FINAL JEE–MAIN EXAMINATION – JULY, 2021

(Held On Thursday 22nd July, 2021) **TIME : 3 : 00 PM to 6 : 00 PM**

CHEMISTRY

TEST PAPER WITH ANSWER

SECTION-A

1. The water having more dissolved O_2 is :

(1) boiling water (2) water at 80°C

(3) polluted water (4) water at 4°C

Official Ans. by NTA (4)

2. Which one of the following statements for D.I. Mendeleeff, is **incorrect**?

(1) He authored the textbook – Principles of Chemistry.

(2) At the time, he proposed Periodic Table of elements structure of atom was known.

(3) Element with atomic number 101 is named after him.

(4) He invented accurate barometer.

Official Ans. by NTA (2)

3. Which purification technique is used for high boiling organic liquid compound (decomposes near its boiling point)?

(1) Simple distillation

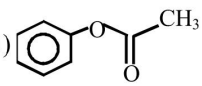
(2) Steam distillation

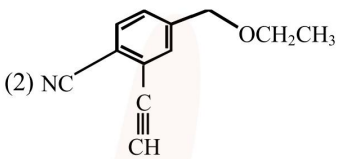
(3) Fractional distillation

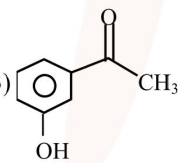
(4) Reduced pressure distillation

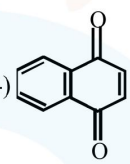
Official Ans. by NTA (4)

4. Which of the following compounds will provide a tertiary alcohol on reaction with excess of CH_3MgBr followed by hydrolysis?

(1) 

(2) 

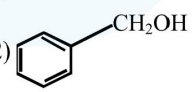
(3) 

(4) 

Official Ans. by NTA (1)

5. Which of the following compounds does not exhibit resonance?

(1) $CH_3CH_2OCH{=}CH_2$

(2) 

(3) $CH_3CH_2CH_2CONH_2$

(4) $CH_3CH_2CH{=}CHCH_2NH_2$

Official Ans. by NTA (4)

6. Match **List-I** with **List-II**

List-I (Elements)	**List-II (Properties)**
(a) Ba	(i) Organic solvent soluble compounds
(b) Ca	(ii) Outer electronic configuration $6s^2$
(c) Li	(iii) Oxalate insoluble in water
(d) Na	(iv) Formation of very strong monoacidic base

Choose the **correct** answer from the options given below :

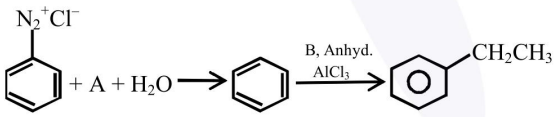
(1) (a)-(ii), (b)-(iii), (c)-(i) and (d)-(iv)

(2) (a)-(iv), (b)-(i), (c)-(ii) and (d)-(iii)

(3) (a)-(iii), (b)-(ii), (c)-(iv) and (d)-(i)

(4) (a)-(i), (b)-(iv), (c)-(ii) and (d)-(iii)

Official Ans. by NTA (1)

7. 

Major product

In the chemical reactions given above A and B respectively are :

(1) H_3PO_2 and CH_3CH_2Cl

(2) CH_3CH_2OH and H_3PO_2

(3) H_3PO_2 and CH_3CH_2OH

(4) CH_3CH_2Cl and H_3PO_2

Official Ans. by NTA (1)

8. Isotope(s) of hydrogen which emits low energy β^- particles with $t_{½}$ value > 12 years is/are

(1) Protium

(2) Tritium

(3) Deuterium

(4) Deuterium and Tritium

Official Ans. by NTA (2)

9. Match **List-I** with **List-II** :

List-I (Species)	**List-II (Hybrid Orbitals)**
(a) SF_4	(i) sp^3d^2
(b) IF_5	(ii) d^2sp^3
(c) NO_2^+	(iii) sp^3d
(d) NH_4^+	(iv) sp^3
	(v) sp

Choose the **correct** answer from the options given below :

(1) (a)-(i), (b)-(ii), (c)-(v) and (d)-(iii)

(2) (a)-(ii), (b)-(i), (c)-(iv) and (d)-(v)

(3) (a)-(iii), (b)-(i), (c)-(v) and (d)-(iv)

(4) (a)-(iv), (b)-(iii), (c)-(ii) and (d)-(v)

Official Ans. by NTA (3)

10. When silver nitrate solution is added to potassium iodide solution then the sol produced is :

(1) AgI / I^- (2) AgI / Ag^+

(3) KI / NO_3^- (4) $AgNO_3 / NO_3^-$

Official Ans. by NTA (1)

11. Which of the following molecules does not show stereo isomerism ?

(1) 3,4-Dimethylhex-3-ene

(2) 3-Methylhex-1-ene

(3) 3-Ethylhex-3-ene

(4) 4-Methylhex-1-ene

Official Ans. by NTA (3)

12. Given below are the statements about diborane

(a) Diborane is prepared by the oxidation of $NaBH_4$ with I_2

(b) Each boron atom is in sp^2 hybridized state

(c) Diborane has one bridged 3 centre-2-electron bond

(d) Diborane is a planar molecule

The option with **correct** statement(s) is -

(1) (c) and (d) only

(2) (a) only

(3) (c) only

(4) (a) and (b) only

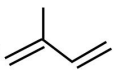
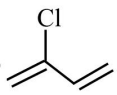
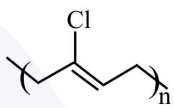
Official Ans. by NTA (2)

13. Which one of the following group-15 hydride is the strongest reducing agent ?

(1) AsH_3 (2) BiH_3 (3) PH_3 (4) SbH_3

Official Ans. by NTA (2)

14. Match **List-I** with **List-II :**

List-I	**List-II**
(a) Chloroprene	(i) 
(b) Neoprene	(ii) 
(c) Acrylonitrile	(iii) 
(d) Isoprene	(iv) CH_2=CH–CN

Choose the **correct** answer from the options given below :

(1) (a) - (iii), (b)-(iv), (c) -(ii), (d) -(i)

(2) (a) - (ii), (b)-(iii), (c) -(iv), (d) -(i)

(3) (a) - (ii), (b)-(i), (c) -(iv), (d) -(iii)

(4) (a) - (iii), (b)-(i), (c) -(iv), (d) -(ii)

Official Ans. by NTA (2)

15. The set having ions which are coloured and paramagnetic both is -

(1) Cu^{2+}, Cr^{3+}, Sc^{+}

(2) Cu^{2+}, Zn^{2+}, Mn^{4+}

(3) Sc^{3+}, V^{5+}, Ti^{4+}

(4) Ni^{2+}, Mn^{7+}, Hg^{2+}

Official Ans. by NTA (1)

16. Thiamine and pyridoxine are also known respectively as :

(1) Vitamin B_2 and Vitamin E

(2) Vitamin E and Vitamin B_2

(3) Vitamin B_6 and Vitamin B_2

(4) Vitamin B_1 and Vitamin B_6

Official Ans. by NTA (4)

17. Sulphide ion is soft base and its ores are common for metals.

(a) Pb (b) Al

(c) Ag (d) Mg

Choose the **correct** answer from the options given below :

(1) (a) and (c) only

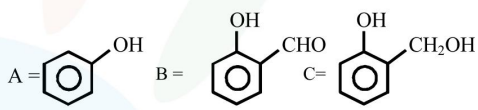
(2) (a) and (d) only

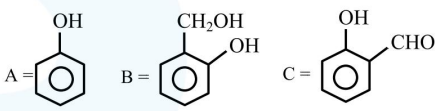
(3) (a) and (b) only

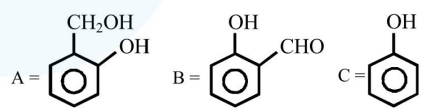
(4) (c) and (d) only

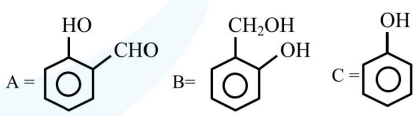
Official Ans. by NTA (1)

18. An organic compound A (C_6H_6O) gives dark green colouration with ferric chloride. On treatment with $CHCl_3$ and KOH, followed by acidification gives compound B. Compound B can also be obtained from compound C on reaction with pyridinium chlorochromate (PCC). Identify A, B and C .

(1) 

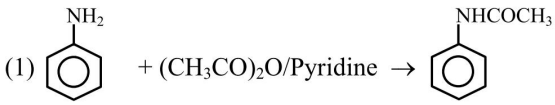
(2) 

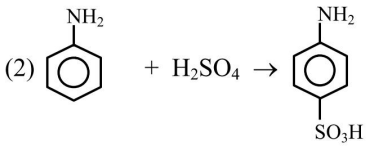
(3) 

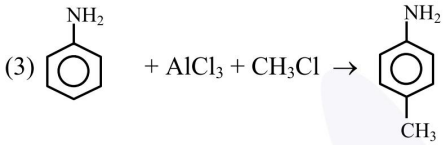
(4) 

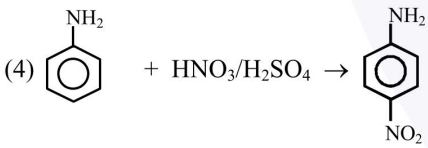
Official Ans. by NTA (1)

19. Which one of the following reactions does not occur ?

(1) 

(2) 

(3) 

(4) 

Official Ans. by NTA (3)

20. Which one of the following 0.06 M aqueous solutions has lowest freezing point ?

(1) $Al_2(SO_4)_3$ (2) $C_6H_{12}O_6$

(3) KI (4) K_2SO_4

Official Ans. by NTA (1)

SECTION-B

1. The total number of unpaired electrons present in $[Co(NH_3)_6]Cl_2$ and $[Co(NH_3)_6]Cl_3$ is

Official Ans. by NTA (1)

ALLEN Ans. (3)

2. Methylation of 10 g of benzene gave 9.2 g of toluene. Calculate the percentage yield of toluene _____. (Nearest integer)

Official Ans. by NTA (78)

3. The number of acyclic structural isomers (including geometrical isomers) for pentene are ____

Official Ans. by NTA (6)

4. Assume a cell with the following reaction

$Cu_{(s)} + 2Ag^{+}(1 \times 10^{-3}\ M) \rightarrow Cu^{2+}(0.250\ M) + 2Ag_{(s)}$

$E^{\ominus}_{cell} = 2.97\,V$

E_{cell} for the above reaction is _____V. (Nearest integer)

[Given : log 2.5 = 0.3979, T = 298 K]

Official Ans. by NTA (3)

5. Value of K_P for the equilibrium reaction

$N_2O_{4\ (g)} \rightleftharpoons 2NO_{2(g)}$ at 288 K is 47.9. The K_C for this reaction at same temperature is _____. (Nearest integer)

($R = 0.083$ L bar K^{-1} mol^{-1})

Official Ans. by NTA (2)

6. If the standard molar enthalpy change for combustion of graphite powder is -2.48×10^2 kJ mol^{-1}, the amount of heat generated on combustion of 1 g of graphite powder is _____ kJ. (Nearest integer)

Official Ans. by NTA (21)

7. A copper complex crystallising in a CCP lattice with a cell edge of 0.4518 nm has been revealed by employing X-ray diffraction studies. The density of a copper complex is found to be 7.62 g cm^{-3}. The molar mass of copper complex is _____ g mol^{-1}. (Nearest integer)

[Given : $N_A = 6.022 \times 10^{23}$ mol^{-1}]

Official Ans. by NTA (106)

8. Number of electrons that Vanadium (Z = 23) has in p-orbitals is equal to _____

Official Ans. by NTA (12)

9. $N_2O_{5(g)} \rightarrow 2NO_{2(g)} + \frac{1}{2}O_{2(g)}$

In the above first order reaction the initial concentration of N_2O_5 is 2.40×10^{-2} mol L^{-1} at 318 K. The concentration of N_2O_5 after 1 hour was 1.60×10^{-2} mol L^{-1}. The rate constant of the reaction at 318 K is _____ $\times 10^{-3}$ min^{-1}. (Nearest integer)

[Given : log 3 = 0.477, log 5 = 0.699]

Official Ans. by NTA (7)

10. If the concentration of glucose ($C_6H_{12}O_6$) in blood is 0.72 g L^{-1}, the molarity of glucose in blood is _____ $\times 10^{-3}$M. (Nearest integer)

[Given : Atomic mass of C = 12, H = 1, O = 16 u]

Official Ans. by NTA (4)