

**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 & SOLUTION**

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<sub>1</sub> moles of the 1<sup>st</sup> component and n<sub>2</sub> moles of the 2<sup>nd</sup> component is prepared. M<sub>1</sub> and M<sub>2</sub> are the molecular weights of component 1 and 2 respectively. If d is the density of the solution in g mL<sup>-1</sup>, C<sub>2</sub> is the molarity and x<sub>2</sub> is the mole fraction of the 2<sup>nd</sup> component, then C<sub>2</sub> can be expressed as :

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

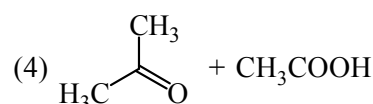
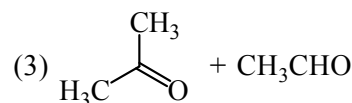
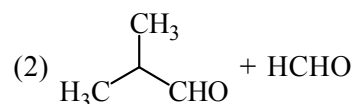
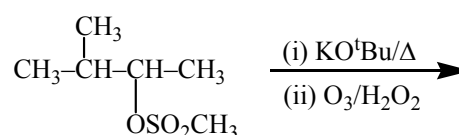
$$(2) C_2 = \frac{dx_2}{M_2 + x_2(M_2 - M_1)}$$

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

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

**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 :

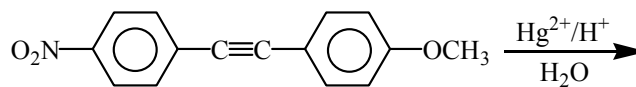
- (1) (A) is correct but (R) is wrong.
- (2) (A) and (R) both are wrong.
- (3) Both (A) and (R) are correct and (R) is the correct explanation of (A).
- (4) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

**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)**

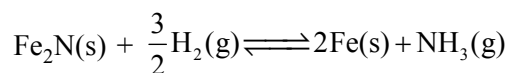
10. The major product obtained from the following reaction is -



- (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)**

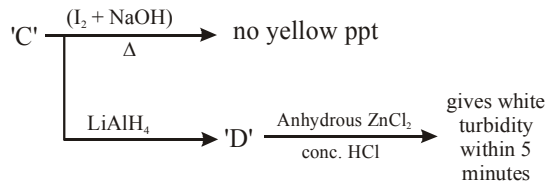
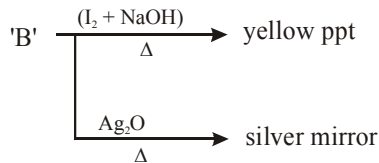
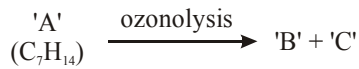
13. The presence of soluble fluoride ion upto 1 ppm concentration in drinking water, is :

- (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 :

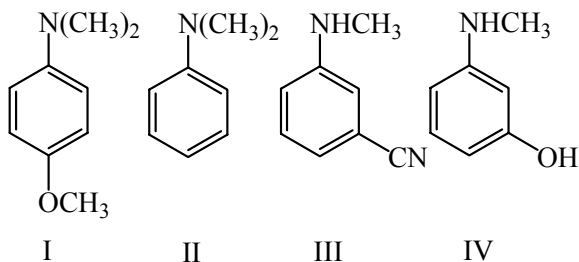
'A' is -



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

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

15. The increasing order of  $\text{pK}_b$  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

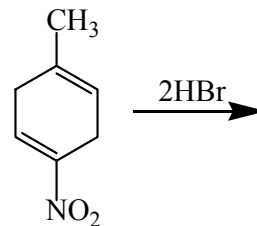
**Official Ans. by NTA (1)**

16. Among the sulphates of alkaline earth metals, the solubilities of  $\text{BeSO}_4$  and  $\text{MgSO}_4$  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



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

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

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

**Temperature**                  **Equilibrium constant**

$T_1 = 25^\circ\text{C}$                    $K_1 = 100$

$T_2 = 100^\circ\text{C}$                    $K_2 = 100$

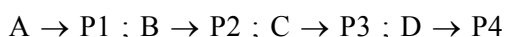
The values of  $\Delta H^\circ$ ,  $\Delta G^\circ$  at  $T_1$  and  $\Delta G^\circ$  at  $T_2$  (in  $\text{kJ mol}^{-1}$ ) respectively, are close to

[Use  $R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$ ]

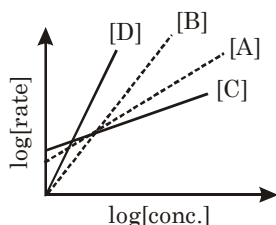
- (1) 0.64, -5.71 and -14.29
- (2) 28.4, -7.14 and -5.71
- (3) 28.4, -5.71 and -14.29
- (4) 0.64, -7.14 and -5.71

**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)**