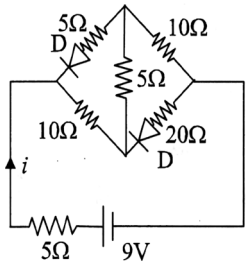
PHYSICS

31. LED is constructed from Ga-As-P semiconducting material. The energy gap of this LED is 1.9 eV. Calculate the wavelength of light emitted and its colour.
[h = 6.63×10^{-34} J s and
c = 3×10^{8} m s^{-1}]
(1) 654 nm and red colour
(2) 1046 nm and blue colour
(3) 1046 nm and red colour
(4) 654 nm and orange colour

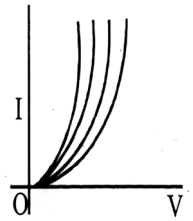
32. The current i in the network is

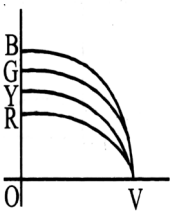


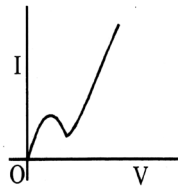
(1) 0.2 A (2) 0.6 A
(3) 0.3 A (4) 0 A

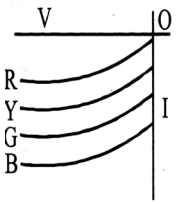
33. Mobility of electrons in a semiconductor is defined as the ratio of their drift velocity to the applied electric field. If, for an n-type semiconductor, the density of electrons is 10^{19} m^{-3} and their mobility is 1.6 m^2 (vs) then the resistivity of the semiconductor (since it is an n-type semiconductor contribution of holes is ignored) is close to
(1) 2 Ωm (2) 4 Ωm
(3) 0.4 Ωm (4) 0.2 Ωm

34. The I-V characteristic of an LED is

(1)


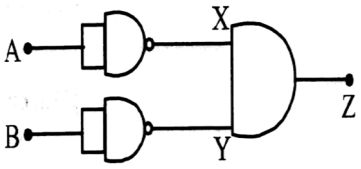
(2)


(3)


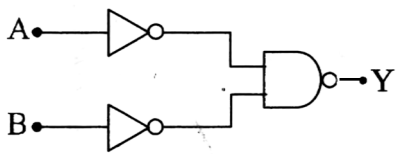
(4)


35. Carbon, silicon and germanium have four valence electrons each. At room temperature which one of the following statements is most appropriate?
(1) The number of free electrons for conduction is significant only in Si and Ge but small in C
(2) The number of free conduction electrons in significant in C but small in Si and Ge.
(3) The number of free conduction electrons is negligibly small in all the three
(4) The number of free electrons for conduction is significant in all the three

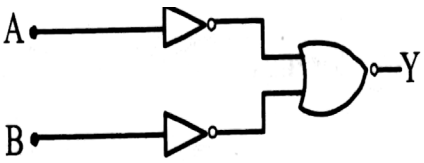
36. Identify the logic operation carried out by the given circuit.
(1) OR
(2) AND
(3) NOR
(4) NAND

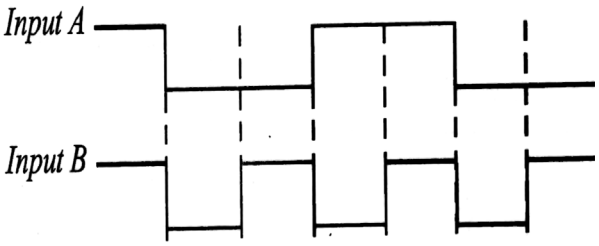


37. The logic gate equivalent to the given circuit is
(1) NAND
(2) OR
(3) NOR
(4) AND

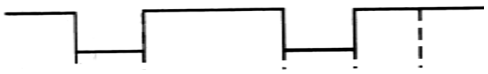


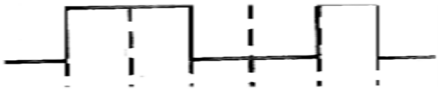
38. The logic circuit shown has the input waveforms A and B as shown. Pick out the correct output waveform.



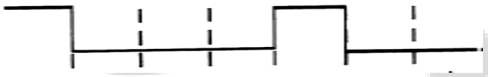


Output is

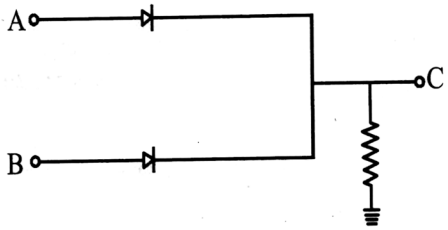
(1) 

(2) 

(3) 

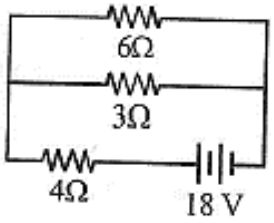
(4) 

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



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

40. The total power dissipated in watts in the circuit shown here is



(1) 40 (2) 54
(3) 4 (4) 16