

**FINAL JEE-MAIN EXAMINATION – SEPTEMBER, 2020**

**(Held On Sunday 06<sup>th</sup> SEPTEMBER, 2020) TIME : 9 AM to 12 PM**

**CHEMISTRY**

**TEST PAPER WITH ANSWER**

1. The set that contains atomic number of only transition element is -

- (1) 21, 32, 53, 64  
(2) 21, 25, 42, 72  
(3) 9, 17, 34, 38  
(4) 37, 42, 50, 64

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

2. The lanthanoid that does NOT show +4 oxidation state is

- (1) Dy  
(2) Eu  
(3) Ce  
(4) Tb

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

3. The INCORRECT statement is :

- (1) bronze is an alloy of copper and tin.  
(2) brass is an alloy of copper and nickel  
(3) cast iron is used to manufacture wrought iron.  
(4) german silver is an alloy of zinc, copper and nickel

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

4. The correct statement with respect to dinitrogen is :

- (1) liquid dinitrogen is not used in cryosurgery.  
(2) it can be used as an inert diluent for reactive chemicals.  
(3) it can combine with dioxygen at 25°C  
(4) N<sub>2</sub> is paramagnetic in nature.

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

5. A solution of two components containing  $n_1$  moles of the 1<sup>st</sup> component and  $n_2$  moles of the 2<sup>nd</sup> component is prepared.  $M_1$  and  $M_2$  are the molecular weights of component 1 and 2 respectively. If  $d$  is the density of the solution in  $\text{g mL}^{-1}$ ,  $C_2$  is the molarity and  $x_2$  is the mole fraction of the 2<sup>nd</sup> component, then  $C_2$  can be expressed as :

$$(1) C_2 = \frac{1000x_2}{M_1 + x_2(M_2 - M_1)}$$

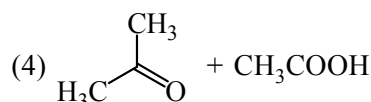
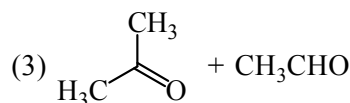
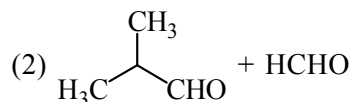
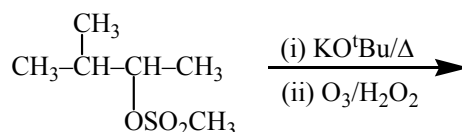
$$(2) C_2 = \frac{dx_2}{M_2 + x_2(M_2 - M_1)}$$

$$(3) C_2 = \frac{dx_1}{M_2 + x_2(M_2 - M_1)}$$

$$(4) C_2 = \frac{1000dx_2}{M_1 + x_2(M_2 - M_1)}$$

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

6. The major products of the following reaction are :



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

7. Kraft temperature is the temperature
- (1) below which the formation of micelles takes place.
  - (2) below which the aqueous solution of detergents starts freezing.
  - (3) above which the formation of micelles takes place.
  - (4) above which the aqueous solution of detergents starts boiling.

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

8. Consider the Assertion and Reason given below.

**Assertion (A) :** Ethene polymerized in the presence of Ziegler Natta Catalyst at high temperature and pressure is used to make buckets and dustbins.

**Reason (R):** High density polymers are closely packed and are chemically inert. Choose the correct answer from the following :

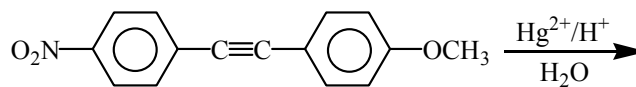
- (1) (A) is correct but (R) is wrong.
- (2) (A) and (R) both are wrong.
- (3) Both (A) and (R) are correct and (R) is the correct explanation of (A).
- (4) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

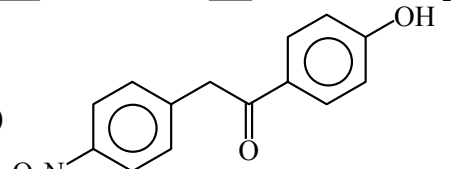
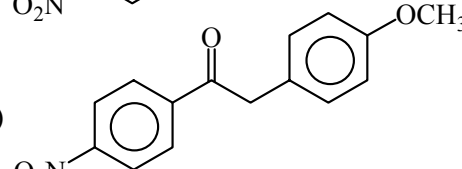
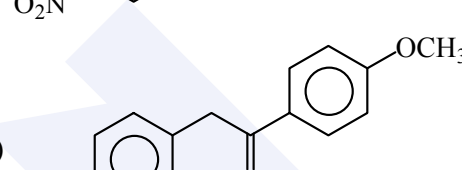
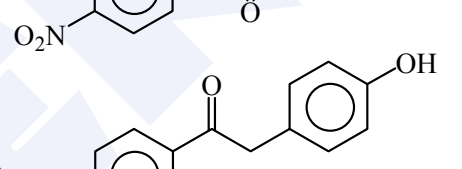
**Official Ans. by NTA (3)**

9. The species that has a spin only magnetic moment of 5.9 BM, is -
- (1)  $\text{Ni}(\text{CO})_4(\text{T}_d)$
  - (2)  $[\text{MnBr}_4]^{2-}(\text{T}_d)$
  - (3)  $[\text{NiCl}_4]^{2-}(\text{T}_d)$
  - (4)  $[\text{Ni}(\text{CN})_4]^{2-}$  (square planar)

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

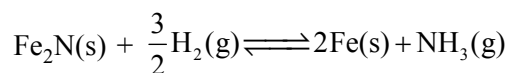
10. The major product obtained from the following reaction is -



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

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

11. For the reaction :



- (1)  $K_C = K_P(\text{RT})$
- (2)  $K_C = K_P(\text{RT})^{-1/2}$
- (3)  $K_C = K_P(\text{RT})^{-3/2}$
- (4)  $K_C = K_P(\text{RT})^{1/2}$

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

12. Arrange the following solutions in the decreasing order of pOH :

- (A) 0.01 M HCl
- (B) 0.01 M NaOH
- (C) 0.01 M  $\text{CH}_3\text{COONa}$
- (D) 0.01 M NaCl

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

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

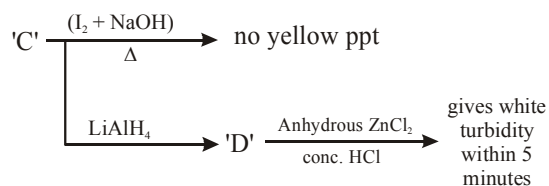
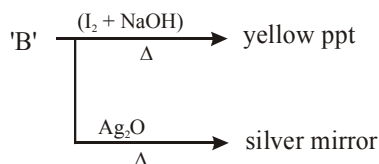
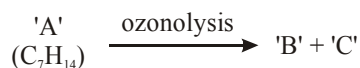
13. The presence of soluble fluoride ion upto 1 ppm concentration in drinking water, is :

- (1) harmful to bones
- (2) harmful for teeth
- (3) safe for teeth
- (4) harmful to skin

Official Ans. by NTA (3)

14. Consider the following reactions :

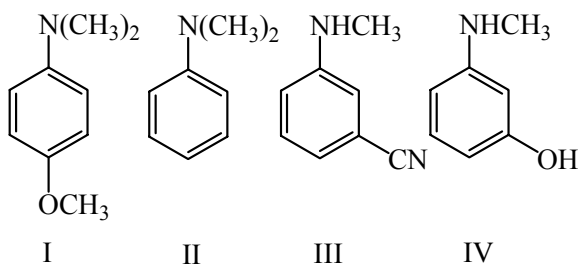
'A' is -



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

Official Ans. by NTA (2)

15. The increasing order of pK<sub>b</sub> values of the following compounds is -



- (1) I < II < IV < III
- (2) II < IV < III < I

(3) II < I < III < IV

(4) I < II < III < IV

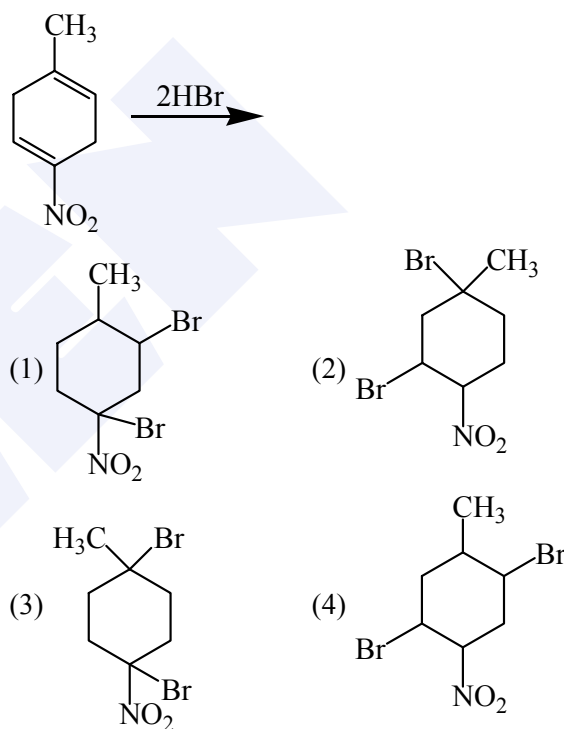
Official Ans. by NTA (1)

16. Among the sulphates of alkaline earth metals, the solubilities of BeSO<sub>4</sub> and MgSO<sub>4</sub> in water, respectively, are:

- (1) high and high                  (2) poor and poor
- (3) high and poor                  (4) poor and high

Official Ans. by NTA (1)

17. The major product of the following reaction is



Official Ans. by NTA (2)

18. The variation of equilibrium constant with temperature is given below :

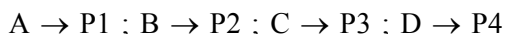
Temperature	Equilibrium constant
T <sub>1</sub> = 25°C	K <sub>1</sub> = 100
T <sub>2</sub> = 100°C	K <sub>2</sub> = 100

The values of ΔH°, ΔG° at T<sub>1</sub> and ΔG° at T<sub>2</sub> (in kJ mol<sup>-1</sup>) respectively, are close to  
[Use R = 8.314 JK<sup>-1</sup>mol<sup>-1</sup>]

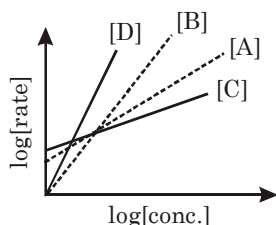
- (1) 0.64, -5.71 and -14.29
- (2) 28.4, -7.14 and -5.71
- (3) 28.4, -5.71 and -14.29
- (4) 0.64, -7.14 and -5.71

Official Ans. by NTA (3)

19. Consider the following reactions :



The order of the above reactions are a, b, c, and d, respectively. The following graph is obtained when  $\log[\text{rate}]$  vs.  $\log[\text{conc.}]$  are plotted:



Among the following , the correct sequence for the order of the reactions is:

- (1)  $a > b > c > d$
- (2)  $c > a > b > d$
- (3)  $d > b > a > c$
- (4)  $d > a > b > c$

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

20. Which of the following compound shows geometrical isomerism

- (1) 2-methylpent-2-ene
- (2) 4-methylpent-1-ene
- (3) 4-methylpent-2-ene
- (4) 2-methylpent-1-ene

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

21. In an estimation of bromine by Carius method, 1.6 g of an organic compound gave 1.88 g of AgBr. The mass percentage of bromine in the compound is \_\_\_\_\_

(Atomic mass, Ag=108, Br = 80 g mol<sup>-1</sup>)

**Official Ans. by NTA (50.00)**

22. The elevation of boiling point of 0.10 m aqueous  $\text{CrCl}_3 \cdot x\text{NH}_3$  solution is two times that of 0.05m aqueous  $\text{CaCl}_2$  solution. The value of x is \_\_\_\_\_.  
 [Assume 100% ionisation of the complex and  $\text{CaCl}_2$ , coordination number of Cr as 6, and that all  $\text{NH}_3$  molecules are present inside the coordination sphere]

**Official Ans. by NTA (5.00)**

23. A spherical balloon of radius 3 cm containing helium gas has a pressure of  $48 \times 10^{-3}$  bar. At the same temperature, the pressure, of a spherical balloon of radius 12 cm containing the same amount of gas will be \_\_\_\_\_  $\times 10^{-6}$  bar.

**Official Ans. by NTA (750.00)**

24. The number of Cl = O bonds in perchloric acid is, " \_\_\_\_\_ "

**Official Ans. by NTA (3.00)**

25. Potassium chlorate is prepared by the electrolysis of KCl in basic solution



If only 60% of the current is utilized in the reaction, the time (rounded to the nearest hour) required to produce 10 g of  $\text{KClO}_3$  using a current of 2 A is \_\_\_\_\_.

(Given :  $F = 96,500 \text{ C mol}^{-1}$  molar mass of  $\text{KClO}_3 = 122 \text{ gmol}^{-1}$ )

**Official Ans. by NTA (11.00)**