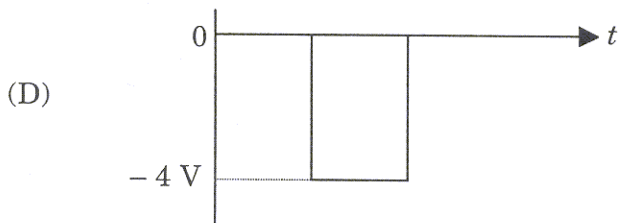
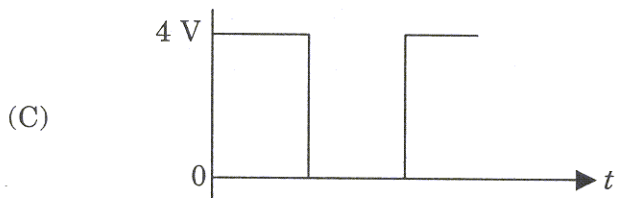
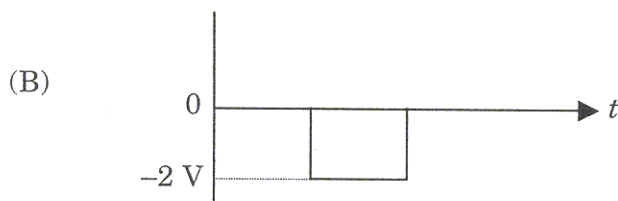
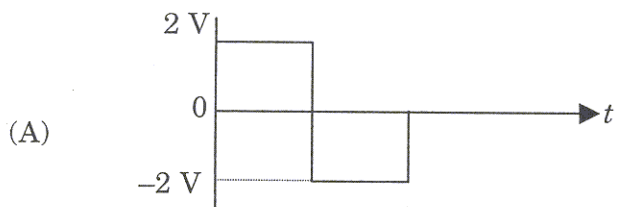
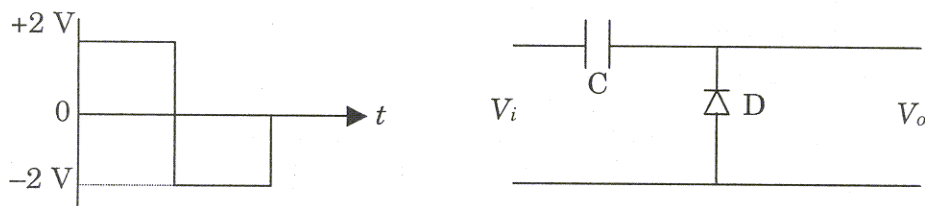


4. The value of entropy at absolute zero of temperature would be
- (A) zero for all the materials
 - (B) finite for all the materials
 - (C) zero for some materials and non-zero for others
 - (D) unpredictable for any material
5. A circuit and the signal applied at its input terminals (V_i) are shown in figure below. Which one of the options correctly describes the output waveform (V_o). (Assume all the devices used are ideal).



6. Consider a beam of light of wavelength λ incident on a system of a polarizer and an analyzer. The analyzer is oriented at 45° to the polarizer. When an optical component is introduced between them, the output intensity becomes zero. (Light is incident normally on all components). The optical component is
- (A) a full-wave plate
 - (B) a half-wave plate
 - (C) a quarter-wave plate
 - (D) an ordinary glass plate
7. A small loop of wire of area $A = 0.01 \text{ m}^2$, $N = 40$ turns and resistance $R = 20 \Omega$ is initially kept in a uniform magnetic field \mathbf{B} in such a way that the field is normal to the plane of the loop. When it is pulled out of the magnetic field, a total charge of $Q = 2 \times 10^{-5} \text{ C}$ flows through the coil. The magnitude of the field \mathbf{B} is
- (A) $1 \times 10^{-3} \text{ T}$
 - (B) $4 \times 10^{-3} \text{ T}$
 - (C) zero
 - (D) unobtainable, as the data is insufficient
8. If M_e , M_p and M_H are the rest masses of electron, proton and hydrogen atom in the ground state (with energy -13.6 eV), respectively, which of the following is exactly true? (c is the speed of light in free space)
- (A) $M_H = M_p + M_e$
 - (B) $M_H = M_p + M_e - \frac{13.6 \text{ eV}}{c^2}$
 - (C) $M_H = M_p + M_e + \frac{13.6 \text{ eV}}{c^2}$
 - (D) $M_H = M_p + M_e + K$, where $K \neq \pm \frac{13.6 \text{ eV}}{c^2}$ or zero