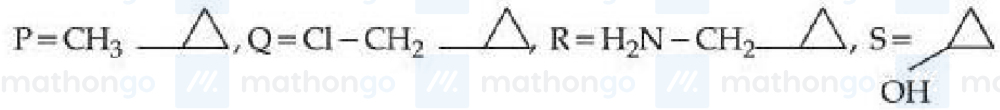
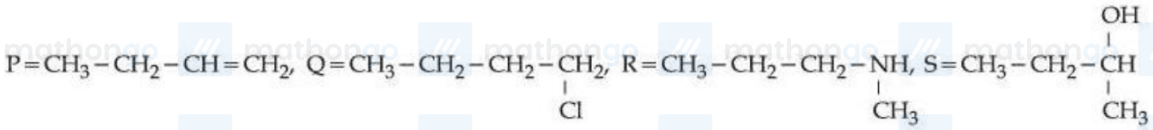
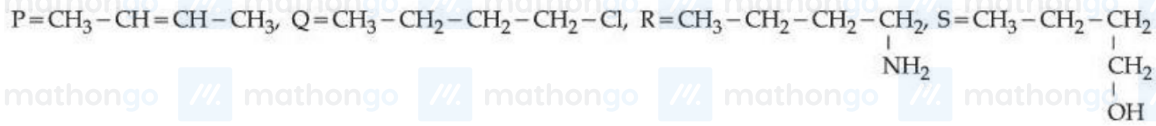
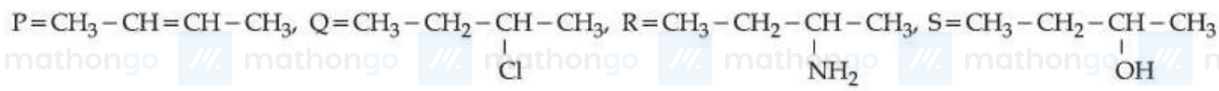
Q1. 21 January Shift 1

A hydrocarbon ' P′ (C_4H_8) on reaction with HCl gives an optically active compound ' Q ' (C_4H_9Cl) which on reaction with one mole of ammonia gives compound ' R′ $(C_4H_{11}N)$. ' R′ on diazotization followed by hydrolysis gives ' S '. Identify P, Q, R and S.

(1) 

(2) 

(3) 

(4) 

Q2. 21 January Shift 1

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

(1) Phenylethanoic acid, phenylethanamide, benzamine

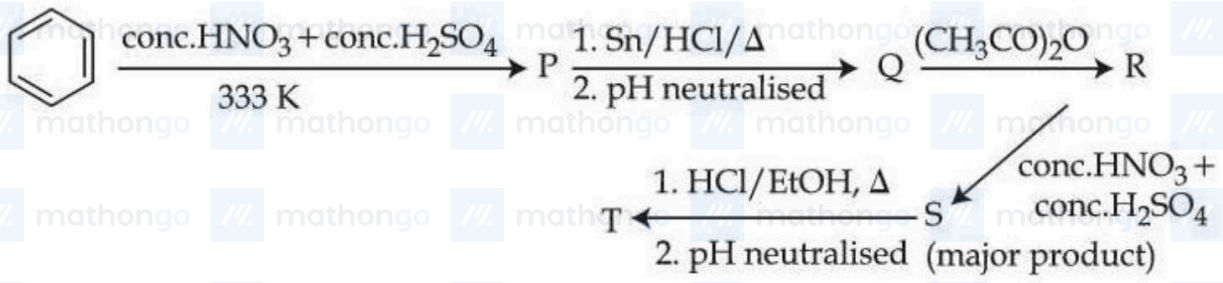
(2) Benzoic acid, 4-methylbenzamide, 4-methylaniline

(3) Toluic acid, methylbenzamide, 2-methylaniline

(4) Benzoic acid, benzamide, aniline

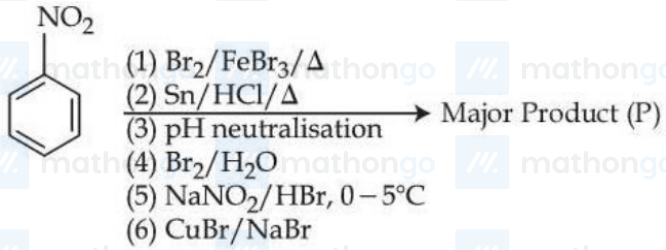
Q3. 21 January Shift 1

Consider the following reaction sequence



The percentage of nitrogen in product ' T ' formed is ____ \%. (Nearest integer) (Given molar mass in $gmol^{-1}$ H : 1, C : 12, N : 14, O : 16)

Q4. 21 January Shift 2



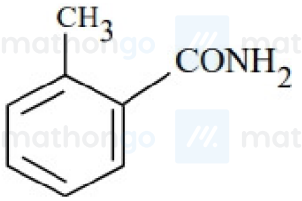
Consider the above sequence of reactions. The number of bromine atom(s) in the final product (P) will be :

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

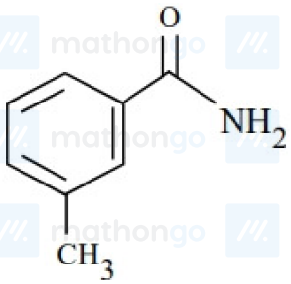
Q5. 22 January Shift 1

' A ' is a neutral organic compound (M. F : C_8H_9ON). On treatment with aqueous $Br_2/HO^{(-)}$, ' A ' forms a compound ' B ' which is soluble in dilute acid. ' B ' on treatment with aqueous $NaNO_2/HCl\,(0-5°C)$ produces a compound ' C ' which on treatment with $CuCN/NaCN$ produces ' D '. Hydrolysis of ' D ' produces ' E ' which is also obtainable from the hydrolysis of ' A '. ' E ' on treatment with acidified $KMnO_4$ produces ' F '. ' F ' contains two different types of hydrogen atoms. The structure of ' A ' is

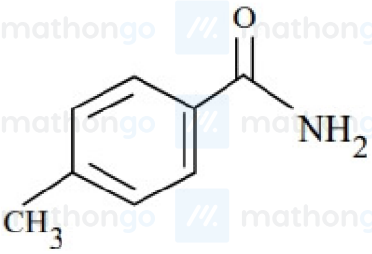
(1)



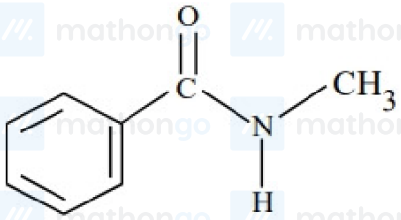
(2)



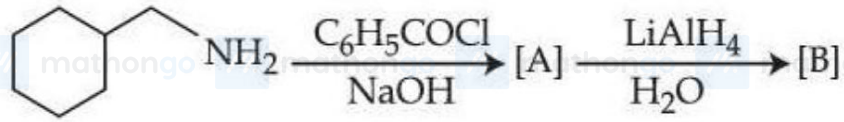
(3)



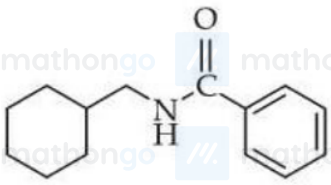
(4)

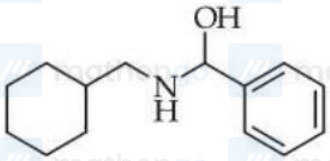


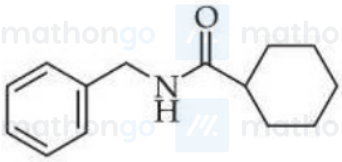
Q6. 22 January Shift 2

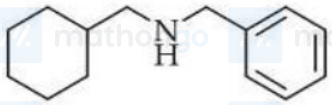


The final product [B] is :

(1) 

(2) 

(3) 

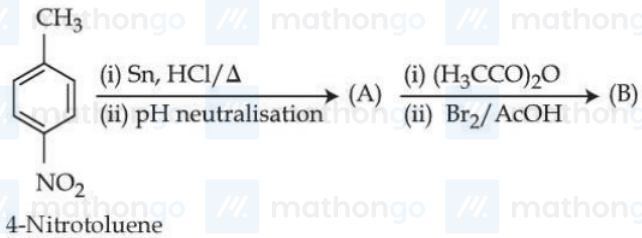
(4) 

Q7. 22 January Shift 2

The mass of benzanilide obtained from the benzoylation reaction of 5.8 g of aniline, if yield of product is 82%, is ____ g (nearest integer). (Given molar mass in $gmol^{-1}$ H : 1, C : 12, N : 14, O : 16)

Q8. 23 January Shift 1

Consider the following sequence of reactions.



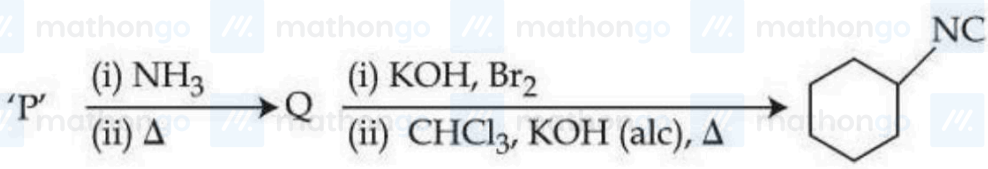
4-Nitrotoluene

Assuming that the reaction proceeds to completion, then 137 mg of 4 -nitrotoluene will produce ____ mg of *B*.
(Given molar mass in $gmol^{-1}$ H : 1, C : 12, N : 14, O : 16, Br : 80)

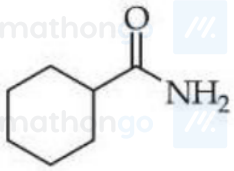
(1) 208 (2) 301 (3) 228 (4) 146

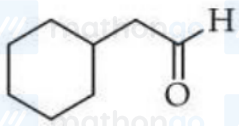
Q9. 23 January Shift 1

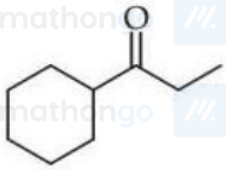
Compound ' P ' undergoes the following sequence of reactions :

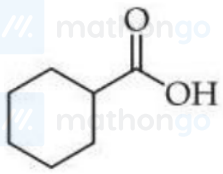


' P′ is :

(1) 

(2) 

(3) 

(4) 

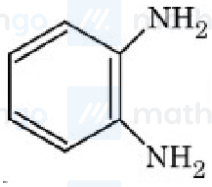
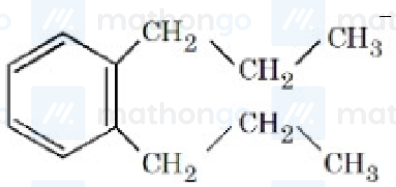
Q10. 23 January Shift 2

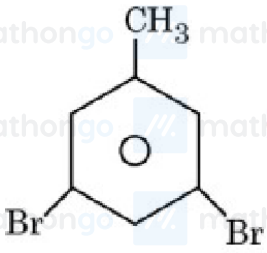
A student has been given a compound " x " of molecular formula- C_6H_7N. ' x ' is sparingly soluble in water. However, on addition of dilute mineral acid, ' x ' becomes soluble in water. ' x ' when treated with $CHCl_3$ and KOH(alc), ' y ' is produced. ' y ' has a specific unpleasant smell. On treatment with benzenesulphonyl chloride, ' x ' gives a compound ' z ' which is soluble in alkali. The number of different " H " atoms present in ' z ' is:-

(1) 8 (2) 4 (3) 5 (4) 7

Q11. 23 January Shift 2

Given below are two statements:

Statement I:  can be synthesized from  using simpler reagents in the order i) Acidic $KMnO_4$, ii) Ammonia, iii) Bromine and alkali

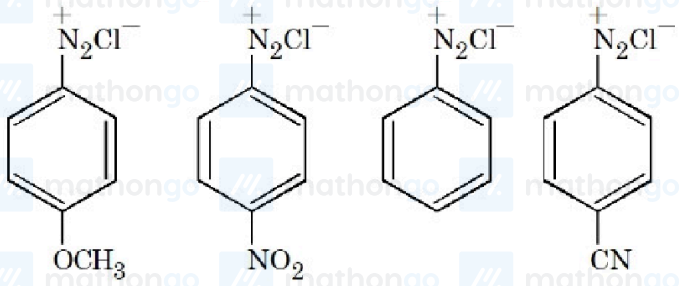
Statement II:  can be converted into  using reagents in the order i) Bromine- H_2O ii) $NaNO_2/HCl\,(0-5°C)$ (iii) Aq. H_3PO_2.

In the light of the above statements, choose the correct answer from the options given below

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

Q12. 24 January Shift 1

The correct stability order of the following diazonium salts i

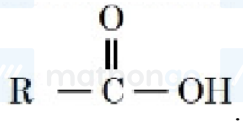


(A) (B) (C) (D)

(1) C > A > D > B
(2) A > C > D > B
(3) A > B > C > D
(4) C > D > B > A

Q13. 24 January Shift 2

Given below are two statements:

Statement I: The dipole moment of R-CN is greater than R-NC and R-NC can undergo hydrolysis under acidic medium to produce  .

Statement II: R-CN hydrolyses under acidic medium to produce a compound which on treatment with $SOCl_2$, followed by the addition of NH_3 gives another compound (x). This compound (x) on treatment with $NaOCl/NaOH$ gives a product, that on treatment with $CHCl_3/KOH/\Delta$ produces R-NC.

In the light of the above statements, choose the correct answer from the options given below

(1) Both Statement I and Statement II are false (2) Statement I is false but Statement II is true

(3) Both Statement I and Statement II are true (4) Statement I is true but Statement II is false

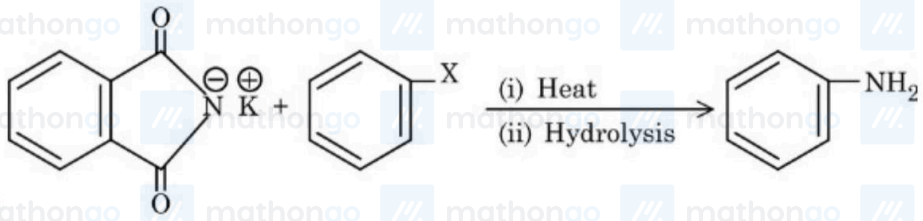
Q14. 24 January Shift 2

A student has planned to prepare acetanilide from aniline using acetic anhydride. The student has started from 9.3 g of aniline. However, the student has managed to obtain 11 g of dry acetanilide. The % yield of this reaction is :-

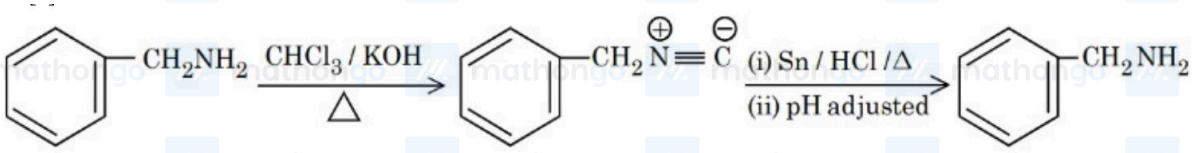
(1) 59.5 % (2) 72.5% (3) 97.5% (4) 81.5%

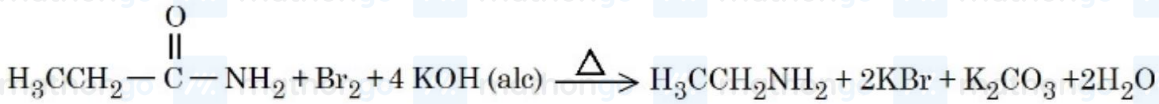
Q15. 28 January Shift 1

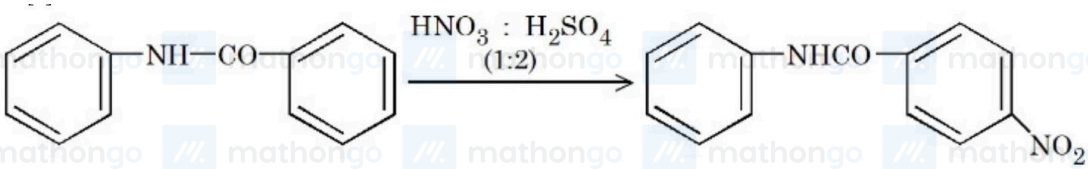
Consider the following reactions giving major product. Identify the correct reaction.

(1) 

[1]

(2) 

(3) 

(4) 

Q16. 28 January Shift 1

Given below are two statements:

Statement I: Griss-Ilosvay test is used for the detection of nitrite ion, which involves the use of sulphanilic acid and α-naphthylamine reagent.

Statement II: In the above test, sulphanilic acid is diazotized by the acidified nitrite ion, which on further coupling with α-naphthylamine forms an azo-dye.

In the light of the above statements, choose the correct answer from the options given below

(1) Both Statement I and Statement II are true

(2) Both Statement I and Statement II are false

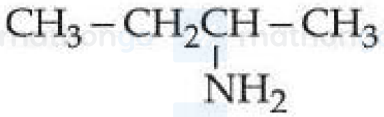
(3) Statement I is false but Statement II is true

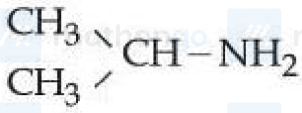
(4) Statement I is true but Statement II is false

Q17. 28 January Shift 2

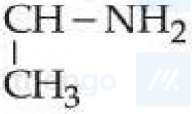
A student performed analysis of aliphatic organic compound ' X ' which on analysis gave $C = 61.01\%$, $H = 15.25\%$, $N = 23.74\%$.

This compound, on treatment with HNO_2/H_2O produced another compound ' Y ' which did not contain any nitrogen atom. However, the compound ' Y ' upon controlled oxidation produced another compound ' Z ' that responded to iodoform test. The structure of ' X ' is :

(1) 

(2) 

(3) $CH_3CH_2CH_2NH_2$

(4) 

Q18. 28 January Shift 2

Total number of alkali insoluble solid sulphonamides obtained by reaction of given amines with Hinsberg's reagent is ____.

Aniline, N-Methylaniline, Methanamine, N, N-Dimethylmethanamine, N-Methyl methanamine, Phenylmethanamine, N-propylaniline, N-phenylaniline, N, N-Dimethylaniline, Allyl amine, Isopropyl amine

(1) 2 (2) 5 (3) 4 (4) 8

ANSWER KEYS

1. (4)	**2.** (4)	**3.** 20	**4.** (2)	**5.** (3)	**6.** (4)	**7.** 10	**8.** (2)
9. (4)	**10.** (4)	**11.** (2)	**12.** (2)	**13.** (2)	**14.** (4)	**15.** (3)	**16.** (1)
17. (2)	**18.** (3)						