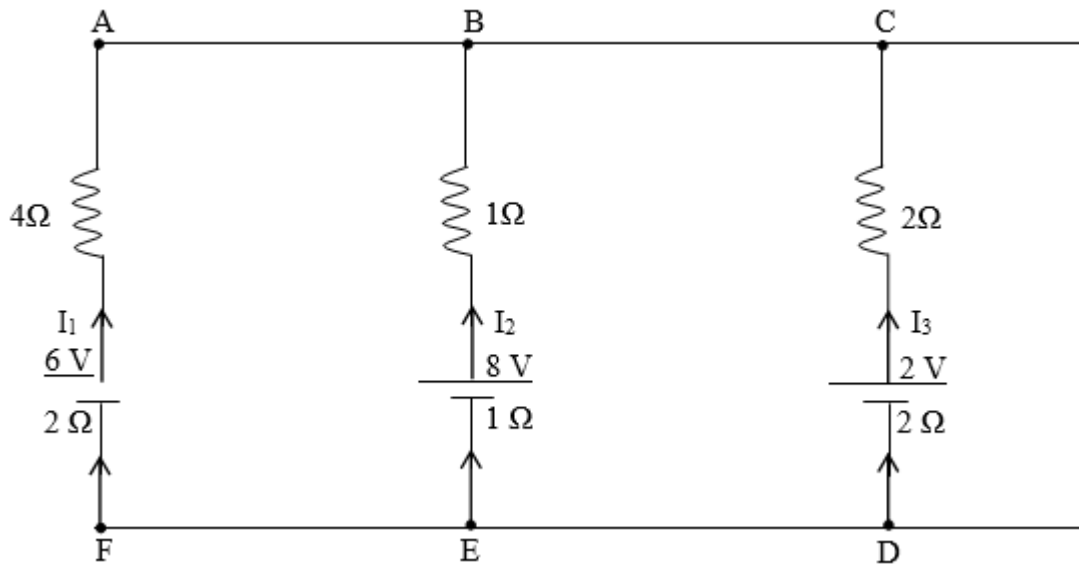


ISC Class 12 Physics Important Questions

1. Show how you will obtain an AND gate using only NOR gates. Draw the truth table for this arrangement of gates.
2. For a common emitter transistor amplifier, the audio signal voltage across the collector resistance (r_c) of $2\text{ k}\Omega$ is 2 V . If the current amplification factor (β) of the transistor is 100 , calculate the input signal voltage (V_{BE}) and base current (I_B) for base resistance of $1\text{ k}\Omega$.
3. For a transistor in a common emitter mode, draw labelled graph to show:
 - a. Input characteristic curve.
 - b. Output characteristic curve.
 - c. Transfer characteristic curve.
4. Draw a neat and labelled diagram of an experimental setup of Young's double slit experiment to study the interference of light and show that: $\beta = \frac{\lambda D}{d}$
Where the terms have their usual meaning. Show intensity variation in the interference.
5. Draw a labelled ray diagram of an image formed by a compound microscope with final image formed at the least distance of distinct vision (D). Derive an expression for its magnifying power (in terms of V_o , U_o , f_e and D).
6. An 8 H inductor, a $2\text{ }\mu\text{F}$ capacitor and a $100\text{ }\Omega$ resistor are connected in series to an A.C. supply of 220 V and 50 Hz . Calculate:
 - a. Impedance of the circuit.
 - b. Current flowing through the circuit.
 - c. Phase difference between the current and the supply voltage.
 - d. Average power consumed by the circuit.
7. With reference to a semiconductor diode, define the terms 'depletion region' and 'potential barrier'. How will the width of depletion region change during reverse biasing?
8. When a ray of ordinary light is incident on the surface of separation of two media at polarizing angle, show with the help of a labelled diagram that reflected ray and the refracted ray are mutually perpendicular to each other.
9. Derive $R = 2f$ for a spherical mirror, where the symbols have their usual meaning.

10. Using Kirchoff's laws of electrical networks, calculate the currents I_1 , I_2 and I_3 in the circuit shown below



11. A parallel plate capacitor is charged by a battery; which is then disconnected. A dielectric slab is now introduced between the two plates to occupy the space completely. State the effect on the following:
 - a. The capacitance of the capacitor.
 - b. Potential difference between the plates.
 - c. The energy stored in the capacitor.
12. Obtain an expression for electric potential 'V' due to a point charge 'Q' at a distance r.
13. Using Gauss' theorem, obtain an expression for intensity of electric field 'E' at a point, which is at a distance „r“ ($r > R$) from the centre „C“ of a thin spherical shell (of radius R) carrying charge „Q“.
14. Name essential components of a communication system. Draw its block diagram.
15. What is meant by 'binding energy per nucleon' of a nucleus? State its physical significance.
16. Draw energy level diagram for Hydrogen atom showing at least four lowest energy levels. Show the transitions responsible for emission of Balmer series.
17. Plot a labelled graph of maximum kinetic energy of photo electrons versus frequency of incident radiation. State how you will obtain the value of Planck's constant „h“ from the graph.
18. What is meant by dispersive power? Write an expression of dispersive power in terms of refractive indices.

19. A thin convex lens of focal length 20 cm is kept in contact with a thin concave lens of focal length 15 cm. Find the focal length and the nature of the combination.

20.

- a. What is displacement current?
- b. Which electromagnetic radiation is used to study the crystal structure?

