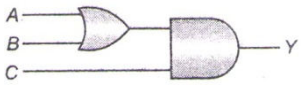
DPP
DAILY PRACTICE PROBLEMS

Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 4**

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

1. For a transistor, the current amplification factor is 0.8. The transistor is connected in common emitter configuration. The charge in the collector current when the base current changes by 6 mA is
   a) 6 mA b) 4.8 mA c) 24 mA d) 8 mA
2. 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
3. In LED visible light is produced by
   a) Gallium phosphide b) Gallium arsenide
   c) Germanium phosphide d) Silicon phosphide
4. A researcher wants an alarm to sound when the temperature of air in his controlled research chamber rises above 40°C or falls below 20°C. The alarm can be triggered by the output of a
   a) AND gate b) NAND gate c) NOT gate d) OR gate
5. A change of 0.8 mA in the anode current of a triode occurs when the anode potential is changed by 10 V. If $\mu = 8$ for the triode, then what change in the grid voltage would be required to produce a change of 4 mA in the anode current
   a) 6.25 V b) 0.16 V c) 15.2 V d) None of these
6. To get an output $Y = 1$ from the circuit shown, the inputs A,B and C must be respectively



   a) 0, 1, 0 b) 1, 0, 0 c) 1, 0, 1 d) 1, 1, 0
7. The Binary Coded Decimal (BCD) equivalent of 429 is
   a) 111001110 b) 010000101001 c) 110101101 d) 0100101001
8. The energy of radiation emitted by LED is
   a) Greater than the band gap of the semiconductor used
   b) Always less than the band gap of the semiconductor used
   c) Always equal to the band gap of the semiconductor used
   d) Equal to or less than the band gap of the semiconductor used

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

Time	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 values 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

10. When the forward bias voltage of a diode is changed from 0.6 V to 0.7 V, the current changes from 5 mA to 15 mA. Then its forward bias resistance is

a) 0.01 Ω b) 0.1 Ω c) 10 Ω d) 100 Ω

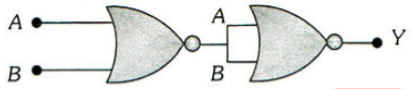
11. To a germanium crystal equal number of aluminium and indium atoms are added. Then

a) It remains an intrinsic semiconductor
b) It becomes a n-type semiconductor
c) It becomes a p-type semiconductor
d) It becomes an insulator

12. A light emitting diode (LED) has a voltage drop of 2 V across it and passes a current of 10 mA. When it operates with 6 V battery through a limiting resistor R, the value of R is

a) 40 kΩ b) 4 kΩ c) 200 Ω d) 400 Ω

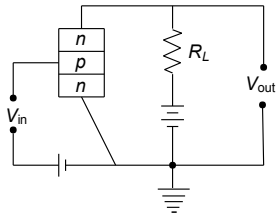
13. In the following circuit, the output Y for all possible inputs A and B is expressed by the truth table



$A \quad B \quad Y$

a) $\begin{vmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \\ 1 & 1 & 1 \end{vmatrix}$ b) $\begin{vmatrix} 0 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{vmatrix}$ c) $\begin{vmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \\ 1 & 1 & 0 \end{vmatrix}$ d) $\begin{vmatrix} 0 & 0 & 0 \\ 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 1 \end{vmatrix}$

14. An $n-p-n-$ transistor circuit is arranged as shown in figure. It is

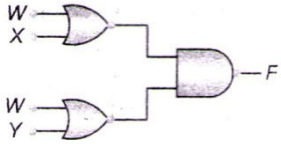


a) A common base amplifier circuit b) A common emitter amplifier circuit
c) A common collector amplifier circuit d) Neither of the above

15. The decimal equivalent of the binary number $(11010.101)_2$ is

a) 9.625 b) 25.265 c) 26.625 d) 26.265

16. The diagram of a logic circuit is given below.



The output F of the circuit is given by

a) $W \cdot (X + Y)$ b) $W \cdot (X \cdot Y)$ c) $W + (X \cdot Y)$ d) $W + (X + Y)$

17. If the ratio of the concentration of electrons 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) $\frac{5}{8}$ b) $\frac{4}{5}$ c) $\frac{5}{4}$ d) $\frac{4}{7}$

18. In the presence of space charge in the diode valve the plate current is 10mA at the plate voltage 50V. Then the plate current at plate voltage 200 V will be

a) 20 mA b) 40 mA c) 80 mA d) None of these

19. The equivalent decimal number of binary number $(11001.001)_2$ is

a) 19.100 b) 19.050 c) 25.250 d) 25.125

20. Let n_e and n_h represent the number density of electrons and holes in a semiconductor. Then

a) $n_e > n_h$ if the semiconductor is intrinsic

b) $n_e < n_h$ if the semiconductor is intrinsic

c) $n_e \neq n_h$ if the semiconductor is intrinsic

d) $n_e = n_h$ if the semiconductor is intrinsic