

TEST PAPER OF JEE(MAIN) EXAMINATION – 2019
(Held On Friday 11th JANUARY, 2019) TIME : 9 : 30 AM To 12 : 30 PM
CHEMISTRY

1. For the cell $Zn(s) | Zn^{2+}(aq) || M^{x+}(aq) | M(s)$, different half cells and their standard electrode potentials are given below :

$M^{x+}(aq)/M(s)$	$Au^{3+}(aq)/Au(s)$	$Ag^{+}(aq)/Ag(s)$	$Fe^{3+}(aq)/Fe^{2+}(aq)$	$Fe^{2+}(aq)/Fe(s)$
$E^{\circ}_{M^{x+}/M(v)}$	1.40	0.80	0.77	-0.44

If $E^{\circ}_{Zn^{2+}/Zn} = -0.76V$, which cathode will give a

maximum value of E°_{cell} per electron transferred ?

- (1) Fe^{3+} / Fe^{2+} (2) Ag^{+} / Ag
 (3) Au^{3+} / Au (4) Fe^{2+} / Fe

Ans. (2)

2. The correct match between items-I and II is :

Item-I	Item-II
(Mixture)	(Separation method)
(A) H_2O : Sugar	(P) Sublimation
(B) H_2O : Aniline	(Q) Recrystallization
(C) H_2O : Toluene	(R) Steam distillation
	(S) Differential extraction
(1) A-Q, B-R, C-S	(2) A-R, B-P, C-S
(3) A-S, B-R, C-P	(4) A-Q, B-R, C-P

Ans. (1)

Sol. (Mixture) (Separation method)

H_2O : Sugar \Rightarrow Recrystallization
 H_2O : Aniline \Rightarrow Steam distillation
 H_2O : Toluene \Rightarrow Differential extraction

3. If a reaction follows the Arrhenius equation, the

plot $\ln k$ vs $\frac{1}{RT}$ gives straight line with a

gradient (-y) unit. The energy required to activate the reactant is :

- (1) y unit (2) -y unit
 (3) yR unit (4) y/R unit

Ans. (1)

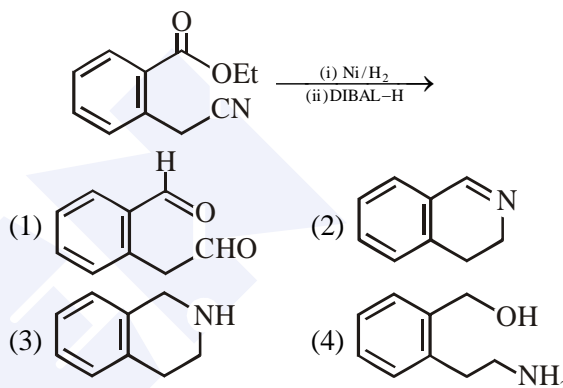
4. The concentration of dissolved oxygen (DO) in cold water can go upto :

- (1) 10 ppm (2) 14 ppm
 (3) 16 ppm (4) 8 ppm

Ans. (1)

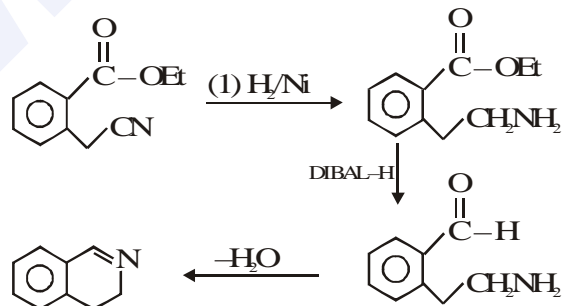
Sol. In cold water, dissolved oxygen (DO) can reach a concentration upto 10 ppm

5. The major product of the following reaction is:



Ans. (2)

Sol.



6. The correct statements among (a) to (d) regarding H_2 as a fuel are :

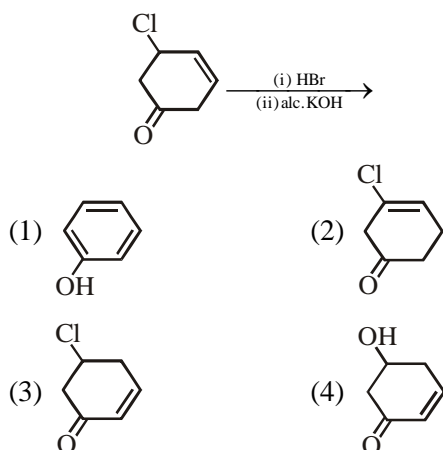
- (a) It produces less pollutant than petrol
 (b) A cylinder of compressed dihydrogen weighs ~ 30 times more than a petrol tank producing the same amount of energy
 (c) Dihydrogen is stored in tanks of metal alloys like $NaNi_5$
 (d) On combustion, values of energy released per gram of liquid dihydrogen and LPG are 50 and 142 kJ, respectively

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

Ans. (2)

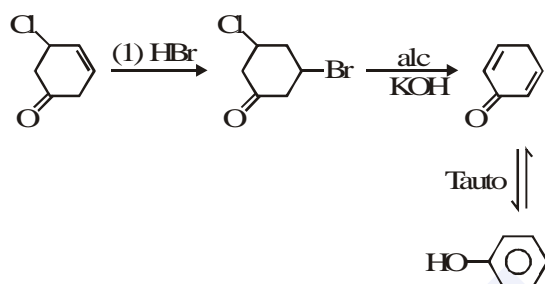
Sol. Option (a), (b) & (c) are correct answer (NCERT THEORY BASED)

7. The major product of the following reaction is:



Ans. (1)

Sol.



8. The element that usually does not show variable oxidation states is :

- (1) V (2) Ti (3) Sc (4) Cu

Ans. (3)

Sol. Usually Sc(Scandium) does not show variable oxidation states.

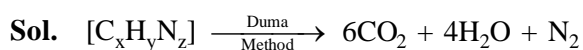
Most common oxidation states of :

- (i) Sc : +3
(ii) V : +2, +3, +4, +5
(iii) Ti : +2, +3, +4
(iv) Cu : +1, +2

9. An organic compound is estimated through Dumas method and was found to evolve 6 moles of CO₂, 4 moles of H₂O and 1 mole of nitrogen gas. The formula of the compound is :

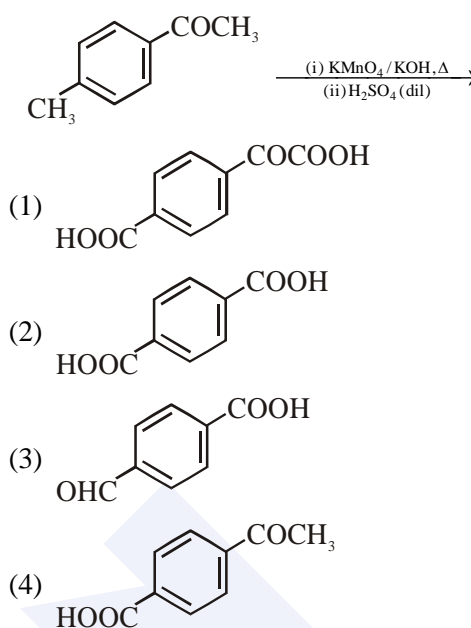
- (1) C₁₂H₈N (2) C₁₂H₈N₂
(3) C₆H₈N (4) C₆H₈N₂

Ans. (4)

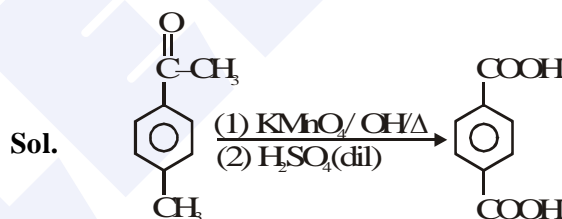


Hence, C₆H₈N₂

10. The major product of the following reaction is :

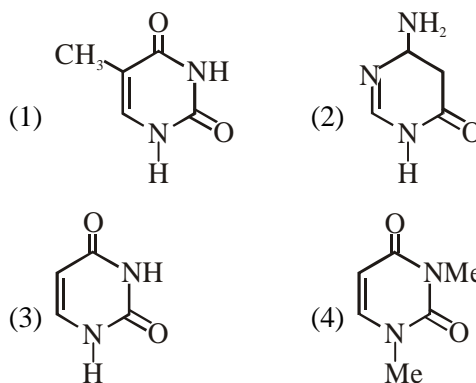


Ans. (2)



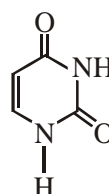
Sol.

11. Among the following compound which one is found in RNA ?

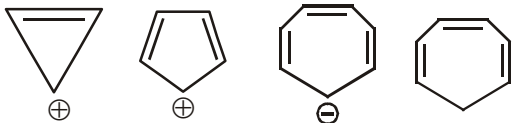


Ans. (3)

Sol. For the given structure 'uracil' is found in RNA



12. Which compound(s) out of the following is/are not aromatic ?



- (A) (B) (C) (D)
- (1) C and D (2) B, C and D
(3) A and C (4) B

Ans. (2)

Sol. out of the given options only is aromatic.

Hence (B), (C) and (D) are not aromatic

13. The correct match between Item(I) and Item(II) is :

Item-I	Item-II
(A) Nortehindrone	(P) Anti-biotic
(B) Ofloxacin	(Q) Anti-fertility
(C) Equanil	(R) Hypertension
	(S) Analgesics
(1) A-R, B-P, C-S	(2) A-Q, B-P, C-R
(3) A-R, B-P, C-R	(4) A-Q, B-R, C-S

Ans. (2)

Sol. (A) Norethindrone – Antifertility
(B) Ofloxacin – Anti-Biotic
(C) Equanil – Hypertension (traquilizer)

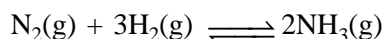
14. Heat treatment of muscular pain involves radiation of wavelength of about 900 nm. Which spectral line of H-atom is suitable for this purpose ?

$$[R_H = 1 \times 10^5 \text{ cm}^{-1}, h = 6.6 \times 10^{-34} \text{ Js}, c = 3 \times 10^8 \text{ ms}^{-1}]$$

- (1) Paschen, $5 \rightarrow 3$ (2) Paschen, $\infty \rightarrow 3$
(3) Lyman, $\infty \rightarrow 1$ (4) Balmer, $\infty \rightarrow 2$

Ans. (2)

15. Consider the reaction,



The equilibrium constant of the above reaction is K_p . If pure ammonia is left to dissociate, the partial pressure of ammonia at equilibrium is given by (Assume that $P_{\text{NH}_3} \ll P_{\text{total}}$ at equilibrium)

- (1) $\frac{3^{\frac{3}{2}} K_p^{\frac{1}{2}} P^2}{4}$ (2) $\frac{3^{\frac{3}{2}} K_p^{\frac{1}{2}} P^2}{16}$
(3) $\frac{K_p^{\frac{1}{2}} P^2}{16}$ (4) $\frac{K_p^{\frac{1}{2}} P^2}{4}$

Ans. (2)

16. Match the ores(Column A) with the metals (column B) :

Column-A Ores	Column-B Metals
(I) Siderite	(a) Zinc
(II) Kaolinite	(b) Copper
(III) Malachite	(c) Iron
(IV) Calamine	(d) Aluminium
(1) I-b ; II-c ; III-d ; IV-a	
(2) I-c ; II-d ; III-a ; IV-b	
(3) I-c ; II-d ; III-b ; IV-a	
(4) I-a ; II-b ; III-c ; IV-d	

Ans. (3)

Sol. Siderite : FeCO_3
Kaolinite : $\text{Al}_2(\text{OH})_4\text{Si}_2\text{O}_5$
Malachite : $\text{Cu}(\text{OH})_2 \cdot \text{CuCO}_3$
Calamine : ZnCO_3

17. The correct order of the atomic radii of C, Cs, Al and S is :

- (1) $S < C < \text{Al} < \text{Cs}$ (2) $S < C < \text{Cs} < \text{Al}$
(3) $C < S < \text{Cs} < \text{Al}$ (4) $C < S < \text{Al} < \text{Cs}$

Ans. (4)

Sol.

Atomic radii order : $C < S < \text{Al} < \text{Cs}$
Atomic radius of C : 170 pm
Atomic radius of S : 180 pm
Atomic radius of Al : 184 pm
Atomic radius of Cs : 300 pm

MAJOR COMPUTER BASED TEST (CBT) SERIES

JEE (Advanced)- Target 2019

dlp.allen.ac.in

Test Dates: 3rd Feb, 21st & 28th April, 12th May

0744-2750275

18. Match the metals (Column I) with the coordination compound(s) / enzyme(s) (Column II)

Column-I

Column-II

Metals

Coordination compound(s) / Enzyme(s)

- | | |
|--------|-------------------------------|
| (A) Co | (i) Wilkinson catalyst |
| (B) Zn | (ii) Chlorophyll |
| (C) Rh | (iii) Vitamin B ₁₂ |
| (D) Mg | (iv) Carbonic anhydrase |

- (1) A-ii ; B-i ; C-iv ; D-iii
 (2) A-iii ; B-iv ; C-i ; D-ii
 (3) A-iv ; B-iii ; C-i ; D-ii
 (4) A-i ; B-ii ; C-iii ; D-iv

Ans. (2)

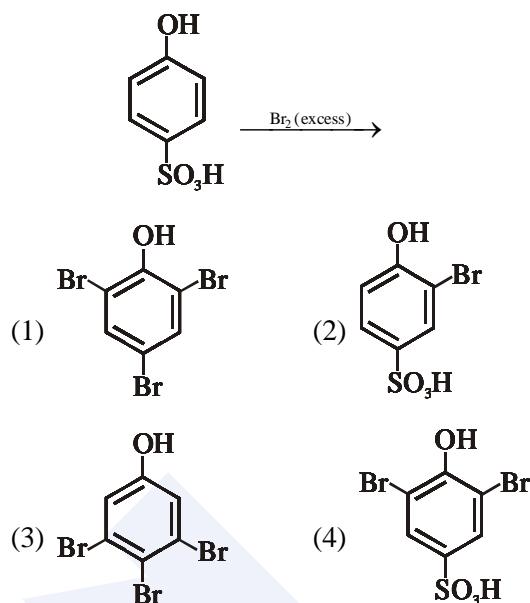
- Sol. (i) Wilkinson catalyst : $\text{RhCl}(\text{PPh}_3)_3$
 (ii) Chlorophyll : $\text{C}_{55}\text{H}_{72}\text{O}_5\text{N}_4\text{Mg}$
 (iii) Vitamin B₁₂ (also known as cyanocobalamin) contain cobalt.
 (iv) Carbonic anhydrase contains a zinc ion.

19. A 10 mg effervescent tablet containing sodium bicarbonate and oxalic acid releases 0.25 ml of CO₂ at T = 298.15 K and p = 1 bar. If molar volume of CO₂ is 25.0 L under such condition, what is the percentage of sodium bicarbonate in each tablet ? [Molar mass of NaHCO₃ = 84 g mol⁻¹]

- (1) 16.8 (2) 8.4
 (3) 0.84 (4) 33.6

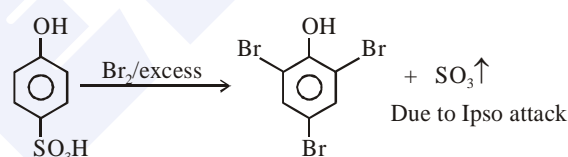
Ans. (1)

20. The major product of the following reaction is :



Ans. (1)

Sol.



21. Two blocks of the same metal having same mass and at temperature T₁ and T₂, respectively. are brought in contact with each other and allowed to attain thermal equilibrium at constant pressure. The change in entropy, ΔS, for this process is :

- (1) $2C_p \ln \left(\frac{T_1 + T_2}{4T_1 T_2} \right)$ (2) $2C_p \ln \left[\frac{(T_1 + T_2)^{1/2}}{T_1 T_2} \right]$
 (3) $C_p \ln \left[\frac{(T_1 + T_2)^2}{4T_1 T_2} \right]$ (4) $2C_p \ln \left[\frac{T_1 + T_2}{2T_1 T_2} \right]$

Ans. (3)

MAJOR COMPUTER BASED TEST (CBT) SERIES

JEE (Main)- Target 2019

dlp.allen.ac.in

Test Dates: 24th & 31st March

0744-2750275

22. The chloride that CANNOT get hydrolysed is :

- (1) SiCl_4 (2) SnCl_4
(3) PbCl_4 (4) CCl_4

Ans. (4)

Sol. CCl_4 cannot get hydrolyzed due to the absence of vacant orbital at carbon atom.

23. For the chemical reaction $X \rightleftharpoons Y$, the standard reaction Gibbs energy depends on temperature T (in K) as :

$$\Delta_r G^\circ \text{ (in kJ mol}^{-1}\text{)} = 120 - \frac{3}{8}T$$

The major component of the reaction mixture at T is :

- (1) X if T = 315 K
(2) X if T = 350 K
(3) Y if T = 300 K
(4) Y if T = 280 K

Ans. (1)

24. The freezing point of a diluted milk sample is found to be -0.2°C , while it should have been -0.5°C for pure milk. How much water has been added to pure milk to make the diluted sample ?

- (1) 2 cups of water to 3 cups of pure milk
(2) 1 cup of water to 3 cups of pure milk
(3) 3 cups of water to 2 cups of pure milk
(4) 1 cup of water to 2 cups of pure milk

Ans. (3)

25. A solid having density of $9 \times 10^3 \text{ kg m}^{-3}$ forms face centred cubic crystals of edge length $200\sqrt{2} \text{ pm}$. What is the molar mass of the solid ?

(Avogadro constant $\cong 6 \times 10^{23} \text{ mol}^{-1}$, $\pi \cong 3$)

- (1) $0.0216 \text{ kg mol}^{-1}$ (2) $0.0305 \text{ kg mol}^{-1}$
(3) $0.4320 \text{ kg mol}^{-1}$ (4) $0.0432 \text{ kg mol}^{-1}$

Ans. (2)

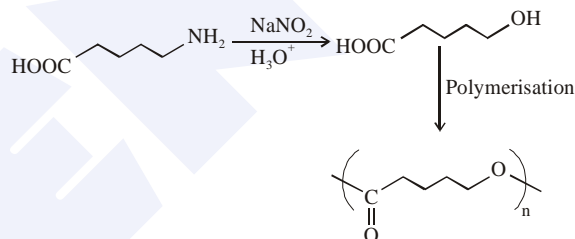
26. The polymer obtained from the following reactions is :



- (1) $\left[\begin{array}{c} \text{O} \\ \parallel \\ \text{C}-(\text{CH}_2)_4-\text{N} \\ | \\ \text{H} \end{array} \right]_n$
(2) $\left[\text{O}-(\text{CH}_2)_4-\overset{\text{O}}{\parallel}{\text{C}} \right]_n$
(3) $\left[\text{HNC}(\text{CH}_2)_4-\overset{\text{O}}{\parallel}{\text{C}}-\text{N} \right]_n$
(4) $\left[\text{OC}(\text{CH}_2)_4\text{O} \right]_n$

Ans. (2)

Sol.



27. An example of solid sol is :

- (1) Butter (2) Gem stones
(3) Paint (4) Hair cream

Ans. (2)

28. Peroxyacetyl nitrate (PAN), an eye irritant is produced by :

- (1) Acid rain (2) Photochemical smog
(3) Classical smog (4) Organic waste

Ans. (2)

Sol. Photochemical smog produce chemicals such as formaldehyde, acrolein and peroxyacetyl nitrate (PAN).

29. NaH is an example of :

- (1) Electron-rich hydride (2) Molecular hydride
(3) Saline hydride (4) Metallic hydride

Ans. (3)

Sol. NaH is an example of ionic hydride which is also known as saline hydride.

30. The amphoteric hydroxide is :

- (1) $\text{Ca}(\text{OH})_2$ (2) $\text{Be}(\text{OH})_2$
(3) $\text{Sr}(\text{OH})_2$ (4) $\text{Mg}(\text{OH})_2$

Ans. (2)

Sol. $\text{Be}(\text{OH})_2$ is amphoteric in nature while rest all alkaline earth metal hydroxide are basic in nature.