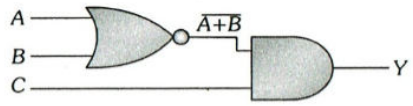
DPP
DAILY PRACTICE PROBLEMS

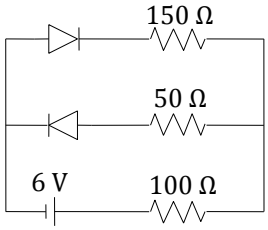
Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 9**

Topic :-.SEMICONDUCTOR ELECTRONICS: MATERIALS,DEVIES AND SIMPLE CIRCUITS

1. A metallic surface with work function of 2 eV, on heating to a temperature of 800 K gives an emission current of 1 mA. If another metallic surface having the same surface area, same emission constant but work function 4 eV is heated to a temperature of 1600 K, then the emission current will be
   a) 1 mA b) 2 mA c) 4 mA d) None of these
2. In a P-N junction diode if P region is heavily doped than n region then the depletion layer is
   a) Greater in P region b) Greater in N region
   c) Equal in both region d) No depletion layer is formed in this case
3. A potential difference of 2V is applied between the opposite faces of a Ge crystal plate of area 1 cm^2 and thickness 0.5 mm. If the concentration of electrons in Ge is $2 \times 10^{19}/m^3$ and mobilities of electrons and holes are $0.36\frac{m^2}{volt-s}$ and $0.14\frac{m^2}{volt-s}$ respectively, then the current flowing through the plate will be
   a) 0.25 A b) 0.45 A c) 0.56 A d) 0.64 A
4. In the circuit given A, B and C are inputs and Y is the output

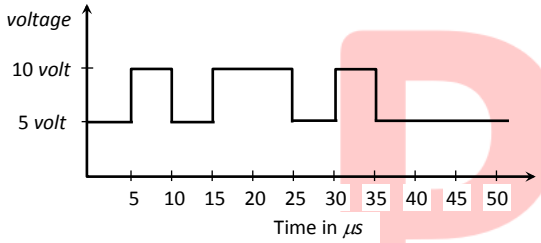


   The output of Y is
   a) High for all the high inputs b) High for all the low inputs
   c) High when $A = 1, B = 1, C = 0$ d) Low for all low inputs
5. The circuit shown in the figure contains two diodes each with a forward resistance of 50 Ω and with infinite backward resistance. If the battery is 6 V, the current through the 100 Ω resistance (in ampere) is

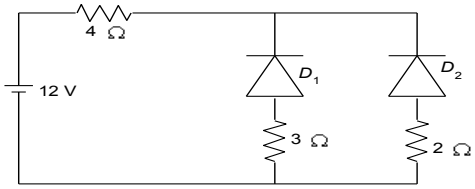


   a) Zero b) 0.02 c) 0.03 d) 0.036

6. Which of the following materials is the best conductor of electricity
   a) Platinum b) Gold c) Silicon d) Copper
7. If a zener diode ($V_Z = 5$ V and $I_Z = 10$ mA) is connected in series with a resistance and 20 V is applied across the combination, then the maximum resistance one can use without spoiling zener action is
   a) 20 kΩ b) 15 kΩ c) 10 kΩ d) 1.5 kΩ
8. In a *PN* junction photo cell, the value of photo-electromotive force produced by monochromatic light is proportional to
   a) The voltage applied at the *PN* junction
   b) The barrier voltage at the *PN* junction
   c) The intensity of the light falling on the cell
   d) The frequency of the light falling on the cell
9. In a *n-p-n* transistor amplifier, the collector current is 9 mA. If 90% of the electrons from the emitter reach the collector, then
   a) $\alpha = 0.9, \beta = 9.0$ b) The base current is 10 mA
   c) The emitter current is 1 mA d) $\alpha = 9.0, \beta = 0.9$
10. In a negative logic the following wave form corresponds to the

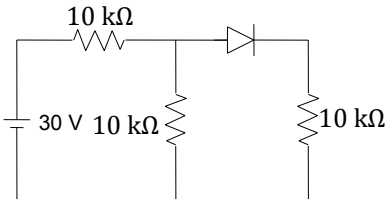


   a) 0000000000 b) 0101101000 c) 1111111111 d) 1010010111
11. The *PN* junction diode is used as
   a) An amplifier b) A rectifier c) An oscillator d) A modulator
12. The circuit has two oppositely connected ideal diodes in parallel. What is the current flowing in the circuit?



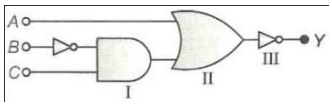
   a) 1.71 A b) 2.00 A c) 2.31 A d) 1.33 A
13. The mobility of free electron is greater than that of free holes because
   a) The carry negative charge
   b) They are light
   c) They mutually collide less
   d) They require low energy to continue their motion

14. In the figure, potential difference between A and B is



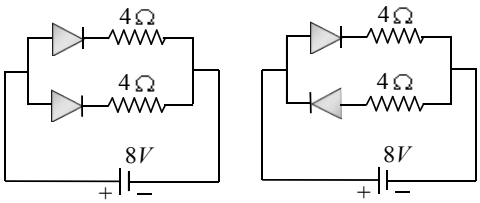
a) Zero b) 5 V c) 10 V d) 15 V

15. In a transistor the collector current is always less than the emitter current because
    a) Collector side is reverse biased and the emitter side is forward biased
    b) A few electrons are lost in the base and only remaining ones reach the collector
    c) Collector being reverse biased, attracts less electrons
    d) Collector side is forward biased and the emitter side is reverse biased
16. At room temperature, a P-type semiconductor has
    a) Large number of holes and few electrons
    b) Large number of free electrons and few holes
    c) Equal number of free electrons and holes
    d) No electrons or holes
17. n-p-n transistor are preferred to p-n-p transistor because they have
    a) Low cost b) Low dissipation energy
    c) Capability of handling large power d) Electrons having high mobility than holes
18. The output Y of the logic circuit shown in figure is best represented as



a) $\overline{A} + \overline{B \cdot C}$ b) $A + \overline{B} \cdot C$ c) $\overline{A + B \cdot C}$ d) $\overline{A + \overline{B} \cdot C}$

19. Currents flowing in each of the circuits A and B respectively are



(Circuit A) (Circuit B)

a) 1 A, 2 A b) 2 A, 1 A c) 4 A, 2 A d) 2 A, 4 A

20. For a crystal system, $a = b = c$, $\alpha = \beta = \gamma \neq 90°$, the system is
    a) Tetragonal system b) Cubic system
    c) Orthorhombic system d) Rhombohedral system