

**Question 3. An electron is moving with an initial velocity  $v = v_0i$  and is in a magnetic field  $B = B_0j$ . Then, its de-Broglie wavelength**

- (a) remains constant**
- (b) increases with time**
- (c) decreases with time**
- (d) increases and decreases periodically**

**Solution:** (a)

From De Broglie hypothesis,

$$\lambda = h/p$$

$$p = mv$$

Since,  $m$  and  $v$  remains constant during motion due to magnetic field. Therefore,  $\lambda$  will be constant.