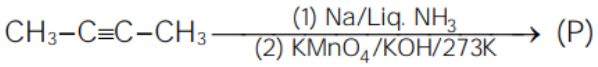
JEE Main 2024 Chemistry Question Paper April 6 Shift 1

1. Total number of O-atoms in the product (P) formed when the compound



(1) 220
(2) 210
(3) 200
(4) 105

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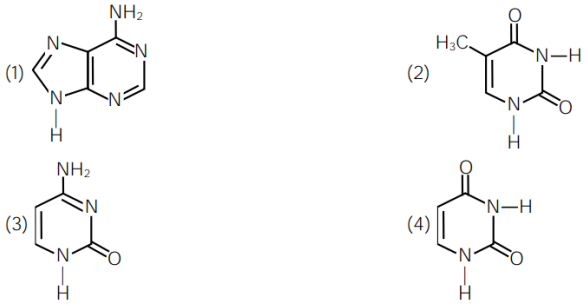
2. Which nitrogenous base is not present in DNA?



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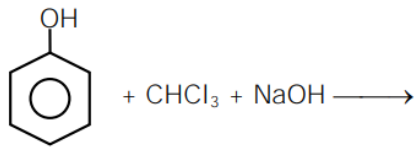
3. In the given reaction, which one is the correct intermediate?



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4. Match the following hybridisations with their structures.

Hybridisations: (P) sp^2d
(Q) sp^3
(R) dsp^2
(S) sp^3d

Structures: (A) Octahedral
(B) Trigonal bipyramidal

(C) Tetrahedral
(D) Square planar

(1) P→A, Q→C, R→D, S→B
(2) P→B, Q→A, R→C, S→D
(3) P→B, Q→D, R→A, S→C
(4) P→C, Q→A, R→D, S→B

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5. Find the sum of magnetic moments (in B.M.) of the basic and amphoteric oxides of chromium: CrO, Cr_2O_3, CrO_3.

(1) 08.77
(2) 05.92
(3) 09.80
(4) 07.30

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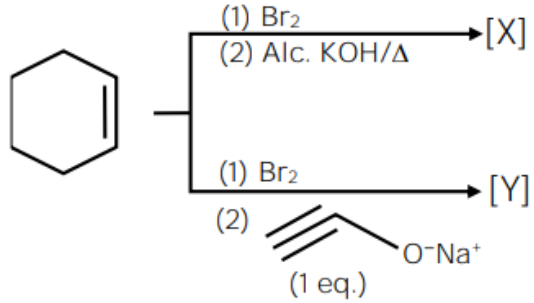
6. For nucleophilic addition reaction, which aldehyde is most reactive?

(1) HCHO
(2) CH_3–CHO
(3) C_2H_5–CHO
(4) C_3H_7–CHO

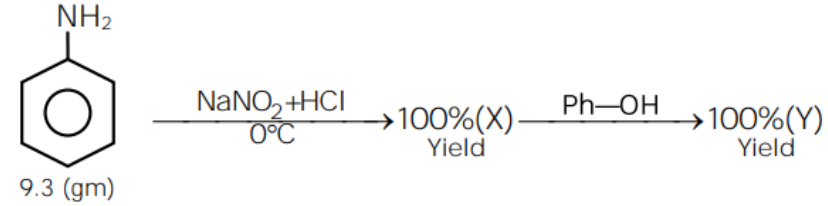
7.



Find the sum of total π-electrons in products [X] and [Y].

(1) 08.00
(2) 06.00
(3) 10.00
(4) 04.00

8.



Find the mass of product (Y).

(1) 19.80 g
(2) 15.60 g
(3) 12.40 g
(4) 09.30 g

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9. Which of the following elements belong to the lanthanide series? Eu, Cm, Cr, Yb, Lu, Cd

(1) Eu, Cm, Cr
(2) Eu, Cr, Cd
(3) Eu, Yb, Lu
(4) Cm, Yb, Lu

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10. Arrange the following complexes in increasing order of wavenumber absorbed:
I: $[Co(CN)_6]^{3-}$
II: $[Co(NH_3)_5Cl]^{2+}$
III: $[Co(NH_3)_6]^{3+}$
IV: $[Co(H_2O)_6]^{2+}$

(1) I ¡ II ¡ III ¡ IV
(2) I ¿ II ¿ III ¿ IV
(3) IV ¿ III ¿ II ¿ I
(4) I ¿ III ¿ II ¿ IV

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11. Match the following:

List–I: (P) CCl_4 (Q) DDT (R) CFC (S) CH_3I

List–II: (A) Antiseptic (B) Refrigerator (C) Insecticide (D) Fire extinguisher

(1) P→A, Q→C, R→D, S→B
(2) P→D, Q→C, R→B, S→A
(3) P→B, Q→D, R→A, S→C
(4) P→A, Q→B, R→D, S→C

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12. Consider the statements:
Statement–I: 2,4,6-Trinitrophenol is known as picric acid.
Statement–II: Phenol can be converted into picric acid by treating with concentrated HNO_3 in presence of phenol–2,4-disulphonic acid.

(1) Both statements are false
(2) Statement–I is false but Statement–II is true
(3) Both statements are true
(4) Statement–I is true but Statement–II is false

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13. Match the following compounds with their structures.

List–I (Compounds): (P) SF_4 (Q) NH_4^+ (R) BrO_3^- (S) BrF_3

List–II (Structures): (A) T-shape (B) See-saw (C) Tetrahedral (D) Pyramidal

(1) P→B, Q→C, R→D, S→A
(2) P→B, Q→A, R→C, S→D
(3) P→B, Q→D, R→A, S→C
(4) P→C, Q→A, R→D, S→B

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14. In the reaction: $KMnO_4 + C_2O_4^{2-} \rightarrow$ (acidic medium) $\rightarrow$ A + B Find the change in oxidation state of Mn.

(1) 5
(2) 4
(3) 3
(4) 6

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15. Match the following compounds with their magnetic/structural properties.

List–I (Compounds): (P) SO_2Cl_2 (Q) NO (R) NO_3^- (S) I_5^-

List–II (Properties): (A) Paramagnetic (B) Diamagnetic (C) Tetrahedral (D) Linear

(1) P→B, Q→A, R→C, S→D
(2) P→A, Q→B, R→C, S→D
(3) P→B, Q→D, R→A, S→C
(4) P→C, Q→A, R→D, S→B

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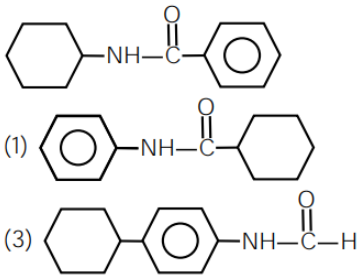
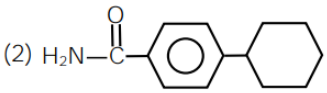
16. Which one is correct metamer of



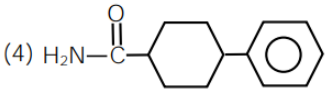
(1)

(2)



(3)

(4)



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17. A NaOH solution has molality = 3 m and density = 1.12 g/mL. Find its molarity.

(1) 3 M
(2) 2 M
(3) 4 M
(4) 1 M

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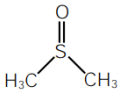
18. Which functional group is present in sulfonic acid?

(1) -SO3H

(2) -SO2H
(3) -SO2
(4) 

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19. Find number of processes in which the electron gain enthalpy is negative.

(A) Al(g) + e$^-$ $->$ $Al^-(g)$
$(B)Be(g) + e^- -> Be^-(g)$
$(C)O(g) + 2e^- -> O^{2-}(g)$
$(D)N(g) + e^- -> N^-(g)$
$(E)Na(g) + e^- -> Na^-(g)$

(1) 01
(2) 02
(3) 03
(4) 00

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20. A gas at 298 K and 5 atm expands adiabatically to 1 atm. Find the final temperature. Given: $C_v = \frac{5}{2}R$.

(1) 230 K
(2) 260 K
(3) 210 K
(4) 270 K

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21. Match the following cations with group reagents.

List–I (Cations): (P) Al^{3+} (Q) Mn^{2+} (R) Pb^{2+} (S) Cu^{2+}

List–II (Group reagents): (A) Dilute HCl (B) H_2S gas with dilute HCl (C) NH_4OH with NH_4Cl (D) H_2S gas with NH_4OH

(1) P→C, Q→D, R→A, S→B
(2) P→B, Q→A, R→C, S→D
(3) P→B, Q→D, R→A, S→C
(4) P→A, B→C, R→D, S→B

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22. Assertion (A): Gallium is used in thermometers. Reason (R): Ga has low melting point but high boiling point.

(1) Both A and R are true; R is correct explanation of A
(2) Both A and R are true; but R is NOT correct explanation of A
(3) A is true; R is false
(4) R is correct; A is false

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23. For a first-order reaction, find the ratio of time for 99.9% completion to 90% completion.

(1) 1
(2) 2
(3) 3
(4) 4

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24. During electrolysis of a dilute solution, if we add water, what happens to molar conductivity?

(1) Increase
(2) Remains unchanged
(3) Decrease
(4) Depends on electrolyte

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25. A sample contains a mixture of helium and oxygen gas. What is the ratio of their root mean square speeds $v_{rms,He} : v_{rms,O_2}$?

(1) $\frac{1}{4}$
(2) $\frac{1}{2\sqrt{2}}$
(3) $\frac{2\sqrt{2}}{1}$
(4) $\frac{1}{32}$

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26. Find the ratio of the shortest wavelength of Balmer series to the shortest wavelength of Lyman series in hydrogen atom.

(1) 4 : 1
(2) 1 : 4
(3) 1 : 2
(4) 2 : 1
