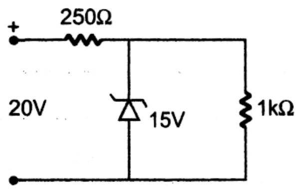
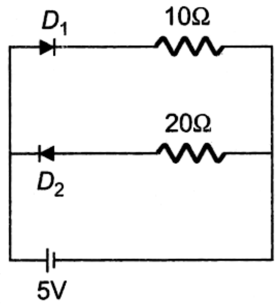
PHYSICS

11. A Zener diode, having breakdown voltage equal to 15 used in a voltage regulator circuit shown in the figure current through the diode is



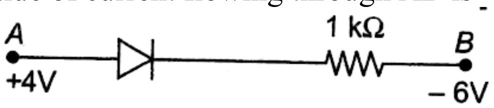
(1) 5 mA (2) 10 mA
(3) 15 mA (4) 20 mA

12. Two ideal diodes are connected to a battery as shown in circuit. The current supplied by the battery is



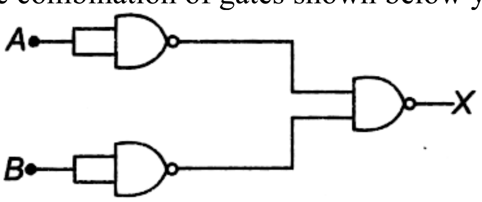
(1) 0.25 A (2) 0.5 A
(3) 0.75 A (4) zero

13. Consider the junction diode as ideal. The value of current flowing through AB is



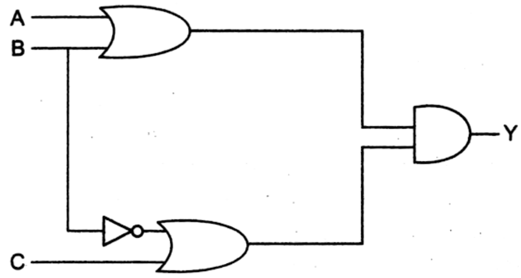
(1) 0 A (2) 10^{-2} A
(3) 10^{-1} A (4) 10^{-3} A

14. The combination of gates shown below yields



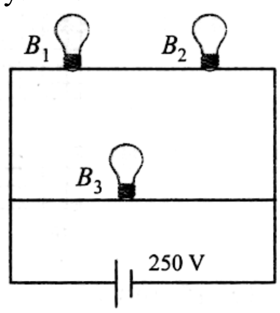
(1) NAND gate
(2) OR gate
(3) NOT gate
(4) XOR gate

15. Find out value of Y



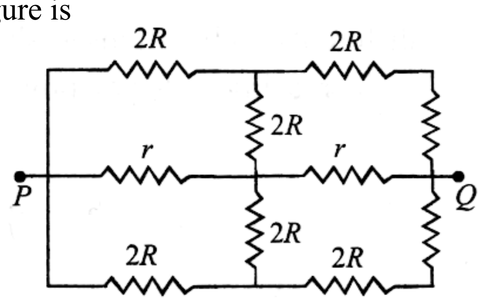
(1) $(\bar{A}+B)\cdot(\bar{B}+C)$
(2) $(A+B)\cdot(\bar{B}+C)$
(3) $(A+\bar{B})\cdot(B+\bar{C})$
(4) $(\bar{A}+B)\cdot(\bar{B}+\bar{C})$

16. A 100 W bulb B_1 and two 60 W bulbs B_2 and B_3, are connected to a 250 V source, as shown in figure. Now W_1, W_2 and W_3 are the output powers of the bulbs B_1, B_2 and B_3, respectively. Then



(1) $W_1 > W_2 = W_3$
(2) $W_1 > W_2 > W_3$
(3) $W_1 < W_2 = W_3$
(4) $W_1 < W_2 < W_3$

17. The effective resistance between points P and Q of the electrical circuit shown in the figure is



(1) $\frac{2Rr}{R+r}$ (2) $\frac{8R(R+r)}{3R+r}$

(3) $2r + 4R$ (4) $\frac{5R}{2}+2r$

18. A piece of copper and another of germanium are cooled from room temperature to 80 K. The resistance of
    (1) each of them increases
    (2) each of them decreases
    (3) copper increases and germanium decreases
    (4) copper decreases and germanium increases.

19. The temperature coefficient of resistance of a wire is 0.00125 per °C. At 300 K, its resistance is 1 Ω. This resistance of the wire will be 2 Ω at
    (1) 1154 K (2) 1100 K
    (3) 1400 K (4) 1127 K

20. A copper rod of cross-sectional area A carries a uniform current I through it. At temperature T, if the volume charge density of the rod is ρ, how long will the charges take to travel a distance d?
    (1) $\frac{\rho dA}{I}$ (2) $\frac{\rho dA}{IT}$
    (3) $\frac{2\rho dA}{I}$ (4) $\frac{2\pi dA}{IT}$