

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 :

$M^{x+}(aq)/M(s)$	$Au^{3+}(aq)/Au(s)$	$Ag^{+}(aq)/Ag(s)$	$Fe^{3+}(aq)/Fe^{2+}(aq)$	$Fe^{2+}(aq)/Fe(s)$
$E^{\circ}_{M^{x+}/M^{(x)}}$	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)

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

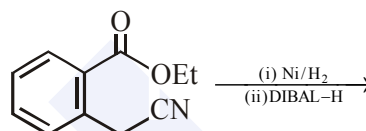
Ans. (1)

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)

5. The major product of the following reaction is:



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

Ans. (2)

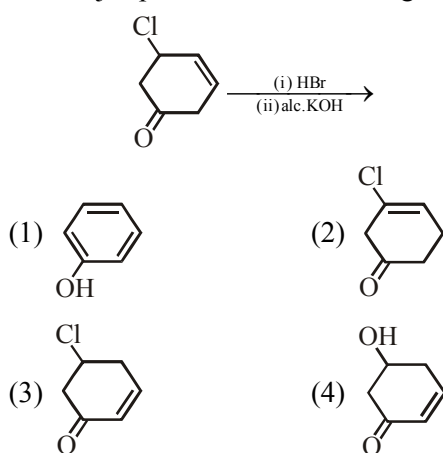
6. The correct statements among (a) to (d) regarding H_2 as a fuel are :

- (a) It produces less pollutant than petrol
(b) A cylinder of compressed dihydrogen weighs ~30times 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)

7. The major product of the following reaction is:



Ans. (1)

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

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

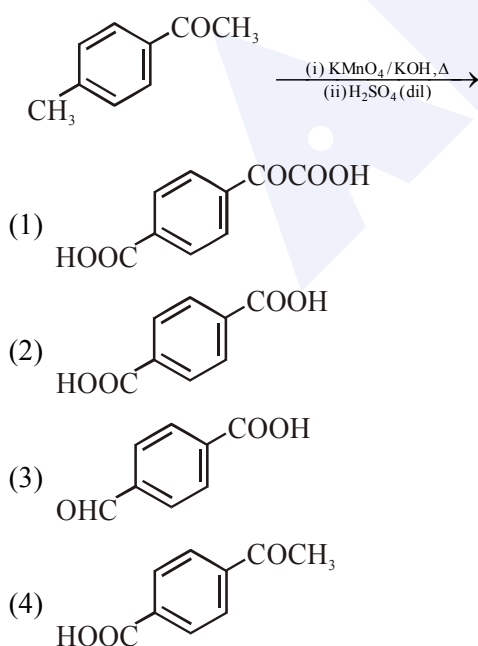
Ans. (3)

9. An organic compound is estimated through Dumas method and was found to evolve 6 moles of CO_2 , 4 moles of H_2O and 1 mole of nitrogen gas. The formula of the compound is :

- (1) $\text{C}_{12}\text{H}_8\text{N}$ (2) $\text{C}_{12}\text{H}_8\text{N}_2$
(3) $\text{C}_6\text{H}_8\text{N}$ (4) $\text{C}_6\text{H}_8\text{N}_2$

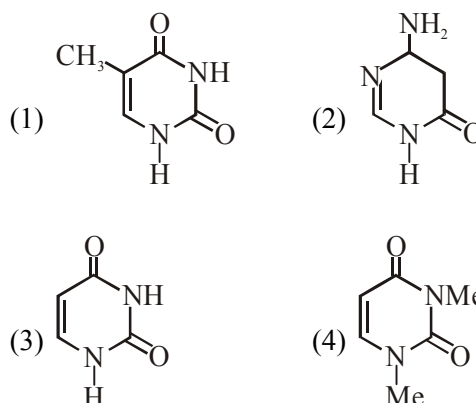
Ans. (4)

10. The major product of the following reaction is :



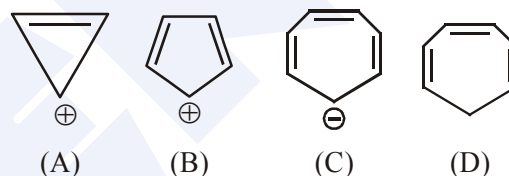
Ans. (2)

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



Ans. (3)

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



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

Ans. (2)

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)

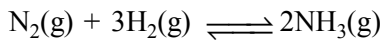
14. Heat treatment of muscular pain involves radiation of wavelength of about 900 nm. Which spectral line of H-atom is suitable for this purpose ?

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

- (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)

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

- (1) $S < C < Al < Cs$ (2) $S < C < Cs < Al$
 (3) $C < S < Cs < Al$ (4) $C < S < Al < Cs$

Ans. (4)

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

Column-I Metals	Column-II 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	

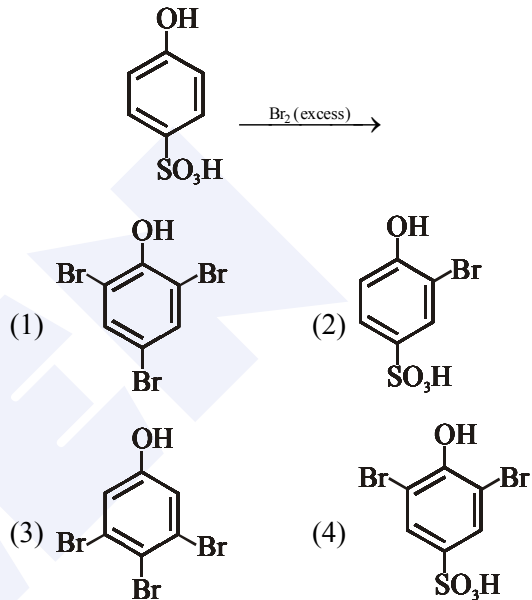
Ans. (2)

19. A 10 mg effervescent tablet containing sodium bicarbonate and oxalic acid releases 0.25 ml of CO_2 at $T = 298.15 \text{ K}$ and $p = 1 \text{ bar}$. If molar volume of CO_2 is 25.0 L under such condition, what is the percentage of sodium bicarbonate in each tablet ? [Molar mass of $\text{NaHCO}_3 = 84 \text{ g mol}^{-1}$]

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

Ans. (2)

20. The major product of the following reaction is :



Ans. (1)

21. Two blocks of the same metal having same mass and at temperature T_1 and T_2 , 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) $2C_p \ln \left[\frac{(T_1 + T_2)^2}{T_1 T_2} \right]$
 (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)

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