

DPP - Daily Practice Problems

Name :

Date :

Start Time :

End Time :

CHEMISTRY

54

SYLLABUS : Nitrogen Containing Compounds- I

Max. Marks : 120

Time : 60 min.

GENERAL INSTRUCTIONS

- The Daily Practice Problem Sheet contains 30 MCQ's. For each question only one option is correct. Darken the correct circle/bubble in the Response Grid provided on each page.
- You have to evaluate your Response Grids yourself with the help of solution booklet.
- Each correct answer will get you 4 marks and 1 mark shall be deducted for each incorrect answer. No mark will be given/ deducted if no bubble is filled. Keep a timer in front of you and stop immediately at the end of 60 min.
- The sheet follows a particular syllabus. Do not attempt the sheet before you have completed your preparation for that syllabus. Refer syllabus sheet in the starting of the book for the syllabus of all the DPP sheets.
- After completing the sheet check your answers with the solution booklet and complete the Result Grid. Finally spend time to analyse your performance and revise the areas which emerge out as weak in your evaluation.

DIRECTIONS (Q.1-Q.21) : There are 21 multiple choice questions. Each question has 4 choices (a), (b), (c) and (d), out of which ONLY ONE choice is correct.

Q.1 C_3H_7N represents

- (a) Primary amine (b) Secondary amine
(c) Tertiary amine (d) All of these

Q.2 Allyl isocyanide has

- (a) 9 sigma bonds and 4 pi bonds
(b) 8 sigma bonds and 5 pi bonds
(c) 8 sigma bonds, 3 pi bonds and 4 non-bonding electrons
(d) 9 sigma bonds, 3 pi bonds and 2 non-bonding electrons

Q.3 Triaminobenzene is a

- (a) 2° amine (b) 3° amine
(c) 1° amine (d) quaternary salt

Q.4 Leakage of which gas was responsible for the Bhopal tragedy in 1984

- (a) $CH_3 - N = C = O$ (b) $CH_3 - C - N = S$
(c) $CHCl_3$ (d) C_6H_5COCl

Q.5 Number of isomeric primary amines obtained from $C_4H_{11}N$ are

- (a) 3 (b) 4
(c) 5 (d) 6

RESPONSE GRID

1. (a) (b) (c) (d)

2. (a) (b) (c) (d)

3. (a) (b) (c) (d)

4. (a) (b) (c) (d)

5. (a) (b) (c) (d)

Q.6 Amides may be converted into amines by reaction named after

- (a) Perkin (b) Claisen
(c) Hofmann (d) Kolbe

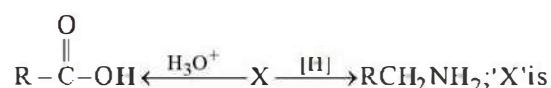
Q.7 Ethylamine can be obtained by the

- (a) Action of NH_3 on ethyl iodide
(b) Action of NH_3 on ethyl alcohol
(c) Both (a) and (b)
(d) None of the above

Q.8 When methyl iodide is heated with ammonia, the product obtained is

- (a) Methylaniline
(b) Dimethylamine
(c) trimethylamine
(d) A mixture of the above three amines

Q.9 In the reaction

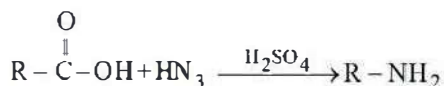


- (a) Isonitrile (b) Nitrile
(c) Nitrite (d) Oxime

Q.10 Which of the following compound is the strongest base?

- (a) Ammonia (b) Aniline
(c) Methylamine (d) N-methylaniline

Q.11 Following reaction is an example of

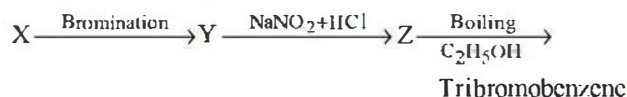


- (a) Hofmann reaction (b) Curtius reaction
(c) Schmidt reaction (d) Lossen reaction

Q.12 When aniline reacts with NaNO_2 and dil. HCl at $0^\circ - 5^\circ\text{C}$, the product formed is

- (a) Nitroaniline
(b) Benzenediazonium chloride
(c) Benzene
(d) Trinitroaniline

Q.13 In the following reaction, X is



- (a) Benzoic acid (b) Salicylic acid
(c) Phenol (d) Aniline

Q.14 Which of the following statements about primary amines is 'False'?

- (a) Alkyl amines are stronger bases than aryl amines
(b) Alkyl amines react with nitrous acid to produce alcohols
(c) Aryl amines react with nitrous acid to produce phenols
(d) Alkyl amines are stronger bases than ammonia

Q.15 Which of the following reacts with chloroform and a base to form phenyl isocyanide?

- (a) Aniline (b) Phenol
(c) Benzene (d) Nitrobenzene

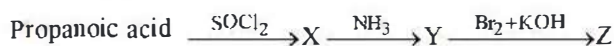
Q.16 Ethyl amine on heating with CS_2 in presence of HgCl_2 forms

- (a) $\text{C}_2\text{H}_5\text{NCS}$ (b) $(\text{C}_2\text{H}_5)_2\text{S}$
(c) $(\text{C}_2\text{H}_5)_2\text{CS}$ (d) $\text{C}_2\text{H}_5(\text{CS})_2$

Q.17 Which of the following reacts with $\text{NaNO}_2 + \text{HCl}$ to give phenol?

- (a) $\text{C}_6\text{H}_5\text{CH}_2\text{NHCH}_3$ (b) $(\text{CH}_3)_2\text{NH}$
(c) CH_3NH_2 (d) $\text{C}_6\text{H}_5\text{NH}_2$

Q.18 Starting from propanoic acid, the following reactions were carried out



What is the compound Z?

- (a) $\text{CH}_3 - \text{CH}_2 - \text{Br}$ (b) $\text{CH}_3 - \text{CH}_2 - \text{NH}_2$
(c) $\text{CH}_3 - \text{CH}_2 - \text{C} \begin{smallmatrix} \nearrow \text{O} \\ \searrow \text{Br} \end{smallmatrix}$ (d) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{NH}_2$

Q.19 Aromatic nitriles (ArCN) are not prepared by reaction

- (a) $\text{ArX} + \text{KCN}$ (b) $\text{ArN}_2^+ + \text{CuCN}$
(c) $\text{ArCONH}_2 + \text{P}_2\text{O}_5$ (d) $\text{ArCONH}_2 + \text{SOCl}_2$

**RESPONSE
GRID**

6. (a)(b)(c)(d) 7. (a)(b)(c)(d) 8. (a)(b)(c)(d) 9. (a)(b)(c)(d) 10. (a)(b)(c)(d)
11. (a)(b)(c)(d) 12. (a)(b)(c)(d) 13. (a)(b)(c)(d) 14. (a)(b)(c)(d) 15. (a)(b)(c)(d)
16. (a)(b)(c)(d) 17. (a)(b)(c)(d) 18. (a)(b)(c)(d) 19. (a)(b)(c)(d)

Q.20

- (a) Aniline
- (b) Salicylic acid
- (c) Benzaldehyde
- (d) Chlorobenzene

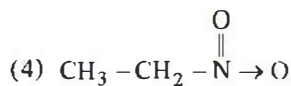
Q.21 For the preparation of *p*-nitroiodobenzene from *p*-nitroaniline, the best method is

- (a) NaNO_2/HCl followed by KI
- (b) NaNO_2/HCl followed by CuCN
- (c) LiAlH_4 followed by I_2
- (d) NaBH_4 followed by I_2

Q.23

reduction?

- (1) $\text{CH}_3 - \text{CH}_2 - \text{O} - \text{N} = \text{O}$
- (2) $\text{CH}_3\text{CH}_2\text{NO}_3$
- (3) $\text{CH}_3\text{CH}_2\text{CH}_2\text{NO}_3$

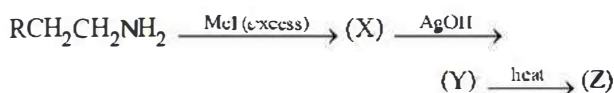


Q.24 Which of the following reduces $\text{C}_6\text{H}_5\text{NO}_2$ to aniline ?

- (1) Sn/HCl
- (2) SnCl_2/HCl
- (3) Zn/HCl
- (4) LiAlH_4

DIRECTIONS (Q.25-Q.27) : Read the passage given below and answer the questions that follows :

Observe the following reaction :



Q.25 The structure of X is—

- (a) $\text{RCH}_2\text{CH}_2\text{NMe}_3^+\text{I}^-$
- (b) $\text{RCH}_2\text{CH}_2\text{NMe}_3^+\text{OH}^-$
- (c) $\text{RCH}=\text{CH}_2$
- (d) None of these

Q.26 The structure of Y is—

- (a) $\text{RCH}_2\text{CH}_2\text{NMe}_3^+\text{I}^-$
- (b) $\text{RCH}_2\text{CH}_2\text{NMe}_3^+\text{OH}^-$
- (c) $\text{RCH}=\text{CH}_2$
- (d) None of these

Q.27 The structure of Z is—

- (a) $\text{RCH}_2\text{CH}_2\text{NMe}_3^+\text{I}^-$
- (b) $\text{RCH}_2\text{CH}_2\text{NMe}_3^+\text{OH}^-$
- (c) $\text{RCH}=\text{CH}_2$
- (d) None of these

DIRECTIONS (Q.22-Q.24) : In the following questions, more than one of the answers given are correct. Select the correct answers and mark it according to the following codes:

Codes :

- (a) 1, 2 and 3 are correct
- (b) 1 and 2 are correct
- (c) 2 and 4 are correct
- (d) 1 and 3 are correct

Q.22 Which of the following reactions yield an amine ?

- (1) $\text{RX} + \text{NH}_3 \longrightarrow$
- (2) $\text{RCH}=\text{NOH} + [\text{H}] \xrightarrow[\text{C}_2\text{H}_5\text{OH}]{\text{Na}} \longrightarrow$
- (3) $\text{RCONH}_2 + 4\text{H} \xrightarrow{\text{LiAlH}_4} \longrightarrow$
- (4) $\text{RCN} + \text{H}_2\text{O} \xrightarrow{\text{H}^+} \longrightarrow$

**RESPONSE
GRID**

20. (a) (b) (c) (d)

21. (a) (b) (c) (d)

22. (a) (b) (c) (d)

23. (a) (b) (c) (d)

24. (a) (b) (c) (d)

25. (a) (b) (c) (d)

26. (a) (b) (c) (d)

27. (a) (b) (c) (d)

DIRECTIONS (Q. 28-Q.30) : Each of these questions contains two statements: Statement-1 (Assertion) and Statement-2 (Reason). Each of these questions has four alternative choices, only one of which is the correct answer. You have to select the correct choice.

- (a) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
 (b) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.
 (c) Statement-1 is False, Statement-2 is True.
 (d) Statement-1 is True, Statement-2 is False.

Q.28 Statement-1 : Methyl isocyanide reacts with ozone to form methyl isocyanate.

Statement-2 : Methyl isocyanate was responsible for Bhopal tragedy.

Q.29 Statement-1 : Alkyl cyanide can be prepared by carbylamine reaction.

Statement-2 : Ethyl amine when heated with chloroform in presence of alcoholic KOH gives isocyanide.

Q.30 Statement-1 : In order to convert $R-Cl$ to pure $R-NH_2$, Gabriel phthalimide synthesis can be used.

Statement-2 : With proper choice of alkyl halides, phthalimide synthesis can be used to prepare 1° , 2° or 3° amines.

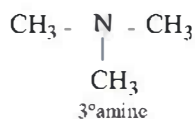
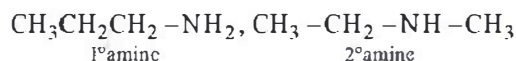
RESPONSE GRID

28. (a) (b) (c) (d) 29. (a) (b) (c) (d) 30. (a) (b) (c) (d)

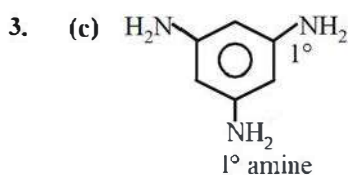
DAILY PRACTICE PROBLEM SHEET 54 - CHEMISTRY

Total Questions	30	Total Marks	120
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	36	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct $\times$ 4) – (Incorrect $\times$ 1)			

1. (d) C_3H_9N can form all the three types of amines.

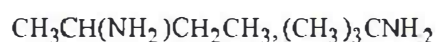
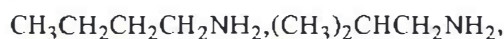


2. (d) Allyl isocyanide, $CH_2=CH-CH_2-\ddot{N} \equiv C$

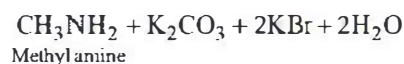
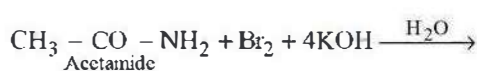


4. (a)

5. (b) Four 1° amines are possible



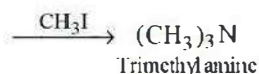
6. (c) Hofmann's bromamide reaction



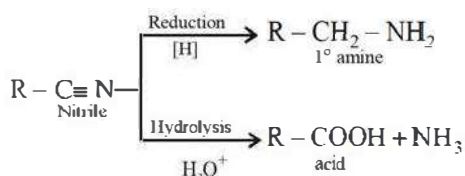
7. (c) $C_2H_5I + NH_3 \rightarrow HI + C_2H_5-NH_2$



8. (d) $CH_3I \xrightarrow[\Delta]{NH_3} CH_3NH_2 \xrightarrow{CH_3I} (CH_3)_2NH$
- Methylamine Dimethylamine

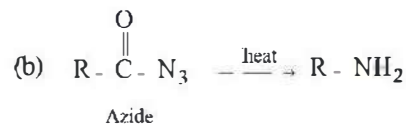


9. (b)

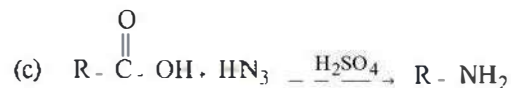


10. (c) Methylamine is the strongest base.

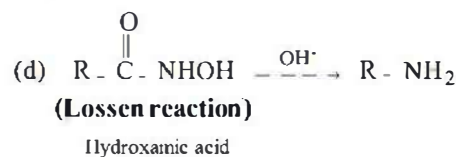
11. (c) (a) $R-\overset{\overset{O}{\parallel}}{C}-NH_2 \xrightarrow{Br_2/NaOH} R-NH_2$
- (Hofmann reaction)



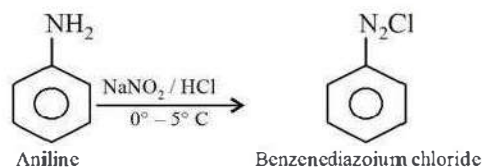
(Curtius reaction)



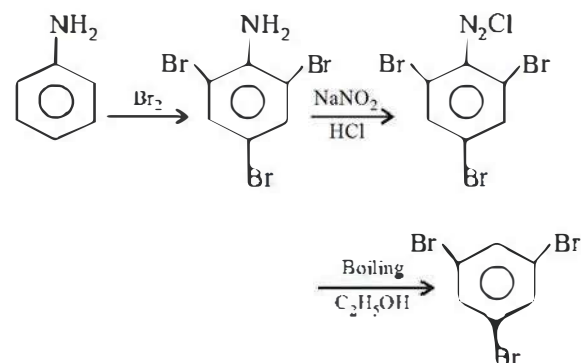
(Schmidt reaction)



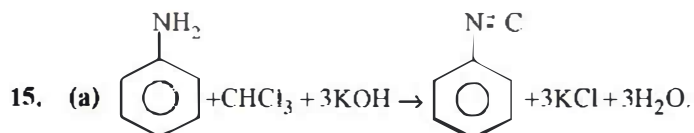
12. (b)



13. (d)



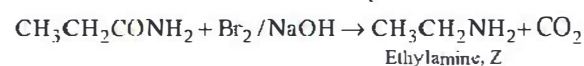
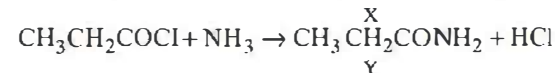
14. (c) Aryl amines do not produce phenol on treatment with nitrous acid.



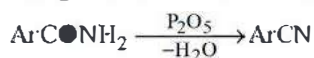
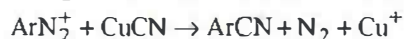
16. (a) $C_2H_5NH_2 + CS_2 + HgCl_2 \rightarrow C_2H_5NCS + 2HCl + HgS$

17. (d) $C_6H_5NH_2 \xrightarrow[HCl]{NaNO_2} C_6H_5N_2Cl \xrightarrow{H_2O} C_6H_5OH + N_2 + HCl$

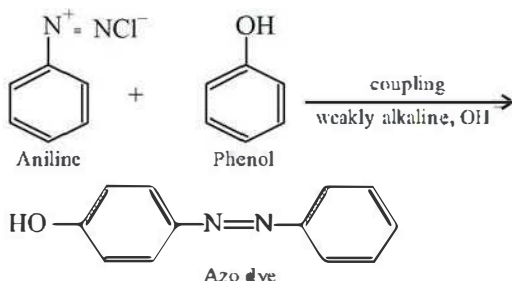
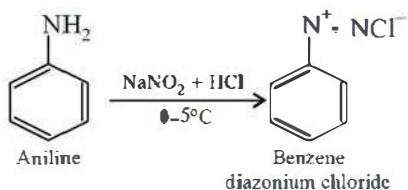
18. (b) $CH_3CH_2COOH \xrightarrow{SOCl_2} CH_3CH_2COCl + SO_2 + HCl$



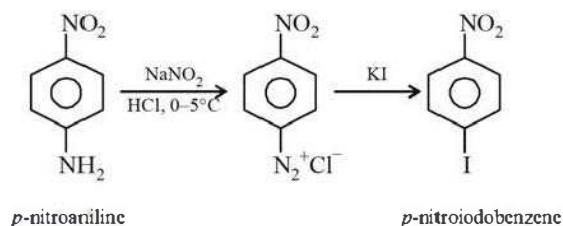
19. (a) —Cl, C—X bond
double bond character and hence becomes short and strong. Thus X can't be replaced easily.



20. (a) When aniline is treated with HNO_2 at $0-5^\circ\text{C}$ then diazonium salt is formed and by the coupling of diazonium salt and phenol, azo dyes are prepared.

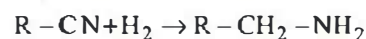


21. (a) *p*-Nitroiodobenzene from *p*-nitroaniline.



22. (a) $\text{R—CN} + \text{H}_2\text{O} \xrightarrow{\text{H}_2\text{O}/\text{H}^+} \text{RCOOH} + \text{NH}_3$

It yields amine when reduced as shown below.



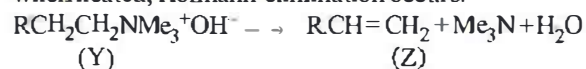
Thus option (d) is incorrect.

23. (a) $\text{CH}_3\text{—CH}_2\text{—}\overset{\text{O}}{\parallel}\text{N} \rightarrow \text{O} + 3\text{H}_2 \rightarrow \text{CH}_3\text{CH}_2\text{NH}_2 + 2\text{H}_2\text{O}$

24. (a) LiAlH_4 does not reduce —NO_2 group.
Thus (1), (2), (3) are the correct choices.

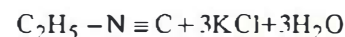
25. (a), 26. (b), 27. (c)

The amine undergoes exhaustive methylation when treated with AgOH forming $\text{RCH}_2\text{CH}_2\text{NMe}_3^+\text{I}^-$ (X) which is converted to (Y), $\text{RCH}_2\text{CH}_2\text{NMe}_3^+\text{OH}^-$ (Y) when heated, Hofmann elimination occurs.



28. (b) The reason being that the terminal carbon atom in isocyanide has electron-deficient carbon having a sextet of electrons and hence undergoes addition reactions with ozone.

29. (c) When primary amines are heated with chloroform in the presence of alcoholic KOH , isocyanides are formed. This reaction is known as carbylamine reaction, eg. ethyl amine gives ethyl isocyanide on treatment with CHCl_3 and alcoholic KOH .



30. (d) Only primary aliphatic amines can be prepared by Gabriel phthalimide reaction.