

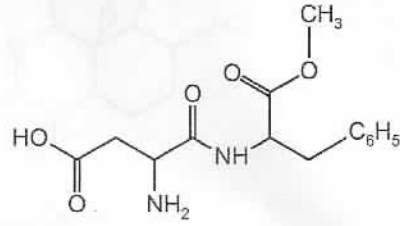
24. O/N 15/P13/Q20, O/N 15/P11/Q20, M/J 12/P13/Q23, M/J 12/P11/Q24

How many isomeric esters have the molecular formula $C_4H_8O_2$?

A 2 B 3 C 4 D 5

25. M/J 15/P13/Q27

The compound *aspartame* is widely used as a sweetener in 'diet' soft drinks.



aspartame

Aspartame is chiral. (There are no chiral carbon atoms in C_6H_5)

How many chiral carbon atoms are present in a molecule of aspartame?

A 1 B 2 C 3 D 4

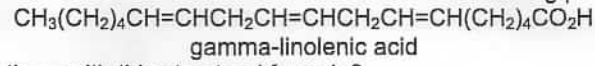
26. O/N 15/P12/Q21

Which compound shows optical isomerism?

A 2-chloropropane B 1,2-dichloropropan
e C 1,3-dichloropropan D 2,2-dichloropropan
e

27. O/N 14/P13/Q25

The compound known as 'gamma-linolenic acid' is found in the seeds of the evening primrose plant.



How many cis-trans isomers are there with this structural formula?

A 3 B 6 C 8 D 12

28. O/N 14/P13/Q20

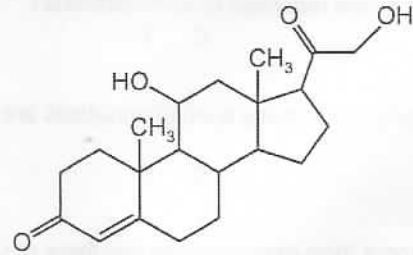
In this question, structural isomerism and stereoisomerism should be considered.

How many isomeric aldehydes have the formula $C_5H_{10}O$?

A 3 B 4 C 5 D 6

29. O/N 14/P12/Q26, O/N 14/P11/Q26

Corticosterone is a hormone involved in the metabolism of carbohydrates and proteins.



corticosterone

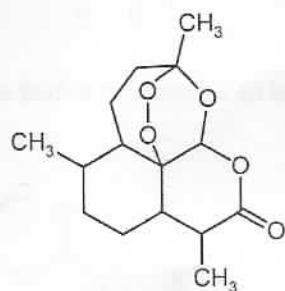
How many chiral centres are there in one molecule of corticosterone?

A 5 B 6 C 7 D 8

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30. M/J 14/P12/Q30

Artemisinin is a powerful anti-malarial drug.



artemisinin

How many chiral centres are there in each molecule of artemisinin?

- A 4 B 6 C 7 D 8

31. M/J 14/P11/Q24

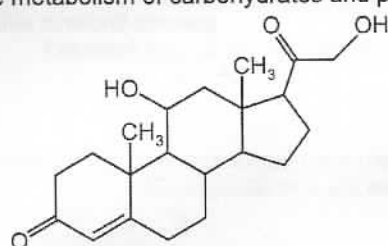
There are three structural isomers with the formula C_5H_{12} .

Which formulae correctly represent these three structural isomers?

- | | | | |
|---|------------------------|------------------------|-------------------------|
| A | $CH_3CH_2CH_2CH_2CH_3$ | $CH_3CH_2CHCH_3CH_3$ | $CH_3CH_2C(CH_3)_2CH_3$ |
| B | $CH_3CH_2CH_2CH_2CH_3$ | $CH_3CH_2(CH)CH_3CH_3$ | $C(CH_3)_4$ |
| C | $CH_3CH_2CH_2CH_2CH_3$ | $CH_3CH(CH_3)CH_2CH_3$ | $CH_3C(CH_3)_2CH_3$ |
| D | $CH_3CH_2CH_2CH_2CH_3$ | $CH_3CH(CH_3)CH_2CH_3$ | $CH_3CH_2CH(CH_3)CH_3$ |

32. O/N 14/P11/Q26

Corticosterone is a hormone involved in the metabolism of carbohydrates and proteins.



corticosterone

How many chiral centres are there in one molecule of corticosterone?

- A 5 B 6 C 7 D 8

33. O/N 13/P13/Q24

Including structural and stereoisomers, how many isomeric products are produced when alcoholic KOH reacts with 2-chlorobutane?

- A 1 B 2 C 3 D 4

34. O/N 13/P13/Q21

Including structural and stereoisomers, how many isomers are there of $C_2H_2Br_2$?

- A 2 B 3 C 4 D 5

35. M/J 13/P13/Q22

How many isomers, including structural and stereoisomers, with the formula C_4H_6 have structures that involve π bonding?

- A 1 B 2 C 3 D 4

36. O/N 13/P12/Q23, O/N 13/P11/Q23

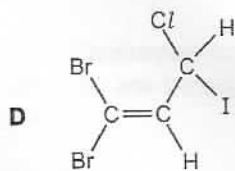
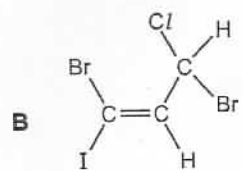
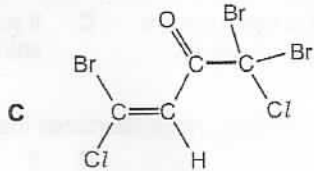
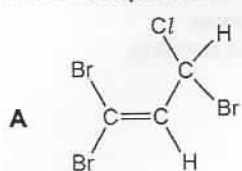
Which compound exhibits stereoisomerism?

- A $CH_3CHClCH_3$ B $CH_3CHClCH_2Cl$ C $CH_3CCl_2CH_3$ D $CH_2ClCH_2CH_2Cl$

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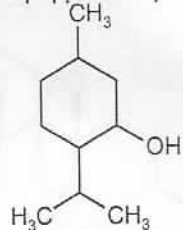
37. M/J 13/P11/Q20

The following compounds are found in the seaweed *Asparagopsis taxiformis*. Which compound could show **both** cis-trans isomerism and optical isomerism?



38. O/N 12/P12/Q22, O/N 12/P11/Q22

Menthol is an important compound extracted from the peppermint plant.



menthol

How many chiral centres are there in one molecule of menthol?

- A 1 B 2 C 3 D 4

39. O/N 12/P12/Q23, O/N 12/P11/Q23

The cracking of a single hydrocarbon molecule, C_nH_{2n+2} , produces two hydrocarbon molecules only. Each hydrocarbon product contains the same number of carbon atoms in one molecule. Each hydrocarbon product has non-cyclic structural isomers. What is the value of n ?

- A 4 B 6 C 8 D 9

40. O/N 12/P11/Q21, O/N 12/P12/Q21

An alkene has the formula $CH_3CH = CRCH_2CH_3$ and does **not** possess *cis-trans* isomers. What is R?

- A H B Cl C CH_3 D C_2H_5

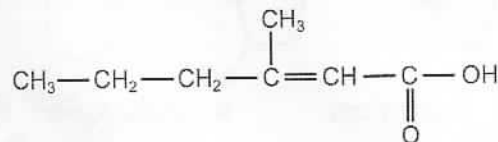
41. M/J 12/P11/Q25, M/J 12/P13/Q26

Which compound, on reaction with hydrogen cyanide, produces a compound with a chiral centre?

- A CH_3CHO B $CH_3CH_2COCH_2CH_3$ C $CH_3CO_2CH_3$ D $HCHO$

42. O/N 11/P13/Q26, O/N 11/P11/Q28

An unpleasant smelling chemical produced in the human armpit is 3-methylhex-2-enoic acid.



If this compound is reacted with a cold, dilute, acidified solution of potassium manganate(VII), how many chiral centres will be produced?

- A 0 B 1 C 2 D 3

43. O/N 11/P12/Q20

Bromine and propene undergo an addition reaction. Which is a property of the product?

- A It exists in *cis-trans* isomers. B It is more volatile than propene. C It possesses a chiral centre. D It possesses hydrogen bonding.

44. M/J 11/P12/Q26

How many isomers with the formula C_5H_{10} have structures that involve π bonding?

- A 3 B 4 C 5 D 6

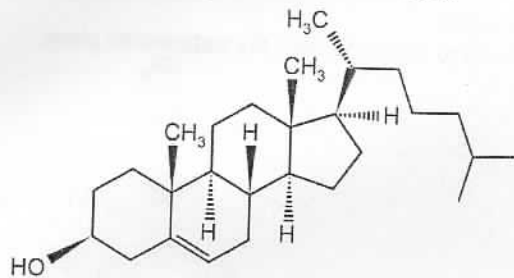
45. M/J 11/P12/Q24

Which compound does **not** show *cis-trans* isomerism?

- A 2-methylpent-2-ene B 3-methylpent-2-ene C 3,4-dimethylhex-3-ene D pent-2-ene

46. M/J 11/P11/Q24, O/N 14/P13/Q29

The diagram shows the structure of the naturally-occurring molecule cholesterol.



cholesterol

Student X claimed that the seventeen carbon atoms in the four rings all lie in the same plane. Student Y claimed that this molecule displays *cis-trans* isomerism at the C=C double bond. Which of the students are correct?

- A both X and Y B neither X nor Y C X only D Y only

47. M/J 11/P11/Q23, M/J 11/P13/Q25

Pentanol, $C_5H_{11}OH$, has four structural isomers that are primary alcohols. How many of these primary alcohols contain a chiral carbon atom?

- A 0 B 1 C 2 D 3

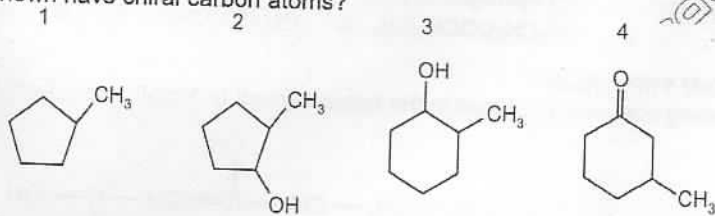
48. M/J 10/P13/Q26, M/J 10/P12/Q28, M/J 10/P11/Q30

Which compound exhibits both *cis-trans* and optical isomerism?

- A $CH_3CH=CHCH_2CH_3$ B $CH_3CHBrCH=CH_2$ C $CH_3CBr=CBrCH_3$ D $CH_3CH_2CHBrCH=CHBr$

49. O/N 10/P12/Q30

Which of the compounds shown have chiral carbon atoms?



- A 1, 2, 3 and 4 B 1 and 4 only C 2 and 3 only D 2, 3 and 4 only

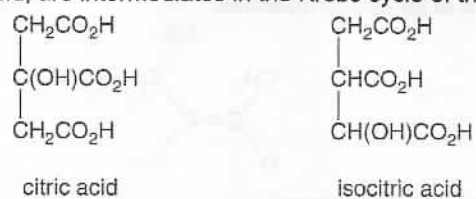
50. O/N 10/P12/Q20

How many structural isomers are there of trichloropropane, $C_3H_5Cl_3$?

- A 3 B 4 C 5 D 6

71. M/J 03/P1/Q21

The isomers, citric acid and isocitric acid, are intermediates in the Krebs cycle of the oxidation of glucose in living cells.



How many chiral centres does each acid possess?

	citric acid	isocitric acid
A	0	1
B	0	2
C	1	1
D	1	2

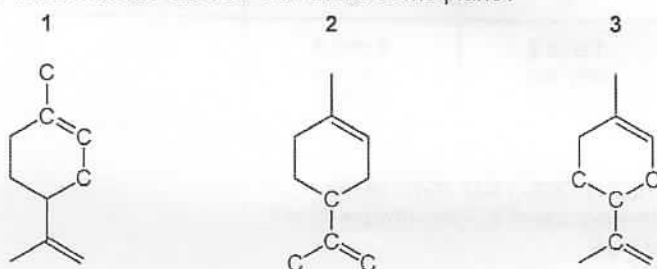
72. M/J 02/P1/Q21

What is the total number of different chloroethanes (formula $\text{C}_2\text{H}_{6-n}\text{Cl}_n$, where n can be any integer from 1 to 6)?

- A** 6 **B** 8 **C** 9 **D** 10

73. M/J 15/P12/Q37

In which structures do the four carbon atoms labelled C lie in the same plane?

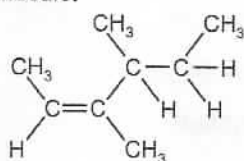


A	B	C	D
1, 2 and 3 are correct	1 and 2 only are correct	2 and 3 only are correct	1 only is correct

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74. M/J 15/P11/Q37

The diagram shows the structure of an alkene molecule.



Which statements about this molecule are correct?

- 1 All the carbon atoms are in the same plane.
- 2 It has geometrical isomers.
- 3 It is optically active.

A	B	C	D
1, 2 and 3 are correct	1 and 2 only are correct	2 and 3 only are correct	1 only is correct

75. M/J 12/P12/Q38

What are the same for a pair of optical isomers?

- 1 their empirical formula
- 2 their functional groups
- 3 their structural formula

A	B	C	D
1, 2 and 3 are correct	1 and 2 only are correct	2 and 3 only are correct	1 only is correct

76. M/J 10/P13/Q37, M/J 10/P12/Q39, | M/J 10/P11/Q38

Which structural formulae represent 2,2-dimethylpentane?

- 1 $(\text{CH}_3)_2\text{CHCH}_2\text{CH}(\text{CH}_3)_2$
- 2 $(\text{CH}_3)_3\text{CCH}_2\text{CH}_2\text{CH}_3$
- 3 $\text{CH}_3\text{CH}_2\text{CH}_2\text{C}(\text{CH}_3)_3$

A	B	C	D
1, 2 and 3 are correct	1 and 2 only are correct	2 and 3 only are correct	1 only is correct

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