FINAL JEE–MAIN EXAMINATION – SEPTEMBER, 2020

(Held On Sunday 06th 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_2 is paramagnetic in nature.

Official Ans. by NTA (2)

5. A solution of two components containing n_1 moles of the 1st component and n_2 moles of the 2nd 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 g mL^{-1}, C_2 is the molarity and x_2 is the mole fraction of the 2nd component, then C_2 can be expressed as :

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

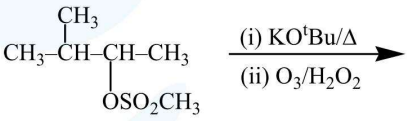
(2) $C_2 = \dfrac{dx_2}{M_2 + x_2(M_2 - M_1)}$

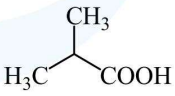
(3) $C_2 = \dfrac{dx_1}{M_2 + x_2(M_2 - M_1)}$

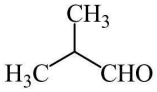
(4) $C_2 = \dfrac{1000dx_2}{M_1 + x_2(M_2 - M_1)}$

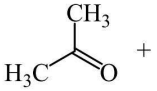
Official Ans. by NTA (4)

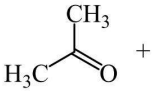
6. The major products of the following reaction are :



(1)  + HCOOH

(2)  + HCHO

(3)  + CH_3CHO

(4)  + CH_3COOH

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) $Ni(CO)_4(T_d)$

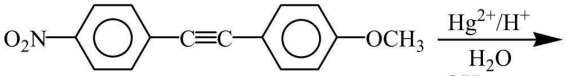
(2) $[MnBr_4]^{2-}(T_d)$

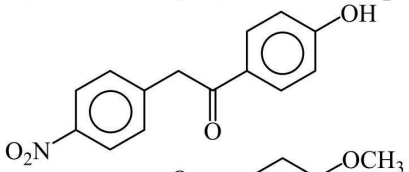
(3) $[NiCl_4]^{2-}(T_d)$

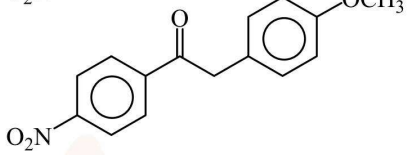
(4) $[Ni(CN)_4]^{2-}$ (square planar)

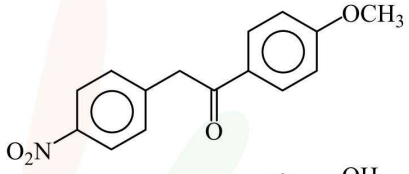
Official Ans. by NTA (2)

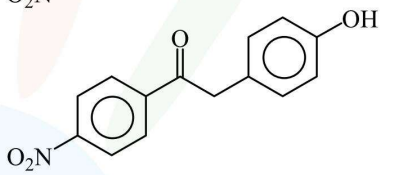
10. The major product obtained from the following reaction is -



(1) 

(2) 

(3) 

(4) 

Official Ans. by NTA (3)

11. For the reaction :

$$Fe_2N(s) + \frac{3}{2}H_2(g) \rightleftharpoons 2Fe(s) + NH_3(g)$$

(1) $K_C = K_P(RT)$ (2) $K_C = K_P(RT)^{-1/2}$

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

Official Ans. by NTA (4)

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

(A) 0.01 M HC1

(B) 0.01 M NaOH

(C) 0.01 M CH_3COONa

(D) 0.01 M NaCl

(1) (B) > (C) > (D) > (A)

(2) (A) > (C) > (D) > (B)

(3) (B) > (D) > (C) > (A)

(4) (A) > (D) > (Q > (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

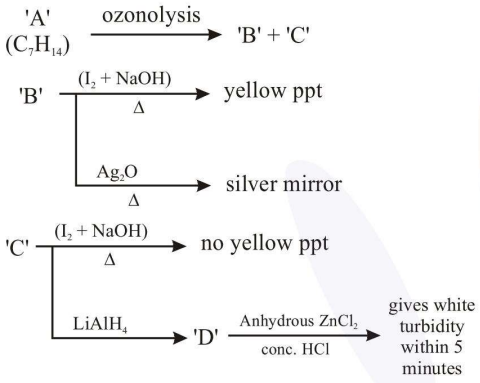
(3) safe for teeth

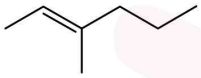
(4) harmful to skin

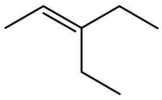
Official Ans. by NTA (3)

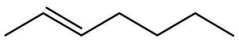
14. Consider the following reactions :

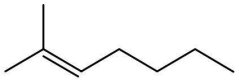
'A' is -



(1) 

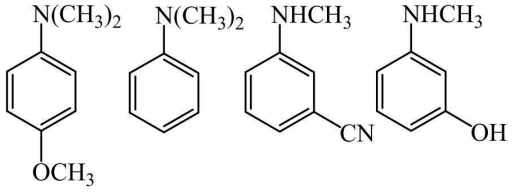
(2) 

(3) 

(4) 

Official Ans. by NTA (2)

15. The increasing order of pK_b values of the following compounds is -



I II III IV

(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)

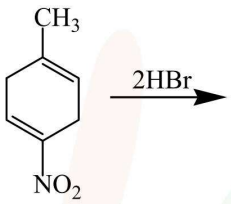
16. Among the sulphates of alkaline earth metals, the solubilities of $BeSO_4$ and $MgSO_4$ in water, respectively, are:

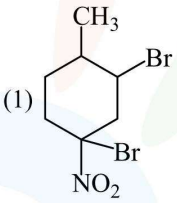
(1) high and high (2) poor and poor

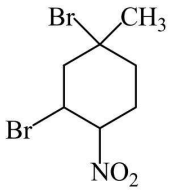
(3) high and poor (4) poor and high

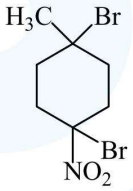
Official Ans. by NTA (1)

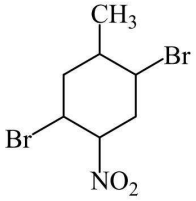
17. The major product of the following reaction is



(1) 

(2) 

(3) 

(4) 

Official Ans. by NTA (2)

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

Temperature	**Equilibrium constant**
$T_1 = 25^oC$	$K_1 = 100$
$T_2 = 100^oC$	$K_2 = 100$

The values of ΔH^o, ΔG^o at T_1 and ΔG^o at T_2 (in kJ mol^{-1}) respectively, are close to

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

(1) 0.64, –5.71 and –14.29

(2) 28.4, –7.14 and –5.71

(3) 28.4, –5.71 and –14.29

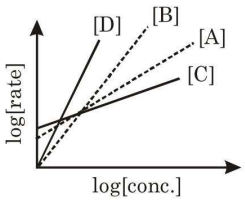
(4) 0.64, –7.14 and –5.71

Official Ans. by NTA (3)

19. Consider the following reactions :

$A \rightarrow P1$; $B \rightarrow P2$; $C \rightarrow P3$; $D \rightarrow P4$

The order of the above reactions are a, b, c, and d, respectively. The following graph is obtained when log [rate] vs. log[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-l-ene

(3) 4-methylpent-2-ene

(4) 2-methylpent-l-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^{-1})

Official Ans. by NTA (50.00)

22. The elevation of boiling point of 0.10 m aqueous $CrCl_3.xNH_3$ solution is two times that of 0.05m aqueous $CaCl_2$ solution. The value of x is____.

[Assume 100% ionisation of the complex and $CaCl_2$, coordination number of Cr as 6, and that all 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 48×10^{-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 CI = 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

$6OH^- + Cl^- \rightarrow ClO_3^- + 3H_2O + 6e^-$

If only 60% of the current is utilized in the reaction, the time (rounded to the nearest hour) required to produce 10 g of $KClO_3$ using a current of 2 A is_____.

(Given : F = 96,500 C mol^{-1} molar mass of $KClO_3$=122 $gmol^{-1}$)

Official Ans. by NTA (11.00)