

FINAL JEE-MAIN EXAMINATION – JULY, 2021

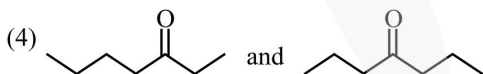
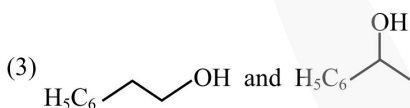
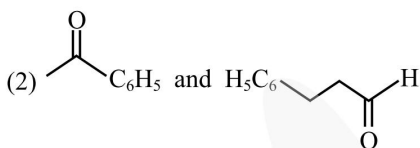
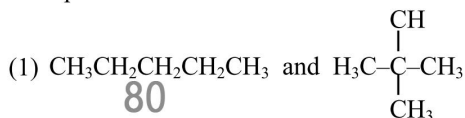
(Held On Tuesday 20th July, 2021)

TIME : 3 : 00 PM to 6 : 00 PM

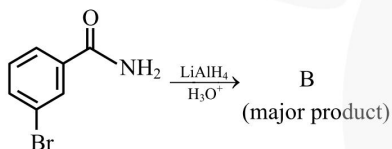
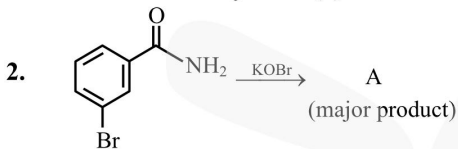
CHEMISTRY

SECTION-A

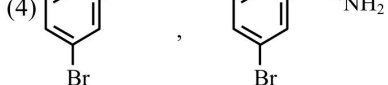
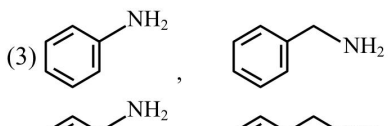
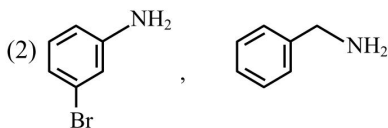
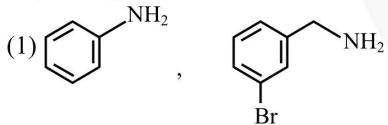
1. Which one of the following pairs of isomers is an example of metamerism ?



Official Ans. by NTA (4)



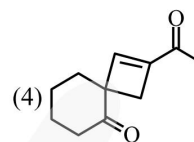
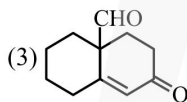
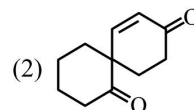
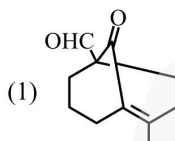
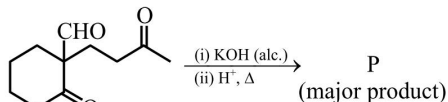
In the above reactions, product A and product B respectively are :



Official Ans. by NTA (4)

TEST PAPER WITH ANSWER

3. The major product (P) in the following reaction is :



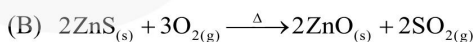
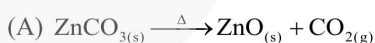
Official Ans. by NTA (2)

4. The single largest industrial application of dihydrogen is :

- (1) Manufacture of metal hydrides
- (2) Rocket fuel in space research
- (3) In the synthesis of ammonia
- (4) In the synthesis of nitric acid

Official Ans. by NTA (3)

5. Consider two chemical reactions (A) and (B) that take place during metallurgical process :



The **correct** option of names given to them respectively is :

- (1) (A) is calcination and (B) is roasting
- (2) Both (A) and (B) are producing same product so both are roasting
- (3) Both (A) and (B) are producing same product so both are calcination
- (4) (A) is roasting and (B) is calcination

Official Ans. by NTA (1)

6. A solution is 0.1 M in Cl^- and 0.001 M in CrO_4^{2-} . Solid AgNO_3 is gradually added to it. Assuming that the addition does not change in volume and $K_{\text{sp}}(\text{AgCl}) = 1.7 \times 10^{-10} \text{ M}^2$ and $K_{\text{sp}}(\text{Ag}_2\text{CrO}_4) = 1.9 \times 10^{-12} \text{ M}^3$.

Select **correct** statement from the following :

- (1) AgCl precipitates first because its K_{sp} is high.
- (2) Ag_2CrO_4 precipitates first as its K_{sp} is low.
- (3) Ag_2CrO_4 precipitates first because the amount of Ag^+ needed is low.
- (4) AgCl will precipitate first as the amount of Ag^+ needed to precipitate is low.

Official Ans. by NTA (4)

7. Outermost electronic configuration of a group 13 element, E, is $4s^2, 4p^1$. The electronic configuration of an element of p-block period-five placed diagonally to element, E is :

- (1) $[\text{Kr}] 3d^{10} 4s^2 4p^2$
- (2) $[\text{Ar}] 3d^{10} 4s^2 4p^2$
- (3) $[\text{Xe}] 5d^{10} 6s^2 6p^2$
- (4) $[\text{Kr}] 4d^{10} 5s^2 5p^2$

Official Ans. by NTA (4)

8. Metallic sodium does not react normally with :

- (1) gaseous ammonia
- (2) But-2-yne
- (3) Ethyne
- (4) tert-butyl alcohol

Official Ans. by NTA (2)

9. Spin only magnetic moment of an octahedral complex of Fe^{2+} in the presence of a strong field ligand in BM is :

- (1) 4.89
- (2) 2.82
- (3) 0
- (4) 3.46

Official Ans. by NTA (3)

10. Which one of the following species **doesn't** have a magnetic moment of 1.73 BM, (spin only value) ?

- (1) O_2^+
- (2) CuI
- (3) $[\text{Cu}(\text{NH}_3)_4]\text{Cl}_2$
- (4) O_2^-

Official Ans. by NTA (2)

11. Which one of the following statements is not true about enzymes ?

- (1) Enzymes are non-specific for a reaction and substrate.
- (2) Almost all enzymes are proteins.
- (3) Enzymes work as catalysts by lowering the activation energy of a biochemical reaction.
- (4) The action of enzymes is temperature and pH specific

Official Ans. by NTA (1)

12. The hybridisations of the atomic orbitals of nitrogen in NO_2^- , NO_2^+ and NH_4^+ respectively are.

- (1) sp^3 , sp^2 and sp
- (2) sp , sp^2 and sp^3
- (3) sp^3 , sp and sp^2
- (4) sp^2 , sp and sp^3

Official Ans. by NTA (4)

13. Bakelite is a cross-linked polymer of formaldehyde and :

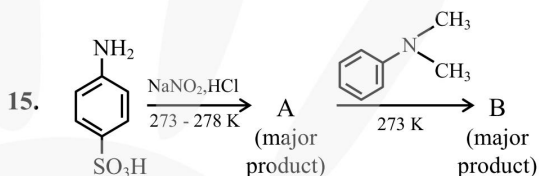
- (1) PHBV
- (2) Buna-S
- (3) Novolac
- (4) Dacron

Official Ans. by NTA (3)

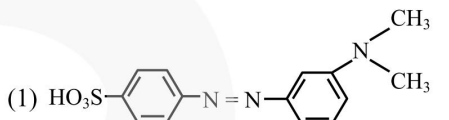
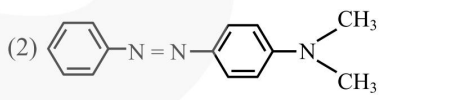
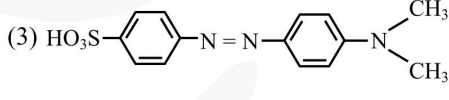
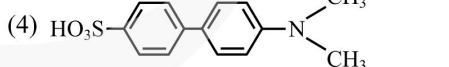
14. Benzene on nitration gives nitrobenzene in presence of HNO_3 and H_2SO_4 mixture, where :

- (1) both H_2SO_4 and HNO_3 act as a bases
- (2) HNO_3 acts as an acid and H_2SO_4 acts as a base
- (3) both H_2SO_4 and HNO_3 act as an acids
- (4) HNO_3 acts as a base and H_2SO_4 acts as an acid

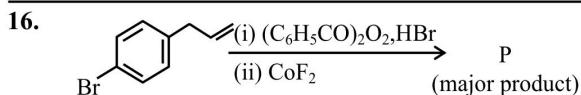
Official Ans. by NTA (4)



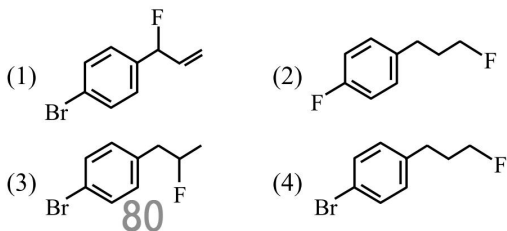
Consider the above reaction, compound B is :

- (1) 
- (2) 
- (3) 
- (4) 

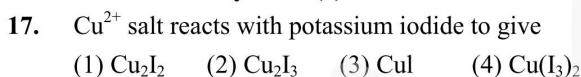
Official Ans. by NTA (3)



Major product P of above reaction, is :

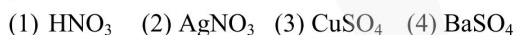
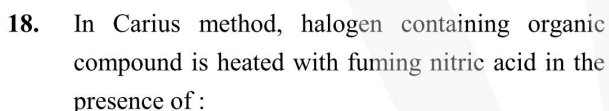


Official Ans. by NTA (4)

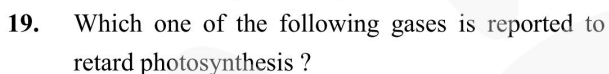


Official Ans. by NTA (1)

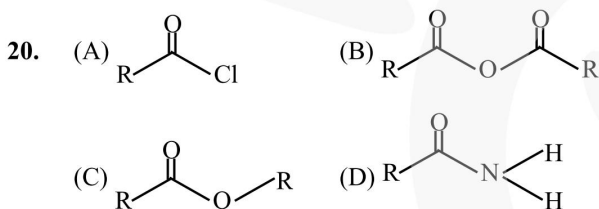
ALLEN Ans. (1, 3)



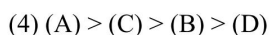
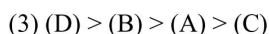
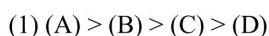
Official Ans. by NTA (2)



Official Ans. by NTA (4)

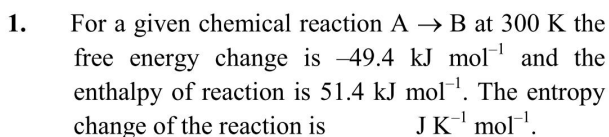


The **correct** order of their reactivity towards hydrolysis at room temperature is :

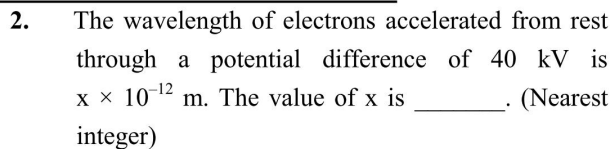


Official Ans. by NTA (1)

SECTION-B



Official Ans. by NTA (360)

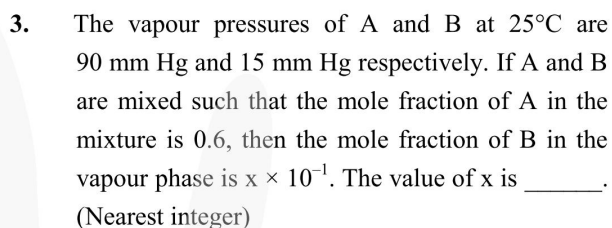


Given : Mass of electron = $9.1 \times 10^{-31} \text{ kg}$

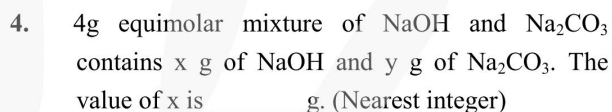
Charge on an electron = $1.6 \times 10^{-19} \text{ C}$

Planck's constant = $6.63 \times 10^{-34} \text{ Js}$

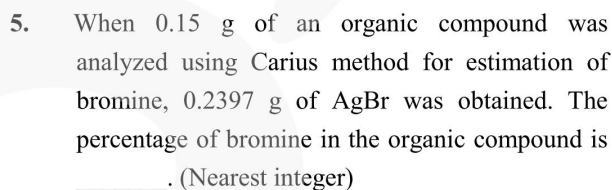
Official Ans. by NTA (6)



Official Ans. by NTA (1)

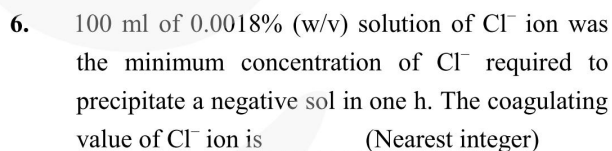


Official Ans. by NTA (1)



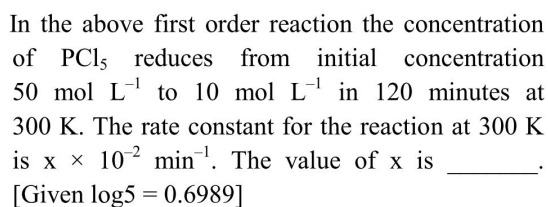
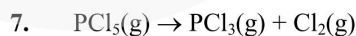
[Atomic mass : Silver = 108, Bromine = 80]

Official Ans. by NTA (68)



Official Ans. by NTA (1)

ALLEN Ans. (Bonus)



Official Ans. by NTA (1)

8. Diamond has a three dimensional structure of C atoms formed by covalent bonds. The structure of diamond has face centred cubic lattice where 50% of the tetrahedral voids are also occupied by carbon atoms. The number of carbon atoms present per unit cell of diamond is _____.

Official Ans. by NTA (8)

9. An aqueous solution of NiCl_2 was heated with excess sodium cyanide in presence of strong oxidizing agent to form $[\text{Ni}(\text{CN})_6]^{2-}$. The total change in number of unpaired electrons on metal centre is _____.

Official Ans. by NTA (2)

10. Potassium chlorate is prepared by electrolysis of KCl in basic solution as shown by following equation.



A current of $x\text{A}$ has to be passed for 10h to produce 10.0g of potassium chlorate. the value of x is _____. (Nearest integer)

(Molar mass of $\text{KClO}_3 = 122.6 \text{ g mol}^{-1}$,
 $F = 96500 \text{ C}$)

Official Ans. by NTA (1)