



JEE (Main)

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2021

COMPUTER BASED TEST (CBT)

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Date: 27 August, 2021 (SHIFT-2) | TIME : (3.00 p.m. to 06.00 p.m)

Duration: 3 Hours | Max. Marks: 300

SUBJECT: CHEMISTRY

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PART : CHEMISTRY

- | 1. Column-I | Column-II |
|---------------|---|
| Ore | Formula |
| (i) Calamine | (a) ZnCO_3 |
| (ii) Siderite | (b) $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$ |

- (iii) Malachite (c) FeCO_3
(iv) Cerussite (d) PbCO_3

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- (1) i - a, ii - c, iii - b, iv - d (2) i - a, ii - b, iii - c, iv - d
(3) i - a, ii - d, iii - b, iv - c (4) i - d, ii - c, iii - b, iv - a

Ans. (1)

- Sol. (i) Calamine : ZnCO_3
(ii) Siderite : FeCO_3
(iii) Malachite : $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$
(iv) Cerussite : PbCO_3

2. When red phosphorous is heated in a sealed tube at 803 K, then

- (1) α -black phosphorous is formed (2) β -black phosphorous is formed
(3) white phosphorous is formed (4) No effect

Ans. (1)

Sol. When red phosphorous is heated in a sealed tube at 800 K, then α -black phosphorous is formed.

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3. Co-ordination number of Fe in $\text{K}_4[\text{Fe(CN)}_6]$ is _____.

Ans. (6)

Sol. $\text{K}_4[\text{Fe(CN)}_6]$ Co-ordination of Fe = 6

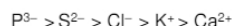
4. Correct order of ionic radius of species P^{3-} , S^{2-} , Cl^- , Ca^{2+} , K^+ is.

- (1) $\text{P}^{3-} > \text{S}^{2-} > \text{Cl}^- > \text{Ca}^{2+} > \text{K}^+$ (2) $\text{P}^{3-} > \text{S}^{2-} > \text{Cl}^- > \text{K}^+ > \text{Ca}^{2+}$
(3) $\text{P}^{3-} > \text{Cl}^- > \text{S}^{2-} > \text{K}^+ > \text{Ca}^{2+}$ (4) $\text{S}^{2-} > \text{P}^{3-} > \text{Cl}^- > \text{Ca}^{2+} > \text{K}^+$

Ans. (2)

Sol.	P^{3-}	S^{2-}	Cl^-	K^+	Ca^{2+}
Z	15	16	17	19	20
No. of e^-	18	18	18	18	18

For isoelectronic species greater is Z smaller is radius. So correct order



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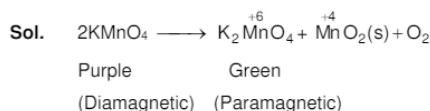
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5. On heating KMnO_4 , the product formed is :

- (1) Paramagnetic and colourless (2) Paramagnetic and Red colour

Ans. (2)

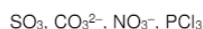


6. How many total optical isomers are possible for complex $[\text{Cr}(\text{C}_2\text{O}_4)_3]^{3-}$.

Ans. (2)

Sol. Complex $[\text{Cr}(\text{C}_2\text{O}_4)_3]^{3-}$ is $[\text{M}(\text{AA})_3]$ type complex, which does not show GI. It have only one form but it is optical active due to absence of plane of symmetry.

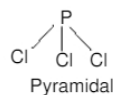
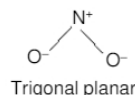
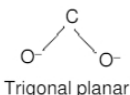
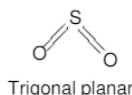
7. How many of following species have non pyramidal geometry.



Ans. (3)

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Sol.



8. Which of the following compound is used to remove plutonium from spent nuclear fuel?

- (1) I_2O_5 (2) O_2F_2 (3) ClF_3 (4) BrO_3

Ans. (2)

Sol. O_2F_2 oxidise plutonium to PuF_6 and the reaction is used to removing plutonium as PuF_6 from spent nuclear fuel.

(2) Because there is strong electrostatic repulsion between the negative charge particles.

(3) They are solvated.

(4) They have negative charge.

Ans. (3)

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Sol. Lyophilic sols are quite stable and cannot be easily coagulated.

Lyophobic sols need stabilising agents for their preservation.

Property	Lyophilic colloids	Lyophobic colloids
Stability	These are very stable	These are unstable and require traces of stabilizers

10. Which of the following gives H_2O_2 on hydrolysis ?

- (1) Na_2O_2 (2) Li_2O (3) MgO (4) KO_3

Ans. (1)

Sol. (i) $Na_2O_2 + H_2O \rightarrow NaOH + H_2O_2$

(ii) $Li_2O + H_2O \rightarrow 2LiOH$

(iii) $MgO + H_2O \rightarrow Mg(OH)_2$

(iv) $KO_3 + H_2O \rightarrow KOH + O_2$

11. Chromium(III) hydroxide is precipitated from a solution of Cr^{3+} ions by adding $NaOH$ solution.

(Precipitate)

- (1) $Cr(OH)_3$ (2) $Cr(OH)_4$ (3) Cr_2O_3 (4) CrO

Ans. (1)

Sol. $Cr^{3+} \xrightarrow{NaOH} Cr(OH)_3 \downarrow$
(Green ppt.)

12. In hydrogen like atom an electron is present in excited state 6, then maximum number of spectral line formed, when electron make transition from excited state to ground state.

Ans. (6)

Sol. Excited state = 6

So $n = 7$

Maximum spectral line formed = $(n - 1) = 6$

13. When 88 g of propane reacts with 640 g of oxygen then find the mole fraction of CO_2 in resultant gaseous

Ans. (0.375)

Sol. $C_3H_8(g) + 5O_2(g) \xrightarrow{\Delta} 3CO_2(g) + 4H_2O(l)$

Weight (g) 88 640

Mole $\frac{88}{46} = 2$ $\frac{640}{32} = 20$

LR = C_3H_8

$$2-2 = 0 \quad 20-10 = 10 \quad 6$$

Total mole in gaseous mixture after reaction = $10 + 6 = 16$

$$\text{Mole fraction of CO}_2 = \frac{6}{16} = 0.375$$

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14. Which of the following test do not involve copper metal in their reaction.

- (1) Seliwanoff Test (2) Barfoed Test (3) Fehling Test (4) Biurate Test

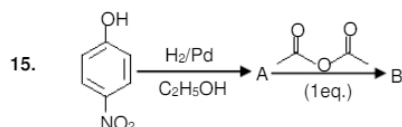
Ans. (1)

Sol. Seliwanoff Test : This test use to detect the presence of Keto-hexose than aldohexose.

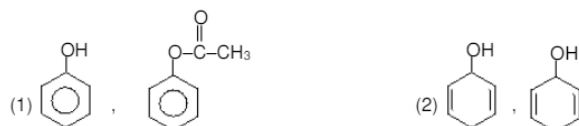
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Fehling Solution: It is used to detect aldehyde than Ketone by reduction Cu(II) into Cu(I).

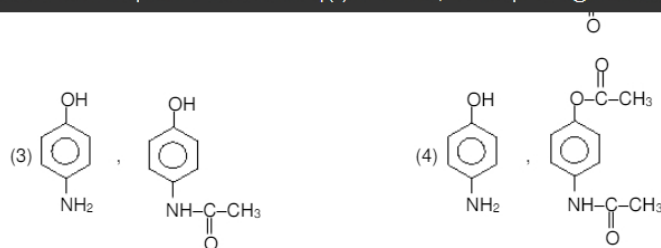
Biurate Test : Use to detect presence of peptide bond. Protein by reduction of Cu(II) into Cu(I).



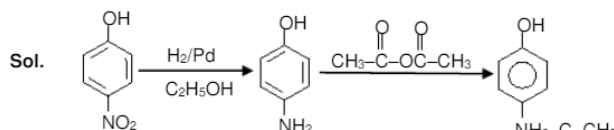
Identify A and B.



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Ans. (3)



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16. The major product obtained on the hydrolysis of sucrose.

- (1) α -D Glucose + α -D Glucose (2) α -D Glucose + β -D Fructose
(3) α -D Glucose + α -D Fructose (4) α -D Fructose + β -D Fructose

Ans. (2)

Sol. Sucrose is a disaccharide of α -Glucose and β -Fructose. So on hydrolysis we obtain α -Glucose and β -Fructose.

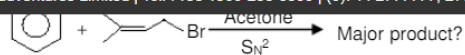
17. What is pH of rain water?

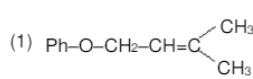
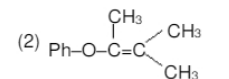
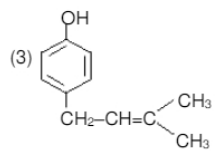
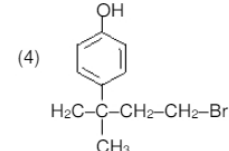
- (1) 5.6 (2) 7.6 (3) 6.6 (4) 4.6

Ans. (1)

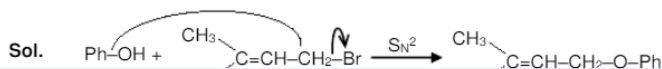
Sol. NCERT based.

18. In this following S_N2 reaction which product will be.



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

Ans. (1)



19. **Statement-1:** Ethyl pent-3-ynoate react with CH_3MgBr than we will get 3^o alcohol as a main product.

Statement-2: 1 mole of ethyl pent-3-ynoate use 2 mole of CH_3MgBr to produce 3^o alcohol.

- (1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
(2) Statement-1 is False, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.
(3) Statement -1 is True, Statement-2 is False.
(4) Statement -1 is False, Statement-2 is False.

Ans. (1)

Sol. Statement-1, correct Statement-2 is also correct and correct Explanation.

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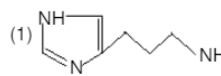
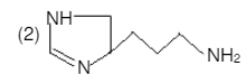
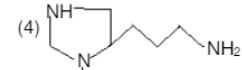
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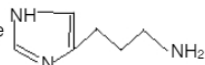
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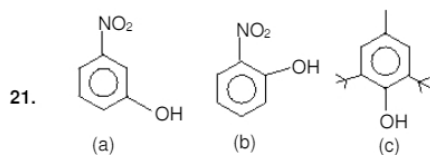
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20. Structure of compound which is responsible for acidity in stomach & stomach disorder.

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

Ans. (1)

Sol. Histamine  is responsible for acidity in stomach and stomach disorder.



In which of the following intra molecular H-bonding possible

- (1) a & b only (2) only b (3) a, b, & c (4) a and c

Ans. (2)

Sol. 

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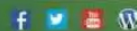
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