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PAPER-1 (B.E./B. TECH.)

JEE (Main) 2020

COMPUTER BASED TEST (CBT)

Memory Based Questions & Solutions

Date: 02 September, 2020 (SHIFT-1) | TIME : (9.30 a.m. to 12.30 p.m)

Duration: 3 Hours | Max. Marks: 300

SUBJECT : CHEMISTRY

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PART : CHEMISTRY

Numerical Value Type (संख्यात्मक प्रकार)

This section contains **5 Numerical value type questions.**

इस खण्ड में **5 संख्यात्मक प्रकार के प्रश्न** हैं।

1. Which metal is used in devising Photo-Chemical cell ?

(1) Li (2) Na (3) Rb (4) Cs

Ans. **(4)**

Sol^{n} Cesium has lowest ionisation enthalpy and hence it can show photoelectric effect to the maximum extent hence it is used in photo chemical cell.

2. 3 moles of O_2 and 5 moles of Ar are present in a closed container, find sum of their internal energy in terms of RT

(1) 15 RT (2) 10 RT (3) 5 RT (4) 20 RT

Ans. **(1)**

Sol^{n}. $\Delta U = \frac{f}{2}nRT$

For $O_2 \Rightarrow \Delta U = \frac{5}{2} \times 3(RT) = \frac{15}{2}RT$

For $He \Rightarrow \Delta U = \frac{3}{2} \times 5(RT) = \frac{15}{2}RT$

So sum of internal energy = 15 RT

3. Among the following properties, which property trend (in magnitude) is different from other across a period ?

(1) Atomic Radius
(2) Electronegativity
(3) Electron gain enthalpy
(4) Ionisation Enthalpy

Ans. **(1)**

Ans. **(1)**

Sol^{n}. On moving Left to Right along a period.
Atomic Radius $\Rightarrow$ decreases.
Electronegativity $\Rightarrow$ Increases.
Electron gainenthalpy $\Rightarrow$ Increases.
Ionisation Enthalpy $\Rightarrow$ Increases.

4. Graph between $\log\left(\frac{x}{m}\right)$ Vs logP has a slope = 2 and intercept = 0.477 . Find $\left(\frac{x}{m}\right)$ at pressure 4 atm.
[Given log3 = 0.477]
(1) 6 (2) 3 (3) 48 (4) 9

Ans. **(1)**

Sol.

$$\left(\frac{x}{m}\right) = k(P)^{\frac{1}{n}}$$

$$\log\left(\frac{x}{m}\right) = \log k + \frac{1}{n}\log P$$ Slope=2

Slope = $\frac{1}{n} = 2$ So n = $\frac{1}{2}$. logk=0.477

Intercept $\Rightarrow$ logk = 0.477 So k = Antilog (0.477) = 3 logP

So $\left(\frac{x}{m}\right) = k(P)^{\frac{1}{n}}$

$= 3[4]^{\frac{1}{2}}$

$= 6$

5. If a compound AB_4 is polar covalent, then its possible geometry is :
(1) Square planar (2) Tetrahedral (3) Sea-saw (4) Square Pyramidal

Ans. **(3)**

Sol^{n}. For AB_4 compound possible geometry are

S. No.	Bond pair	Lone pair	Total	Hybridisation	Geometry	Polarity
1	4	0	4	SP^3	Tetrahedral	non polar
2	4	1	5	SP^3d	Sea-saw	Polar
3	4	2	6	sp^3d^2	Square Planar	non polar

6. Which of the following statement about ozone is **INCORRECT** ?
(1) Ozone acts as a protective layer against UV rays.
(2) It is toxic layer and converts NO to NO_2.
(3) It converts Cl free radical of CFC's to chlorinedioxide.
(4) It acts as shield to our atmosphere.

Ans. **(3)**

Sol. In presence of sunlight CFC's molecule divides & release chlorine free radical, which react with ozone give chlorine monoxide radical ($ClO^{\bullet}$) and oxygen.

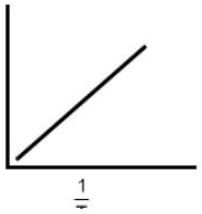
$$CF_2Cl_2(g) \xrightarrow{UV} \dot{C}l(g) + \dot{C}F_2Cl(g)$$

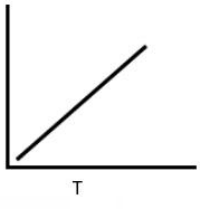
$$Cl^{\bullet}(g) + O_3(g) \longrightarrow ClO^{\bullet}(g) + O_2(g)$$

$$ClO^{\bullet}(g) + O(g) \longrightarrow Cl^{\bullet}(g) + O_2(g)$$

7. Which of the following graph is incorrect for an ideal gas ?

(1)

(2) 

(3) 

(4) None of these w

Ans. **(3)**

Sol^{n}. For ideal gas

$PM = dRT$

$d = \left[\frac{PM}{R}\right]\frac{1}{T}$

So graph between d Vs T is not straight line.

8. An example of solid sol is :

(1) Butter (2) gem stones (3) Paints (4) Cake

Ans. **(2)**

Sol^{n}. Solid sol has dispersed phase solid and dispersion medium solid.

Example $\Rightarrow$ Gem stones, some coloured glass

9. For following cell reaction.

$Cu(s) + Sn^{2+}(aq) \longrightarrow Cu^{2+}(aq) + Sn(s)$

$[Cu^{2+}] = [Sn^{2+}] = 1M$

Find Gibb's energy change (in KJ). Given $[E^0_{Cu^{2+}/Cu} = 0.34V, E^0_{Sn^{2+}/Sn} = -0.16V]$

Sol^{n} 96.50

$E^0_{cell} = E^0_{Sn^{2+}/Sn} - E^0_{Cu^{2+}/Cu}$

$= -0.16 - 0.34$

$= -0.50V$

$\Delta G^0 = -nFE^0_{cell}$

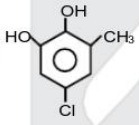
$= -2 \times 96500 \times (-0.5)$

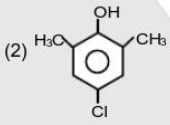
$= 96500J$

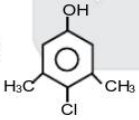
$= 96.5\ KJ$

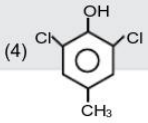
10. Correct Structure of Dettol is ?

डिटॉल की सही संरचना है।

(1) 

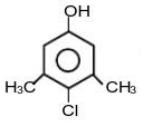
(2) 

(3) 

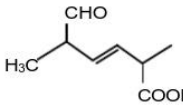
(4) 

Ans. **(C)**

Sol. Dettol (NCERT XII class)

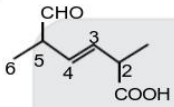


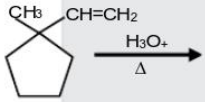
4-Chloro-3,5-dimethyl phenol.

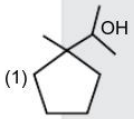
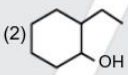
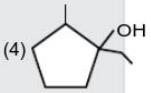
11.  Correct IUPAC name of following compound is

(1) 2-Methyl-5-oxohet-3-enoic acid. (2*) 5-Formyl-2-methyl hex-3- conic acid.
(3) 2,5-Dimethyl-5-oxo pent-3- enoic acid. (4) 2,5-Dimethyl-5-formyl pent-3-enoic acid.

Ans. **(B)**

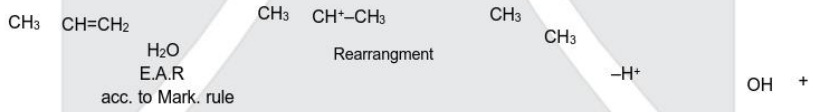
Sol.  5-formyl-2-methyl pent-3-enoic acid.

12.  Find out end product of this reaction.

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

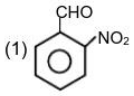
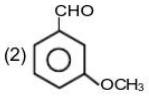
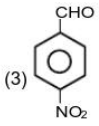
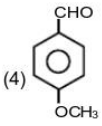
Ans. **(C)**

Sol.



(Hydration addition of water acc. to Mark. rule.)

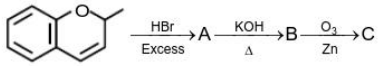
13. Most reactive with HCN out of following.

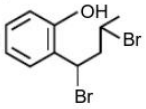
(1)  (2)  (3)  (4) 

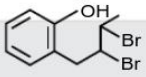
Ans. **(C)**

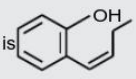
Sol. –I, – M effect of NO_2 increase reactivity towards nucleophilic addition reaction with HCN. and as steric crowding ↑ increase rate of NAR decrease.

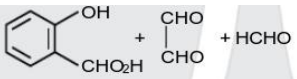
14. Find out correct statement regarding this reaction?



(A) Product A is 

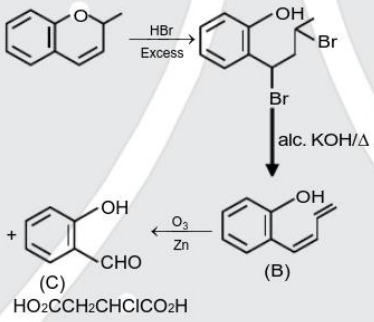
(B) Product A is 

(C) Product B is 

(D) Product C is  + HCHO

Ans. (A)

Sol.



$HO_2CCH_2CHClCO_2H$

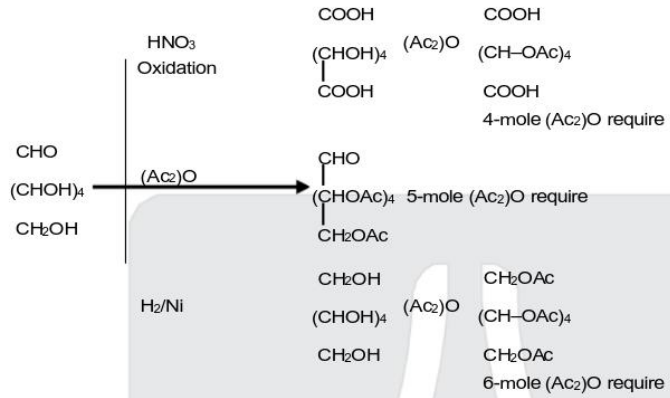
15. Glucose → X ($(i)\ HNO_3$ $(ii)\ (Ac_2)O$), Glucose → Y ($(Ac_2)O$), Glucose → Z ($(i)\ H_2/Ni$ $(ii)\ (Ac_2)O$)

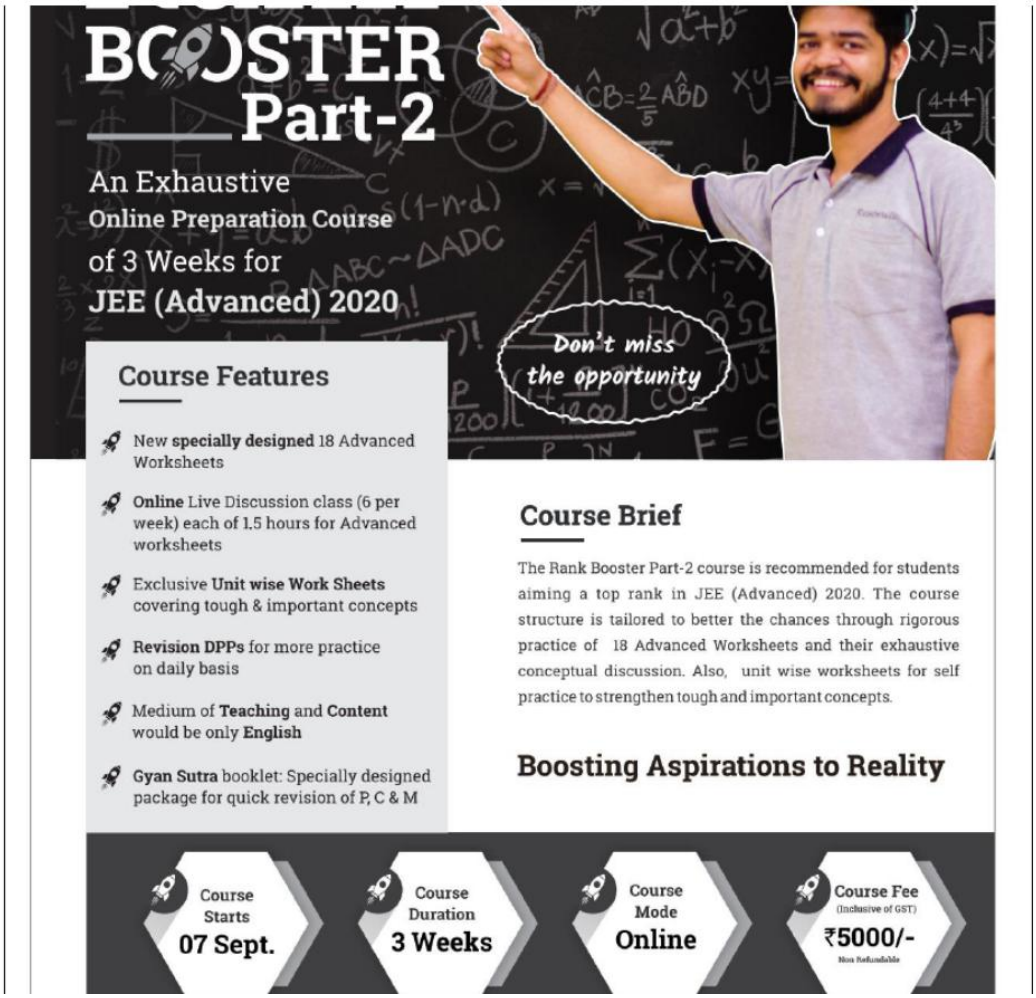
Calculate require moles of $(Ac_2)O$ in X, Y, Z product formation.

(A) 2, 3, 4 (B) 5, 5, 5 (C) 4, 5, 6 (D) 5, 5, 6

Ans. **(C)**

Sol.

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