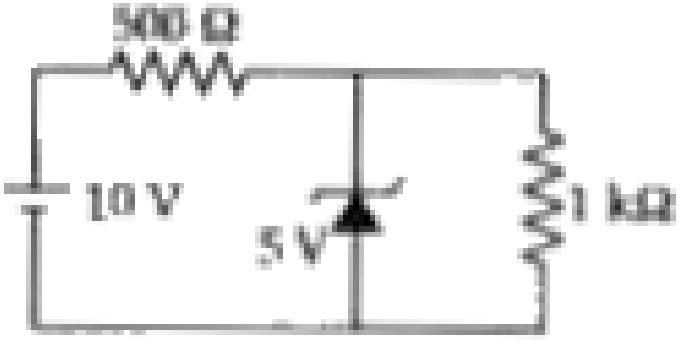
53. In the following circuit, the current flowing through $1k\Omega$. resistor is



A. 0 mA

B. 5 mA

C. 10 mA

D. 15 mA

Answer: B

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54. Identify the mismatch of the following.

A. Photo diode - Optical signal

B. Diode laser - Spontaneous emission

C. Diodc laser - Stimulated emission

D. Solar cell - Electrical energy into light

Answer: D

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55. The device used for detecting optical signal is

A. Zener diode

B. photodiode

C. LED

D. junction diode

Answer: B

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56. A zener diode has a contact potential of 1 V in the absence of biasing. It undergoes Zener breakdown for an electric field of 10^6 V/m at the depletion region of p-n junction. If the width of the depletion region is 2.5 μm, what should be the reverse biased potential for the Zener breakdown to occur ?

A. 3.5 V

B. 2.5 V

C. 1.5V

D. 0.5 V

Answer: B

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57. The p-n junction which generates an emf when solar radiation falls on it, with no external bias applied, is a

A. light emitting diode

B. photodiode

C. solar cell

D. zener diode

Answer: C

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58. 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

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59. In an NPN transistor the collector current is $24mA$. If 80% of electrons reach collector it base current in mA is

A. 36

B. 26

C. 16

D. 6

Answer: D

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60. In an n-p-n transistor 10^{10} electrons enter the emitter in 10^{-6}s. If 2% of the electrons are

lost in the base, find the current transfer ratio and the current amplification factor.

A. 0.88

B. 0.78

C. 0.98

D. 0.68

Answer: C

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61. One way in which the operation of an n-p-n transistor differs from that of a p-n-p transistor is that

A. the emitter junction is reverse biased in the n-p-n.

B. the emitter injects minority carriers into the base region of the p-n-p and majority carriers in the base region of the n-p-n.

C. the emitter injects holes into the base region of the p-n-p and electrons into the base region of the n-p-n.

D. the emitter injects electrons into the base region of the p-n-p and holes into the base region of the n-p-n.

Answer: C

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62. The heavily and lightly doped regions of a bipolar junction transistor are respectively

A. base and emitter

B. base and collector

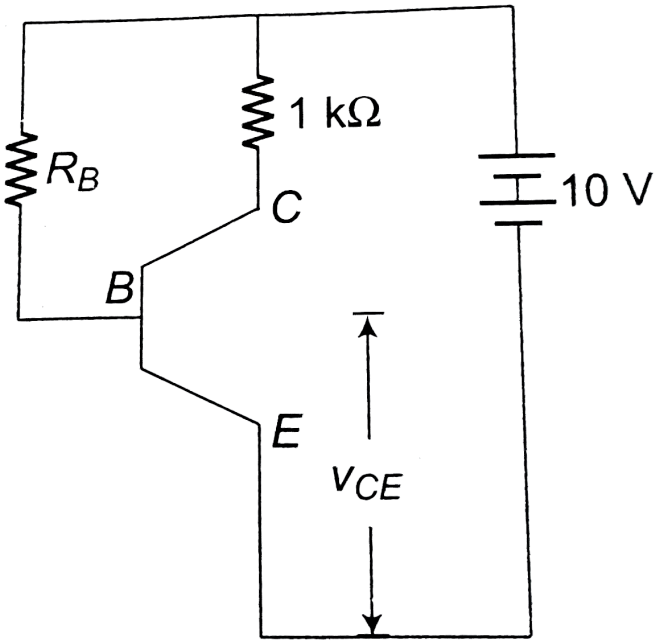
C. emitter and base

D. collector and emitter

Answer: C

Watch Video Solution

63. In the cuircuit shown here the transistor used has a current gain $\beta = 100$. What should be the bias resistor R_{BE} so that $V_{CE} = 5V(\text{neglect } \ V_{BE})$



A. $200 \times 10^3\Omega$

B. $1 \times 10^6\Omega$

C. 500Ω

D. $2 \times 10^3\Omega$

Answer: A

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64. A transistor connected at common emitter mode contains load resistance of 5 k and an input resistance of $1k\Omega$. If the input peak voltage is 5 mV and the current gain is 50, find the voltage gain.

A. 250

B. 500

C. 125

D. 50

Answer: A

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65. A transistor is connected in a common emitter configuration.

The collector supply is 8 V and the voltage

drop across a resistor of 800Ω in the collector circuit is 0.5 V. If the current gain factor (α) is 0.96 , Find the base current.

A. $26mA$

B. $30\mu A$

C. $36\mu A$

D. $40\mu A$

Answer: A

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66. The current amplification factor α of a common base transistor and the current amplification factor $\beta$of a common emitter transistor are not related by

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

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

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

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

Answer: D

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67. In a transistor, the current amplification factor α is 0.9. The transistor is connected in common base configuration. The change in collector current when base current changes by 4 mA is

A. 1.2 mA

B. 12 mA

C. 24 mA

D. 36 mA

Answer: D

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68. If α and β are the current gain in the CB and CE configurations respectively of the transistor circuit, then $\frac{\beta - \alpha}{\alpha\beta} =$

A. zero

B. 1

C. 2

D. 0.5

Answer: B

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69. The current gain of a transistor in a common base arrangement in 0.98 . Find the change in collector current corresponding to a change of 5.0 mA in emitter current . What would be the change in base current?

A. 4.6 mA, 0.1 mA

B. 4.9 mA, 0.2 mA

C. 5.9 mA, 0.3 mA

D. 5.9 mA, 0.8 mA

Answer: A

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70. A transistor is used in common emitter configuration. Given its $\alpha = 0.9$, calculate the

change in collector current when the base current changes by $2\mu A$.

A. $1\mu A$

B. $0.9\mu A$

C. $30\mu A$

D. $18\mu A$

Answer: D

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71. The collector supply voltage is 6 V and the voltage drop across a resistor of 600 Ω in the collector circuit is 0.6 V, in a circuit of a transistor connected in common emitter mode. What is the base current if the current gain is 20?

A. 0.25 mA

B. 0.05 mA

C. 0.12 mA

D. 0.02 mA

Answer: B

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72. In a junction transistor, the current gain B is defined as

A. The ratio of the change in collector current to the change in emitter current for a constant collector voltage in the common base configuration.

B. he ratio of change in emitter current to the change in base current for constant emitter voltage in common emitter configuration.

C. The ratio of change in collector current to the change in base current for constant collector voltage in CE configuration.

D. The ratio of change in base current to the change in collector current for

constant collector voltage in CE configuration

Answer: C

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73. For a transistor, $\beta = 100$. The value of a is

A. 1.01

B. 0.99

C. 100

D. 0.01

Answer: B

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74. The current gain for transistor working as a common base amplifier is 0.96.If the emitter current is 7.2mA, then the base current is

A. 0.29

B. 0.35 mA

C. 0.39 mA

D. 0.43 mA

Answer: A

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75. In a transistor amplifier $\beta = 62, R_L = 5000\Omega$ and internal resistance of the transistor is 500Ω. Its power amplification will be.

A. 6200

B. 45850

C. 38440

D. 15320

Answer: C

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76. 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. 1002.5

B. 1232.8

C. 7235.9

D. 9879.3

Answer: A

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77. For a transistor amplifier, the voltage gain

A. remains constant for all frequencies.

B. is high at high and low frequencies and constant in the middle frequency range.

C. is low at high and low frequencies and constant at mid frequencies.

D. none of these.

Answer: C

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78. In a common-base amplifier, the phase difference between the input signal voltage and output voltage is :

A. 0

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. π

Answer: A

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79. 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. $5 \times 10^{-6}V$

B. $12.5 \times 10^{-4}V$

C. $1.25V$

D. 125 V

Answer: C

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80. Two amplifiers are connected one after the other in series (cascaded). The first amplifier has a voltage gain of 10 and the second has a voltage gain of 20 . If the input signal is 0.01 V , calcualte the output AC signal .

A. 1 V

B. 2 V

C. 3 V

D. 4 V

Answer: B

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81. The input resistance of a common emitter transistor amplifier, if the output resistance is $500k\Omega$, the current gain $\alpha = 0.98$ and the power gain is 6.0625×10^6 is

A. 198Ω

B. 300Ω

C. 100Ω

D. 400Ω

Answer: A

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82. An amplifier has a voltage gain $A_V = 1000$.

The voltage gain in dB is

A. 30 dB

B. 60 dB

C. 3 dB

D. 20 dB

Answer: B

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83. An n-p-n transistor having a.c. current gain of 50 to be used to make to make an amplifier

of power gain of 300. What will be the voltage gain of the amplifier?

A. 8.5

B. 6

C. 4

D. 3

Answer: B

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84. In a common emitter transistor amplifier, the output resistance is $500K\Omega$ and the current gain $\beta = 49$. If the power gain of the amplifier is 5×10^6, the input resistance is

A. 325Ω

B. 165Ω

C. 240Ω

D. 225Ω

Answer: C

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85. A transistor oscillator is

(i) An amplifier with positive feedback

(ii) An amplifier with reduced gain

(iii) The one in which DC supply energy is converted into AC output energy. Then

A. only (i) and (ii) are correct

B. only (1) and (iii) are correct

C. only (ii) and (iii) are correct

D. all (i), (ii) and (iii) are correct

Answer: B

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86. For a common emitter amplifier, the audio frequency voltage across the collector resistance $2k\Omega$ is 2V. If the current amplication factor of the transistor is 200, and the base resistance is $1.5k\Omega$, the input signal voltage and base current are

A. $0.1V$ and $1\mu A$

B. $0.15V$ and $10\mu A$

C. 0.015 V and 1 A

D. 0.0075 V and $5\mu A$

Answer: D

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87. If β, R_L and r are the ac current gain, load resistance and the input resistance of a transistor respectively in CE configuration, the voltage and the power gains respectively are

A. $\beta \frac{R_L}{r}$ and $\beta^2 \frac{R_L}{r}$

B. $\beta \frac{r}{R_L}$ and $\beta^2 \frac{r}{R_L}$

C. $\beta \frac{R_L}{r}$ and $\beta \left(\frac{R_L}{r} \right)^2$

D. $\beta \frac{r}{R_L}$ and $\beta \left(\frac{r}{R_L} \right)^2$

Answer: A

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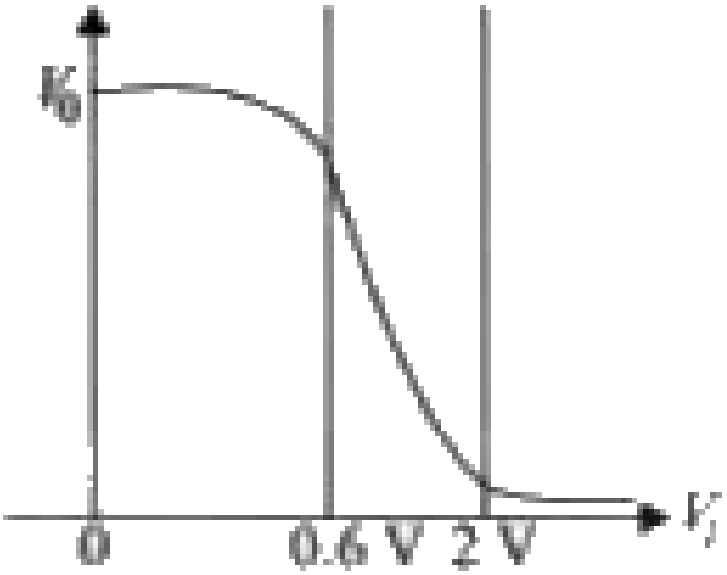
88. The transfer characteristics of a base biased common in the figure. Which of the

following statements are true?



A. At $V_i = 1V$, it can be used as an amplifier.

B. At $V_i = 0.5V$, it can be used as a switch turned off.

C. At $V_i = 2.5V$, it can be used as a switch turned on.

D. All of these

Answer: D

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89. The transfer characteristics of a base biased transistor has the operation regions, namely, cutoff, active region and saturation

region. For using the transistor as an amplifier it has to operate in the

A. active region

B. cut off region

C. saturation region

D. cut off and saturation

Answer: A

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90. To get an OR gate from a NAND gate we need

A. Only 2 NAND gates.

B. Two NOT gates obtained from NAND gates and one NAND gate.

C. 4 NAND gates and 2 AND gates obtained from NAND gate.

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

Answer: B

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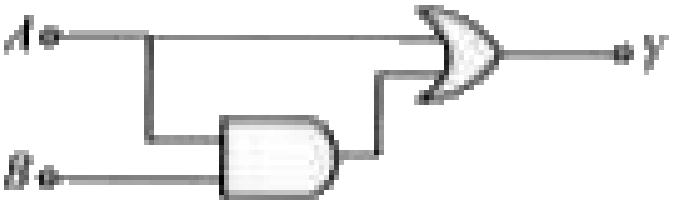
91. In the following circuit, Y is



A. A

B. B

C. AB

D. $A + B$

Answer: A

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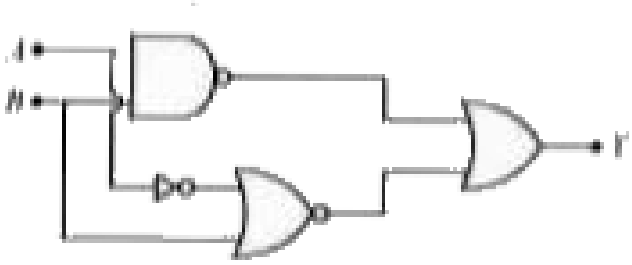
92. The Booleam expression for the given circuit is



A. $\overline{A.B}$

B. $A + B$

C. $\overline{A} + B$

D. $A + \overline{B}$

Answer: A

Watch Video Solution

93. In Boolean expression, a gate may be expressed as $Y = \overline{A + B}$. Which one of the following is it?

A. OR gate

B. AND gate

C. NOR gate

D. NAND gate

Answer: C

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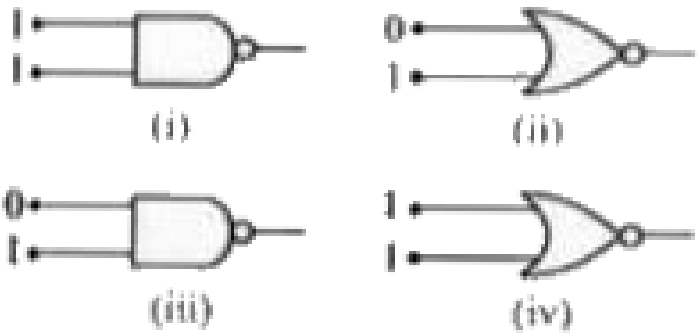
94. Which of the following gates (figure) will have an output of 1 ?



A. (iv)

B. (i)

C. (ii)

D. (iii)

Answer: D

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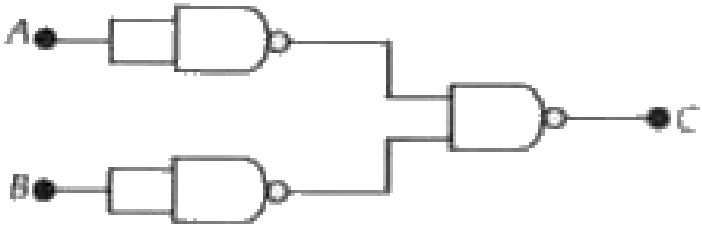
95. The combination of the gates as shown in figure represent



A. OR gate

B. AND gate

C. NOR gate

D. XOR gate

Answer: A

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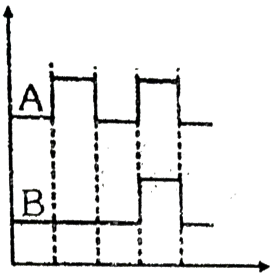
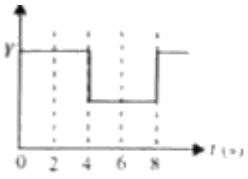
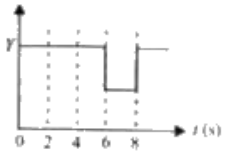
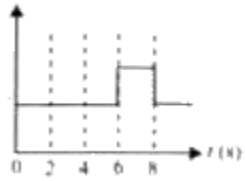
96. The real time variation of input signals A and B are as shown below. If the inputs are fed into NAND gate, then select the output signal from the following :-

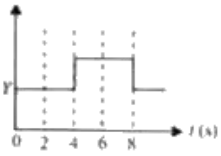


A.



B. 

C. 

D. 

Answer: B

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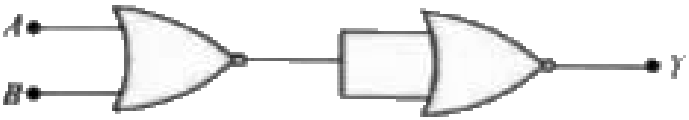
97. Identify the logic operation performed by the circuit as shown in the figure.



A. AND

B. OR

C. NAND

D. NOT

Answer: B

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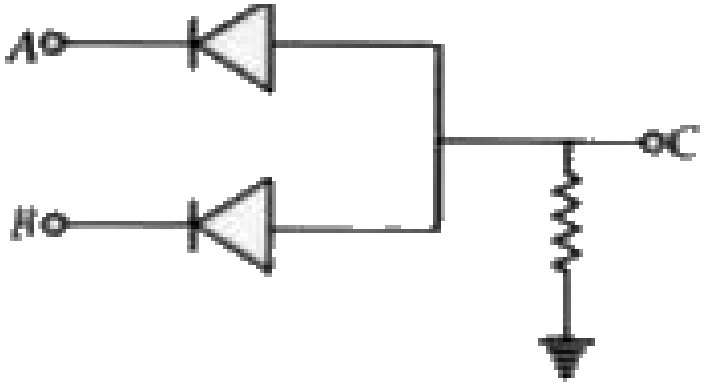
98. In the circuit below, A and B represent two inputs and C represents the output. The circuit represents



A. OR gate

B. NOR gate

C. AND gate

D. NAND gate

Answer: C

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99. In the Boolean algebra, what is the equivalent expression for $\overline{A} . \overline{B}$?

A. $A + B$

B. $\overline{A + B}$

C. $A \cdot B$

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

Answer: B

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100. The inputs and outputs for different time intervals are given below for NAND gate

Time interval	Input A	Input B	Output Y
t_1 to t_2	0	1	P
t_2 to t_3	0	0	Q
t_3 to t_4	1	0	R
t_4 to t_5	1	1	S

The value taken by P, Q, R, S are respectively

A. 1,1,1,0

B. 0,1,0,1

C. 0,1,0,0

D. 1,0,1,1

Answer: A

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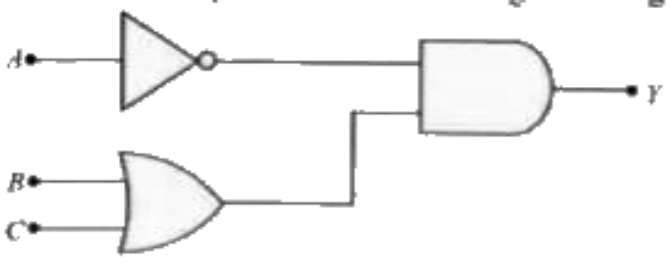
101. The Boolean equation for the circuit given in figure is



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

B. $Y = \overline{A} \cdot \left(\overline{B} + \overline{C}\right)$

C. $Y = \overline{A}\left(B + \overline{C}\right)$

D. $Y = \overline{A} \cdot (B + C)$

Answer: D

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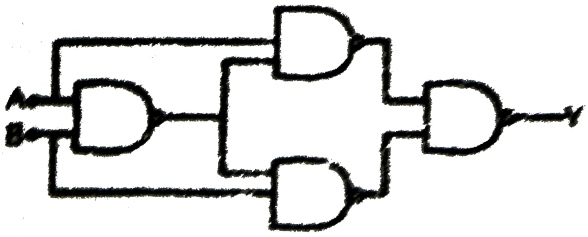
102. Select the outputs Y of the combination of gates shown below for inputs $A = 1, B = 0, A = 1, B = 1$ and $A = 0, B = 0$ respectively :-



A. (0,1,1)

B. (1,0,1)

C. (1,1,1)

D. (1, 0,0)

Answer: D

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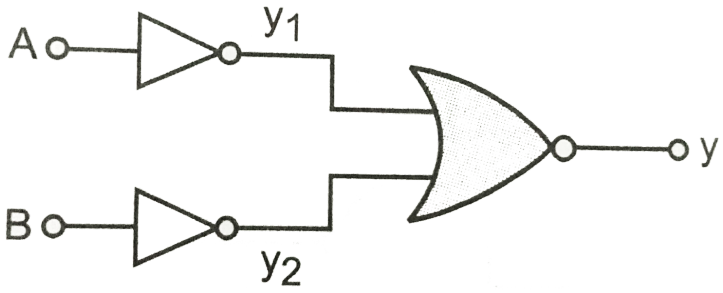
103. Which logic gate is represented by the following combination of logic gates



A. OR

B. NAND

C. AND

D. NOR

Answer: C

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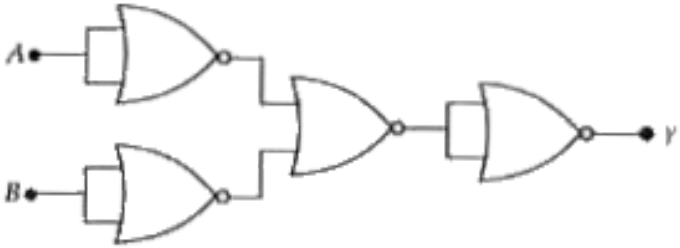
104. The circuit as shown in the figure is equivalent to



(a) AND gate
(b) NOR gate
(c) OR gate
(d) NAND gate

A. AND gate

B. NOR gate

C. OR gate

D. NAND gate

Answer: D

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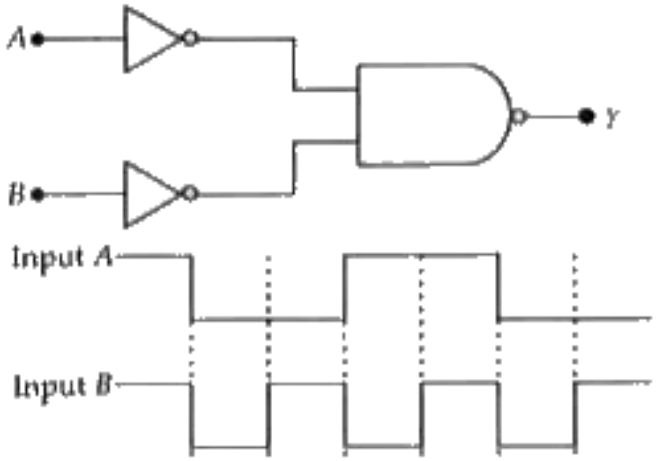
105. The logic circuit shown below has the input waveforms A and B as shown. Pick out the correct out put waveform.



A. 

B. 

C. 

D. 

Answer: B

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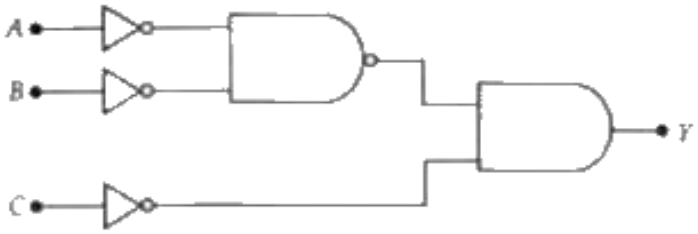
106. The output Y of the logic circuit as shown in figure is



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

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

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

D. $A + B + C$

Answer: A

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107. NAND gates can be used to form AND gate. What is the the minimum number of NAND gates required for this purpose?

A. 1

B. 2

C. 3

D. 4

Answer: B

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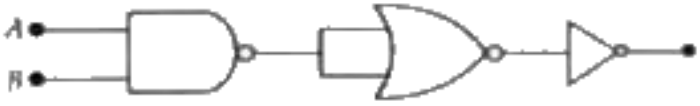
108. The circuit as shown in figure is equivalent to



A. NOR gate

B. OR gate

C. AND gate

D. NAND gate

Answer: D

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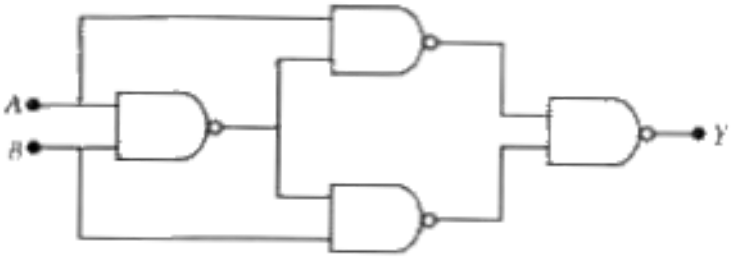
109. The simplified Y output of the given logic circuit is



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

B. $\overline{A}$

C. $\overline{B}$

D. AB

Answer: A

Watch Video Solution

110. In Boolean algebra $\overline{\left(A+\overline{B}\right)} \cdot C$ will be equal to

A. $\left(\overline{A} \cdot B\right)+\overline{C}$

B. $\left(A \cdot \overline{B}\right)+C$

C. $(A \cdot B) \cdot C$

D. $\left(A+\overline{B}\right)+C$

Answer: A

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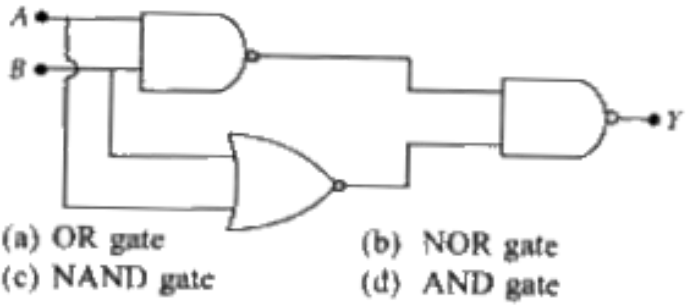
111. The circuit as shown in figure is equivalent to



(a) OR gate (b) NOR gate
(c) NAND gate (d) AND gate

A. OR gate

B. NOR gate

C. NAND gate

D. AND gate

Answer: A

Watch Video Solution

112. The output Y of the logic circuit as shown in figure is best represents as

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

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

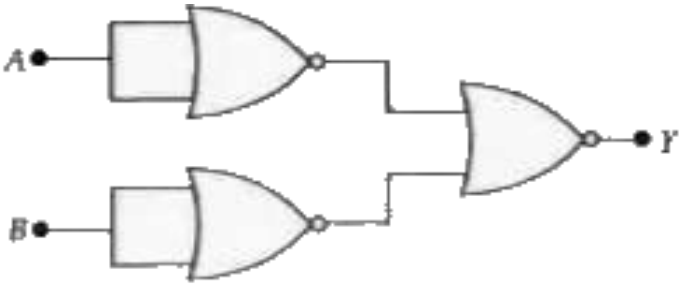
C. $\overline{A + B \cdot C}$

D. $\overline{\overline{A + \overline{B} \cdot C}}$

Answer: D

Watch Video Solution

113. The combination of the gates shown below yields



A. NAND gate

B. OR gate

C. NOT gate

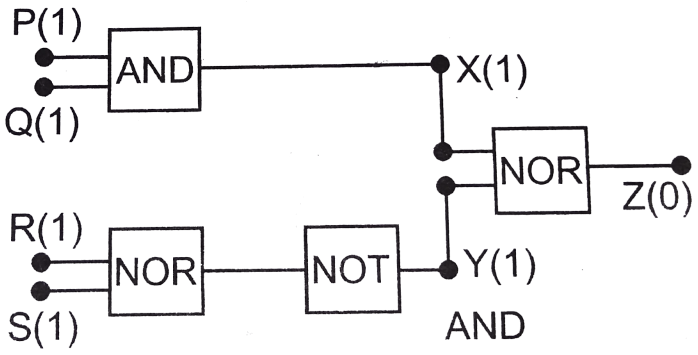
D. AND gate

Answer: D

Watch Video Solution

114. The circuit diagram (see fig.) shows a 'logic combination' with the states outputs X, Y and Z given for input P, Q, R and S all at state 1 (i.e., high). When inputs P and R

change to state 0 i.e., low) with inputs Q and S still at 1, the condition of output X, Y and Z chages to



A. 1, 0, 0

B. 1, 1, 1

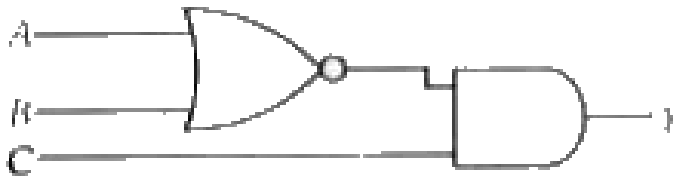
C. 0, 1, 0

D. 0, 0, 1

Answer: C

Watch Video Solution

115. In the circuit givne, A, B and C are inputs and Y is the output.



The output of Y is

A. high for all the high inputs

B. high for all the low inputs

C. high when $A = 1, B = 1, C = 0$

D. low for all low inputs

Answer: D

Watch Video Solution

116. Which of the following truth tables corresponds to NAND gate ?

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

(i)

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

(ii)

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

(iii)

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

(iv)

(a) (iv) (b) (iii) (c) (ii) (d) (i)

A. (iv)

B. (iii)

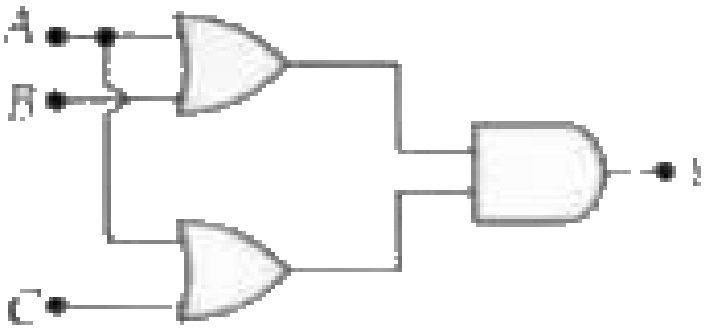
C. (ii)

D. (i)

Answer: D

 Watch Video Solution

117. The output of given logic circuit is



A. $A \cdot (B + C)$

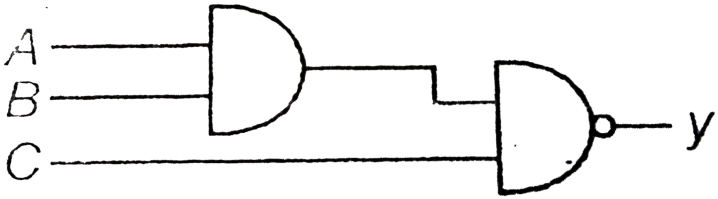
B. $A \cdot (B \cdot C)$

C. $(A + B) \cdot (A + C)$

D. $A + B + C$

Answer: C

Watch Video Solution



118.

The output y, when all three inputs are first high and then low, will respectively be

A. 1, 0

B. 1, 1

C. 0, 0

D. 0, 1

Answer: D

 Watch Video Solution

119. The logic gates giving output '1' for the inputs of '1' and '0' are

A. AND and OR

B. OR and NOR

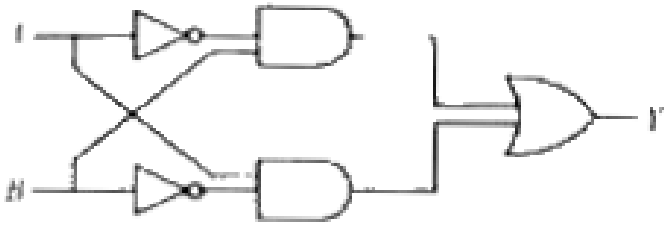
C. NAND and NOR

D. NAND and OR

Answer: D

Watch Video Solution

120. The truth table for the following logic circuit is



A.

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

B.

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

C.

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

D.

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

Answer: A

Watch Video Solution

Check Your Beet Vitals

1. Which one of the following statement is false?

A. Pure Si doped with trivalent impurities gives a p - type semiconductor.

B. Majority carriers in a n - type semiconductor are holes.

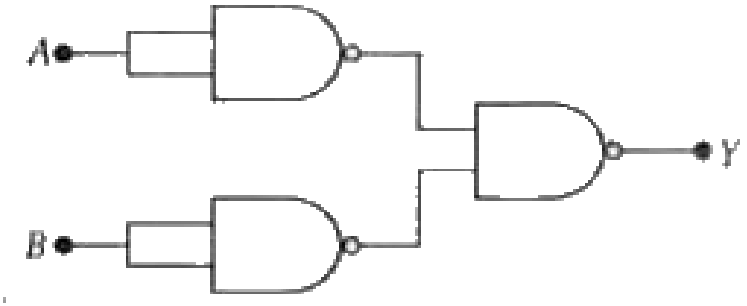
C. Minority carriers in a p - type semiconductor are electrons.

D. The resistance of intrinisic semiconductor decreases with increases of temperature.

Answer: C

Watch Video Solution

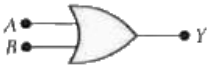
2. The following network of gates



is equivalent to

A. 

B. 

C. 

D. 

Answer: C

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

A. 90

B. 100

C. 9

D. 10

Answer: B

Watch Video Solution

4. Which of the following elements when added as an impurity into the germanium produces a p - type semiconductor?

A. P

B. As

C. Al

D. Sb

Answer: C

View Text Solution

5. At temperature of absolute zero an intrinsic semiconductor is

A. insulator

B. metallic conductor

C. superconductor

D. extrinsic semiconductor

Answer: A

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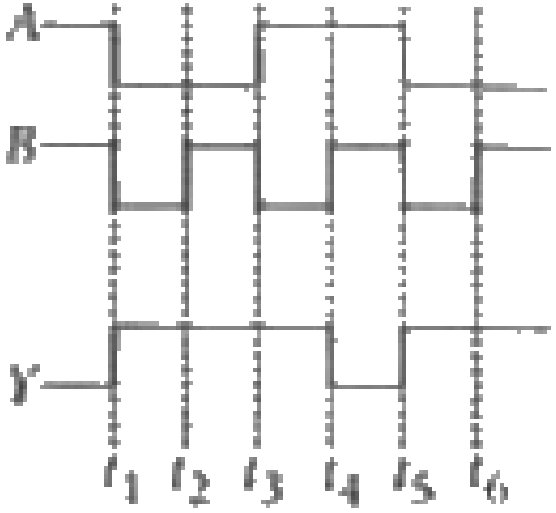
6. The figure shows the voltage waveforms across two inputs A and B and the output Y of a logic circuit. The logic circuit gate is



A. OR gate

B. AND gate

C. NOR gate

D. NAND gate

Answer: D

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7. In an n-p-n transistor amplifier, the collector current is 9 mA. If 90% of the electrons emitted reach the collector, then

A. the emitter current is 1 mA.

B. the base current is 10 mA.

C. $\alpha = 0.9, \beta = 9.0$

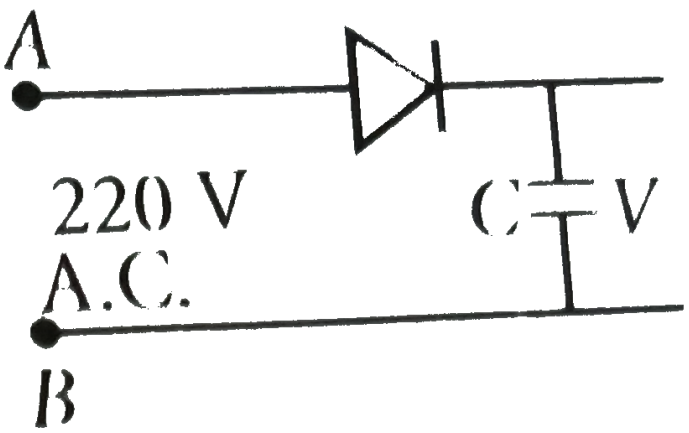
D. $\alpha = 9.0, \beta = 0.9$

Answer: C

View Text Solution

8. A 220 V ac supply is connected between points A and B as shown 220 V in figure. What will be the potential AC difference V across the

capacitor?



A. 0 V

B. 110 V

C. 220 V

D. $200\sqrt{2}V$

Answer: D

Watch Video Solution

9. If the energy gap between valence band and conduction band is 10 eV, then the material is a/an

A. metal

B. insulator

C. semiconductor

D. superconductor

Answer: B

Watch Video Solution

10. SSI integrated chip contains

A. less than 10 gates

B. 10 to 100 gates

C. 100 to 1000 gates

D. 1000 to 10000 gates

Answer: A

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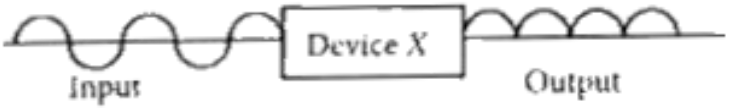
11. In the figure, the input waveform is converted into the output waveform by a device X. The devise X is a/an



A. amplifier

B. half wave rectifier

C. full wave rectifier

D. oscillator

Answer: C

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12. The input resistance of a silicon transisitor is 100Ω. Base current is changed by $50\mu A$ which result in a change in collector current by 5 mA. This transisitor is used as a common emitter amplifier with a load resistance of $4k\Omega$. The voltage gain of the amplifier is

A. 1000

B. 2000

C. 4000

D. 5000

Answer: C

View Text Solution

13. Match List I with List II and select the correct answer using the codes given below

the lists.

List I		List II	
P.	Photodiode	1.	Light into electrical energy
Q.	Zener diode	2.	Electrical energy into light
R.	Solar cell	3.	Optical signal
S.	LED	4.	Voltage regulator

A. $\begin{matrix} P & Q & R & S \\ 2 & 3 & 4 & 1 \end{matrix}$

B. $\begin{matrix} P & Q & R & S \\ 4 & 1 & 2 & 3 \end{matrix}$

C. $\begin{matrix} P & Q & R & S \\ 1 & 2 & 3 & 4 \end{matrix}$

D. $\begin{matrix} P & Q & R & S \\ 3 & 4 & 1 & 2 \end{matrix}$

Answer: D

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14. The amplifiers X, Y and Z are connected in series. The voltage gain of X, Y and Z are connected in series. The voltage gain of X, Y and Z are 10, 20 and 40 respectively. If the input signal is 1 mV, then the output signal voltage is

A. 4 V

B. 6 V

C. 8 V

D. 10 V

Answer: C

View Text Solution

15. Four photodiodes D_1, D_2, D_3 and D_4 are made of semiconductors having band gaps of 2.5 eV, 3 eV, 2 eV, 3.5 eV respectively. Which one will be able to detect light of wavelength 600 nm?

A. D_4

B. D_3

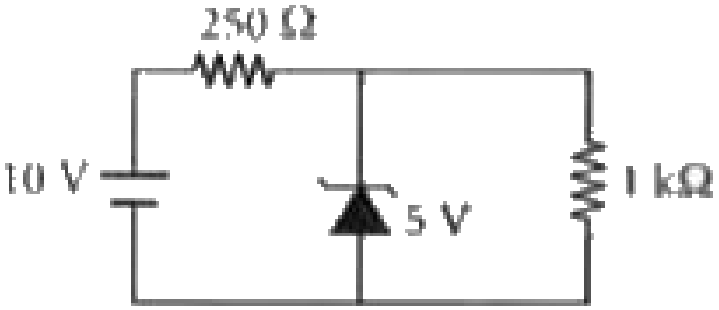
C. D_2

D. D_1 is reverse biased and D_2 is forward biased.

Answer: B

View Text Solution

16. In the circuit, the current flowing through the zener diode is



A. 10 mA

B. 15 mA

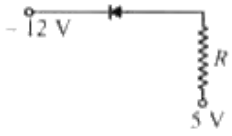
C. 20 mA

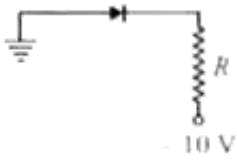
D. 5 mA

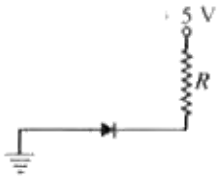
Answer: B

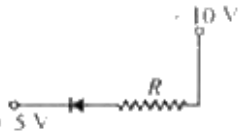
Watch Video Solution

17. Of the diodes shown in the following diagrams, which one is reverse biased?

A. 

B. 

C. 

D. 

Answer: C

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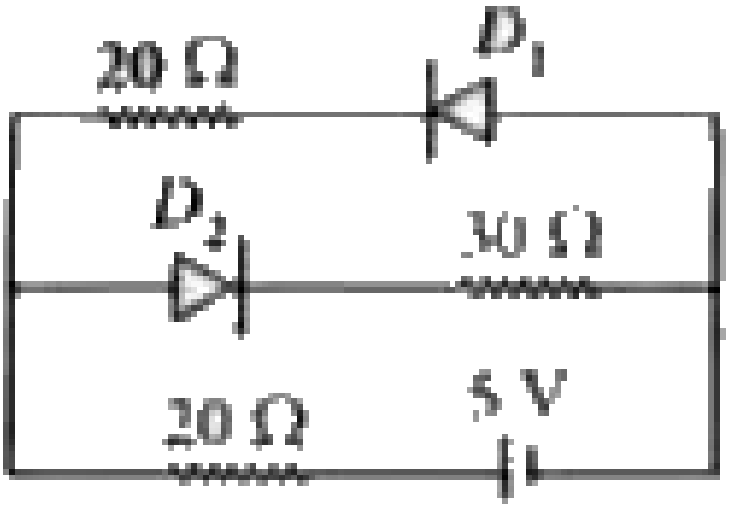
18. The current in the circuit will be



A. 5/40 A

B. 5/50 A

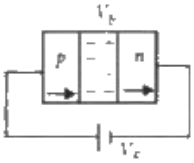
C. 5/10 A

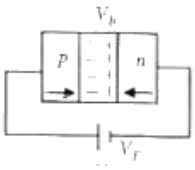
D. 5/20 A

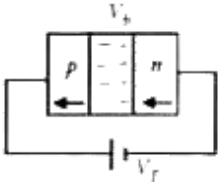
Answer: B

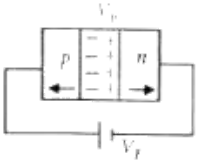
Watch Video Solution

19. 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: B

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20. p-n junction is called as forward biased when

A. the positive pole of the battery is joined to the p - semiconductor and negative pole to the n - semiconductor

B. the positive pole of the battery is connected to n - semiconductor and negative pole to the p - semiconductor

C. a mechanical force is applied in the forward direction

D. None of these

Answer: A

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21. The transfer ratio (β) of a transistor is 50. The input resistance of the transistor when used in the common emitter configuration is $1k\Omega$. The peak value of the collector current for a peak value of AC input voltage of 0.01 V is

A. $100\mu A$

B. $0.01\mu A$

C. $0.25\mu A$

D. $500\mu A$

Answer: D

View Text Solution

22. When the emitter current of a transistor is changed by 1 mA, its collector current changes by 0.990 mA. In the common base circuit, current gain for the transistor is

A. 0.099

B. 1.01

C. 1.001

D. 0.990.

Answer: D

 Watch Video Solution

23. In a transistor, the current amplification factor α is 0.9. The transistor is connected in common base configuration. The change in

collector current when base current changes by 4 mA is

A. 4 mA

B. 12 mA

C. 24 mA

D. 36 mA

Answer: D

 Watch Video Solution

24. Mobility of electron and holes in a sample of intristic germanium at room temperature are $0.36m^2V^{-1}s^{-1}$ and $0.17m^2V^{-1}s^{-1}$. The electron and hole densities are each equal to $2.5 \times 10^{19}m^{-3}$. The electrical conductivity of germanium is

A. $0.47Sm^{-1}$

B. $5.18Sm^{-1}$

C. $2.12Sm^{-1}$

D. $1.09Sm^{-1}$

Answer: C

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25. Digital signals

(i) do not provide a continuous set of values.

(ii) represents values as descrete steps.

(iii) can utillize binary system

(iv) can utillize decimal as well as binary system.

The true option is.

A. (i) and (ii) only

B. (ii) and (iii) only

C. (i), (ii) and (iii) but not (iv)

D. All of (i), (ii), (iii) and (iv).

Answer: C

Watch Video Solution

Aipmt Neet Mcqs

1. Which one of the following statement is false?

A. Pure Si doped with trivalent impurities gives ap-type semiconductor.

B. Majority earners in a n-type semiconductor are holes.

C. Minority carriers in a p-type semiconductor are electrons.

D. The resistance of intrinisic semiconductor decreases with increase of temperature.

Answer: B

 Watch Video Solution

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

A. junction diode

B. integrated circuit

C. junction transistor

D. zener diode

Answer: B

Watch Video Solution

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

A. 500

B. 1000

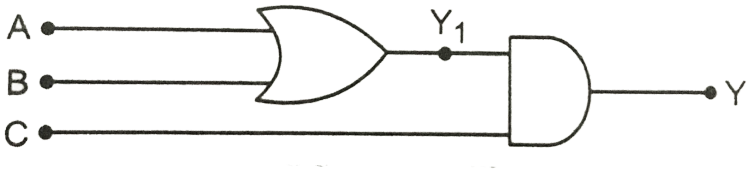
C. 1250

D. 50

Answer: C

Watch Video Solution

4. To get an output $y = 1$ from the circuit shown below, the input must be



A. a-0, b-1, c-0

B. a-0, b-0, c-1

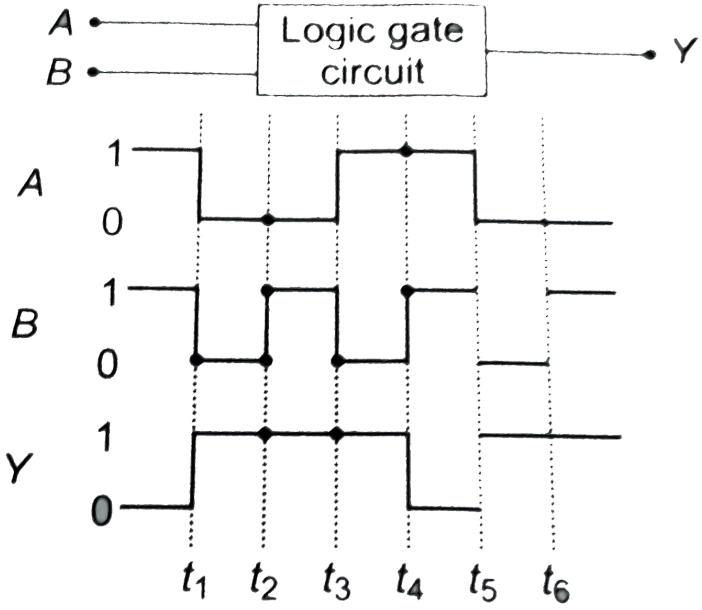
C. a-1, b-0, c-1

D. a-1, b-0, c-0

Answer: C

Watch Video Solution

5. The following figure shows a logic gate circuit with two inputs A and B and the output Y. The voltage waveforms of A, B and the output Y are as given



A. NOR gate

B. OR gate

C. AND gate

D. NAND gate

Answer: D

Watch Video Solution

6. For transistor action:

(1) Base, emitter and collector regions should have similar size and doping concentrations.

(2) The base region must be very thin and

lightly doped.

(3) The emitter-base junction is forward biased and base-collector junction is reverse biased.

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

Which one of the following pairs of statements is correct?

A. (1) and (4)

B. (1) and (2)

C. (2) and (3)

D. (3) and (4)

Answer: C

View Text Solution

7. A transistor is operated in common emitter configuration at $V_c = 2V$ such that a change in the base current from $100\mu A$ to $300\mu A$ produces a change in the collector current from $10mA$ to $20mA$. The current gain is

A. 50

B. 75

C. 100

D. 25

Answer: A

Watch Video Solution

8. In forward biasing of the p-n junction

A. the positive terminal of the battery is connected to p-side and the depletion

region becomes thick.

B. the positive terminal of the battery is connected to m-side and the depletion region becomes thin.

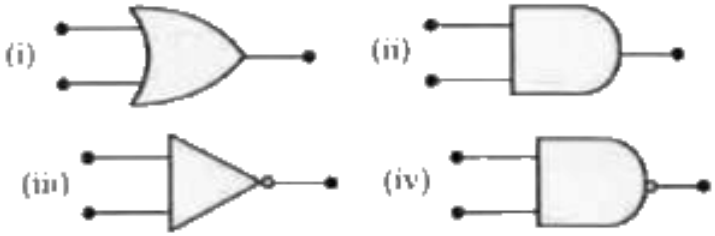
C. the positive terminal of the battery is connected to n-side and the depletion region becomes thick.

D. the positive terminal of the battery is connected to p-side and the depletion region becomes thin.

Answer: D

View Text Solution

9. Symbolic representation of four logic gates are shown as:



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

A. (ii), (iii) and (iv)

B. (iii), (ii) and (i)

C. (iii), (ii) and (iv)

D. (ii), (iv) and (iii)

Answer: D

 Watch Video Solution

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

A. it becomes a p-type semiconductor

B. the antimony becomes an acceptor atom

C. there will be more free electrons than holes in the semiconductor

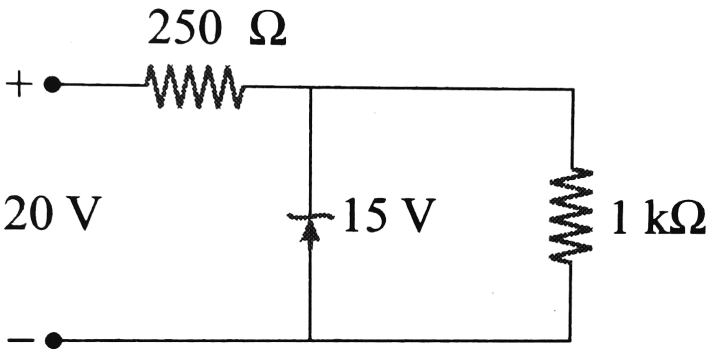
D. its resistance is increased

Answer: C

Watch Video Solution

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

through the diode is



A. 5 mA

B. 10 mA

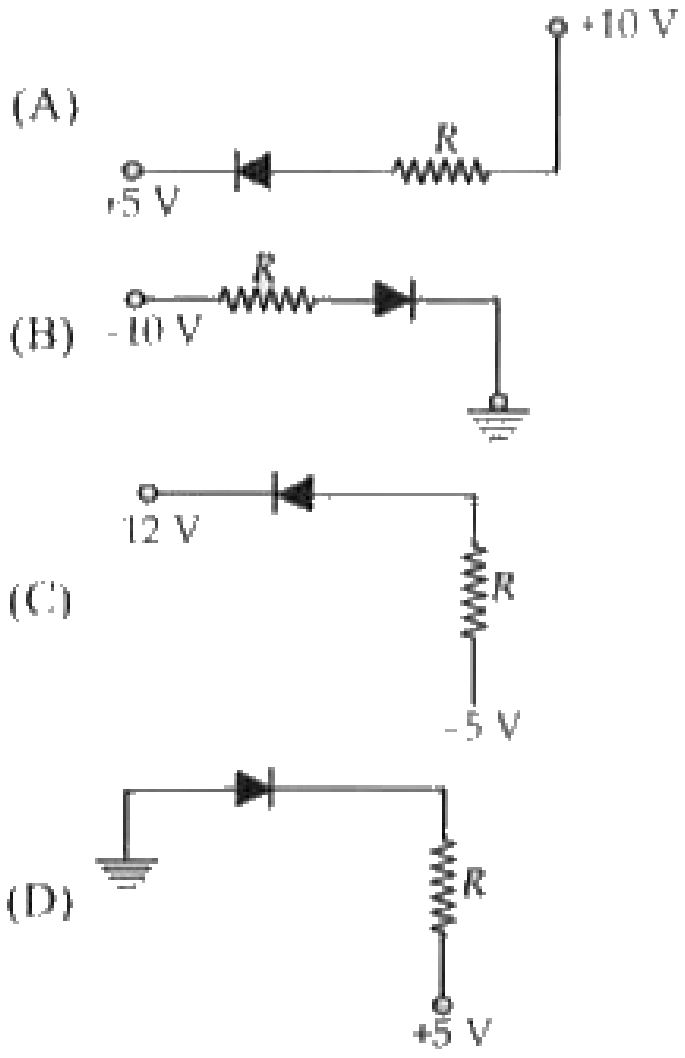
C. 15 mA

D. 20 mA

Answer: A

Watch Video Solution

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



A. (A), (B) and (D)

B. (C) only

C. (A) and (c)

D. (B) and (D)

Answer: C

Watch Video Solution

13. Pure Si at $500K$ has equal number of electron (n_e) and hole (n_h) concentration of $1.5 \times 10^{16} m^{-3}$. Dopping by indium. Increases

n_h to $4.5 \times 10^{22} m^{-3}$. The doped semiconductor is of

A. p-type having electron concentration $n_e = 5 \times 10^9 m^{-3}$

B. h-type with electron concentration $n_e = 5 \times 10^{22} m^{-3}$

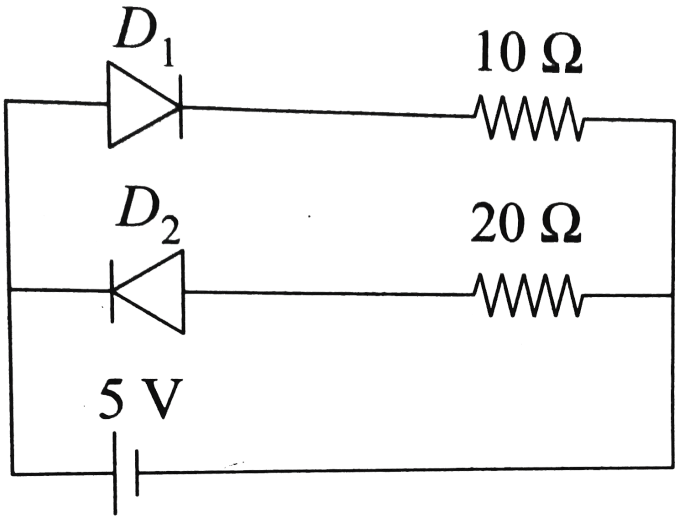
C. p-type with electron concentration $n_e = 2.5 \times 10^{10} m^{-3}$

D. n-type with electron concentration $n_e = 2.5 \times 10^{23} m^{-1}$

Answer: A

Watch Video Solution

14. Two ideal diodes are connected to a battery as shown in the circuit. The current supplied by the battery is



A. 0.75 A

B. zero

C. 0.25 A

D. 0.5 A

Answer: D

Watch Video Solution

15. In a CE transistor amplifier, the audio signal voltage across the collector resistance of $2k\Omega$ is $2V$. If the base resistance is $1k\Omega$ and

the current amplification of the transistor is 100, the input signal voltage is

A. 0.1 V

B. 1.0 V

C. 1 mV

D. 10 mV

Answer: D

Watch Video Solution

16. C and Si both have same lattice structure, having 4 bonding electrons in each. However, C is insulator whereas Si is intrinsic semiconductor. This is because

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

B. In case of C the conduction band is partly filled even at absolute zero temperature.

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

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

Answer: C

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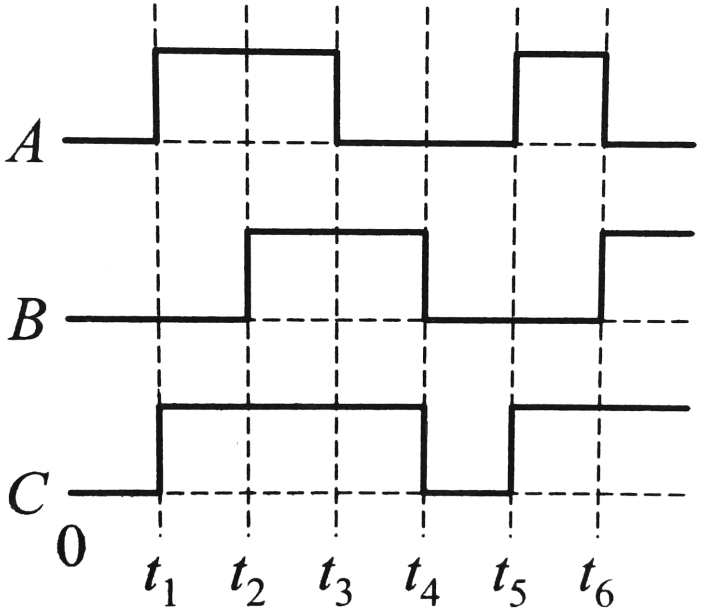
17. The figure shows a logic circuit with two inputs A and B and the output C. The voltage wave forms across A, B and C are as given. The logic circuit gate is



A. OR gate

B. NOR gate

C. AND gate

D. NAND gate

Answer: A

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18. The input resistance of a silicon transistor is 100Ω. Base current is changed by $40\mu A$ which results in a change in collector current by $2mA$. This transistor is used as a common-

emitter amplifier with a load resistance of $4k\Omega$. The voltage gain of the amplifier is

A. 2000

B. 3000

C. 4000

D. 1000

Answer: A

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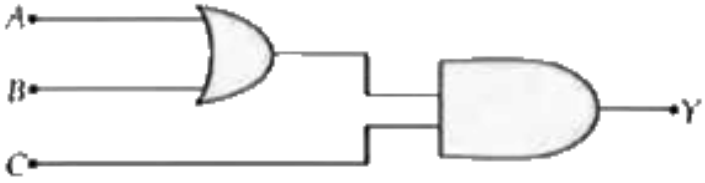
19. To get an output Y = 1 in given circuit, which of the following input will be correct?



A. A-1, B-0, C-0

B. A-1, B-0, C-1

C. A-1, B-1, C-1

D. A-0, B-1, C-0

Answer: B:C

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

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

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

D. $1.5G$

Answer: C

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

A. Holes are minority carriers and pentavalent atoms are dopants.

B. Holes are majority carriers and trivalent atoms are dopants.

C. Electrons are majority carriers and trivalent atoms are dopants.

D. Electrons are minority carriers and pentavalent atoms are dopants.

Answer: A

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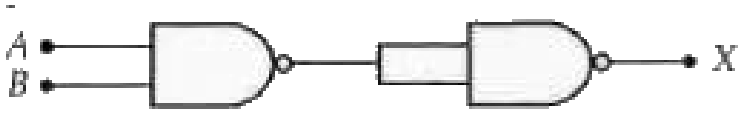
22. The output (X) of the logic circuit shown in figure will be



A. X=A.B

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

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

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

Answer: A

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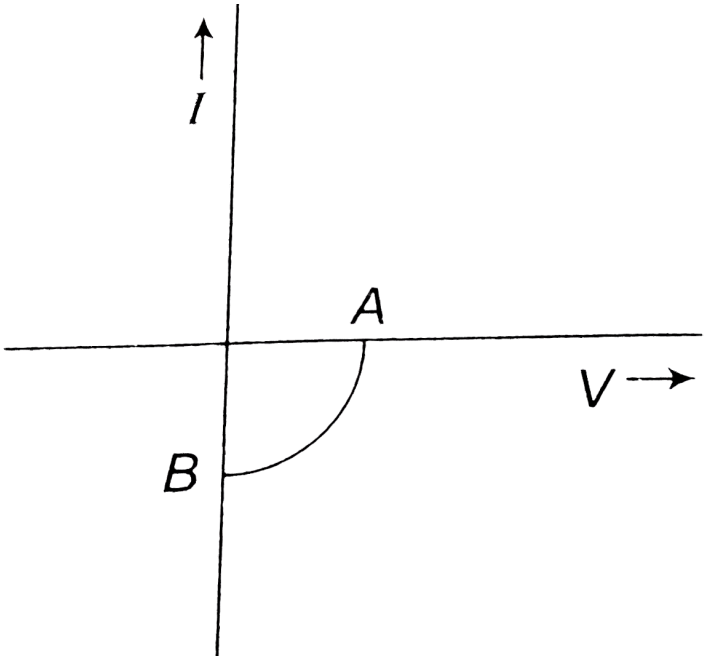
23. The given graph represents $V - I$ characteristic for a semiconductor device.

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.

Answer: A

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24. The barrier potential of a p-n junction depends on : (i) type of semiconductor material (ii) amount of doping (iii)

temperature.

Which is one of the following is correct?

A. (1) and (2) only

B. (2) only

C. (2) and (3) only

D. (1), (2) and (3)

Answer: D

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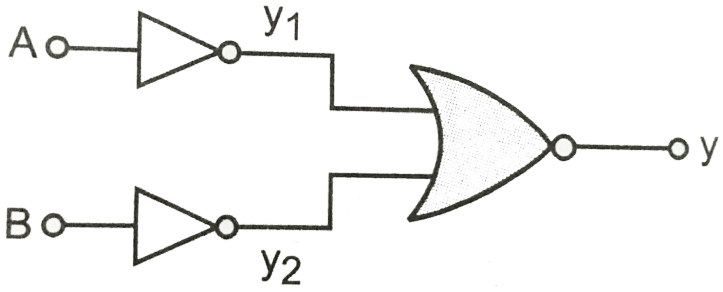
25. Which logic gate is represented by the following combination of logic gates



A. AND

B. NOR

C. OR

D. NAND

Answer: A

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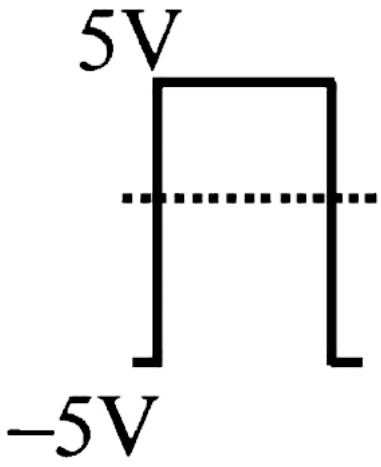
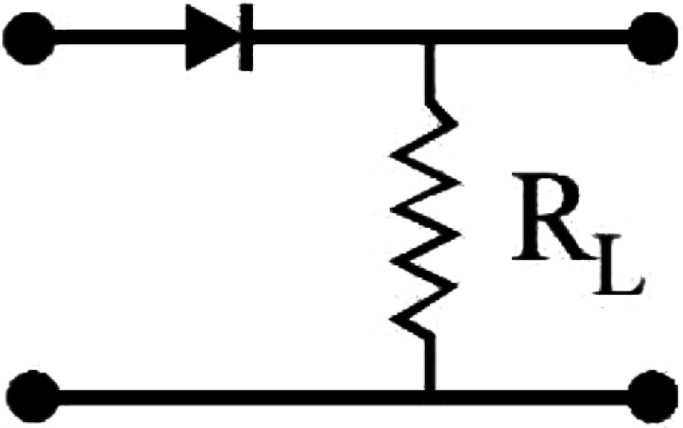
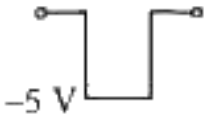
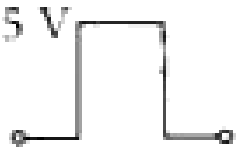
26. If in a $p-n$ junction diode , a square input single of $10V$ is applied as shown

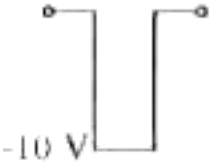


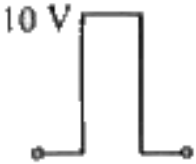


A.



B. 

C. 

D. 

Answer: B

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27. The input signal given to a CE amplifier having a voltage gain of 150 is $V_1 = 2\cos\left(15t + \frac{\pi}{3}\right)$. The corresponding output signal will be

A. $2\cos\left(15t + \frac{5\pi}{6}\right)$

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

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

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

Answer: B

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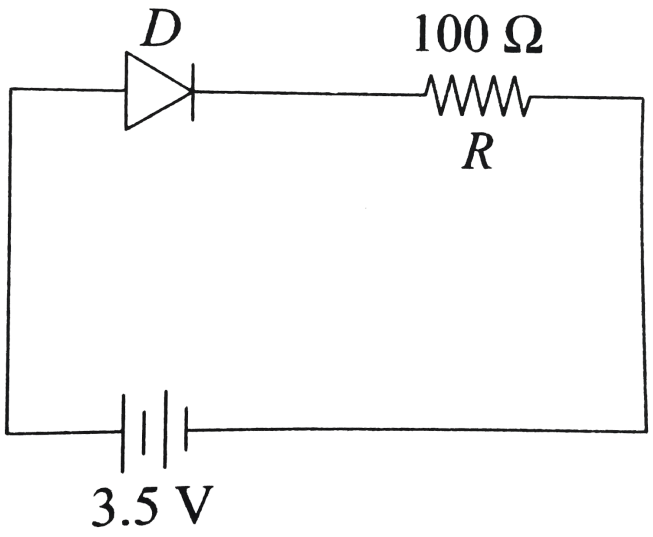
28. In the given figure, a diode D is connected to an external resistance $R = 100\Omega$ and an emf of $3.5V$. If the barrier potential developed across the diode is $0.5V$, the current in the circuit will be :



A. 20 mA

B. 35 mA

C. 30 mA

D. 40 mA

Answer: C

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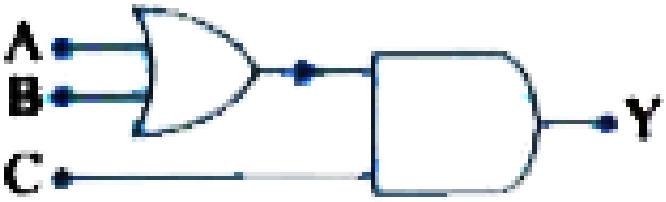
29. To get output 1 for the following circuit, the correct choice for the input is :



A. A=l,B=l,C=0A=1, B=1, C=0

B. A=1, B=0, C=1

C. A=0, B=1, C=0

D. A=1, B=0, C=0

Answer: B

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30. A n-p-n transisitor is connected in common emitter configuration in a given amplifier. A load resistance of 800Ω is connected in the collector circuit and the voltage drop across it is $0.8V$. If the current amplification factor is 0.96 and the input resistance of the circuits is 192Ω, the voltage gain and the power gain of the amplifier will respectively be

A. 4,3.69

B. 4,3.84

C. 3.69, 3.84

D.

Answer: C

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

A. $10^{-1}A$

B. $10^{-3}A$

C. $0A$

D. $10^{-2}A$

Answer: D

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32. For CE transistor amplifier, the audio signal voltage across the collector resistance of $2k\Omega$ is 4V. If the current amplification factor of the

transistor is 100 and the base resistance is $1k\Omega$, then the input signal voltage is

A. 10 mV

B. 20 mV

C. 30 mV

D. 15 mV

Answer: B

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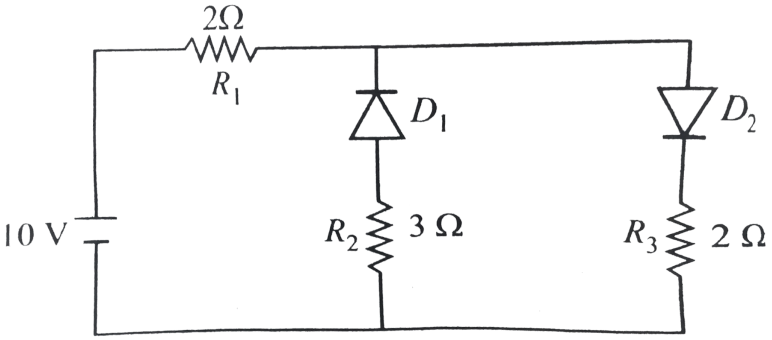
33. The given circuit has two ideal diodes connected as show in the figure. The current flowing through the resistance R_1 will be



A. 2.5 A

B. 10.0 A

C. 1.43 A

D. 3.13 A

Answer: A

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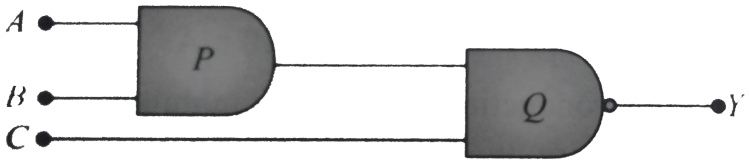
34. What is the output Y in the following circuit, when all the three output A, B, C are first 0 and then 1?



A. 0,1

B. 0,0

C. 1,0

D. 1,1

Answer: C

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35. In a common emitter transistor amplifier the audio signal voltage across the collector is $3V$. The resistance of collector is $3k\Omega$. If current gain is 100 and the base resistance is

$2k\Omega$, the voltage and power gain of the amlifier is :

A. 15 and 200

B. 150 and 15000

C. 20 and 2000

D. 200 and 1000

Answer: B

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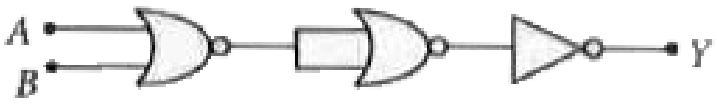
36. The given electrical network is equivalent to



A. OR gate

B. NOR gate

C. NOT gate

D. AND gate

Answer: B

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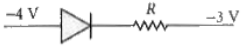
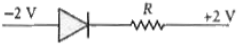
37. Which one of the following represents forward bias diode?

A. 

B. 

C. 

D. 

Answer: D

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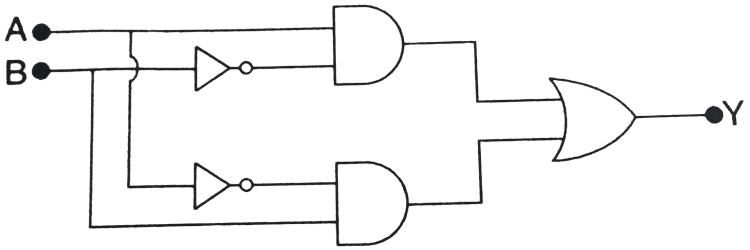
38. In the combination of the following gates the output Y can be written in terms of inputs A and B as:



A. $\overline{A.B}$

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

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

D. $\overline{A+B}$

Answer: B

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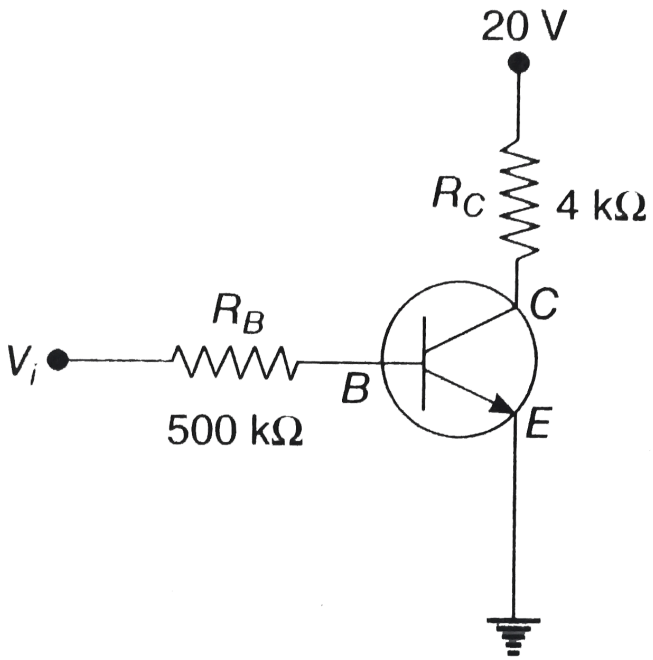
39. In the circuit shown in the figure, the input voltage V_i is $20V$, $V_{BE} = 0$ and $V_{CE} = 0$. The

values of I_B, I_C and β are given by:



A. $I_B = 40\mu A, I_C = 10mA, \beta = 250$

B. $I_B = 25\mu A, I_C = 5mA, \beta = 200$

C. $I_B = 20\mu A, I_C = 5mA, \beta = 250$

D. $I_B = 40\mu A, I_C = 5mA, \beta = 125$

Answer: D

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40. In a $p-n$ junction diode, change in temperature due to heating

A. affects only reverse resistance

B. affects only forward resistance

C. does not affect resistance of p-n junction

D. affects the overall V-I characteristics of p-n junction

Answer: D

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41. For a p-type semiconductor, which of the following statements is true?

A. Electrons are the majority carriers and pentavalent atoms are the dopants.

B. Electrons are the majority carriers and trivalent atoms are the dopants.

C. Holes are the majority carriers and trivalent atoms are the dopants.

D. Holes are the majority carriers and pentavalent atoms are the dopants.

Answer: C

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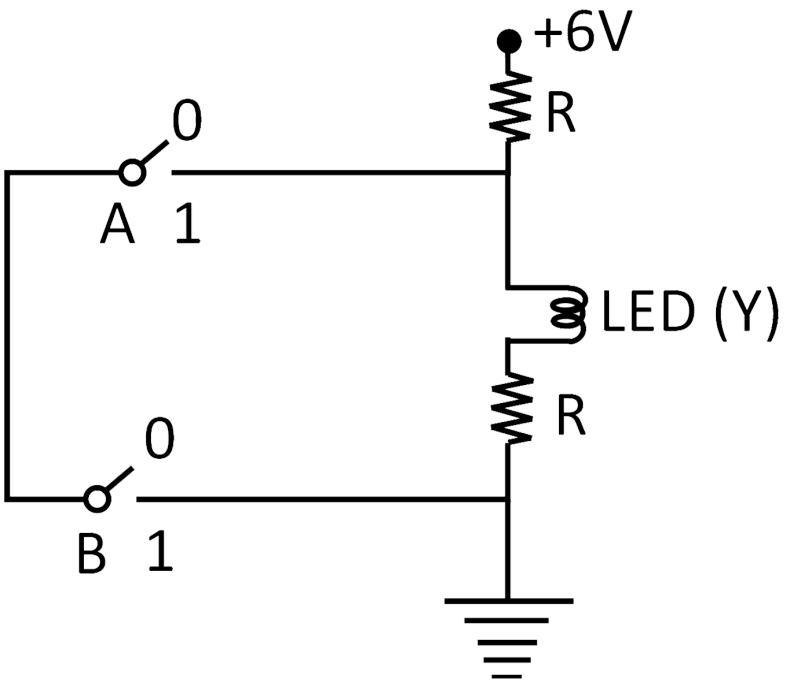
42. The correct Boolean operation represented by the circuit diagram drawn is



A. NOR

B. AND

C. OR

D. NAND

Answer: D

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