

**FINAL JEE-MAIN EXAMINATION – APRIL, 2019**

 (Held On Friday 12<sup>th</sup> APRIL, 2019) TIME : 2 : 30 PM To 5 : 30 PM

**CHEMISTRY**

1. The molar solubility of  $\text{Cd}(\text{OH})_2$  is  $1.84 \times 10^{-5}$  M in water. The expected solubility of  $\text{Cd}(\text{OH})_2$  in a buffer solution of  $\text{pH} = 12$  is :

- (1)  $6.23 \times 10^{-11}$  M      (2)  $1.84 \times 10^{-9}$  M  
 (3)  $\frac{2.49}{1.84} \times 10^{-9}$  M      (4)  $2.49 \times 10^{-10}$  M

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

2. The correct statement is :

- (1) leaching of bauxite using concentrated NaOH solution gives sodium aluminate and sodium silicate  
 (2) the blistered appearance of copper during the metallurgical process is due to the evolution of  $\text{CO}_2$   
 (3) pig iron is obtained from cast iron  
 (4) the Hall-Heroult process is used for the production of aluminium and iron

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

3. Which one of the following is likely to give a precipitate with  $\text{AgNO}_3$  solution ?

- (1)  $(\text{CH}_3)_3\text{CCl}$       (2)  $\text{CHCl}_3$   
 (3)  $\text{CH}_2=\text{CH}-\text{Cl}$       (4)  $\text{CCl}_4$

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

4. The compound used in the treatment of lead poisoning is :

- (1) EDTA      (2) Cis-platin  
 (3) D-penicillamine      (4) desferrioxime B

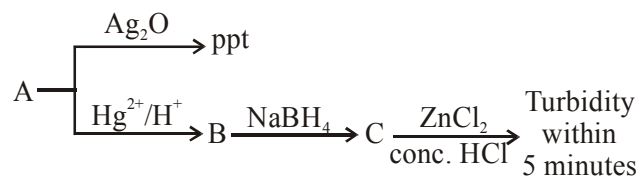
**Official Ans. by NTA (1)**

5. A solution is prepared by dissolving 0.6 g of urea (molar mass =  $60 \text{ g mol}^{-1}$ ) and 1.8 g of glucose (molar mass =  $180 \text{ g mol}^{-1}$ ) in 100 mL of water at  $27^\circ\text{C}$ . The osmotic pressure of the solution is :

- (R =  $0.08206 \text{ L atm K}^{-1} \text{ mol}^{-1}$ )  
 (1) 4.92 atm      (2) 1.64 atm  
 (3) 2.46 atm      (4) 8.2 atm

**Official Ans. by NTA (1)**
**TEST PAPER WITH ANSWER**

6. Consider the following reactions :

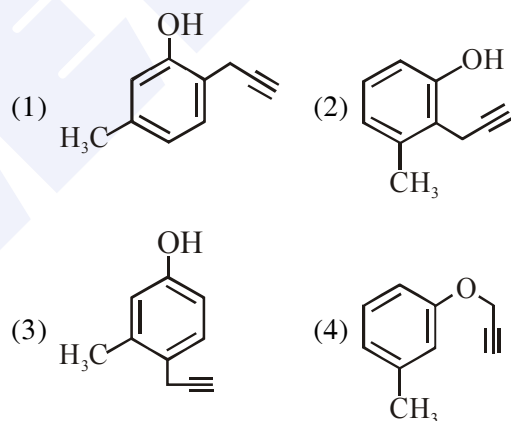


'A' is :

- (1)  $\text{CH}\equiv\text{CH}$       (2)  $\text{CH}_3-\text{C}\equiv\text{CH}$   
 (3)  $\text{CH}_2=\text{CH}_2$       (4)  $\text{CH}_3-\text{C}\equiv\text{C}-\text{CH}_3$

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

7. What will be the major product when m-cresol is reacted with propargyl bromide ( $\text{HC}\equiv\text{C}-\text{CH}_2\text{Br}$ ) in present of  $\text{K}_2\text{CO}_3$  in acetone

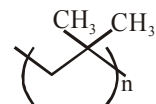

**Official Ans. by NTA (4)**

8. The INCORRECT match in the following is :

- (1)  $\Delta G^\circ < 0, K < 1$       (2)  $\Delta G^\circ = 0, K = 1$   
 (3)  $\Delta G^\circ > 0, K < 1$       (4)  $\Delta G^\circ < 0, K > 1$

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

9. The correct name of the following polymer is:



- (1) Polyisoprene      (2) Polytert-butylene  
 (3) Polyisobutane      (4) Polyisobutylene

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

10. Among the following, the energy of 2s orbital is lowest in :

- (1) K      (2) Na      (3) Li      (4) H

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

11. The primary pollutant that leads to photochemical smog is :

- (1) sulphur dioxide      (2) acrolein  
(3) ozone      (4) nitrogen oxides

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

12. An 'Assertion' and a 'Reason' are given below. Choose the correct answer from the following options.

**Assertion (A) :** Vinyl halides do not undergo nucleophilic substitution easily.

**Reason (R) :** Even though the intermediate carbocation is stabilized by loosely held  $\pi$ -electrons, the cleavage is difficult because of strong bonding.

- (1) Both (A) and (R) are wrong statements  
(2) Both (A) and (R) are correct statements and (R) is the correct explanation of (A)  
(3) Both (A) and (R) are correct statements but (R) is not the correct explanation of (A)  
(4) (A) is a correct statement but (R) is a wrong statement.

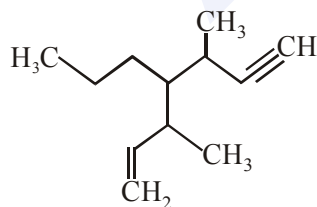
**Official Ans. by NTA (4)**

13. The coordination numbers of Co and Al in  $[\text{Co}(\text{Cl})(\text{en})_2]\text{Cl}$  and  $\text{K}_3[\text{Al}(\text{C}_2\text{O}_4)_3]$ , respectively, are :

- (en=ethane-1,2-diamine)  
(1) 3 and 3      (2) 6 and 6  
(3) 5 and 6      (4) 5 and 3

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

14. The IUPAC name of the following compound is :



- (1) 3,5-dimethyl-4-propylhept-6-en-1-yne  
(2) 3-methyl-4-(3-methylprop-1-enyl)-1-heptyne  
(3) 3-methyl-4-(1-methylprop-2-ynyl)-1-heptene  
(4) 3,5-dimethyl-4-propylhept-1-en-6-yne

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

15. Among the following, the INCORRECT statement about colloids is :

- (1) They can scatter light  
(2) They are larger than small molecules and have high molar mass  
(3) The range of diameters of colloidal particles is between 1 and 1000 nm  
(4) The osmotic pressure of a colloidal solution is of higher order than the true solution at the same concentration

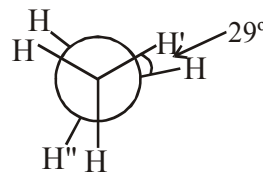
**Official Ans. by NTA (4)**

16. In comparison to boron, beryllium has :

- (1) lesser nuclear charge and greater first ionisation enthalpy  
(2) lesser nuclear charge and lesser first ionisation enthalpy  
(3) greater nuclear charge and greater first ionisation enthalpy  
(4) greater nuclear charge and lesser first ionisation enthalpy

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

17. In the following skew conformation of ethane,  $\text{H}'\text{-C-C-H}''$  dihedral angle is :



- (1)  $120^\circ$       (2)  $58^\circ$   
(3)  $149^\circ$       (4)  $151^\circ$

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

18.  $\text{NO}_2$  required for a reaction is produced by the decomposition of  $\text{N}_2\text{O}_5$  in  $\text{CCl}_4$  as per the equation



The initial concentration of  $\text{N}_2\text{O}_5$  is  $3.00 \text{ mol L}^{-1}$  and it is  $2.75 \text{ mol L}^{-1}$  after 30 minutes. The rate of formation of  $\text{NO}_2$  is :

- (1)  $2.083 \times 10^{-3} \text{ mol L}^{-1} \text{ min}^{-1}$   
(2)  $4.167 \times 10^{-3} \text{ mol L}^{-1} \text{ min}^{-1}$   
(3)  $8.333 \times 10^{-3} \text{ mol L}^{-1} \text{ min}^{-1}$   
(4)  $1.667 \times 10^{-2} \text{ mol L}^{-1} \text{ min}^{-1}$

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

19. Thermal decomposition of a Mn compound (X) at 513 K results in compound Y,  $\text{MnO}_2$  and a gaseous product.  $\text{MnO}_2$  reacts with NaCl and concentrated  $\text{H}_2\text{SO}_4$  to give a pungent gas Z. X, Y and Z, respectively.

- (1)  $\text{K}_2\text{MnO}_4$ ,  $\text{KMnO}_4$  and  $\text{SO}_2$
- (2)  $\text{K}_2\text{MnO}_4$ ,  $\text{KMnO}_4$  and  $\text{Cl}_2$
- (3)  $\text{K}_3\text{MnO}_4$ ,  $\text{K}_2\text{MnO}_4$  and  $\text{Cl}_2$
- (4)  $\text{KMnO}_4$ ,  $\text{K}_2\text{MnO}_4$  and  $\text{Cl}_2$

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

20. 25 g of an unknown hydrocarbon upon burning produces 88 g of  $\text{CO}_2$  and 9 g of  $\text{H}_2\text{O}$ . This unknown hydrocarbon contains.

- (1) 20g of carbon and 5 g of hydrogen
- (2) 24g of carbon and 1 g of hydrogen
- (3) 18g of carbon and 7 g of hydrogen
- (4) 22g of carbon and 3 g of hydrogen

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

21. Which of the given statements is INCORRECT about glycogen ?

- (1) It is a straight chain polymer similar to amylose
- (2) Only  $\alpha$ -linkages are present in the molecule
- (3) It is present in animal cells
- (4) It is present in some yeast and fungi

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

22. The C–C bond length is maximum in

- (1) graphite
- (2)  $\text{C}_{70}$
- (3) diamond
- (4)  $\text{C}_{60}$

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

23. The temporary hardness of a water sample is due to compound X. Boiling this sample converts X to compound Y. X and Y, respectively, are :

- (1)  $\text{Ca}(\text{HCO}_3)_2$  and  $\text{CaO}$
- (2)  $\text{Mg}(\text{HCO}_3)_2$  and  $\text{MgCO}_3$
- (3)  $\text{Mg}(\text{HCO}_3)_2$  and  $\text{Mg}(\text{OH})_2$
- (4)  $\text{Ca}(\text{HCO}_3)_2$  and  $\text{Ca}(\text{OH})_2$

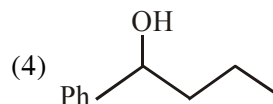
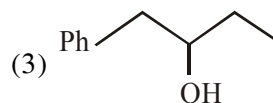
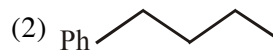
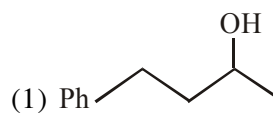
**Official Ans. by NTA (3)**

24. The ratio of number of atoms present in a simple cubic, body centered cubic and face centered cubic structure are, respectively :

- (1) 1 : 2 : 4
- (2) 8 : 1 : 6
- (3) 4 : 2 : 1
- (4) 4 : 2 : 3

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

25. Heating of 2-chloro-1-phenylbutane with EtOK/EtOH gives X as the major product. Reaction of X with  $\text{Hg}(\text{OAc})_2/\text{H}_2\text{O}$  followed by  $\text{NaBH}_4$  gives Y as the major product. Y is :



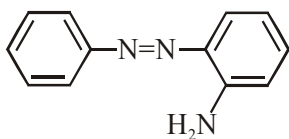
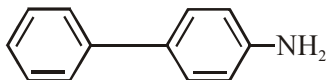
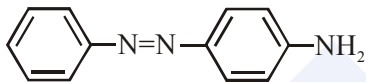
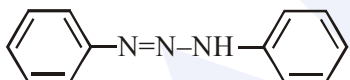
**Official Ans. by NTA (4)**

26. In which one of the following equilibria,  $K_p \neq K_c$  ?

- (1)  $\text{NO}_2(\text{g}) + \text{SO}_2(\text{g}) \rightleftharpoons \text{NO}(\text{g}) + \text{SO}_3(\text{g})$
- (2)  $2 \text{HI}(\text{g}) \rightleftharpoons \text{H}_2(\text{g}) + \text{I}_2(\text{g})$
- (3)  $2\text{NO}(\text{g}) \rightleftharpoons \text{N}_2(\text{g}) + \text{O}_2(\text{g})$
- (4)  $2\text{C}(\text{s}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{CO}(\text{g})$

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

27. Benzene diazonium chloride on reaction with aniline in the presence of dilute hydrochloric acid gives :

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

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

28. The decreasing order of electrical conductivity of the following aqueous solutions is :

- 0.1 M Formic acid (A),  
0.1 M Acetic acid (B)  
0.1 M Benzoic acid (C)

- (1)  $C > B > A$
- (2)  $A > B > C$
- (3)  $A > C > B$
- (4)  $C > A > B$

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

29. The INCORRECT statement is :

- (1) Lithium is least reactive with water among the alkali metals.
- (2) LiCl crystallises from aqueous solution as  $\text{LiCl} \cdot 2\text{H}_2\text{O}$ .
- (3) Lithium is the strongest reducing agent among the alkali metals.
- (4)  $\text{LiNO}_3$  decomposes on heating to give  $\text{LiNO}_2$  and  $\text{O}_2$ .

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

30. The pair that has similar atomic radii is :

- (1) Sc and Ni
- (2) Ti and HF
- (3) Mo and W
- (4) Mn and Re

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