

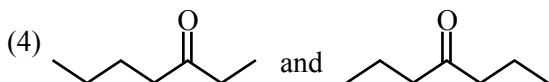
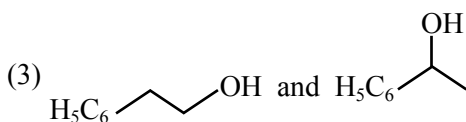
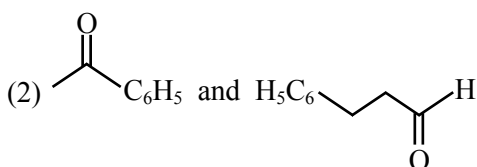
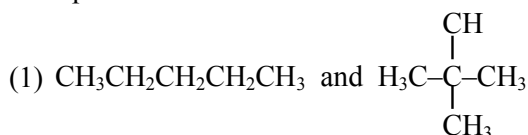
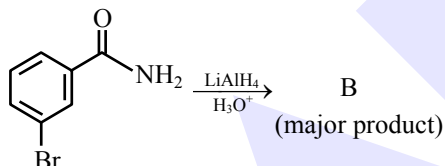
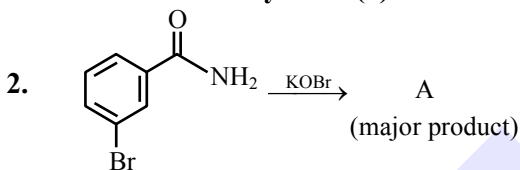
**FINAL JEE-MAIN EXAMINATION – JULY, 2021**

 (Held On Tuesday 20<sup>th</sup> July, 2021)

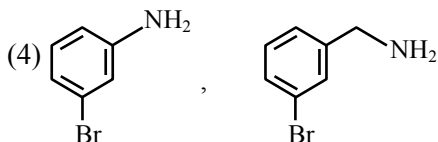
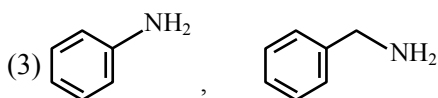
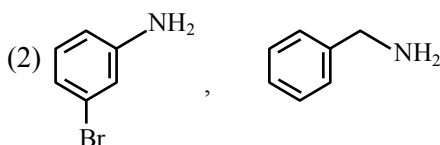
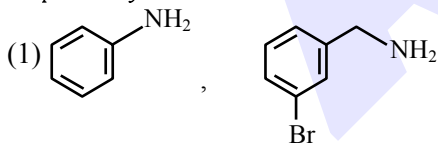
TIME : 3 : 00 PM to 6 : 00 PM

**CHEMISTRY**
**TEST PAPER WITH ANSWER**
**SECTION-A**

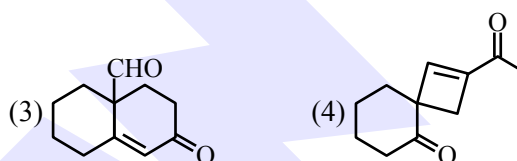
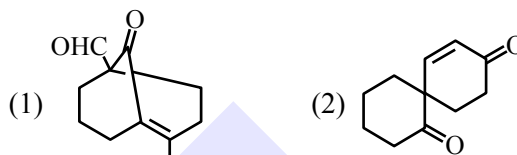
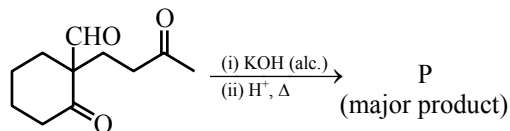
1. Which one of the following pairs of isomers is an example of metamerism ?


**Official Ans. by NTA (4)**


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


**Official Ans. by NTA (4)**

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

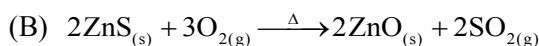
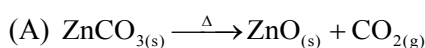

**Official Ans. by NTA (2)**

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  $\text{Cl}^-$  and 0.001 M in  $\text{CrO}_4^{2-}$ . Solid  $\text{AgNO}_3$  is gradually added to it. Assuming that the addition does not change in volume and  $K_{sp}(\text{AgCl}) = 1.7 \times 10^{-10} \text{ M}^2$  and  $K_{sp}(\text{Ag}_2\text{CrO}_4) = 1.9 \times 10^{-12} \text{ M}^3$ .

Select **correct** statement from the following :

- (1)  $\text{AgCl}$  precipitates first because its  $K_{sp}$  is high.
- (2)  $\text{Ag}_2\text{CrO}_4$  precipitates first as its  $K_{sp}$  is low.
- (3)  $\text{Ag}_2\text{CrO}_4$  precipitates first because the amount of  $\text{Ag}^+$  needed is low.
- (4)  $\text{AgCl}$  will precipitate first as the amount of  $\text{Ag}^+$  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  $\text{Fe}^{2+}$  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)  $\text{O}_2^+$
- (2)  $\text{CuI}$
- (3)  $[\text{Cu}(\text{NH}_3)_4]\text{Cl}_2$
- (4)  $\text{O}_2^-$

**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  $\text{NO}_2^-$ ,  $\text{NO}_2^+$  and  $\text{NH}_4^+$  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 :

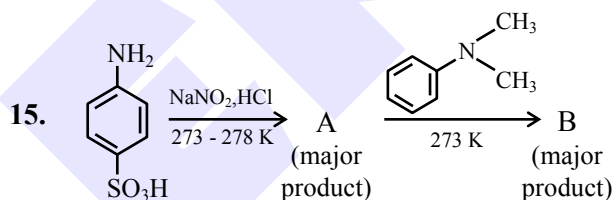
- (1) PHBV
- (2) Buna-S
- (3) Novolac
- (4) Dacron

**Official Ans. by NTA (3)**

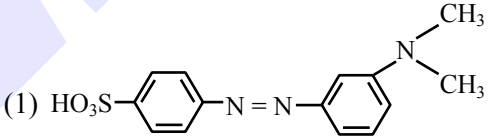
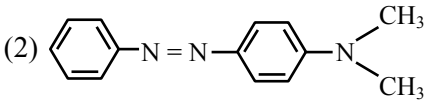
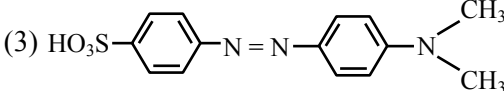
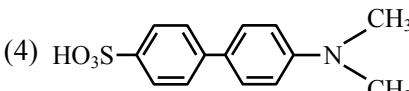
14. Benzene on nitration gives nitrobenzene in presence of  $\text{HNO}_3$  and  $\text{H}_2\text{SO}_4$  mixture, where :

- (1) both  $\text{H}_2\text{SO}_4$  and  $\text{HNO}_3$  act as a bases
- (2)  $\text{HNO}_3$  acts as an acid and  $\text{H}_2\text{SO}_4$  acts as a base
- (3) both  $\text{H}_2\text{SO}_4$  and  $\text{HNO}_3$  act as an acids
- (4)  $\text{HNO}_3$  acts as a base and  $\text{H}_2\text{SO}_4$  acts as an acid

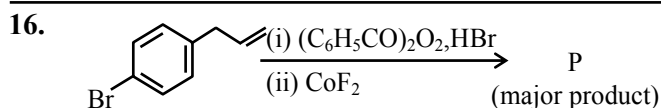
**Official Ans. by NTA (4)**



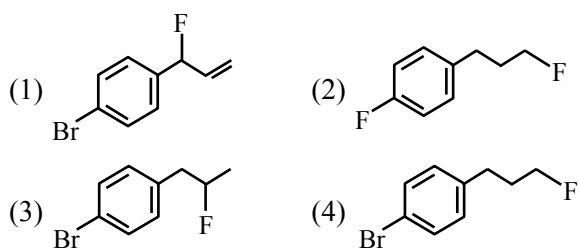
Consider the above reaction, compound B is :

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

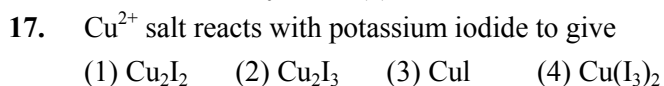
**Official Ans. by NTA (3)**



Major product P of above reaction, is :

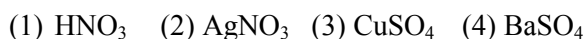
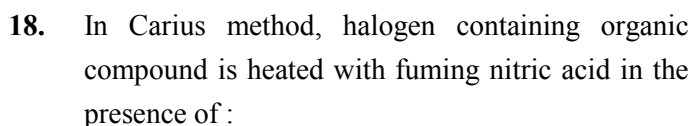


**Official Ans. by NTA (4)**

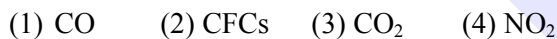
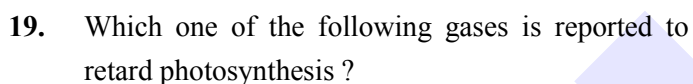


**Official Ans. by NTA (1)**

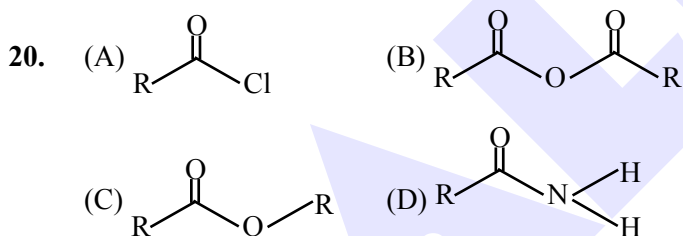
**ALLEN Ans. (1, 3)**



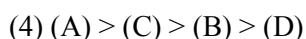
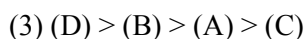
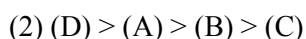
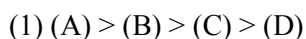
**Official Ans. by NTA (2)**



**Official Ans. by NTA (4)**

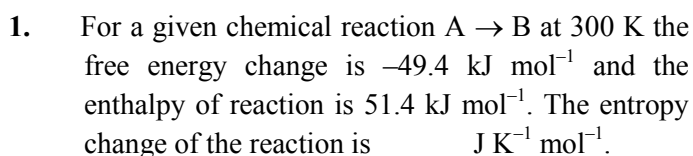


The **correct** order of their reactivity towards hydrolysis at room temperature is :

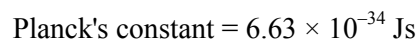
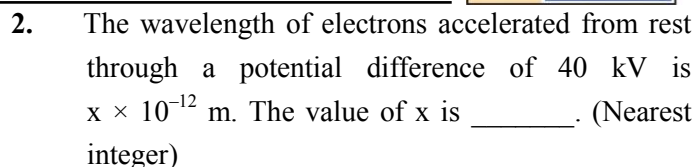


**Official Ans. by NTA (1)**

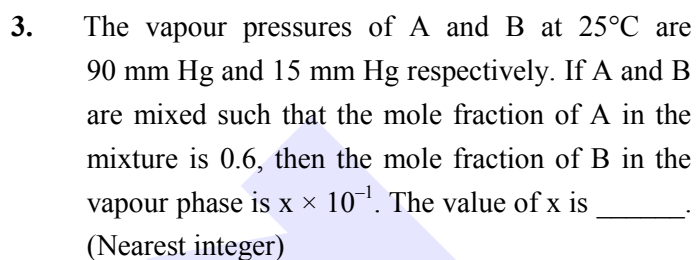
### SECTION-B



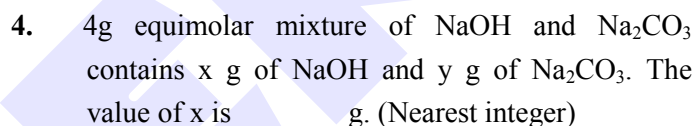
**Official Ans. by NTA (360)**



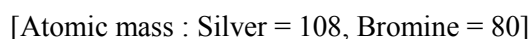
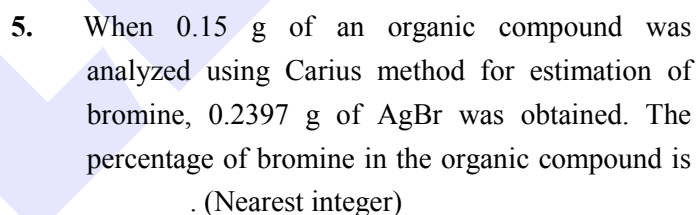
**Official Ans. by NTA (6)**



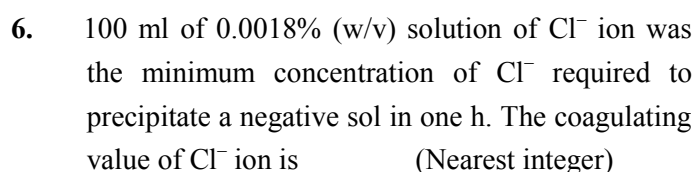
**Official Ans. by NTA (1)**



**Official Ans. by NTA (1)**

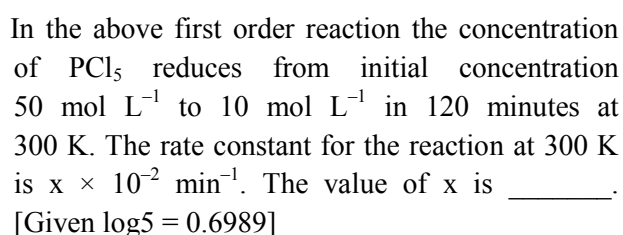
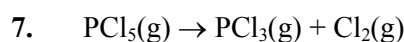


**Official Ans. by NTA (68)**



**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  $\text{NiCl}_2$  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)**