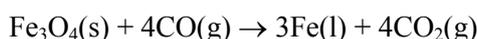


FINAL JEE-MAIN EXAMINATION – JUNE, 2022
(Held On Wednesday 29th June, 2022)
TIME : 9 : 00 AM to 12 : 00 PM
CHEMISTRY
TEST PAPER WITH ANSWER
SECTION-A

1. Production of iron in blast furnace follows the following equation



when 4.640 kg of Fe_3O_4 and 2.520 kg of CO are allowed to react then the amount of iron (in g) produced is :

[Given : Molar Atomic mass (g mol^{-1}): Fe = 56

Molar Atomic mass (g mol^{-1}): O = 16

Molar Atomic mass (g mol^{-1}): C = 12

- (A) 1400 (B) 2200
 (C) 3360 (D) 4200

Official Ans. by NTA (C)

Allen Ans. (C)

2. Which of the following statements are **correct** ?

(A) The electronic configuration of Cr is $[\text{Ar}] 3d^5 4s^1$.

(B) The magnetic quantum number may have a negative value.

(C) In the ground state of an atom, the orbitals are filled in order of their increasing energies.

(D) The total number of nodes are given by $n - 2$.

Choose the **most appropriate** answer from the options given below :

- (A) (A), (C) and (D) only
 (B) (A) and (B) only
 (C) (A) and (C) only
 (D) (A), (B) and (C) only

Official Ans. by NTA (D)

Allen Ans. (D)

3. Arrange the following in the decreasing order of their covalent character :

- (A) LiCl (B) NaCl
 (C) KCl (D) CsCl

Question: Choose the **most appropriate** answer from the options given below :

- (A) (A) > (C) > (B) > (D)
 (B) (B) > (A) > (C) > (D)
 (C) (A) > (B) > (C) > (D)
 (D) (A) > (B) > (D) > (C)

Official Ans. by NTA (C)

Allen Ans. (C)

4. The solubility of AgCl will be maximum in which of the following ?

- (A) 0.01 M KCl
 (B) 0.01 M HCl
 (C) 0.01 M AgNO_3
 (D) Deionised water

Official Ans. by NTA (D)

Allen Ans. (D)

5. Which of the following is a **correct** statement ?

- (A) Brownian motion destabilises sols.
 (B) Any amount of dispersed phase can be added to emulsion without destabilising it.
 (C) Mixing two oppositely charged sols in equal amount neutralises charges and stabilises colloids.
 (D) Presence of equal and similar charges on colloidal particles provides stability to the colloidal solution.

Official Ans. by NTA (D)

Allen Ans. (D)

6. The electronic configuration of Pt (atomic number 78) is:

- (A) $[\text{Xe}] 4f^{14} 5d^9 6s^1$
 (B) $[\text{Kr}] 4f^{14} 5d^{10}$
 (C) $[\text{Xe}] 4f^{14} 5d^{10}$
 (D) $[\text{Xe}] 4f^{14} 5d^8 6s^2$

Official Ans. by NTA (A)

Allen Ans. (A)

7. In isolation of which one of the following metals from their ores, the use of cyanide salt is not commonly involved ?

- (A) Zinc (B) Gold
 (C) Silver (D) Copper

Official Ans. by NTA (D)

Allen Ans. (D)

8. Which one of the following reactions indicates the reducing ability of hydrogen peroxide in basic medium ?

- (A) $\text{HOCl} + \text{H}_2\text{O}_2 \rightarrow \text{H}_3\text{O}^+ + \text{Cl}^- + \text{O}_2$
 (B) $\text{PbS} + 4\text{H}_2\text{O}_2 \rightarrow \text{PbSO}_4 + 4\text{H}_2\text{O}$
 (C) $2\text{MnO}_4^- + 3\text{H}_2\text{O}_2 \rightarrow 2\text{MnO}_2 + 3\text{O}_2 + 2\text{H}_2\text{O} + 2\text{OH}^-$
 (D) $\text{Mn}^{2+} + \text{H}_2\text{O}_2 \rightarrow \text{Mn}^{4+} + 2\text{OH}^-$

Official Ans. by NTA (C)

Allen Ans. (C)

9. Match the List-I with List- II.

List-I (Metal)	List-II (Emitted light wavelength (nm))
(A) Li	(I) 670.8
(B) Na	(II) 589.2
(C) Rb	(III) 780.0
(D) Cs	(IV) 455.5

Choose the **most appropriate** answer from the options given below:

- (A) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
 (B) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)
 (C) (A)-(III), (B)-(I), (C)-(II), (D)-(IV)
 (D) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)

Official Ans. by NTA (A)

Allen Ans. (A)

10. Match the List-I with List- II.

List-I (Metal)	List-II Application
(A) Cs	(I) High temperature thermometer
(B) Ga	(II) Water repellent sprays
(C) B	(III) Photoelectric cells
(D) Si	(IV) Bullet proof vest

Choose the most appropriate answer from the option given below:

- (A) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
 (B) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)
 (C) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
 (D) (A)-(I), (B)-(IV), (C)-(II), (D)-(III)

Official Ans. by NTA (A)

Allen Ans. (A)

11. The oxoacid of phosphorus that is easily obtained from a reaction of alkali and white phosphorus and has two P-H bonds, is :

- (A) Phosphonic acid
 (B) Phosphinic acid
 (C) Pyrophosphorus acid
 (D) Hypophosphoric acid

Official Ans. by NTA (B)

Allen Ans. (B)

12. The acid that is believed to be mainly responsible for the damage of Taj Mahal is

- (A) Sulfuric acid (B) Hydrofluoric acid
 (C) Phosphoric acid (D) Hydrochloric acid

Official Ans. by NTA (A)

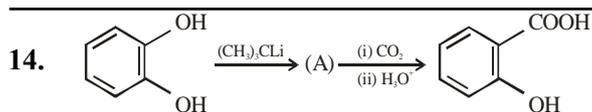
Allen Ans. (A)

13. Two isomers 'A' and 'B' with molecular formula C_4H_8 give different products on oxidation with KMnO_4 in acidic medium. Isomer 'A' on reaction with KMnO_4/H^+ results in effervescence of a gas and gives ketone. The compound 'A' is

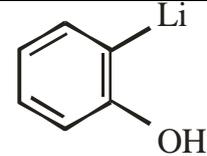
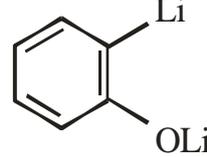
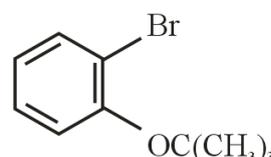
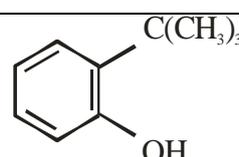
- (A) But-1-ene (B) cis-But-2-ene
 (C) trans-But-2-ene (D) 2-methyl propene

Official Ans. by NTA (D)

Allen Ans. (D)



In the given conversion the compound A is:

(A)	
(B)	
(C)	
(D)	

Official Ans. by NTA (B)

Allen Ans. (B)

15. Given below are two statements :

Statement I : The esterification of carboxylic acid with an alcohol is a nucleophilic acyl substitution.

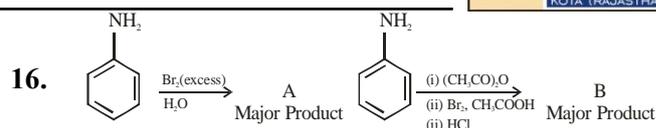
Statement II : Electron withdrawing groups in the carboxylic acid will increase the rate of esterification reaction.

Choose the **most appropriate** option :

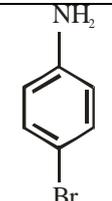
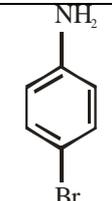
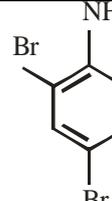
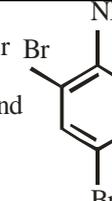
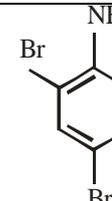
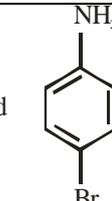
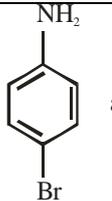
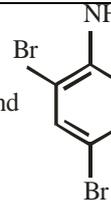
- (A) Both **Statement I** and **Statement II** are correct.
 (B) Both **Statement I** and **Statement II** are incorrect.
 (C) **Statement I** is correct but **Statement II** is incorrect.
 (D) **Statement I** is incorrect but **Statement II** is correct.

Official Ans. by NTA (A)

Allen Ans. (A)



Consider the above reaction, the product A and product B respectively are

(A)		and	
(B)		and	
(C)		and	
(D)		and	

Official Ans. by NTA (C)

Allen Ans. (C)

17. The polymer, which can be stretched and retains its original status on releasing the force is

- (A) Bakelite (B) Nylon 6,6
 (C) Buna-N (D) Terylene

Official Ans. by NTA (C)

Allen Ans. (C)

18. Sugar moiety in DNA and RNA molecules respectively are

- (A) β -D-2-deoxyribose, β -D-deoxyribose
 (B) β -D-2-deoxyribose, β -D-ribose
 (C) β -D-ribose, β -D-2-deoxyribose
 (D) β -D-deoxyribose, β -D-2-deoxyribose

Official Ans. by NTA (B)

Allen Ans. (B)

19. Which of the following compound **does not** contain sulfur atom ?

- (A) Cimetidine (B) Ranitidine
 (C) Histamine (D) Saccharin

Official Ans. by NTA (C)

Allen Ans. (C)

20. Given below are two statements.

Statement I : Phenols are weakly acidic.

Statement II : Therefore they are freely soluble in NaOH solution and are weaker acids than alcohols and water.

Choose the **most appropriate** option:

- (A) Both **Statement I** and **Statement II** are correct.
 (B) Both **Statement I** and **Statement II** are incorrect.
 (C) **Statement I** is correct but **Statement II** is incorrect.
 (D) **Statement I** is incorrect but **Statement II** is correct.

Official Ans. by NTA (C)

Allen Ans. (C)

SECTION-B

1. Geraniol, a volatile organic compound, is a component of rose oil. The density of the vapour is 0.46 gL^{-1} at 257°C and 100 mm Hg. The molar mass of geraniol is _____ (Nearest Integer)

[Given $R = 0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$]

Official Ans. by NTA (152)

Allen Ans. (152)

2. 17.0 g of NH_3 completely vapourises at -33.42°C and 1 bar pressure and the enthalpy change in the process is 23.4 kJ mol^{-1} . The enthalpy change for the vapourisation of 85 g of NH_3 under the same conditions is _____ kJ.

Official Ans. by NTA (117)

Allen Ans. (117)

3. 1.2 mL of acetic acid is dissolved in water to make 2.0 L of solution. The depression in freezing point observed for this strength of acid is 0.0198°C . The percentage of dissociation of the acid is _____. (Nearest integer)

[Given : Density of acetic acid is 1.02 g mL^{-1}
 Molar mass of acetic acid is 60 g mol^{-1}

$K_f(\text{H}_2\text{O}) = 1.85 \text{ K kg mol}^{-1}$]

Official Ans. by NTA (5)

Allen Ans. (5)

4. A dilute solution of sulphuric acid is electrolysed using a current of 0.10 A for 2 hours to produce hydrogen and oxygen gas. The total volume of gases produced at STP is _____ cm^3 . (Nearest integer) [Given : Faraday constant $F = 96500 \text{ C mol}^{-1}$ at STP, molar volume of an ideal gas is 22.7 L mol^{-1}]

Official Ans. by NTA (127)

Allen Ans. (127)

5. The activation energy of one of the reactions in a biochemical process is $532611 \text{ J mol}^{-1}$. When the temperature falls from 310 K to 300 K, the change in rate constant observed is $k_{300} = x \times 10^{-3} k_{310}$. The value of x is _____.

[Given: $\ln 10 = 2.3$, $R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1}$]

Official Ans. by NTA (1)

Allen Ans. (1)

6. The number of terminal oxygen atoms present in the product B obtained from the following reaction is _____.



Official Ans. by NTA (6)

Allen Ans. (6)

7. An acidified manganate solution undergoes disproportionation reaction. The spin-only magnetic moment value of the product having manganese in higher oxidation state is _____

B.M. (Nearest integer)

Official Ans. by NTA (0)

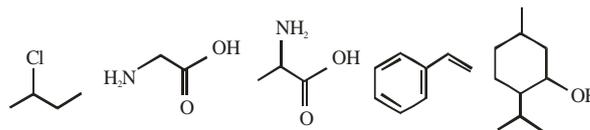
Allen Ans. (0)

8. Kjeldahl's method was used for the estimation of nitrogen in an organic compound. The ammonia evolved from 0.55 g of the compound neutralised 12.5 mL of 1 M H_2SO_4 solution. The percentage of nitrogen in the compound is _____. (Nearest integer)

Official Ans. by NTA (64)

Allen Ans. (64)

9. Observe structures of the following compounds



The total number of structures/compounds which possess asymmetric carbon atoms is _____.

Official Ans. by NTA (3)

Allen Ans. (3)

10. $\text{C}_6\text{H}_{12}\text{O}_6 \xrightarrow{\text{Zymase}} \text{A} \xrightarrow[\Delta]{\text{NaOI}} \text{B} + \text{CHI}_3$

The number of carbon atoms present in the product B is _____.

Official Ans. by NTA (1)

Allen Ans. (1)