CHAPTER - 19

SOLIDS AND SEMICONDUCTOR DEVICES

SECTION - I

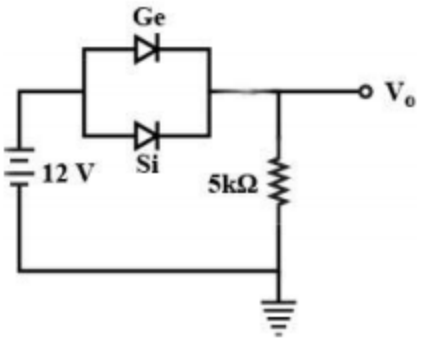
1. 4

2. 2

3.

4. 4

5. B Consider the case when Ge and Si diodes are connected as shown in the given figure



Equivalent voltage drop across the combination Ge and Si diode = 0.3 V

$\Rightarrow$ Current, $i = \frac{12 - 0.3}{5k\Omega} = 2.34mA$

$\therefore$ Output voltage, $V_0 = Ri = 5k\Omega \times 2.34mA = 11.7V$

Now consider the case when diode connection are reversed. In this case voltage drop acorss the diode's combination = 0.7 V

$\Rightarrow$ Current, $i = \frac{12 - 0.7}{5k\Omega} = 2.26mA$

$\therefore$ $V_0 = iR = 2.26mA \times 5k\Omega = 11.3V$

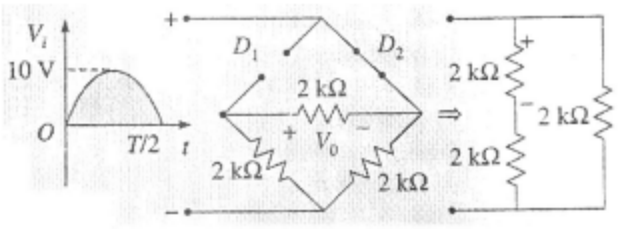
Hence charge in the value of $V_0 = 11.7 - 11.3 = 0.4V$

6. D Vd = 0.5 V, P = 100 mW = 100 x 10^{-3} = 0.1 W; $Rd \frac{Vd^2}{P} = \frac{(0.5)^2}{0.1} = 2.5\Omega$; $Id \frac{Vd}{Rd} = \frac{0.5}{2.5} = 0.2A$;

Total resistance $= \frac{2.5}{0.2} = 12.5\Omega$, R = 12.5 - 2.5 = 10Ω

7. 4

8. B For the positive half cylce of input, the resulting network is shown below:



$$\Rightarrow (V_0)_{max} = \frac{1}{2}(V_i)_{max} = \frac{1}{2}\times 10 = 5V$$

9. C
10. 2
11. 1
12. 3 $i = \frac{V}{R} = \frac{20}{2\times 10^3} = 10\,mA$
13. 2 $R = \frac{\Delta V}{\Delta I} = \frac{2.1-2}{(800-400)\times 10^{-3}} = \frac{1}{4} = 0.25\Omega$
14. 4
15. 4
16. B

A_1	B_1	Y
0	0	1
0	1	1
1	0	1
1	1	0

$Y = \overline{A_1 \odot B_1}$ NAND

17. D $\overline{(A\bullet A)} = \overline{A}$

$\overline{B\bullet B} = \overline{B}$

$\left(\overline{\overline{A}\bullet\overline{B}}\right) = A + B$

OR Gate

18. D Given circuite represent XOR.
19. C
20. D
21. 5
22. 0.02
23. 199
24. 9
25. 25