Interactive Practice & Step-by-Step Solutions: Click any question to solve it with timer & full explanation on The Crucible.
Open on The Crucible ↗

Azo Coupling Reactions · JEE Main 2025 · Shift-II
View Solution on Crucible ↗

1. When a concentrated solution of sulphanilic acid and 1-naphthylamine is treated with nitrous acid (273 K) and acidified with acetic acid, the mass (g) of 0.1 mole of product formed is: (Given molar mass in g mol^{-1}: H: 1, C: 12, N: 14, O: 16, S: 32)

(A) 343
(B) 330
(C) 33
(D) 66

Halogenation of Phenols · JEE Main 2022 · Shift-I
View Solution on Crucible ↗

2. Difference in reaction of phenol with bromine in chloroform vs water is due to:

(A) Hyperconjugation in substrate
(B) Polarity of solvent
(C) Free radical formation
(D) Electromeric effect of substrate

Haloform Reaction · JEE Main 2022 · Shift-II
View Solution on Crucible ↗

3. Hex-4-en-2-ol on treatment with PCC gives 'A'. 'A' on reaction with sodium hypoiodite gives 'B', which on further heating with soda lime gives 'C'. The compound 'C' is

(A) 2-Pentene
(B) Proponaldehyde
(C) 2-Butene
(D) 4-Methylpent-2-ene

Denaturation · JEE Main 2024 · Shift-II
View Solution on Crucible ↗

4. Which structure of protein remains intact after coagulation of egg white on boiling?

(A) Primary
(B) Tertiary
(C) Secondary
(D) Quaternary

Basicity of Amides & Heterocycles · JEE Main 2021 · Shift-II
View Solution on Crucible ↗

5. Which of the following is least basic?

(A) $(CH_3CO)NHC_2H_5$
(B) $(C_2H_5)_3N$
(C) $(CH_3CO)_2NH$
(D) $(C_2H_5)_2NH$

Reimer-Tiemann Reaction · JEE Main 2024 · Shift-I View Solution on Crucible ↗

6. Phenol treated with chloroform in presence of sodium hydroxide, which further hydrolysed in presence of an acid results in:

(A) Salicylic acid
(B) Benzene-1, 2-diol (catechol)
(C) Benzene-1, 3-diol (resorcinol)
(D) 2-Hydroxybenzaldehyde (salicylaldehyde)

Boiling Point & Solubility Trends · JEE Main 2024 · Shift-II View Solution on Crucible ↗

7. Which among the following has highest boiling point?

(A) $CH_3CH_2CH_2CH_3$
(B) $CH_3CH_2CH_2CH_2-OH$
(C) $CH_3CH_2CH_2CHO$
(D) $H_3C-O-C_2H_5$

Sucrose · JEE Main 2022 · Shift-II View Solution on Crucible ↗

8. Glycosidic linkage between C_1 of α-glucose and C_2 of β-fructose is found in

(A) Maltose
(B) Sucrose
(C) Lactose
(D) Amylose

Carbylamine Reaction · JEE Main 2021 · Shift-I View Solution on Crucible ↗

9. Compound A is converted to B on reaction with $CHCl_3$ and KOH. The compound B is toxic and can be decomposed by C. A, B and C respectively are:

(A) Primary amine, nitrile compound, conc. HCl
(B) Secondary amine, isonitrile compound, conc. $NaOH$
(C) Primary amine, isonitrile compound, conc. HCl
(D) Secondary amine, nitrile compound, conc. $NaOH$

Grignard + Carbonyls · JEE Main 2024 · Shift-II View Solution on Crucible ↗

10. The final product A, formed in the following reaction sequence is: $Ph-CH=CH_2 \xrightarrow{\text{(i) } BH_3;\ \text{(ii) } H_2O_2,\ OH^-}$ intermediate $\xrightarrow{\text{(iii) HBr; (iv) Mg, ether, then HCHO/H3O+}}$ A

(A) $Ph-CH_2-CH_2-CH_3$
(B) $Ph-CH(CH_3)_2$
(C) $Ph-CH(CH_3)(CH_2OH)$ (branched alcohol)
(D) $Ph-CH_2-CH_2-CH_2OH$ (3-phenylpropan-1-ol)

Aldol Condensation · JEE Main 2025 · Shift-I View Solution on Crucible ↗

11. Both acetaldehyde and acetone (individually) undergo which of the following reactions? A. Iodoform Reaction B. Cannizzaro Reaction C. Aldol Condensation D. Tollens's Test E. Clemmensen Reduction Choose the correct answer from the options given below:

(A) A, B and D Only
(B) A, C and E Only
(C) B, C and D Only
(D) C and E Only

Amino Acid Classification, Names & Codes · JEE Main 2023 · Shift-II View Solution on Crucible ↗

12. The naturally occurring amino acid that contains only one basic functional group in its chemical structure is

(A) arginine
(B) lysine
(C) asparagine
(D) histidine

Reduction of Nitriles & Amides · JEE Main 2020 · Shift-I View Solution on Crucible ↗

13. The most appropriate reagent for conversion of C_2H_5CN into $CH_3CH_2CH_2NH_2$ is:

(A) $NaBH_4$
(B) CaH_2
(C) $Na(CN)BH_3$
(D) $LiAlH_4$

Nomenclature of Alcohols, Phenols & Ethers · JEE Main 2025 · Shift-II View Solution on Crucible ↗

14. The IUPAC name of the following compound is: $HC\equiv C-CH_2-CH(OH)-CH_2-CH=CH_2$

(A) 4-Hydroxyhept-1-en-6-yne
(B) 4-Hydroxyhept-6-en-1-yne
(C) Hept-6-en-1-yn-4-ol
(D) Hept-1-en-6-yn-4-ol

Tollen's Test · JEE Main 2024 · Shift-II View Solution on Crucible ↗

15. Which of the following compounds will give silver mirror with ammoniacal silver nitrate? (A) Formic acid (B) Formaldehyde (C) Benzaldehyde (D) Acetone Choose the correct answer from the options given below:

(A) C and D only
(B) A, B and C only
(C) A only
(D) B and C only

Maltose & Lactose · JEE Main 2021 · Shift-I View Solution on Crucible ↗

16. Which of the glycosidic linkage between galactose and glucose is present in lactose?

(A) $\mathrm{C}-1$ of glucose and $\mathrm{C}-6$ of galactose
(B) $\mathrm{C}-1$ of galactose and $\mathrm{C}-4$ of glucose
(C) $\mathrm{C}-1$ of glucose and $\mathrm{C}-4$ of galactose
(D) $\mathrm{C}-1$ of galactose and $\mathrm{C}-6$ of glucose

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Azo Coupling Reactions · JEE Main 2025 · Shift-II View Solution on Crucible ↗

17. When a concentrated solution of sulphanilic acid and 1-naphthylamine is treated with nitrous acid (273 K) and acidified with acetic acid, the mass (g) of 0.1 mole of product formed is: (Given molar mass in $\mathrm{g\ mol^{-1}}$ H: 1, C: 12, N: 14, O: 16, S: 32)

(A) 343
(B) 330
(C) 33
(D) 66

Effect of Substituents on Acidity · JEE Main 2023 · Shift-II View Solution on Crucible ↗

18. The strongest acid from the following is:

(A) 3-Nitrophenol (m-nitrophenol)
(B) 3-Chlorophenol (m-chlorophenol)
(C) 3-Methylphenol (m-cresol)
(D) Phenol

Haloform Reaction · JEE Main 2025 · Shift-I View Solution on Crucible ↗

19. Number of molecules from below which cannot give iodoform reaction is: Ethanol, Isopropyl alcohol, Bromoacetone, 2-Butanol, 2-Butanone, Butanal, 2-Pentanone, 3-Pentanone, Pentanal and 3-Pentanol

(A) 5
(B) 4
(C) 3
(D) 2

Sucrose · JEE Main 2022 · Shift-II View Solution on Crucible ↗

20. When sugar 'X' is boiled with dilute $\mathrm{H_2SO_4}$ in alcoholic solution, two isomers 'A' and 'B' are formed. 'A' on oxidation with $\mathrm{HNO_3}$ yields saccharic acid whereas 'B' is laevorotatory. The compound 'X' is:

(A) Maltose
(B) Sucrose
(C) Lactose
(D) starch

Basicity in Aqueous Phase · JEE Main 2023 · Shift-I View Solution on Crucible ↗

21. The correct order in aqueous medium of basic strength in case of methyl substituted amines is:

(A) $Me_2NH > MeNH_2 > Me_3N > NH_3$

(B) $Me_2NH > Me_3N > MeNH_2 > NH_3$

(C) $NH_3 > Me_3N > MeNH_2 > Me_2NH$

(D) $Me_3N > Me_2NH > MeNH_2 > NH_3$

Nitration of Phenols · JEE Main 2024 · Shift-I View Solution on Crucible ↗

22. Identify compound (Z) in the following reaction sequence: $C_6H_5Cl + NaOH \xrightarrow{623\ K,\ 300\ atm} X \xrightarrow{HCl} Y \xrightarrow{Conc.\ HNO_3} Z$

(A) 2-Nitrophenol

(B) 2,4-Dinitrophenol

(C) 2,4,6-Trinitrophenol

(D) 4-Nitrophenol

Substituent Effects on Acidity · JEE Main 2023 · Shift-II View Solution on Crucible ↗

23. The descending order of acidity for the following carboxylic acid is: (A) CH_3COOH (B) $F_3C-COOH$ (C) $ClCH_2-COOH$ (D) FCH_2-COOH (E) $BrCH_2-COOH$ Choose the correct answer from the options given below:

(A) D > B > A > E > C

(B) E > D > B > A > C

(C) B > C > D > E > A

(D) B > D > C > E > A

Nucleotide Structure · JEE Main 2025 · Shift-I View Solution on Crucible ↗

24. The carbohydrate "Ribose" present in DNA, is A. A pentose sugar B. present in pyranose form C. in "D" configuration D. a reducing sugar, when free E. in α-anomeric form Choose the correct answer from the options given below:

(A) A, D and E Only

(B) B, D and E Only

(C) A, B and E Only

(D) A, C and D Only

Hofmann Bromamide Reaction · JEE Main 2026 · Shift-I View Solution on Crucible ↗

25. An organic compound (P) on treatment with aqueous ammonia under hot condition forms compound (Q) which on heating with Br_2 and KOH forms compound (R) having molecular formula C_6H_7N. Names of P, Q and R respectively are.

(A) Benzoic acid, benzamide, aniline

(B) Toluic acid, methylbenzamide, 2-methylaniline

(C) Benzoic acid, 4-methylbenzamide, 4-methylaniline.

(D) Phenylethanoic acid, phenylethanamide, benzamine

Reaction with $FeCl_3$ · JEE Main 2024 · Shift-II View Solution on Crucible ↗

26. Phenolic group can be identified by a positive:

(A) Phthalein dye test
(B) Lucas test
(C) Tollen's test
(D) Carbylamine test

Classification & Structure · JEE Main 2024 · Shift-II View Solution on Crucible ↗

27. The molecular formula of second homologue in the homologous series of mono carboxylic acids is _____ .

(A) $C_3H_6O_2$
(B) $C_2H_4O_2$
(C) CH_2O
(D) $C_2H_2O_2$

Glycogen · JEE Main 2022 · Shift-II View Solution on Crucible ↗

28. Animal starch is the other name of:

(A) Amylose
(B) Maltose
(C) Glycogen
(D) Amylopectin

Basicity Order Comparison · JEE Main 2026 · Shift-II View Solution on Crucible ↗

29. The strongest conjugate acid will result from

(A) Aniline ($C_6H_5NH_2$)
(B) p-Anisidine ($4\text{-}CH_3O-C_6H_4-NH_2$)
(C) p-Nitroaniline ($4\text{-}O_2N-C_6H_4-NH_2$)
(D) p-Toluidine ($4\text{-}CH_3-C_6H_4-NH_2$)

Grignard Reagent Basics · JEE Main 2023 · Shift-II View Solution on Crucible ↗

30. $H_3C-CH_2-CH(OH)-CH_3 \xrightarrow{\text{(i) NaI, } H_3PO_4\text{; (ii) Mg, dry ether; (iii) } D_2O}$ Product [X] Product [X] formed in the above reaction is:

(A) $H_3C-CH_2-CHD-CH_3$
(B) $H_3C-CH_2-CH(OH)-CH_3$
(C) $H_3C-H_2C-CH=CH_2$
(D) $H_3C-CH=CH-CH_3$

Answer Key (Q1 to Q30)

Click any question number below to open its exact step-by-step solution on The Crucible ↗

1: (C)	2: (B)	3: (C)	4: (A)	5: (C)	6: (D)	7: (B)	8: (B)	9: (C)	10: (D)
11: (B)	12: (C)	13: (D)	14: (D)	15: (B)	16: (B)	17: (C)	18: (A)	19: (B)	20: (B)
21: (A)	22: (C)	23: (D)	24: (D)	25: (A)	26: (A)	27: (B)	28: (C)	29: (C)	30: (A)

Sample Solution — Question 27 (Correct Option: B)

Open Full Solution on Crucible ↗

Q27. The molecular formula of second homologue in the homologous series of mono carboxylic acids is _____ .

The monocarboxylic acid series starts with the smallest acid, formic acid, $HCOOH$ (CH_2O_2).

Each next member has one more CH_2. So the second member is acetic acid, CH_3COOH, which is $C_2H_4O_2$.

The answer is (b).

• **Watch out:** many students choose (a) $C_3H_6O_2$ because they start the series at acetic acid. Formic acid is the first member. (c) CH_2O is formaldehyde, an aldehyde, not an acid.

Answer: (b)

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