PRE-MEDICAL

# ORGANIC CHEMISTRY

ENTHUSIAST | LEADER | ACHIEVER

## EXERCISE

## Nitrogen Containing Compounds

ENGLISH MEDIUM

## EXERCISE-I (Conceptual Questions) — Build Up Your Understanding

### AMINE

**1.** Among the following which one is not formed in Hoffmann degradation

(1) RNCO (2) $R-\ddot{N}H_2$

(3) $RCO\ddot{N}HBr$ (4) RNC

**AM0001**

**2.** $CH_3CH_2CONH_2 \xrightarrow[Br_2]{NaOH} A$,

Aqueous solution of A
(1) Turns blue litmus to red
(2) Turns red litmus to blue
(3) Does not affect the litmus
(4) Decolourise the litmus

**AM0002**

**3.** Ethanamine can be obtained if the following compound is heated with [KOH + $Br_2$]
(1) Ethanamide (2) Methanamide
(3) Propionamide (4) All the above

**AM0003**

**4.** $CH_3CONH_2 \xrightarrow[I]{P_2O_5} A \xrightarrow[II]{Na/EtOH} B$

Reaction II is called
(1) Clemmensen
(2) Stephen
(3) Mendius
(4) Bouveault–Blanc reduction

**CA0004**

**5.** Tertiary amine is obtained in the reaction :-

(1) Aniline $\xrightarrow{CH_3I} \xrightarrow{CH_3I}$

(2) Aniline $\xrightarrow{CH_3I}$

(3) Nitrobenzene $\xrightarrow{Sn/HCl}$

(4) None of the above

**AM0007**

**6.** $C_2H_5NH_2$ cannot be prepared by the reduction of
(1) $C_2H_5NO_2$ (2) $CH_3CH{=}NOH$
(3) $C_2H_5NC$ (4) $CH_3CN$

**AM0008**

**7.** Gabriel reaction for the synthesis of amines, involves the use of
(1) 1° amide (2) 2° amide
(3) Imides (4) Aliphatic amide

**AM0009**

**8.** Gabriel phthalimide reaction is used in the synthesis of
(1) Primary aromatic amines
(2) Secondary amines
(3) Primary aliphatic amines
(4) Tertiary amines

**AM0010**

**9.** The reaction : [$C_2H_5Br$ + $NH_3$] is in fact an example of
(1) Ammonolysis only
(2) Nucleophilic substitution only
(3) Ammonolysis as well as nucleophilic substitution
(4) None

**HD0011**

**10.** Melting points are normally the highest for
(1) Tertiary amides (2) Secondary amides
(3) Primary amides (4) Amines

**GC0012**

**11.** Solubility of ethylamine in water is due to
(1) Low molecular weight
(2) Ethyl group is present in ethyl alcohol
(3) Formation of H–bonding with water
(4) Being a derivative of ammonia

**GC0013**

**12.** Which of the following compound liberates $CO_2$ when treated with $NaHCO_3$
(1) $CH_3COCH_2NH_2$ (2) $CH_3NH_2$
(3) $(CH_3)_4\overset{\oplus}{N}\overset{\ominus}{O}H$ (4) $CH_3\overset{\oplus}{N}H_3\overset{\ominus}{Cl}$

**PO0014**

**13.** The product obtained by the alkaline hydrolysis of $C_2H_5$—NCO when treated with t–butyl magnesiumbromide, the compound obtained will be
(1) t–butylamine (2) n–butylamine
(3) Isobutane (4) n–butane

**AM0015**

**14.** $C_2H_5NH_2$ → $HNO_2$ → a; $C_6H_5CHO$ → b; NOCl → c; $C_6H_5SO_2Cl$ → d

Which product is a Schiff's base :-
(1) a (2) b (3) c (4) d

**AM0016**

**15.** Acidic nature of amino group is shown by the reaction :-

(1) $R–NH_2 + NOCl \rightarrow RCl + N_2 + H_2O$

(2) $2RNH_2 + 2Na \rightarrow 2RNH.Na + H_2$

(3) $R.CH_2NH_2 + HNO_2 \rightarrow R.CH_2OH + N_2 + H_2O$

(4) $R.NH_2 + HCl \rightarrow \overset{\oplus}{R}\overset{}{N}H_3\ \overset{\ominus}{Cl}$

**AM0017**

**16.** The reagent used in the conversion of $C_2H_5NH_2$ to $C_2H_5Cl$ would be :-

(1) $SO_2Cl_2$ (2) $SOCl_2$

(3) NOCl (4) All

**AM0018**

**17.** Hydrogen attached to nitrogen is released in the reaction :-

(1) $RCONH_2 + NaNH_2$

(2) $RNH_2 + Na$

(3) Both the above

(4) None of the abvoe

**GC0019**

**18.** If primary amines are treated with ketones the product is :-

(1) Urea (2) Guanidine

(3) Amide (4) Schiff's base

**CC0020**

**19.** Reactants of reaction – I are :-

$CH_3CONH_2$, KOH, $Br_2$

Reactants of reaction–II are

$CH_3NH_2$, $CHCl_3$, KOH

The intermediate species of reaction–I and reaction–II are respectively

(1) Carbonium ion, carbene

(2) Nitrene, carbene

(3) Carbene, nitrene

(4) Carbocation, carbanion

**AM0021**

**20.** This compound does not respond to carbylamine reaction :-

(1) $CH_3–\underset{\displaystyle CH_3}{\overset{}{CH}}–NH_2$ (2) $C_2H_5–NH–C_2H_5$

(3) $CH_3–\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{}{C}}}–NH_2$ (4) $CH_3–\underset{\displaystyle NH_2}{\overset{}{CH}}–CH_2–CH_3$

**AM0023**

**21.** Blue litmus can be turned to red by the compound :-

(1) ROH (2) $RNH_2$

(3) $R\overset{\oplus}{N}H_3\ \overset{\ominus}{O}H$ (4) $R\overset{\oplus}{N}H_3\ \overset{\ominus}{Cl}$

**AM0024**

**22.** Which one of the following amine compound gives alcohol with $HNO_2$ ?

(1) N,N–Dimethylaniline (2) Benzylamine

(3) N–methylaniline (4) Aniline

**AM0026**

## ANILINE

**23.** $C_6H_5NH_2 \xrightarrow{Br_2/CCl_4}$ ? The product is :-

(1) Only o– bromoaniline

(2) 2, 4, 6–triboromoaniline

(3) o–and p–bromoaniline

(4) Only p–bromoaniline

**AM0028**

**24.** Reaction $C_6H_5NH_2 + HAuCl_4 \longrightarrow$ $[C_6H_5\overset{\oplus}{N}H_3]\overset{\ominus}{AuCl_4}$ shows ... behaviour of aniline :-

(1) Acidic (2) Neutral

(3) Basic (4) Amphoteric

**GC0031**

**25.** Aniline on treatment with bromine water yields white precipitate of :-

(1) o–Bromoaniline

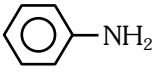
(2) p–Bromonailine

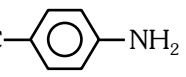
(3) 2, 4, 6–Tribromoaniline

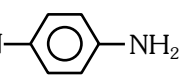
(4) m–Bromoaniline

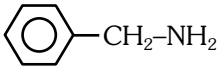
**AH0032**

**26.** Which compound does not show diazo coupling reaction ?

(1) 

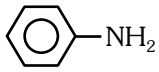
(2) 

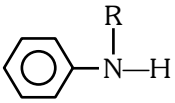
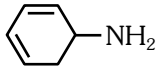
(3) 

(4) 

**AM0033**

**27.** Which of the following amines give N–nitroso derivative with $NaNO_2$ and HCl ?

(1) $C_2H_5NH_2$ (2) 

(3)  (4) 

**AM0034**

**28.** Which of the following does not reduce Tollen's reagent ?

(1) $CH_3CHO$ (2) HCOOH

(3) $C_6H_5NHOH$ (4) $C_6H_5NH_2$

**PO0036**

**29.** Aniline can be obtained by :-

(1) Benzoyl chloride and ammonia

(2) Reduction of benzamide

(3) Phenol and ammonia in presence of $ZnCl_2$

(4) Benzoic anhydride and ammonia

**AM0037**

**30.** Aniline on direct nitration produces :-

(1) o–Nitroaniline

(2) m–Nitroaniline

(3) p–Nitroaniline

(4) All

**AH0038**

**31.** Nitration of acetanilide followed by hydrolysis gives

(1) o–Nitroaniline only

(2) p–Nitroaniline only

(3) o– & p–Nitroaniline

(4) o–Nitroanilinium ion

**AH0039**

**32.** $C_6H_5NH_2 \xrightarrow[0-5°C]{NaNO_2/HCl}$ A, Which is the incorrect structure of the product 'A' ?

(1) $[C_6H_5-N=\overset{\oplus}{N}]\overset{\ominus}{Cl}$

(2) $[C_6H_5\overset{\oplus}{N}_2]\overset{\ominus}{Cl}$

(3) $[C_6H_5-\overset{\oplus}{N}\equiv N]\overset{\ominus}{Cl}$

(4) $[C_6H_5-N\equiv\overset{\oplus}{N}]\overset{\ominus}{Cl}$

**AM0040**

**33.** Chloroform and ethanolic KOH is used as a reagent in the following reaction :-

(a) Hoffmann carbylamine reaction

(b) Hoffmann degradation reaction

(c) Reimer–Tiemann reaction

(d) Hoffmann mustard oil reaction

Code is :-

(1) Only for a (2) Only for a and b

(3) Only for b and d (4) Only for a and c

**AM0041**

**34.** Acetanilide when treated with bromine in acetic acid mainly gives :-

(1) o–Bromoacetanilide

(2) N–Bromoacetanilide

(3) p–Bromoacetanilide

(4) m–Bromoacetanilide

**AH0042**

**35.** Aromatic nitriles (ArCN) are not prepared by reaction

(1) ArX + KCN

(2) $ArN_2^+$ + CuCN

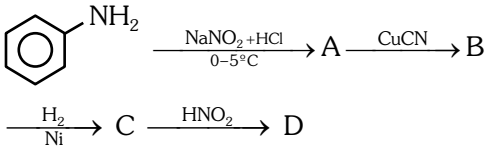
(3) $ArCONH_2 + P_2O_5$

(4) $ArCONH_2 + SOCl_2$

**AM0043**

## NITRO GROUP, CYANIDE & ISOCYANIDE

**36.** Aniline in a set of reactions yielded end product D



The structure of the product D would be

(1) $C_6H_5CH_2OH$ (2) $C_6H_5CH_2NH_2$

(3) $C_6H_5NHOH$ (4) $C_6H_5NHCH_2CH_3$

**AM0044**

**37.** $\phi-X \xrightarrow{NaNO_2/HCl} C_6H_5N_2Cl \xrightarrow[\Delta]{Water} \phi-Y$,

In the above sequence X and Y are :-

(1) o–, p– and m–directing

(2) o–, p– and o–, p–directing

(3) m and m directing

(4) m and o, p directing

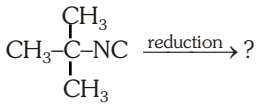
**AM0046**

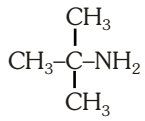
**38.** Which of the following compound gives an explosive on decarboxylation ?
(1) 2,4, 6–Trinitrobenzoicacid
(2) 2, 4–Dinitrobenzoicacid
(3) o–Aminobenzoicacid
(4) o–Hydroxybenzoicacid

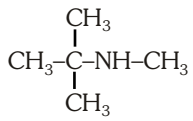
**AM0047**

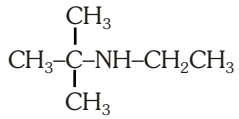
**39.** The gas leaked from a storage tank of the Union Carbide plant in Bhopal gas tragedy was:-
(1) Methylisocyanate
(2) Methylamine
(3) Ammonia
(4) Phosgene

**AM0048**

**40.** 

(1) 

(2) 

(3) 

(4) None

**AM0049**

**41.** Reaction of RCN with sodium and alcohol leads to the formation of :-
(1) $RCONH_2$ (2) $RCOO^-NH_4^+$
(3) $RCH_2NH_2$ (4) $R(CH_2)_3NH_2$

**AM0050**

**42.** $C_6H_5NO_2 \xrightarrow{SnCl_2/HCl} A \xrightarrow[0°C]{NaNO_2/HCl} B$;
Benzene from B, is suitably obtained by using :-
(1) Ethanol (2) $H_3PO_2$
(3) Both the above (4) Methanol

**AM0051**

**43.** Which reagent is used to get iodo benzene from benzene diazonium hydrogen sulphate $[C_6H_5N_2HSO_4]$ :
(1) CuBr, Δ (2) Cu powder + HI
(3) KI, Δ (4) None

**AM0052**

**44.** Which of the following is used as a solvent in the Friedel–Crafts reaction ?
(1) Toluene (2) Nitrobenzene
(3) Benzene (4) Aniline

**AH0053**

**45.** In the Sandmeyer's reaction, —N=N—X group of diazonium salt is replaced by :-
(1) Halide group (2) Nitro group
(3) —OH group (4) $—NHNH_2$ group

**AM0055**

## EXERCISE-I (Conceptual Questions) ANSWER KEY

| Que. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | 4 | 2 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 2 | 2 |
| Que. | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Ans. | 3 | 3 | 4 | 2 | 2 | 4 | 2 | 2 | 3 | 3 | 4 | 3 | 4 | 3 | 4 |
| Que. | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| Ans. | 3 | 4 | 4 | 3 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 3 | 3 | 2 | 1 |

## EXERCISE-II (Previous Year Questions) AIPMT/NEET

### AIPMT 2006

**1.** In a set of reactions propionic acid yielded a compound (D) ;

$CH_3CH_2COOH$ (A) $\xrightarrow{SOCl_2}$ (B) $\xrightarrow[\Delta]{NH_3}$ (C) $\xrightarrow[Br_2]{KOH}$ (D), What is the structure of (D)

(1) $CH_3CH_2CH_2NH_2$ (2) $CH_3CH_2CONH_2$

(3) $CH_3CH_2NHCH_3$ (4) $CH_3CH_2NH_2$

**CA0056**

### AIPMT 2007

**2.** Which one of the following on reduction with $LiAlH_4$ yields a secondary amine ?

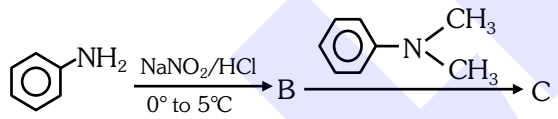
(1) Methyl isocyanide (2) Acetamide

(3) Methyl cyanide (4) Nitro ethane

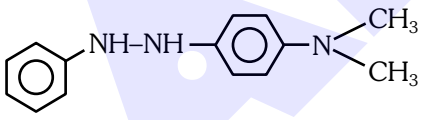
**AM0057**

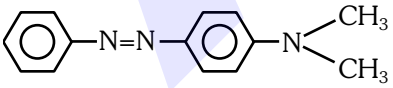
### AIPMT 2008

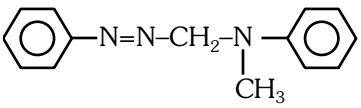
**3.** In a reaction of aniline a coloured product C was obtained.

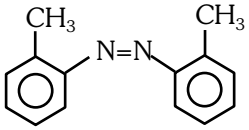



The structure C would be :

(1) 


(2) 

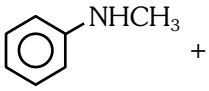

(3) 


(4) 

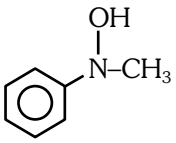

**AM0058**

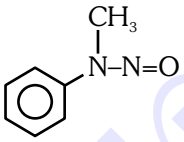
### AIPMT 2009

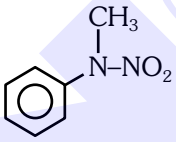
**4.** Predict the product :

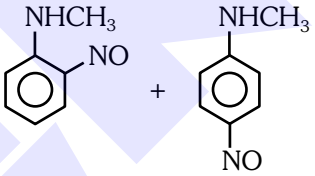


+ $NaNO_2$ + HCl ⟶ Product

(1) 


(2) 


(3) 


(4) 


**AM0059**

### AIPMT 2010

**5.** Which of the following statements about primary amines is 'False' ?

(1) Alkyl amines are stronger bases than ammonia

(2) Alkyl amines are stronger bases than aryl amines

(3) Alkyl amines react with nitrous acid to produce alcohols

(4) Aryl amines react with nitrous acid to produce phenols

**AM0060**

**6.** Acetamide is treated with the following reagents separately. Which one of these would yield methyl amine ?

(1) $PCl_5$

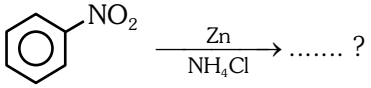
(2) $NaOH/Br_2$

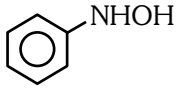
(3) Sodalime

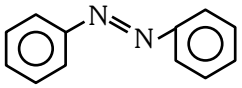
(4) Hot conc. $H_2SO_4$

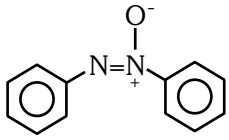
**AM0061**

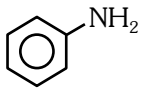
**AIPMT Pre. 2011**

**7.** What is the product obtained in the following reaction :  ..... ?

(1) 

(2) 

(3) 

(4) 

**AM0063**

**AIPMT Mains 2012**

**8.** An organic compound $C_3H_9N$ (A), when treated with nitrous acid, gave an alcohol and $N_2$ gas was evolved. (A) on warming with $CHCl_3$ and caustic potash gave (C) which on reduction gave isopropylmethylamine. Predict the structure of (A):

(1) $CH_3–\underset{\displaystyle CH_3}{\overset{\displaystyle |}{N}}–CH_3$

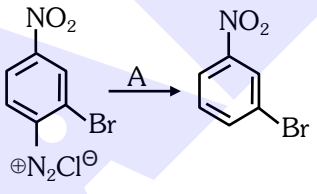
(2) $CH_3CH_2CH_2–NH_2$

(3) $\begin{matrix} CH_3 \\ \diagdown \\ CH_3 \end{matrix}\!\!>\!CH–NH_2$

(4) $CH_3CH_2–NH–CH_3$

**AM0064**

**NEET UG 2013**

**9.** In the reaction  A is

(1) $H^+/H_2O$
(2) $HgSO_4/H_2SO_4$
(3) $Cu_2Cl_2$
(4) $H_3PO_2$ and $H_2O$

**AM0065**

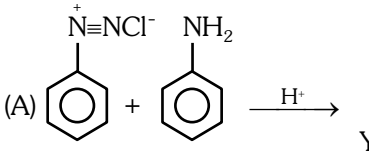
**10.** Nitrobenzene on reaction with conc. $HNO_3/H_2SO_4$ at 80-100°C forms which one of the following products ?

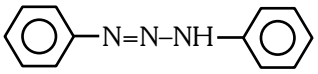
(1) 1, 2, 4-Trinitrobenzene
(2) 1, 2-Dinitrobenzene
(3) 1, 3-Dinitrobenzene
(4) 1, 4-Dinitrobenzene

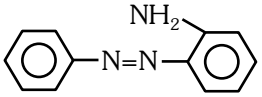
**AH0066**

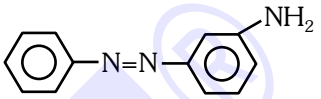
**AIPMT 2014**

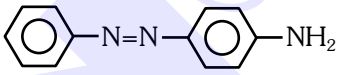
**11.** In the following reaction, the product

 (A) Yellow dye is :-

(1) 

(2) 

(3) 

(4) 

**AM0069**

**12.** Which of the following will be most stable diazonium salt $RN_2^+X^-$ ?

(1) $CH_3N_2^+X^-$ (2) $C_6H_5N_2^+X^-$

(3) $CH_3CH_2N_2^+X^-$ (4) $C_6H_5CH_2N_2^+X^-$

**AM0070**

**AIPMT 2015**

**13.** The electrolytic reduction of nitrobenzene in strongly acidic medium produces :-

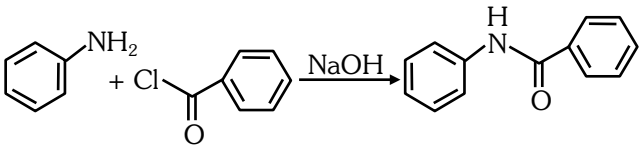
(1) Azoxybenzene (2) Azobenzene

(3) Aniline (4) p-Aminophenol

**AM0071**

**RE-AIPMT 2015**

**14.** The following reaction



is known by the name :

(1) Acetylation reaction
(2) Schotten-Baumann reaction
(3) Friedel–Craft's reaction
(4) Perkin's reaction

**AM0072**

**15.** Method by which Aniline cannot be prepared is:-

(1) reduction of nitrobenzene with $H_2$/Pd in ethanol

(2) potassium salt of phthalimide treated with chlorobenzene followed by hydrolysis with aqueous NaOH solution

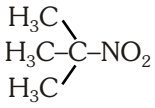
(3) hydrolysis of phenylisocyanide with acidic solution

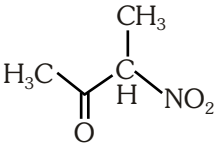
(4) degradation of benzamide with bromine in alkaline solution

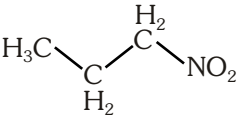
**AM0073**

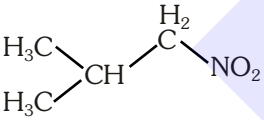
## NEET-II 2016

**16.** Which one of the following nitro-compounds does not react with nitrous acid ?

(1) 

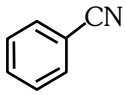
(2) 

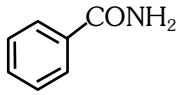
(3) 

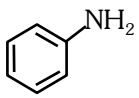
(4) 

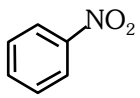
**AM0075**

**17.** A given nitrogen-containing aromatic compound (A) reacts with Sn/HCl, followed by $HNO_2$ to give an unstable compound (B). (B), on treatment with phenol, forms a beatiful coloured compound (C) with the molecular formula $C_{12}H_{10}N_2O$. The structure of compound (A) is :-

(1) 

(2) 

(3) 

(4) 

**AM0076**

## NEET(UG) 2017

**18.** Which of the following reactions is appropriate for converting acetamide to methanamine ?

(1) Hoffmarnn hypobromamide reaction

(2) Stephens reaction

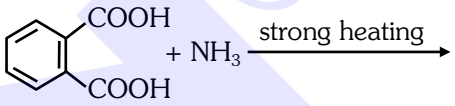
(3) Gabriels phthalimide synthesis

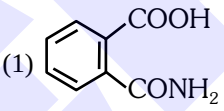
(4) Carbylamine reaction

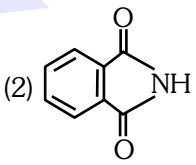
**AM0078**

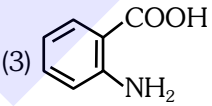
## NEET(UG) 2019

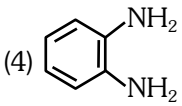
**19.** The major product of the following reaction is :



(1) 

(2) 

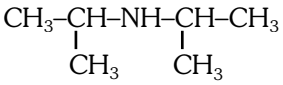
(3) 

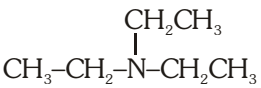
(4) 

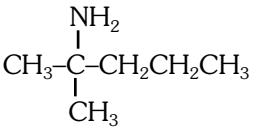
**AM0107**

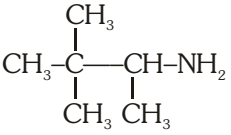
## NEET(UG) 2019 (ODISHA)

**20.** The amine that reacts with Hinsberg's reagent to give an alkali insoluble product is :-

(1) 

(2) 

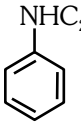
(3) 

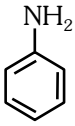
(4) 

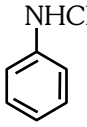
**AM0108**

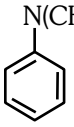
**NEET(UG) 2020**

**21.** Which of the following amine will give the carbylamine test?

(1) 

(2) 

(3) 

(4) 

**AM0130**

**NEET(UG) 2020 (COVID-19)**

**22.** Reaction of propanamide with ethanolic sodium hydroxide and bromine will give

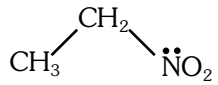
(1) Ethylamine (2) Methylamine

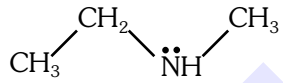
(3) Propylamine (4) Aniline

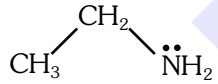
**AM0131**

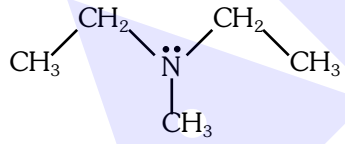
**NEET(UG) 2021**

**23.** Identify the compound that will react with Hinsberg's reagent to give a solid which dissolves in alkali :

(1) 

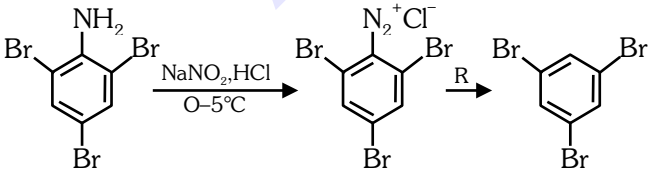
(2) 

(3) 

(4) 

**AM0132**

**24.** The reagent 'R' in the given sequence of chemical reaction is :



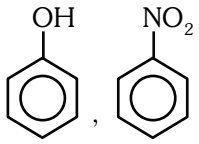
(1) $H_2O$ (2) $CH_3CH_2OH$

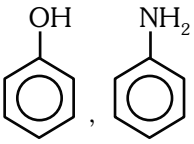
(3) HI (4) CuCN/KCN

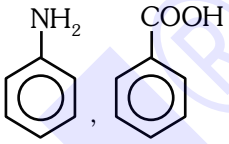
**AM0133**

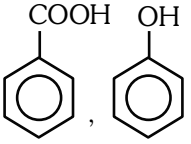
**NEET (UG) 2021(Paper-2)**

**25.** A mixture of organic compound *A* and *B* when dissolve in NaOH, *A* is soluble and its residue *B* gives positive test with $Zn/NH_4Cl$ followed by $AgNO_3$ + $NH_4OH$, (Mulliken's-Barker test). Identify *A* and *B*

(1) 

(2) 

(3) 

(4) 

**AM0134**

**NEET(UG) 2022**

**26.** Given below are two statements :

**Statement I :**

Primary aliphatic amines react with $HNO_2$ to give unstable diazonium salts.

**Statement II :**

Primary aromatic amines react with $HNO_2$ to form diazonium salts which are stable even above 300 K.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both **Statement-I** and **Statement-II** are incorrect.

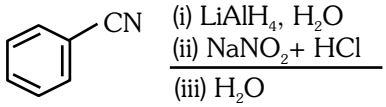
(2) **Statement-I** is correct but **Statement-II** is incorrect.

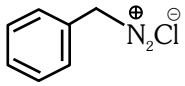
(3) **Statement-I** is incorrect but **Statement-II** is correct.

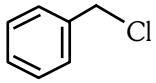
(4) Both **Statement-I** and **Statement-II** are correct.

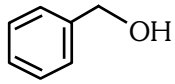
**AM0135**

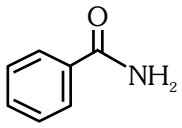
**27.** The product formed from the following reaction sequence is




(1) 


(2) 


(3) 


(4) 


**AM0136**

**NEET(UG) 2022 (Overseas)**

**28.** Match **List-I** with **List-II** :

| **List-I (Amines)** | **List-II ($pK_b$ values)** |
|---|---|
| (a) N-methylmethanamine | (i) 9.30 |
| (b) Ammonia | (ii) 9.38 |
| (c) N-methylaniline | (iii) 4.75 |
| (d) Benzenamine | (iv) 3.27 |

Choose the **correct answer** from the options given below :

(1) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

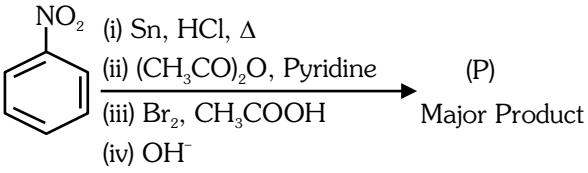
(2) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

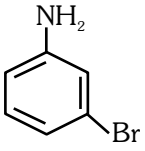
(3) (a)-(i), (b)-(iv), (c)-(iii), (d)-(ii)

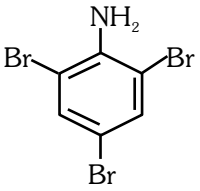
(4) (a)-(iv), (b)-(ii), (c)-(i), (d)-(iii)

**AM0137**

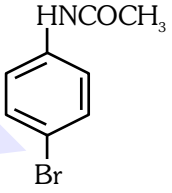
**29.** The major product (P) formed in the following reaction sequence is




(1) 


(2) 


(3) 


(4) 


**AM0138**

**Re-NEET(UG) 2022**

**30.** Match List - I with List - II :

| **List - I (Reaction)** | **List - II (Product fromed)** |
|---|---|
| (a) Gabriel synthesis | (i) Benzaldehyde |
| (b) Kolbe synthesis | (ii) Ethers |
| (c) Williamson synthesis | (iii) Primary amines |
| (d) Etard reaction | (iv) Salicylic acid |

Choose the correct answer from the options given below :

(1) (a) - (iii), (b) - (i), (c) - (ii), (d) - (iv)

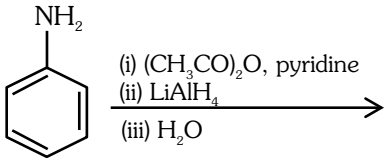
(2) (a) - (ii), (b) - (iii), (c) - (i), (d) - (iv)

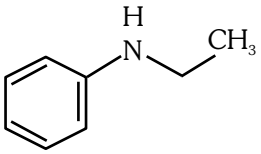
(3) (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii)

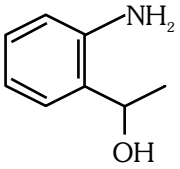
(4) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)

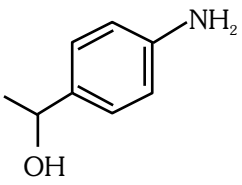
**AM0139**

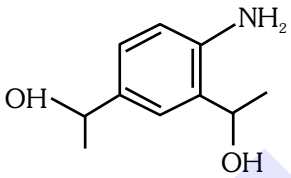
**31.** The product formed from the following reaction sequence is




(1) 


(2) 


(3) 


(4) 


**AM0140**

## EXERCISE-II (Previous Year Questions) ANSWER KEY

| Que. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | **4** | **1** | **2** | **2** | **4** | **2** | **1** | **3** | **4** | **3** | **4** | **2** | **4** | **2** | **2** |
| Que. | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Ans. | **1** | **4** | **1** | **2** | **1** | **2** | **1** | **3** | **2** | **1** | **2** | **3** | **1** | **3** | **4** |
| Que. | 31 | | | | | | | | | | | | | | |
| Ans. | **1** | | | | | | | | | | | | | | |

## EXERCISE-III (Analytical Questions) — Master Your Understanding

**1.** $A \xrightarrow{NH_3} B \xrightarrow{\Delta} C \xrightarrow{Br_2+KOH} CH_3CH_2NH_2$

A is :-

(1) $CH_3COOH$

(2) $CH_3CH_2CH_2COOH$

(3) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOH$

(4) $CH_3CH_2COOH$

**AM0083**

**2.** The correct set of the products obtained in the following reactions

$RCN \xrightarrow{reduction} (A)$ , $RCN \xrightarrow[(ii)H_2O]{(i)CH_3MgBr} (B)$,

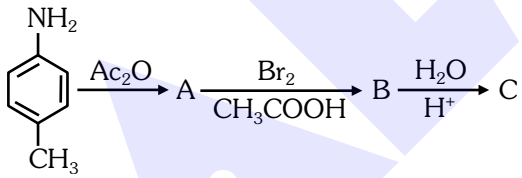
$RNC \xrightarrow{hydrolysis} (C)$, $RNH_2 \xrightarrow{HNO_2} (D)$

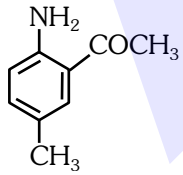
The answer is

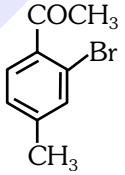
| | A | B | C | D |
|---|---|---|---|---|
| (1) | 2°Amine | Methyl ketone | 1°Amine | Alcohol |
| (2) | 1°Amine | Methyl ketone | 1°Amine | Alcohol |
| (3) | 2°Amine | Methyl ketone | 2°Amine | Acid |
| (4) | 1°Amine | Methyl ketone | 2°Amine | Aldehyde |

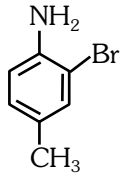
**AM0084**

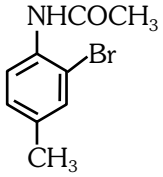
**3.** The final product C, obtained in this reaction would be



(1) 

(2) 

(3) 

(4) 

**AH0085**

**4.** $C_2H_5Br \xrightarrow{AgCN} A \xrightarrow{H_3O^+} HCOOH + B$;

$B \xrightarrow[KOH]{CHCl_3} A \xrightarrow{Reduction} C$

A, B, C respectively in the above sequence are

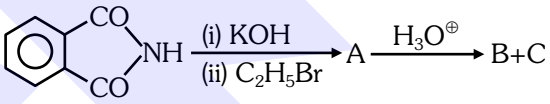
(1) Ethane amine, methane nitrile and diethyl amine

(2) Carbyl amino ethane, ethane amine and primary amine

(3) Ethyl isocyanide, ethyl amine and methyl isocyanate

(4) Carbylamino ethane, ethanamine and ethyl methyl amine

**AM0086**

**5.** 

B and C in the above sequence are

(1) Benzoic acid + aniline

(2) Phthalic acid + ethylamine

(3) Phthalic acid + aniline

(4) Benzoic acid + ethylamine

**AM0087**

**6.** The end–product in the reaction sequence would be :

Ethyl amine $\xrightarrow{HNO_2} A \xrightarrow{PCl_5} B \xrightarrow{NH_3} C$

(1) Ethyl cyanide

(2) Ethyl amine

(3) Methyl amine

(4) Acetamide

**AM0088**

**7.** $A \xrightarrow{H_2NOH} B \xrightarrow{reduction} C \xrightarrow{NOCl} CH_3CH_2Cl$,

A and C in the above sequence respectively are:-

(1) Methanal, Methylamine

(2) Acetone, ethanamine

(3) Ethanal, dimethylamine

(4) Acetaldehyde, ethylamine

**CC0089**

**8.** A compound of mol. wt. 180 gm is acetylated to give a compound of mol. wt. 390. The number of amino groups in the compound are :-

(1) 2 (2) 4

(3) 5 (4) 6

**AM0090**

**9.** In the reaction sequence A, B and C are :-

$A \xrightarrow[HCl]{Sn} B \xrightarrow[0°C]{NaNO_2/HCl} C \xrightarrow{H_2O/\Delta} C_6H_5OH$

(1) Benzene, nitrobenzene, aniline

(2) Nitrobenzene, aniline and azo–compound

(3) Nitrobenzene, benzene, aniline

(4) Benzene, amino compound, aniline

**AM0091**

**10.** Which one of the following tests can be used to identify primary amino group in a given organic compound

(1) Iodoform test

(2) Victor Meyer's test

(3) Carbylamine reaction

(4) Libermann's reaction

**PO0092**

**11.** $CH_3Cl \xrightarrow{KCN} \xrightarrow{+4H} A \xrightarrow{NaNO_2/HCl}$ Ethanol+ ?

Apart from ethanol as the main product, the other products would be

(1) $H_2C=CH_2$ (2) $CH_3CH_2–ONO$

(3) $CH_3CH_2–Cl$ (4) All the above

**AM0094**

**12.** Identify B, X and R respectively in the following sequence of reactions

$C_2H_5MgBr \xrightarrow{ClCN} A \xrightarrow{H_3O^+} \boxed{B}$,

$CH_3COCH_3 \xrightarrow[NaOH]{I_2} \boxed{X} \xrightarrow{Ag} CH{\equiv}CH$

$C_6H_5NH_2 \xrightarrow[0-5°C]{NaNO_2/HCl} P \xrightarrow{CuCN} Q \xrightarrow[EtOH]{Na} \boxed{R}$

(1) $C_2H_5COOH$, $CHI_3$, $C_6H_5CH_2NH_2$

(2) $C_2H_5COOH$, $CH_3I$, $C_6H_5COOH$

(3) $C_2H_5CH_2NH_2$, $CH_3I$, $C_6H_5COOH$

(4) $C_2H_5COOH$, $C_2H_5I$, $C_6H_5CONH_2$

**AM0095**

**13.** Using Fe/HCl, which one of the following reaction is possible [Here $\phi = C_6H_5$]

(1) $\phi–NO_2 \rightarrow \phi–NH–NH–\phi$

(2) $\phi–NO_2 \rightarrow \phi–NH_2$

(3) $\phi–NO_2 \rightarrow \phi–NHOH$

(4) $\phi–NO_2 \rightarrow \phi–N=N–\phi$

**AM0096**

**14.** Total structural isomeric amines possible for molecular formula $C_4H_{11}N$

(1) 7 (2) 8 (3) 9 (4) 6

**NC0109**

**15.** $C_2H_5NH_2 \xrightarrow{NOCl} A \xrightarrow{NaCN} B \xrightarrow{H_2/Ni} C$

what will be "C"

(1) $CH_3 – CH_2 – CH_2 – NH_2$

(2) $CH_3 – \underset{\displaystyle CH_3}{\underset{|}{CH}} – NH_2$

(3) $CH_3\ CH_2 – CH = NH$

(4) $H_5C_2–\underset{\displaystyle CH_2–NH_2}{\underset{|}{N}}–N=O$

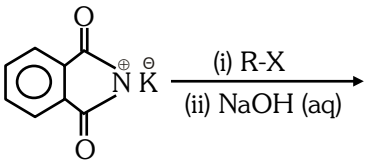
**AM0110**

**16.** Which of following will not gives only primary amine

(1) $C_2H_5X \xrightarrow{NH_3(Alc)}$

(2) $CH_3 – CN \xrightarrow[C_2H_5OH]{Na(Hg)}$

(3) $CH_3 – \overset{\displaystyle O}{\overset{\|}{C}} – NH_2 \xrightarrow[(ii)\ H_2O]{(i)\ LiAlH_4}$

(4) 

**AM0111**

**17.** Basic nature of amine in aqueous medium can be explained by :-

(1) Inductive effect (2) Solvation effect

(3) Steric hinderance (4) All of these

**AM0112**

**18.** Which of following is correct regarding basic nature ?

(1) $R – NH_2 > R_2NH > R_3N$ (Gaseous phase)

(2) $CH_3NH_2 > (CH_3)_2NH > (CH_3)_3N$ (Aqueous solutions)

(3) $(C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5–NH_2 > NH_3$ (Aqueous solutions)

(4) $(C_2H_5)_2NH > PhNH_2 > Ph – NH – CH_3$ (Aqueous solution)

**GC0113**

**19.** What is decreasing order of H-bonding in water for alkyl substituted ammonium cation ?

(1) $R\overset{\oplus}{N}H_3 > R_2\overset{\oplus}{N}H_2 > R_3\overset{\oplus}{N}H$

(2) $R_3\overset{\oplus}{N}H > R_2\overset{\oplus}{N}H_2 > R\overset{\oplus}{N}H_3$

(3) $R_2\overset{\oplus}{N}H_2 > R_3\overset{\oplus}{N}H > R\overset{\oplus}{N}H_3$

(4) $R_2\overset{\oplus}{N}H_2 > R\overset{\oplus}{N}H_3 > R_3\overset{\oplus}{N}H$

**AM0114**

**20.** Which of following reaction is not acylation ?

(1) $C_2H_5NH_2 + CH_3-\overset{O}{\overset{\|}{C}}-Cl \longrightarrow$

(2) $C_2H_5NH_2 + CH_3-\overset{O}{\overset{\|}{C}}-O-\overset{O}{\overset{\|}{C}}-CH_3 \longrightarrow$

(3) $C_2H_5NH_2 + CH_3\overset{O}{\overset{\|}{C}}-OCH_3 \longrightarrow$

(4) $C_2H_5NH_2 + CH_3-\overset{O}{\overset{\|}{C}}-OH \longrightarrow$

**AM0115**

**21.** Which of following will not give acylation reaction?

(1) $H_5C_2 - NH_2$ (2) $H_5C_2 - NH - C_2H_5$

(3) $C_2H_5-\underset{\underset{C_2H_5}{|}}{\overset{\overset{C_2H_5}{|}}{N}}$ (4) $H_5C_6 - NH_2$

**AM0116**

**22.** Which of following is not correct match?

(1) $H_5C_2NH_2 + CH_3-\overset{O}{\overset{\|}{C}}-Cl \longrightarrow H_5C_2-NH-\overset{O}{\overset{\|}{C}}-CH_3+HCl$
(Acylation)

(2) $H_5C_2NH_2 + H_5C_6-\overset{O}{\overset{\|}{C}}-Cl \longrightarrow H_5C_2-NH-\overset{O}{\overset{\|}{C}}-C_6H_5+HCl$
(Benzoylation)

(3) $(H_5C_2)_2\,NH + CHCl_3 + 3KOH \longrightarrow H_5C_2 - NC + 3KCl + 3H_2O$
(Carbyl amine reaction)

(4) $H_5C_2 - NH_2 + CH_3COOH \longrightarrow H_5C_2\overset{\oplus}{N}H_3\,CH_3COO^-$
(Salt formation or Neutralisation)

**AM0117**

**23.** Which of following can be use to distinguish primary, secondary and tertiary amine?

(1) Carbyl amine reaction

(2) Reaction with Nitrous acid

(3) Reaction with Hinsberg's reagent followed by NaOH

(4) Both 2 & 3

**PO0118**

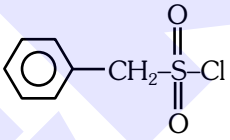
**24.** Which of following is insoluble in alkali?

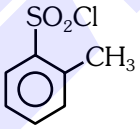
(1) $H_5C_6-\overset{O}{\overset{\|}{\underset{O}{\underset{\|}{S}}}}-N-C_2H_5$ (2) $H_5C_6-\overset{O}{\overset{\|}{\underset{O}{\underset{\|}{S}}}}-N-CH_3$ (H)

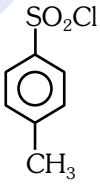
(3) $H_5C_6-\overset{O}{\overset{\|}{\underset{O}{\underset{\|}{S}}}}-N-C_2H_5$ (H) (4) All of these

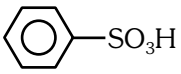
**AM0119**

**25.** These days benzene sulphonyl chloride replaced by which compound in Hinsberg test :-

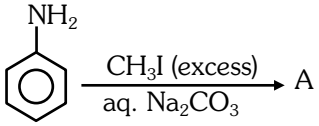
(1) 

(2) 

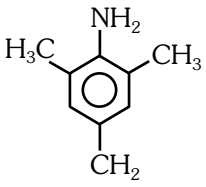
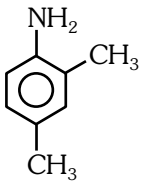
(3) 

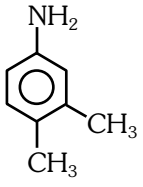
(4) 

**AM0120**

**26.** 

What will be "A"

(1)  (2) 

(3)  (4) $Ph - \overset{\oplus}{N}(CH_3)_3\overset{\ominus}{I}$

**AM0121**

**27.** Total number of isomers of molecular formula $C_3H_9N$ which will liberate $N_2$ gas on treatment with nitrous acid?
(1) 2 (2) 3 (3) 4 (4) 1

**AM0122**

**28.** Which of following is water insoluble and stable at room temperature ?
(1) $C_6H_5N_2^{\oplus}Cl^{\ominus}$ (2) $C_6H_5N_2^{\oplus}BF_4^{\ominus}$
(3) $C_6H_5N_2^{\oplus}HSO_4^{\ominus}$ (4) All

**AM0123**

**29.** Which of following reaction do not displace $N_2$ from benzenediazonium salt?
(1) $ArN_2^{\oplus}Cl^- \xrightarrow{Cu_2Cl_2/HCl}$
(2) $ArN_2^{\oplus}Cl^- \xrightarrow{Cu/HCl}$
(3) $ArN_2^{\oplus}Cl^- + KI \longrightarrow$
(4) $ArN_2^{\oplus}Cl^- + HBF_4 \xrightarrow[\text{temperature}]{\text{Room}}$

**AM0124**

**30.** Which of following group can not be introduced in the benzene ring by sandmeyer reaction?
(1) –Cl (2) –Br (3) –CN (4) –I

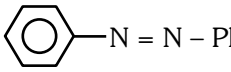
**AM0125**

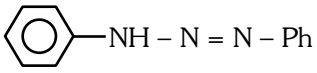
**31.** Formation of benzene from $C_6H_5N_2^{\oplus}Cl^-$ by use of $C_2H_5OH$ is example of :-
(1) Redox reaction
(2) Electrophilic substitution reaction
(3) Nucleophilic substitution reaction
(4) Elimination reaction

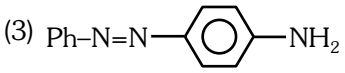
**AM0126**

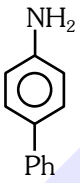
**32.** $A + HBF_4 \xrightarrow[\text{Temprature}]{\text{Room}} B \xrightarrow[Cu,\Delta]{NaNO_2} C \xrightarrow{Fe/HCl} D \xrightarrow[H^{\oplus}]{A} E$

What is "E"

(1) 

(2) 

(3) 

(4) 

**AM0127**

**33.** Diazo coupling reaction can be use to distinguish
(1) Aniline and Benzyl amine
(2) Ethylamine and N-methyl aniline
(3) Aniline and Phenol
(4) All of these

**AM0128**

**34.** What is correct sequence of reagent to form 2,4,6-tibromofluorobenzene from Aniline?
(1) $NaNO_2$/HCl (0-5°C), $HBF_4/\Delta$, $Br_2/H_2O$
(2) $Br_2/H_2O$, $NaNO_2$/HCl (0-5°C), $HBF_4/\Delta$
(3) $NaNO_2$/HCl (25°C), $HBF_4/\Delta$, $Br_2/H_2O$
(4) $Br_2/H_2O$, $NaNO_2$/HCl (0-5°C), $HBF_4$ (Room temperature)

**AM0129**

## EXERCISE-III (Analytical Questions) ANSWER KEY

| Que. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | **4** | **2** | **3** | **4** | **2** | **2** | **4** | **3** | **2** | **3** | **4** | **1** | **2** | **2** | **1** |
| Que. | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Ans. | **1** | **4** | **3** | **1** | **4** | **3** | **3** | **4** | **1** | **3** | **4** | **1** | **2** | **4** | **4** |
| Que. | 31 | 32 | 33 | 34 | | | | | | | | | | | |
| Ans. | **1** | **3** | **4** | **2** | | | | | | | | | | | |