DPP

DAILY PRACTICE PROBLEMS

Class : XIIth   Subject : PHYSICS
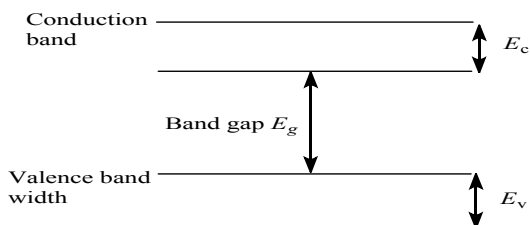Date :   DPP No. : 8

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

1. If the lattice constant of this semiconductor is decreased, then which of the following is correct?

   a) All E_c, E_g, E_v increase
   b) E_c and E_v increase, but E_g decreases
   c) E_c and E_v decrease, but E_g increases
   d) All E_c, E_g, E_v decreases

2. A piece of copper and another of germanium are cooled from room temperature to 77 K, the resistance of
   a) Each of them increases
   b) Each of them decreases
   c) Copper decreases and germanium increases
   d) Copper increases and germanium decreases

3. Potassium has a bcc structure with nearest neighbor distance 4.525 Å. Its molecular weight is 39. Its density in kg/m^3 is
   a) 900   b) 494   c) 602   d) 802

4. In p-type semiconductors, conduction is due to
   a) Greater number of holes and less number of electrons
   b) Only electrons
   c) Only holes
   d) Greater number of electrons and less number of holes

5.
   Symbol represents
   a) NAND gate   b) NOR gate   c) NOT gate   d) XNOR gate

6. Identify the system of crystal structure, if $a = b \neq c$ $\alpha = \beta = 90°$ and $\gamma = 120°$.
   a) Monoclinic   b) Triclinic   c) Hexagonal   d) Rhombohedral

7. This symbol represents

   a) NOT gate   b) OR gate   c) AND gate   d) NOR gate

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8. A semiconductor X is made by doping a germanium crystal with arsenic ($Z = 33$). A second semiconductor Y is made by doping germanium with indium ($Z = 49$). The two are joined end to end and connected to a battery as shown. Which of the following statements is correct
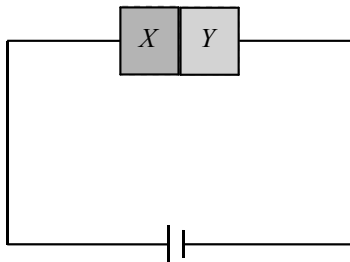
   a) X is P-type, Y is N-type and the junction is forward biased
   b) X is P-type, Y is P-type and the junction is forward biased
   c) X is P-type, Y is N-type and the junction is reverse biased
   d) X is N-type, Y is P-type and the junction is reverse biased

9. The difference in the variation of resistance with temperature in a metal and a semiconductor arises essentially due to the difference in the
   a) Crystal structure
   b) Variation of the number of charge carriers with temperature
   c) Type of bonding
   d) Variation of scattering mechanism with temperature

10. What is the current in the circuit shown below
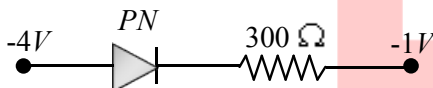
   a) $0\ A$ b) $10^{-2}\ A$ c) $1\ A$ d) $0.10\ A$

11. For a given plate-voltage, the plate current in a triode is maximum when the potential of
   a) The grid is positive and plate is negative   b) The grid is positive and plate is positive
   c) The grid is zero and plate is positive   d) The grid is negative and plate is positive

12. Select the outputs Y of the combination of gates shown below for inputs
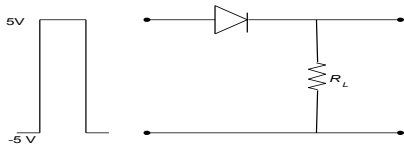 $A = 1, B = 0; A = 1, B = 1$ and $A = 0, B = 0$ respectively
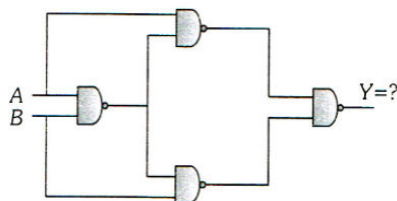
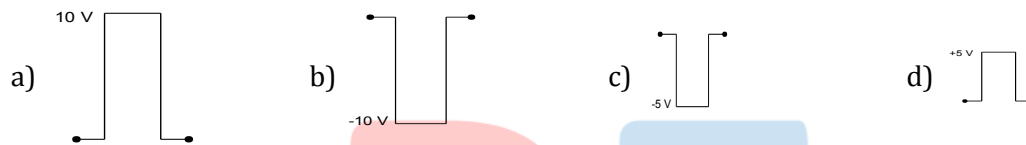   a) (0 1 1)   b) (0 0 1)   c) (1 0 0)   d) (1 1 1)

13. In the circuit shown below, an input of $1V$ is fed into the inverting input of an ideal OP-amplifier. The output signal V_{out} will be
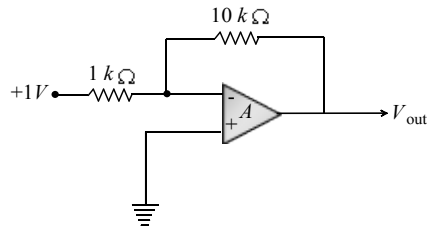
 a) $+10\,V$ b) $-10\,V$ c) $0\,V$ d) Infinity

14. If in a *p-n* junction diode, a square input signal of 10 V is applied as shown
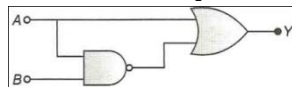

Then the output signal across R_L will be

15. Two diodes have resistance 20 Ω and is centretapped with rms secondary voltage from centre tap to each end of secondary 50 V. If external resistance is 980 Ω. What is mean load?

 a) 0.05 A   b) 45 mA   c) 0.25 A   d) 25 mA

16. What is the output of the combination of the gates shown in the figure?

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

17. A logic gate having two inputs A and B and output C has the following truth table.

A	B	C
1	1	0
1	0	1
0	1	1
0	0	1

It is

 a) An OR gate   b) An AND gate   c) A NOR gate   d) A NAND gate

18. Which of the following is a dichroic crystal

 a) Mica   b) Selenite   c) Quartz   d) Tourmaline

19. The ionic bond is absent in

 a) NaCl   b) CsCl   c) LiF   d) H_2O

20. In a common emitter amplifier the input signal is applied across

 a) Anywhere   b) Emitter-collector   c) Collector-base   d) Base-emitter