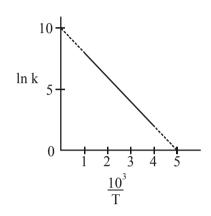
# FINAL JEE-MAIN EXAMINATION - SEPTEMBER, 2020

(Held On Saturday 05th SEPTEMBER, 2020) TIME: 3 PM to 6 PM

# **CHEMISTRY**

- 1. The rate constant (k) of a reaction is measured at different temperatures (T), and the data are plotted in the given figure. The activation energy of the reaction in kJ mol<sup>-1</sup> is:
  - (R is gas constant)



- (1) 2R
- (2) R
- (3) 1/R
- (4) 2/R

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

2. The major product of the following reaction is:

$$\begin{array}{c} \text{HO} \\ \text{CH}_2\text{CH}_3 \end{array} \xrightarrow{\text{H}_2\text{SO}_4}$$



Official Ans. by NTA (2)

## TEST PAPER WITH ANSWER

**3.** The following molecule acts as an:

$$N$$
 $(CH_2)_2$ 
 $(Brompheniramine)$ 
 $Br$ 

- (1) Antiseptic
- (2) Anti-bacterial
- (3) Anti-histamine
- (4) Anti-depressant

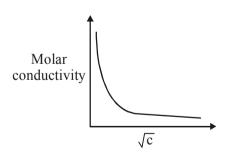
#### Official Ans. by NTA (3)

- 4. An element crystallises in a face-centred cubic (fcc) unit cell with cell edge a. The distance between the centres of two nearest octahedral voids in the crystal lattice is
  - (1) a

- (2)  $\sqrt{2}a$
- (3)  $\frac{a}{\sqrt{2}}$
- (4)  $\frac{a}{2}$

# Official Ans. by NTA (3)

5. The variation of molar conductivity with concentration of an electrolyte (X) in aqueous solution is shown in the given figure.



The electrolyte X is:

- (1) CH<sub>3</sub>COOH
- (2) KNO<sub>3</sub>
- (3) HCl
- (4) NaCl

Official Ans. by NTA (1)

# Final JEE-Main Exam September, 2020/05-09-2020/Evening Session



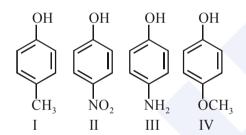
- **6.** The one that is NOT suitable for the removal of permanent hardness of water is:
  - (1) Treatment with sodium carbonate
  - (2) Calgon's method
  - (3) Clark's method
  - (4) Ion-exchange method

## Official Ans. by NTA (3)

- 7. The correct statement about probability density (except at infinite distance from nucleus) is:
  - (1) It cn be negative for 2p orbital
  - (2) It can be zero for 3p orbital
  - (3) It can be zero for 1s orbital
  - (4) It can never be zero for 2s orbital

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

**8.** The increasing order of boiling points of the following compounds is:



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

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

- 9. The compound that has the largest H-M-H bond angle (M=N, O, S, C), is:
  - (1) H<sub>2</sub>O
- (2) CH<sub>4</sub>
- (3) NH<sub>3</sub>
- $(4) H_2S$

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

**10.** Among the following compounds, geometrical isomerism is exhibited by :

$$(1) \begin{array}{c} \text{CH}_2 \\ \\ \text{Cl} \end{array} \qquad (2) \begin{array}{c} \text{CHCl} \\ \\ \text{CH}_3 \end{array}$$

(3) 
$$CHCI$$
  $CHCI$   $CHC$ 

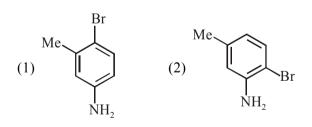
Official Ans. by NTA (2)
Official Ans. by ALLEN (2 & 4)

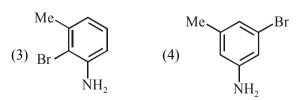
- **11.** Which one of the following polymers is not obtained by condensation polymerisation?
  - (1) Buna N
- (2) Bakelite
- (3) Nylon 6
- (4) Nylon 6, 6

Official Ans. by NTA (1)

**12.** The final major product of the following reaction is:

Me (i) 
$$Ac_2O/Pyridine$$
 (ii)  $Br_2$ ,  $FeCl_3$  (iii)  $OH^-/\Delta$ 





Official Ans. by NTA (1)

- **13.** Hydrogen peroxide, in the pure state, is:
  - (1) non-planar and almost colorless
  - (2) linear and almost colorless
  - (3) planar and blue in color
  - (4) linear and blue in color

### Official Ans. by NTA (1)

- **14.** Boron and silicon of very high purity can be obtained through:
  - (1) vapour phase refining
  - (2) electrolytic refining
  - (3) liquation
  - (4) zone refining

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

- 15. Lattice enthalpy and enthalpy of solution of NaCl are 788 kJ mol<sup>-1</sup> and 4 kJ mol<sup>-1</sup>, respectively. The hydration enthalpy of NaCl is:
  - (1) -780 kJ mol<sup>-1</sup>
- $(2) -784 \text{ kJ mol}^{-1}$
- (3) 780 kJ mol<sup>-1</sup>
- (4) 784 kJ mol-1

## Official Ans. by NTA (2)

- **16.** Reaction of ammonia with excess Cl<sub>2</sub> gives :
  - (1) NH<sub>4</sub>Cl and N<sub>2</sub>
  - (2) NCl<sub>3</sub> and NH<sub>4</sub>Cl
  - (3) NH<sub>4</sub>Cl and HCl
  - (4) NCl<sub>3</sub> and HCl

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

17. The correct order of the ionic radii of

$$O^{2-}$$
,  $N^{3-}$ ,  $F^-$ ,  $Mg^{2+}$ ,  $Na^+$  and  $Al^{3+}$  is :

(1) 
$$Al^{3+} < Na^+ < Mg^{2+} < O^{2-} < F^- < N^{3-}$$

$$(2)\ N^{3-}\!<\!O^{2-}\!<\!F^-\!<\!Na^+\!<\!Mg^{2+}\!<\!Al^{3+}$$

(3) 
$$Al^{3+} < Mg^{2+} < Na^+ < F^- < O^{2-} < N^{3-}$$

(4) 
$$N^{3-} < F^{-} < O^{2-} < Mg^{2+} < Na^{+} < Al^{3+}$$

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

**18.** Consider the complex ions,

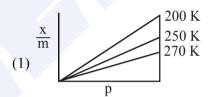
trans-[Co(en)<sub>2</sub>Cl<sub>2</sub>]<sup>+</sup> (A) and

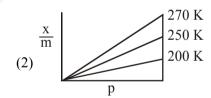
cis-[Co(en)<sub>2</sub>Cl<sub>2</sub>]<sup>+</sup> (B). The correct statement regarding them is :

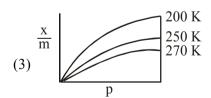
- (1) both (A) and (B) can be optically active
- (2) both (A) and (B) cannot be optically active
- (3) (A) can be optically active, but (B) cannot be optically active
- (4) (A) cannot be optically active, but (B) can be optically active

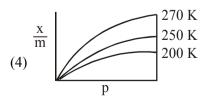
#### Official Ans. by NTA (4)

19. Adsorption of a gas follows Freundlich adsorption isotherm. If x is the mass of the gas adsorbed on mass m of the adsorbent, the correct plot of  $\frac{x}{m}$  versus p is:









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

# Final JEE-Main Exam September, 2020/05-09-2020/Evening Session



**20.** The major product formed in the following reaction is:

 $CH_3CH = CHCH(CH_3)_2 \xrightarrow{HBr}$ 

- (1) CH<sub>3</sub> CH<sub>2</sub> CH<sub>2</sub> C(Br) (CH<sub>3</sub>)<sub>2</sub>
- (2) Br(CH<sub>2</sub>)<sub>3</sub> CH(CH<sub>3</sub>)<sub>2</sub>
- (3) CH<sub>3</sub> CH<sub>2</sub> CH(Br) CH(CH<sub>3</sub>)<sub>2</sub>
- (4) CH<sub>3</sub> CH(Br) CH<sub>2</sub> CH(CH<sub>3</sub>)<sub>2</sub>

Official Ans. by NTA (1)
Official Ans. by ALLEN (4)

**21.** The number of chiral carbons present in sucrose is\_\_\_\_\_\_.

Official Ans. by NTA (9)

22. For a dimerization reaction,

 $2 \; A(g) \to A_2(g)$ 

at 298 K,  $\Delta U^{\odot}$ , = -20kJ mol<sup>-1</sup>,  $\Delta S^{\odot}$  = -30 J

 $K^{-1}$  mol<sup>-1</sup>, then the  $\Delta G^{\odot}$  will be J.

Official Ans. by NTA (-13538.00) Official Ans. by ALLEN (-13537.57) 23. For a reaction  $X + Y \rightleftharpoons 2Z$ , 1.0 mol of X, 1.5 mol of Y and 0.5 mol of Z were taken in a 1 L vessel and allowed to react. At equilibrium, the concentration of Z was 1.0 mol  $L^{-1}$ . The equilibrium constant of the reaction is

 $\frac{x}{15}$ . The value of x is  $\frac{x}{15}$ .

Official Ans. by NTA (16)

**24.** The volume, in mL, of 0.02 M K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> solution required to react with 0.288 g of ferrous oxalate in acidic medium is\_\_\_\_\_.

(Molar mass of Fe =  $56 \text{ g mol}^{-1}$ )

Official Ans. by NTA (50.00)

**25.** Considering that  $\Delta_0 > P$ , the magnetic moment (in BM) of  $[Ru(H_2O)_6]^{2+}$  would be

Official Ans. by NTA (00)