

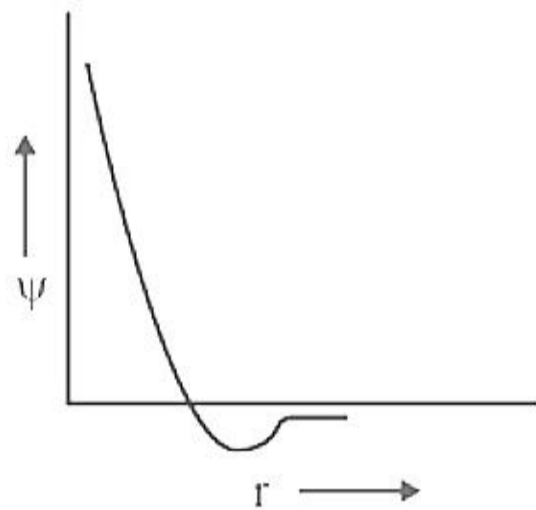
# JEE-Main-29-06-2022-Shift-2 (Memory Based)

## Chemistry

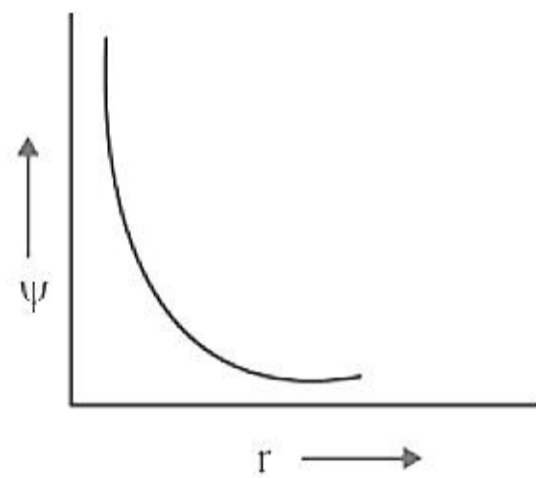
**Question:** Which of the following graph is correct for 2s orbital?

**Options:**

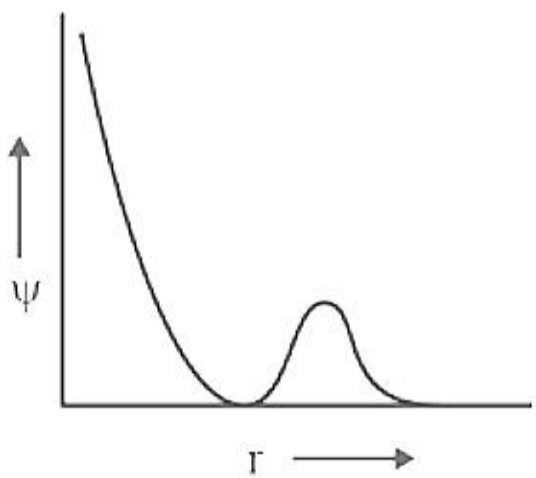
(a)



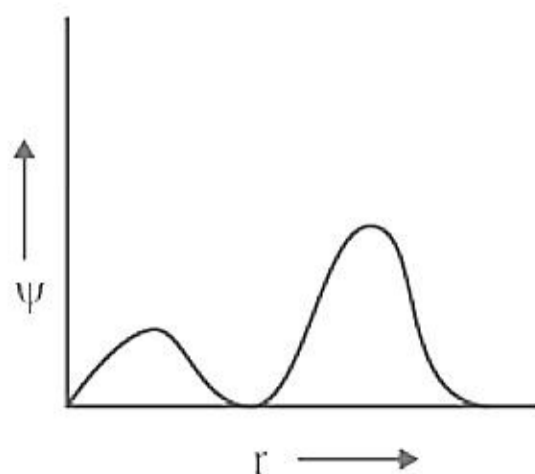
(b)



(c)



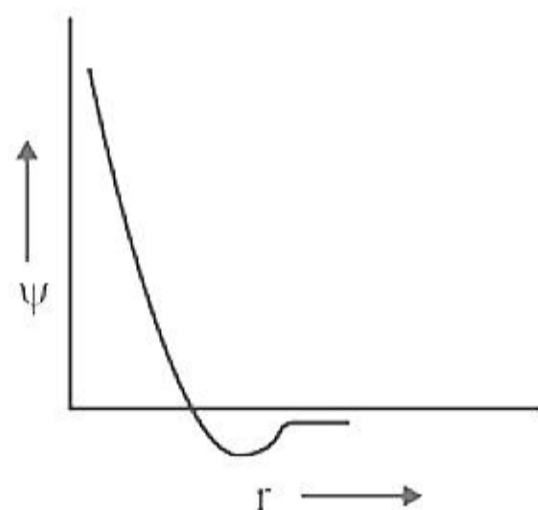
(d)



**Answer:** (a)

**Solution:** 2s orbital has  $n - 1 = 2 - 1 = 1$  node

Correct graph of wavefunction and radius for 2s orbital is



**Question:** Match the following.

Column-I	Column-II
(i) Siderite	(A) $\text{ZnCO}_3$
(ii) Malachite	(B) $\text{ZnS}$
(iii) Sphalerite	(C) $\text{Cu}(\text{OH})_2\text{CuCO}_3$
(iv) Calamine	(D) $\text{FeCO}_3$

**Options:**

- (a) i  $\rightarrow$  C; ii  $\rightarrow$  A; iii  $\rightarrow$  D; iv  $\rightarrow$  B
- (b) i  $\rightarrow$  D; ii  $\rightarrow$  C; iii  $\rightarrow$  A; iv  $\rightarrow$  B
- (c) i  $\rightarrow$  C; ii  $\rightarrow$  B; iii  $\rightarrow$  A; iv  $\rightarrow$  D
- (d) i  $\rightarrow$  D; ii  $\rightarrow$  C; iii  $\rightarrow$  B; iv  $\rightarrow$  A

**Answer:** (d)

**Solution:**

- (i) Siderite  $\Rightarrow \text{FeCO}_3$
- (ii) Malachite  $\Rightarrow \text{Cu}(\text{OH})_2\text{CuCO}_3$
- (iii) Sphalerite  $\Rightarrow \text{ZnS}$

(iv) Calamine  $\Rightarrow$   $\text{ZnCO}_3$

**Question:** The spin only magnetic moment of the compound  $[\text{MnCl}_6]^{4-}$  is

**Options:**

(a) 4.89

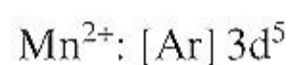
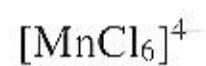
(b) 5.91

(c) 2.83

(d) 1.73

**Answer:** (b)

**Solution:**



Number of unpaired electrons = 5

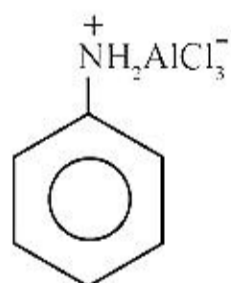
Magnetic moment of the complex

$$\mu = \sqrt{n(n+2)} = \sqrt{35} = 5.91 \text{ B.M.}$$

**Question:** Which of the following product is formed when Friedel craft reaction of aniline takes place?

**Options:**

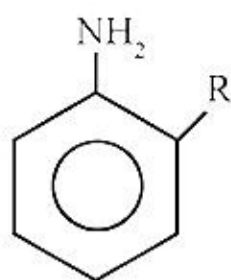
(a)



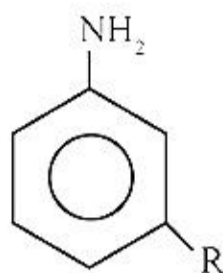
(b)



(c)



(d)



**Answer:** (a)

**Solution:** Aniline acts as Lewis base and reacts with aluminium chloride to form salt. Due to this, nitrogen of aniline acquires positive charge and acts as strong deactivating group.

**Question:** Which of the following species have carbonate ion?

**Options:**

- (a) Washing Soda
- (b) Caustic Soda
- (c) Baking Soda
- (d) All of the above

**Answer:** (a)

**Solution:**

Washing Soda  $\Rightarrow \text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$

Caustic Soda  $\Rightarrow \text{NaOH}$

Baking Soda  $\Rightarrow \text{NaHCO}_3$

**Question:** Dichlorodiphenyltrichloroethane act as:

**Options:**

- (a) Antiseptic
- (b) Disinfectant
- (c) Pesticide
- (d) Water softner

**Answer:** (c)

**Solution:** DDT (dichloro-diphenyl-trichloroethane) is used as pesticide for insect control

**Question:** Consider the following calculation:

$$\frac{0.002858 \times 0.112}{0.5702} = X$$

What is X ?

**Options:**

- (a) 0.00056
- (b) 0.000561
- (c) 0.000563
- (d) 0.0005

**Answer:** (b)

**Solution:**

Number of significant fig in 0.002858 = 4

Number of significant fig in 0.112 = 3

Number of significant fig in 0.5702 = 4

Answer should be in 3 significant figures

$$\frac{0.002858 \times 0.112}{0.5702} = 0.000561$$

**Question:** Which of the following structure of protein does not change its structure on heating?

**Options:**

- (a) Primary
- (b) Secondary
- (c) Quaternary
- (d) Tertiary

**Answer:** (a)

**Solution:** Primary structure of protein is not affected by heat.

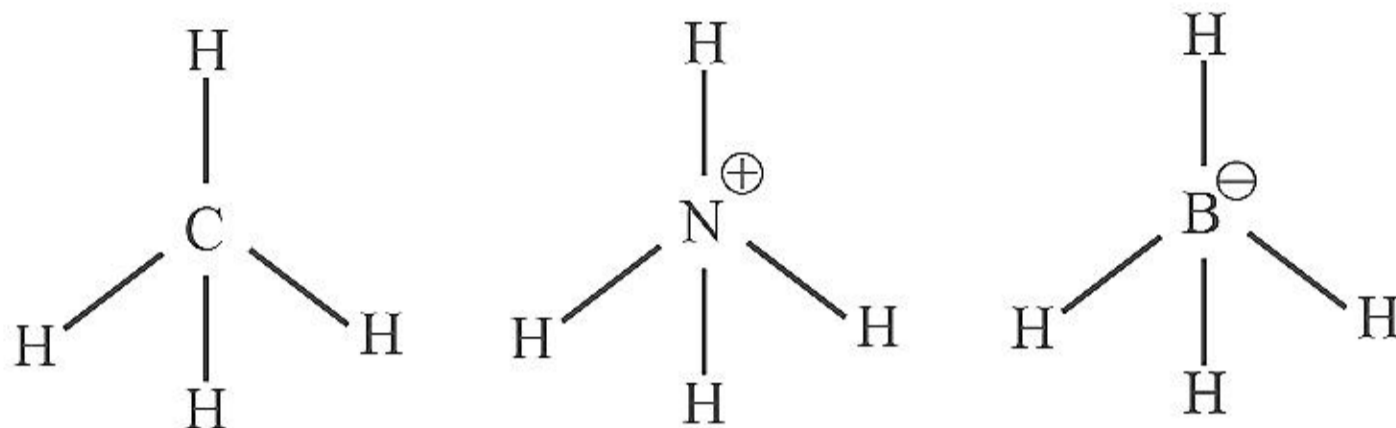
**Question:** CH<sub>4</sub>, NH<sub>4</sub><sup>+</sup>, BH<sub>4</sub><sup>-</sup> which statement is true about them

**Options:**

- (a) They are isoelectronic species
- (b) 2 of them are isoelectronic and all tetrahedral structure
- (c) All are isoelectronic and tetrahedral structure
- (d) All are isoelectronic and 2 are tetrahedral

**Answer:** (c)

**Solution:**



All these are tetrahedral and are isoelectronic. (10 electrons)

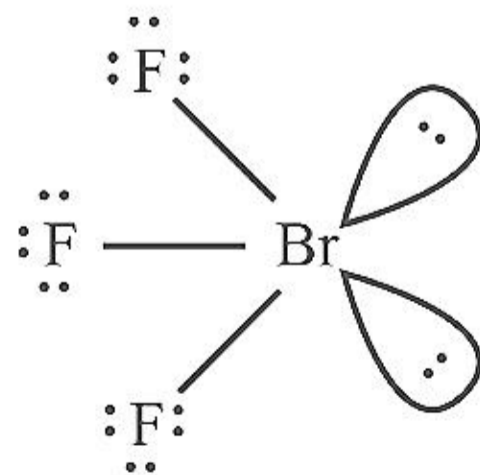
**Question:** The shape and number of lone pairs present in one molecule of BrF<sub>3</sub> are respectively

**Options:**

- (a) Tetrahedral, five
- (b) T-shape, two
- (c) Trigonal planar, zero
- (d) T-shape, eleven

**Answer:** (d)

**Solution:**



**Question:** Common Monomer of Bakelite and Novolac is

**Options:**

- (a) Phenol and formaldehyde
- (b) Caprolactum
- (c) Ethene and phenol
- (d) Formaldehyde and neoprene

**Answer:** (a)

**Solution:** Monomers for both the polymers are phenol and formaldehyde.

**Question:** What is formed by the mixture of Chloroxylenol and terpineol?

**Options:**

- (a) Disinfectant
- (b) Antibiotic
- (c) Antiseptic
- (d) Antacid

**Answer:** (c)

**Solution:** Mixture of chloroxylenol and terpineol is known as Dettol. It acts as an antiseptic

**Question:** Find the volume in  $\text{cm}^3$  at standard temperature and pressure. Given 16 g of Hydrogen and 128 g of oxygen and value of R is  $0.0821 \text{ L atm mol}^{-1} \text{ K}^{-1}$

**Answer:** 269000.00

**Solution:**

$$\text{Number of moles of hydrogen} = \frac{16}{2} = 8 \text{ moles}$$

$$\text{Number of moles of oxygen} = \frac{128}{32} = 4 \text{ moles}$$

Total number of moles = 12

$$PV = nRT$$

$$V = \frac{nRT}{P} = \frac{12 \times 0.0821 \times 2.23}{1} = 268.9 \text{ L} = 269 \text{ L} = 269000 \text{ cm}^3$$

**Question:** Half life of a radioactive decay is 5 years. The time required to fall the rate of decay to 6.25 % (in years) is

**Answer:** 20.00

**Solution:**

$$N = N_0 \left(\frac{1}{2}\right)^{t/T} \dots(1)$$

$$N = 6.25 \% \text{ of } N_0$$

$$\therefore N = N_0 \times \frac{6.25}{100}$$

$$\text{or } \frac{N}{N_0} = \frac{1}{16}$$

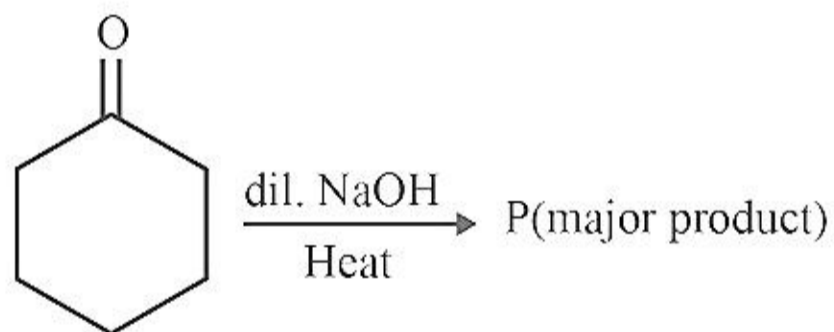
From eq (1)

$$\left(\frac{1}{16}\right) = \left(\frac{1}{2}\right)^{t/5}$$

$$\left(\frac{1}{2}\right)^4 = \left(\frac{1}{2}\right)^{t/5}$$

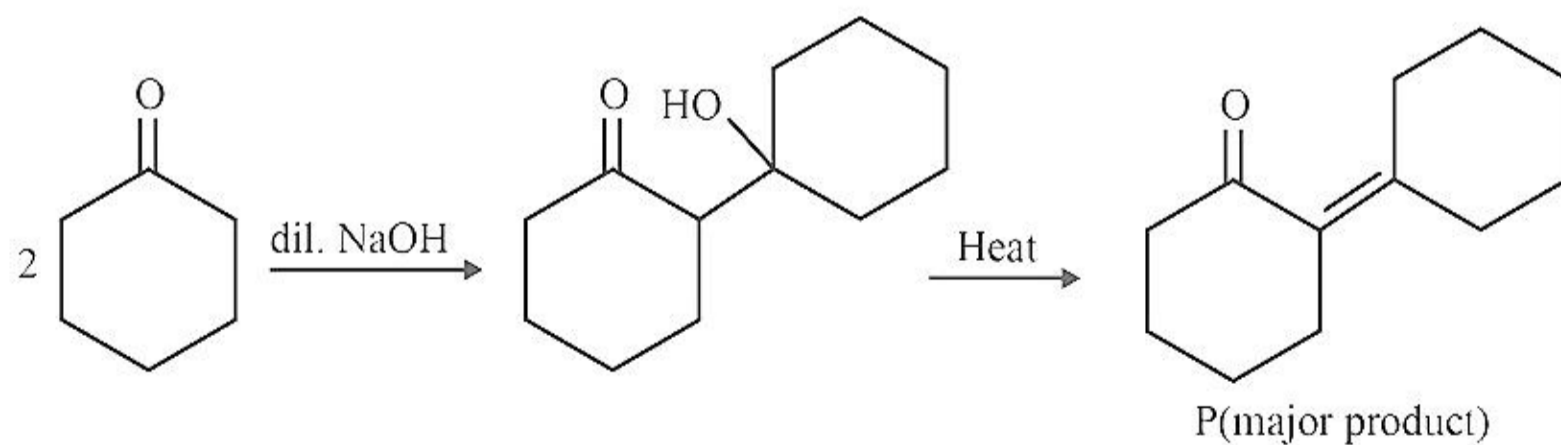
$$t = 20 \text{ years}$$

**Question:** Calculate the number of  $\pi$  bonds in product P.



**Answer:** 2.00

**Solution:**



Number of  $\pi$  bond = 2



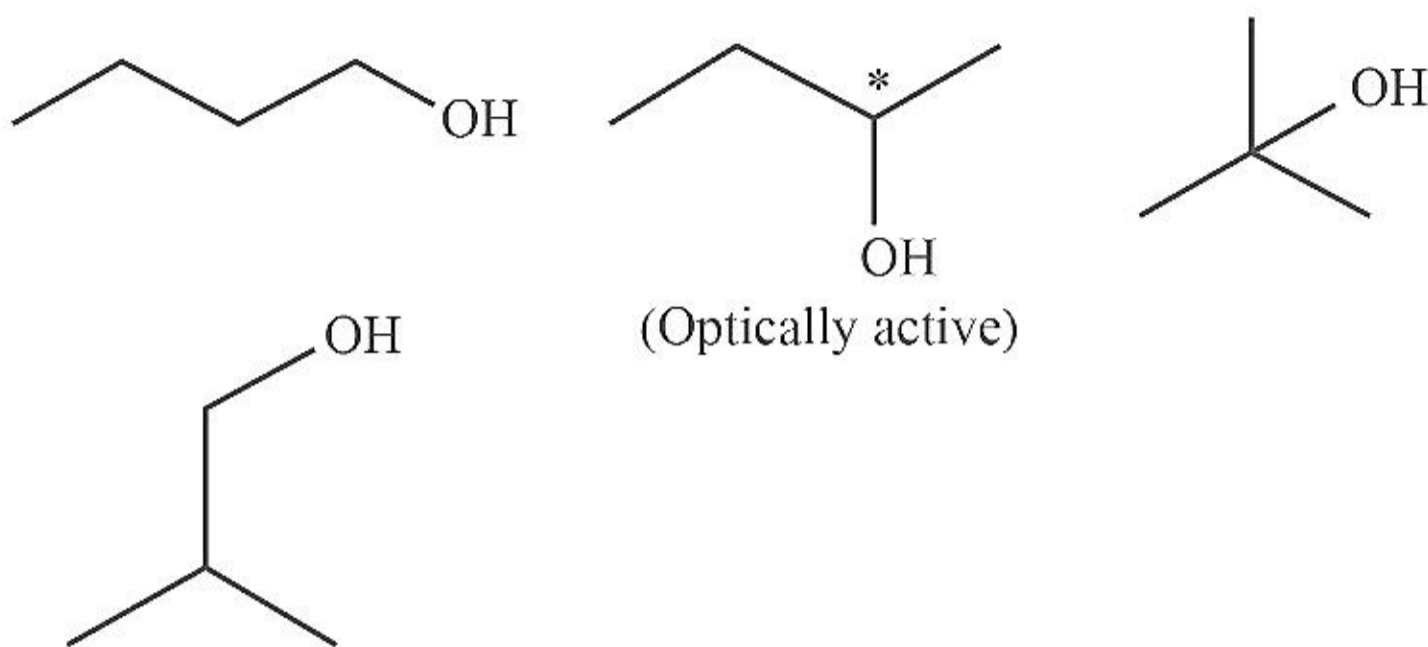
**Question:** How many chiral alcohols have molecular formula  $C_4H_{10}O$  (including stereoisomers)?

**Answer:** 2.00

**Solution:** Molecular formula =  $C_4H_{10}O$

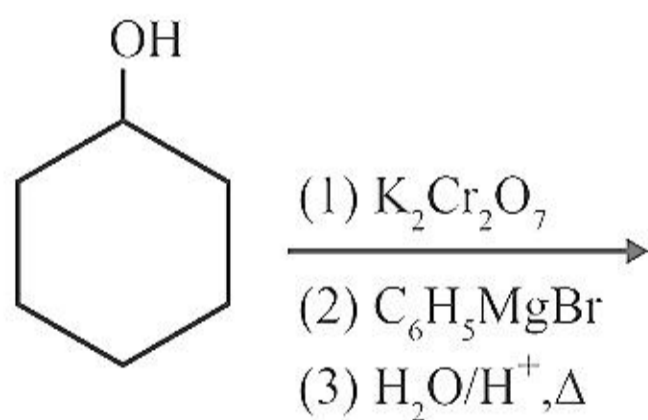
$$\text{Degree of unsaturation} = (C + 1) - \frac{H - X - N}{2} = 5 - \frac{10}{2} = 0$$

Possible alcohols are



Hence only one optically active alcohol so number of chiral alcohols is 2

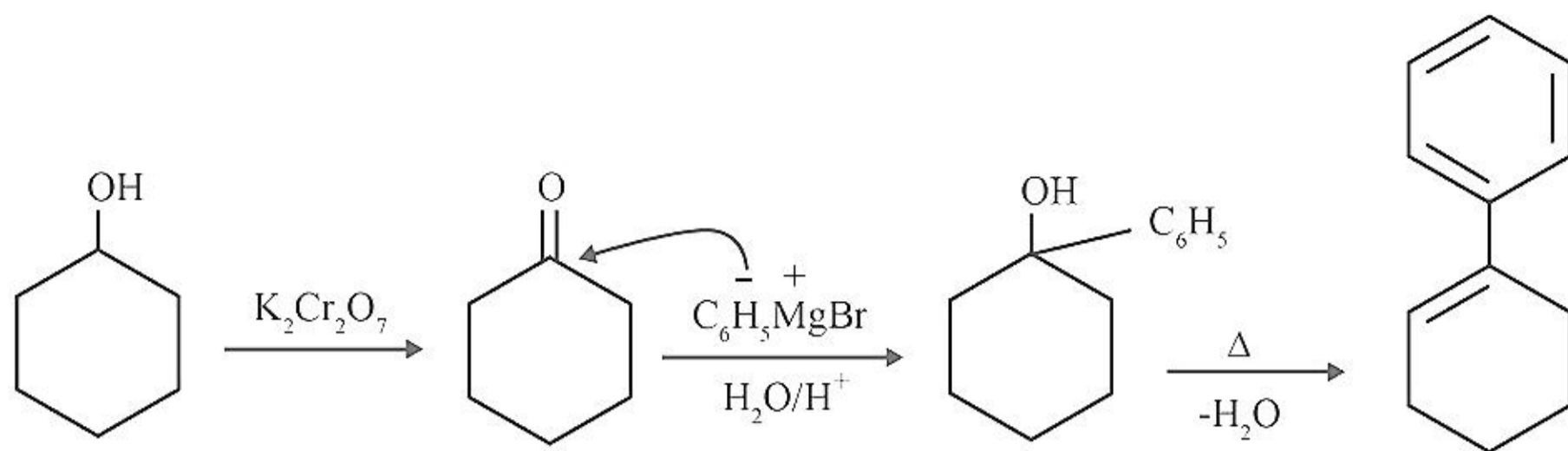
**Question:**



Number of  $sp^2$  hybridised carbon are

**Answer:** 8.00

**Solution:**



Number of  $\text{sp}^2$  hybridised carbon are 8