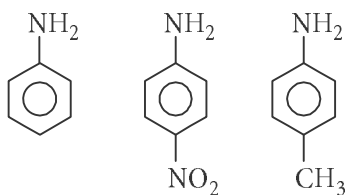


# Chapter 27

## Organic Compounds Containing Nitrogen

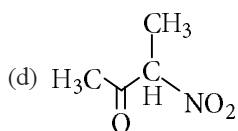
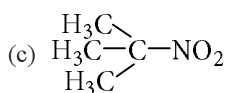
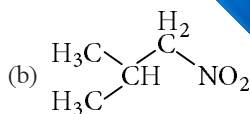
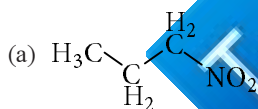
1. The correct increasing order of basic strength for the following compounds is



- (I)                      (II)                      (III)
- (a) III < I < II                      (b) III < II < I  
(c) II < I < III                      (d) II < III < I

(NEET 2017)

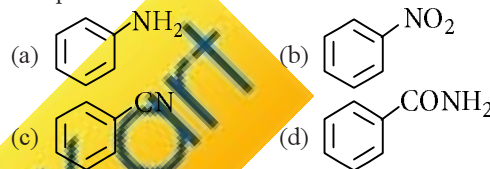
2. Which of the following reactions is appropriate for converting acetamide to methanamine?
- (a) Hoffmann hypobromamide reaction  
(b) Stephen's reaction  
(c) Gabriel phthalimide synthesis  
(d) Carbylamine reaction
3. Which one of the following nitro-compounds does not react with nitrous acid?



(NEET-II 2016)

4. A given nitrogen-containing aromatic compound 'A' reacts with Sn/HCl, followed

by  $\text{HNO}_2$  to give an unstable compound 'B'. 'B', on treatment with phenol, forms a beautiful coloured compound 'C' with the molecular formula  $\text{C}_{12}\text{H}_{10}\text{N}_2\text{O}$ . The structure of compound 'A' is

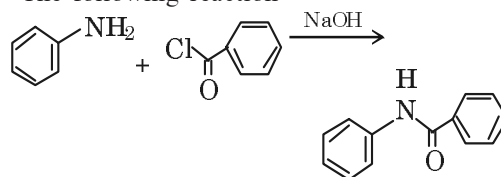


(NEET-II 2016)

5. The correct statement regarding the basicity of arylamines is
- (a) arylamines are generally more basic than alkylamines because of aryl group  
(b) arylamines are generally more basic than alkylamines, because the nitrogen atom in arylamines is  $sp$ -hybridised  
(c) arylamines are generally less basic than alkylamines because the nitrogen lone-pair electrons are delocalised by interaction with the aromatic ring  $\pi$ -electron system  
(d) arylamines are generally more basic than alkylamines because the nitrogen lone-pair electrons are not delocalised by interaction with the aromatic ring  $\pi$ -electron system.
6. The product formed by the reaction of an aldehyde with a primary amine is
- (a) carboxylic acid                      (b) aromatic acid  
(c) Schiff's base                      (d) ketone.

(NEET-I 2016)

7. The following reaction



is known by the name

- (a) Perkin's reaction  
 (b) Acetylation reaction  
 (c) Schotten-Baumann reaction  
 (d) Friedel-Craft's reaction. (2015)

8. Method by which aniline cannot be prepared is

- (a) degradation of benzamide with bromine in alkaline solution  
 (b) reduction of nitrobenzene with  $H_2/Pd$  in ethanol  
 (c) potassium salt of phthalimide treated with chlorobenzene followed by hydrolysis with aqueous NaOH solution  
 (d) hydrolysis of phenylisocyanide with acidic solution. (2015)

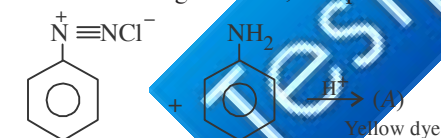
9. The number of structural isomers possible from the molecular formula  $C_3H_9N$  is

- (a) 5 (b) 2  
 (c) 3 (d) 4 (2015)

10. The electrolytic reduction of nitrobenzene in strongly acidic medium produces

- (a) azobenzene (b) aniline  
 (c) *p*-aminophenol (d) azoxybenzene. (2015, Cancelled)

11. In the following reaction, the product (A) is



- (a)
- (b)
- (c)
- (d)

(2014)

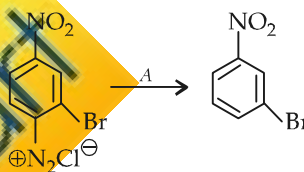
12. Which of the following will be most stable diazonium salt  $RN_2^+X^-$ ?

- (a)  $CH_3N_2^+X^-$  (b)  $C_6H_5N_2^+X^-$   
 (c)  $CH_3CH_2N_2^+X^-$  (d)  $C_6H_5CH_2N_2^+X^-$  (2014)

13. Nitrobenzene on reaction with conc.  $HNO_3/H_2SO_4$  at  $80-100^\circ C$  forms which one of the following products?

- (a) 1, 4-Dinitrobenzene  
 (b) 1, 2, 4-Trinitrobenzene  
 (c) 1, 2-Dinitrobenzene  
 (d) 1, 3-Dinitrobenzene (NEET 2013)

14. In the reaction



A is

- (a)  $H_3PO_2$  and  $H_2O$  (b)  $H^+/H_2O$   
 (c)  $HgSO_4/H_2SO_4$  (d)  $Cu_2Cl_2$  (NEET 2013)

15. On hydrolysis of a "compound", two compounds are obtained. One of which on treatment with sodium nitrite and hydrochloric acid gives a product which does not respond to iodoform test. The second one reduces Tollens reagent and Fehling's solution. The "compound" is

- (a)  $CH_3CH_2CH_2NC$   
 (b)  $CH_3CH_2CH_2CN$   
 (c)  $CH_3CH_2CH_2ON=O$   
 (d)  $CH_3CH_2CH_2CON(CH_3)_2$  (Karnataka NEET 2013)

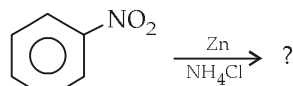
16. Some reactions of amines are given. Which one is not correct?

- (a)  $(CH_3)_2N-C_6H_5 + NaNO_2 + HCl \rightarrow (CH_3)_2N-C_6H_4-N=NCl$
- (b)  $CH_3CH_2NH_2 + HNO_2 \rightarrow CH_3CH_2OH + N_2$
- (c)  $CH_3NH_2 + C_6H_5SO_2Cl \rightarrow CH_3NHOSO_2C_6H_5$
- (d)  $(CH_3)_2NH + NaNO_2 + HCl \rightarrow (CH_3)_2N-N=O$  (Karnataka NEET 2013)

17. 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*).

- (a)  $\begin{array}{c} CH_3 \\ | \\ CH-NH_2 \\ | \\ CH_3 \end{array}$   
 (b)  $CH_3CH_2-NH-CH_3$   
 (c)  $\begin{array}{c} CH_3 \\ | \\ CH_3-N-CH_3 \\ | \\ CH_3 \end{array}$   
 (d)  $CH_3CH_2CH_2-NH_2$  (2012)

18. What is the product obtained in the following reaction?

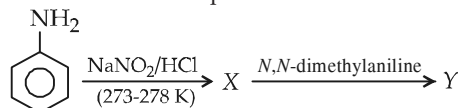


- (a)  $\text{C}_6\text{H}_5\text{NHOH}$   
 (b)  $\text{C}_6\text{H}_5\text{N}=\text{N}-\text{C}_6\text{H}_5$   
 (c)  $\text{C}_6\text{H}_5\text{N}=\text{N}^+\text{C}_6\text{H}_5\text{O}^-$   
 (d)  $\text{C}_6\text{H}_5\text{NH}_2$  (2011)

19. Which of the following compounds is most basic?

- (a)  $\text{O}_2\text{N}-\text{C}_6\text{H}_4-\text{NH}_2$   
 (b)  $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$   
 (c)  $\text{C}_6\text{H}_5\text{N}(\text{H})\text{COCH}_3$   
 (d)  $\text{C}_6\text{H}_5\text{NH}_2$  (Mains 2011)

20. Aniline in a set of the following reactions yielded a coloured product *Y*.



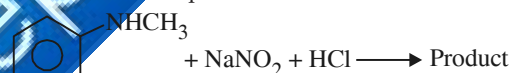
The structure of '*Y*' would be

- (a)  $\text{C}_6\text{H}_5\text{N}=\text{N}-\text{C}_6\text{H}_4\text{N}(\text{CH}_3)_2$   
 (b)  $\text{C}_6\text{H}_5\text{N}(\text{CH}_3)-\text{C}_6\text{H}_4\text{NH}-\text{C}_6\text{H}_4\text{N}(\text{CH}_3)$   
 (c)  $\text{H}_3\text{C}-\text{C}_6\text{H}_4\text{N}=\text{N}-\text{C}_6\text{H}_4\text{NH}_2$   
 (d)  $\text{C}_6\text{H}_5\text{N}(\text{CH}_3)-\text{C}_6\text{H}_4\text{N}=\text{N}-\text{C}_6\text{H}_4\text{N}(\text{CH}_3)$  (2010)

21. 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. (2010)

22. Predict the product.

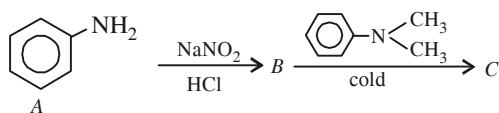


- (a)  $\text{C}_6\text{H}_5\text{N}(\text{CH}_3)\text{NO}_2$   
 (b)  $\text{C}_6\text{H}_5\text{NHCH}_3 + \text{C}_6\text{H}_4(\text{NO})_2$   
 (c)  $\text{C}_6\text{H}_5\text{N}(\text{OH})\text{CH}_3$   
 (d)  $\text{C}_6\text{H}_5\text{N}(\text{CH}_3)\text{N}=\text{O}$  (2009)

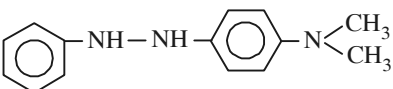
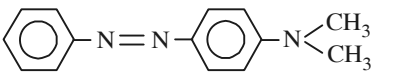
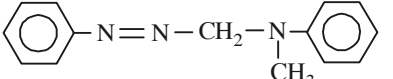
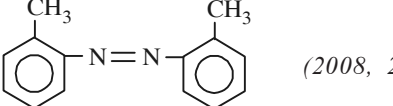
23. Nitrobenzene can be prepared from benzene by using a mixture of conc.  $\text{HNO}_3$  and conc.  $\text{H}_2\text{SO}_4$ . In the mixture, nitric acid acts as a/an

- (a) acid (b) base  
 (c) catalyst (d) reducing agent. (2009)

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



The structure of *C* would be

- (a) 
- (b) 
- (c) 
- (d)  (2008, 2004)

25. Which one of the following on reduction with lithium aluminium hydride yields a secondary amine?

- (a) Methyl isocyanide (b) Acetamide  
(c) Methyl cyanide (d) Nitroethane (2007)

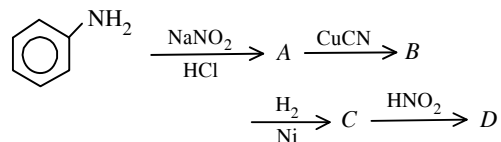
26. Which of the following is more basic than aniline?

- (a) Benzylamine (b) Diphenylamine  
(c) Triphenylamine (d) *p*-Nitroaniline (2006)

27. Electrolytic reduction of nitrobenzene in weakly acidic medium gives

- (a) *N*-phenylhydroxylamine  
(b) nitrosobenzene  
(c) aniline  
(d) *p*-hydroxyaniline. (2005)

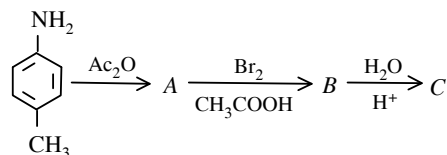
28. Aniline in a set of reactions yielded a product *D*.



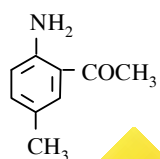
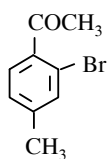
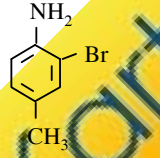
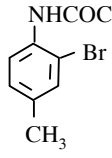
The structure of the product *D* would be

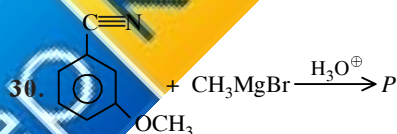
- (a)  $\text{C}_6\text{H}_5\text{NHOH}$  (b)  $\text{C}_6\text{H}_5\text{NHCH}_2\text{CH}_3$   
(c)  $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$  (d)  $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$  (2005)

29. The final product *C*, obtained in this reaction

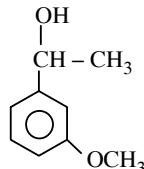
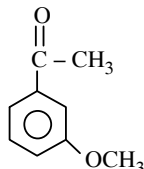
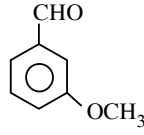
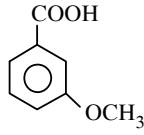


would be

- (a) 
- (b) 
- (c) 
- (d)  (2003)



Product '*P*' in the above reaction is

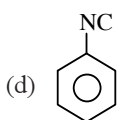
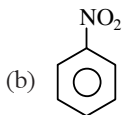
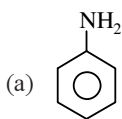
- (a) 
- (b) 
- (c) 
- (d)  (2002)

31. Intermediates formed during reaction of  $\text{RCNH}_2$

with  $\text{Br}_2$  and  $\text{KOH}$  are

- (a)  $\text{RCONHBr}$  and  $\text{RNCO}$   
(b)  $\text{RNHCOBr}$  and  $\text{RNCO}$   
(c)  $\text{RNH}-\text{Br}$  and  $\text{RCONHBr}$   
(d)  $\text{RCONBr}_2$  (2001)

32.  $A \xrightarrow{\text{reduction}} B \xrightarrow{\text{CHCl}_3/\text{KOH}} C \xrightarrow{\text{reduction}} \text{N-methylaniline}$ , then *A* is



(2000)

33. Amides may be converted into amines by a reaction named after

- (a) Hoffmann (b) Claisen  
(c) Perkin (d) Kekule

(1999)

34. Phenyl isocyanides are prepared by which of the following reaction?

- (a) Reimer-Tieman reaction  
(b) Carbylamine reaction  
(c) Rosenmund's reaction  
(d) Wurtz reaction

(1999)

35. Aniline is reacted with bromine water and the resulting product is treated with an aqueous solution of sodium nitrite in presence of dilute hydrochloric acid. The compound so formed is converted into a tetrafluoroborate which is subsequently heated dry. The final product is

- (a) *p*-bromoaniline  
(b) *p*-bromofluorobenzene  
(c) 1, 3, 5-tribromobenzene  
(d) 2, 4, 6-tribromofluorobenzene.

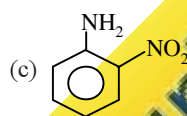
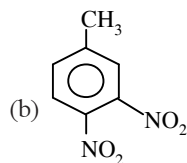
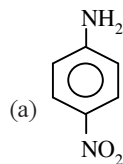
(1998)

36. The compound obtained by heating a mixture of ethyl amine and chloroform with ethanolic potassium hydroxide (KOH) is

- (a) an amide  
(b) an amide and nitro compound  
(c) an ethyl isocyanide  
(d) an alkyl halide.

(1997)

37. An aniline on nitration gives



- (d) both (a) and (c).

(1996)

38. Which product is formed, when acetonitrile is hydrolysed partially with cold concentrated HCl?

- (a) Methyl cyanide  
(b) Acetic anhydride  
(c) Acetic acid  
(d) Acetamide

(1995)

39. When aniline reacts with oil of bitter almonds ( $\text{C}_6\text{H}_5\text{CHO}$ ) condensation takes place and benzal derivative is formed. This is known as

- (a) Schiff's base  
(b) Benedict's reagent  
(c) Million's base  
(d) Schiff's reagent.

(1995)

40. The action of nitrous acid on an aliphatic primary amine gives

- (a) secondary amine (b) nitro alkane  
(c) alcohol (d) alkyl nitrite.

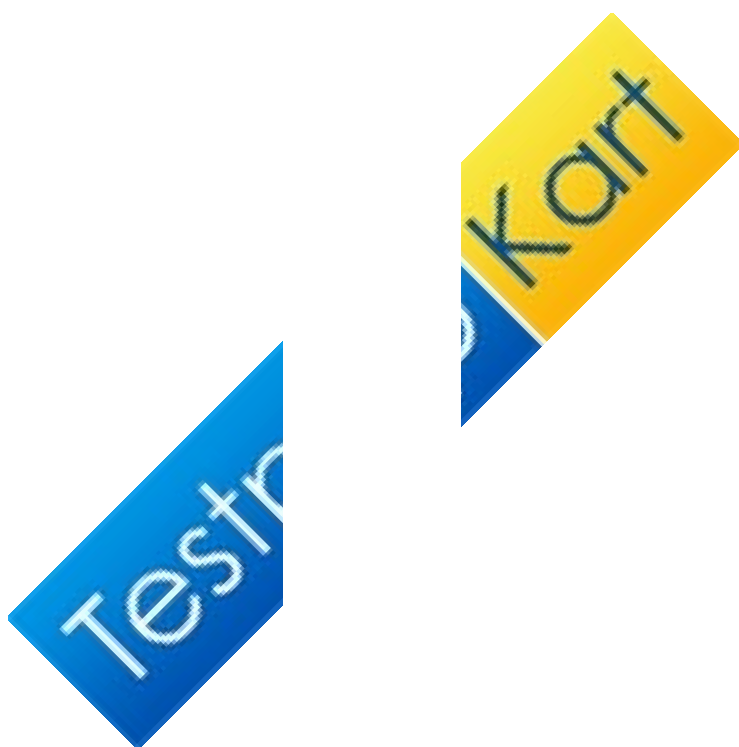
(1994)

41. Which one of the following order is wrong, with respect to the property indicated?

- (a) Benzoic acid > phenol > cyclohexanol (acid strength)  
(b) Aniline > cyclohexylamine > benzamide (basic strength)  
(c) Formic acid > acetic acid > propanoic acid (acid strength)  
(d) Fluoroacetic acid > chloroacetic acid > bromoacetic acid (acid strength)

(1994)

42. For carbylamine reaction, we need hot alcoholic KOH and
- any primary amine and chloroform
  - chloroform and silver powder
  - a primary amine and an alkyl halide
  - a monoalkylamine and trichloromethane.
- (1992)
43. Indicate which nitrogen compound amongst the following would undergo Hofmann reaction (*i.e.*, reaction with  $\text{Br}_2$  and strong KOH) to furnish the primary amine ( $R\text{-NH}_2$ )?
- $R\text{CONHCH}_3$
  - $R\text{COONH}_4$
  - $R\text{CONH}_2$
  - $R\text{-CO-NHOH}$
- (1989)




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**Answer Key**

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