

**TEST PAPER OF JEE(MAIN) EXAMINATION – 2019****(Held On Wednesday 09<sup>th</sup> JANUARY, 2019) TIME : 9 : 30 AM To 12 : 30 PM****CHEMISTRY**

1. Which one of the following statements regarding Henry's law not correct ?

- (1) The value of  $K_H$  increases with function of the nature of the gas
- (2) Higher the value of  $K_H$  at a given pressure, higher is the solubility of the gas in the liquids.
- (3) The partial of the gas in vapour phase is proportional to the mole fraction of the gas in the solution.
- (4) Different gases have different  $K_H$  (Henry's law constant) values at the same temperature.

Ans. (2)

2. The correct decreasing order for acid strength is :-

- (1)  $\text{NO}_2\text{CH}_2\text{COOH} > \text{NCCH}_2\text{COOH} > \text{FCH}_2\text{COOH} > \text{ClCH}_2\text{COOH}$
- (2)  $\text{FCH}_2\text{COOH} > \text{NCCH}_2\text{COOH} > \text{NO}_2\text{CHCOOH} > \text{ClCH}_2\text{COOH}$
- (3)  $\text{NO}_2\text{CH}_2\text{COOH} > \text{FCH}_2\text{COOH} > \text{CNCH}_2\text{COOH} > \text{ClCH}_2\text{COOH}$
- (4)  $\text{CNCH}_2\text{COOH} > \text{O}_2\text{NCH}_2\text{COOH} > \text{FCH}_2\text{COOH} > \text{ClCH}_2\text{COOH}$

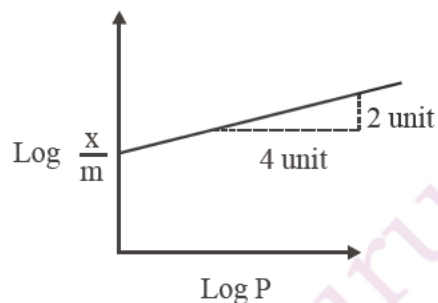
Ans. (1)

3. Two complexes  $[\text{Cr}(\text{H}_2\text{O}_6)\text{Cl}_3]$  (A) and  $[\text{Cr}(\text{NH}_3)_6]\text{Cl}_3$  (B) are violet and yellow coloured, respectively. The incorrect statement regarding them is :

- (1)  $\Delta_0$  value of (A) is less than that of (B).
- (2)  $\Delta_0$  value of (A) and (B) are calculated from the energies of violet and yellow light, respectively
- (3) Both absorb energies corresponding to their complementary colors.
- (4) Both are paramagnetic with three unpaired electrons.

Ans. (2)

4. Adsorption of a gas follows Freundlich adsorption isotherm. In the given plot, x is the mass of the gas adsorbed on mass m of the adsorbent at pressure p.  $\frac{x}{m}$  is proportional to



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

Ans. (4)

5. Correct statements among a to d regarding silicones are :

- (a) They are polymers with hydrophobic character
  - (b) They are biocompatible.
  - (c) In general, they have high thermal stability and low dielectric strength.
  - (d) Usually, they are resistant to oxidation and used as greases.
- (1) (a), (b) and (c) only
  - (2) (a), and (b) only
  - (3) (a), (b), (c) and (d)
  - (4) (a), (b) and (d) only

Ans. (3)

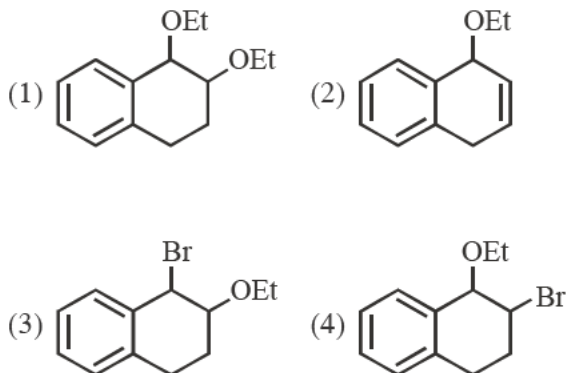
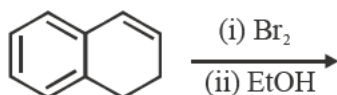
6. For emission line of atomic hydrogen from  $n_i = 8$  to  $n_f =$  the plot of wave number  $\bar{\nu}$  against  $\left(\frac{1}{n^2}\right)$  will be (The Ry dberg constant,  $R_H$  is in wave number unit).

- (1) Linear with slope -  $R_H$
- (2) Linear with intercept -  $R_H$
- (3) Non linear
- (4) Linear with slope  $R_H$

Ans. (4)



7. The major product the following reaction is :



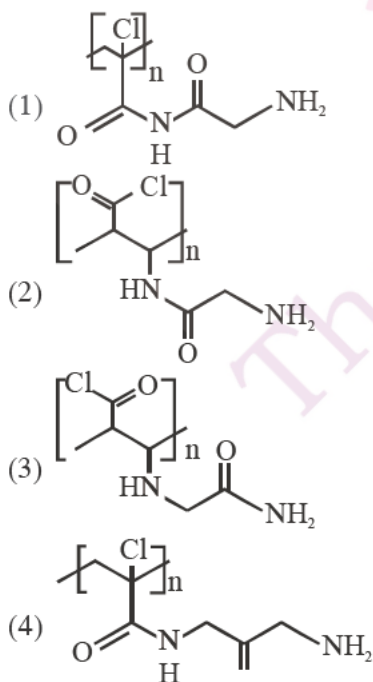
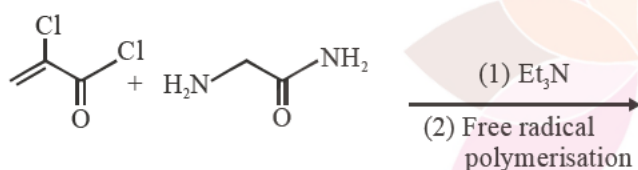
Ans. (4)

8. The alkaline earth metal nitrate that does not crystallise with water molecules, is :

- (1) Sr(NO<sub>3</sub>)<sub>2</sub>                      (2) Mg(NO<sub>3</sub>)<sub>2</sub>  
(3) Ca(NO<sub>3</sub>)<sub>2</sub>                    (4) Ba(NO<sub>3</sub>)<sub>2</sub>

Ans. (4)

9. Major product of the following reaction is :



Ans. (4)

10. The highest value of the calculated spin only magnetic moment (in BM) among all the transition metal complexes is :

- (1) 5.92    (2) 3.87    (3) 6.93    (4) 4.90

Ans. (1)

11. 20 mL of 0.1 M H<sub>2</sub>SO<sub>4</sub> solution is added to 30 mL of 0.2 M NH<sub>4</sub>OH solution. The pH of the resultant mixture is : [pK<sub>b</sub> of NH<sub>4</sub>OH = 4.7].

- (1) 9.4    (2) 5.0    (3) 9.0    (4) 5.2

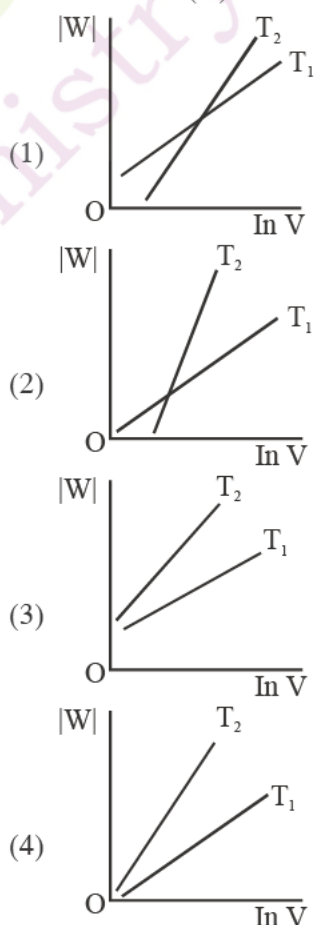
Ans. (3)

12. 0.5 moles of gas A and x moles of gas B exert a pressure of 200 Pa in a container of volume 10 m<sup>3</sup> at 1000 K. given R is the gas constant in JK<sup>-1</sup> mol<sup>-1</sup>m, x is :

- (1)  $\frac{2R}{4+12}$     (2)  $\frac{2R}{4-R}$     (3)  $\frac{4-R}{2R}$     (4)  $\frac{4+R}{2R}$

Ans. (3)

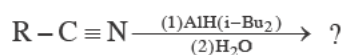
13. Consider the reversible isothermal expansion of an ideal gas in a closed system at two different temperatures T<sub>1</sub> and T<sub>2</sub> (T<sub>1</sub> < T<sub>2</sub>). The correct graphical depiction of the dependence of work done (w) on the final volume (V) is:



Ans. (2)



14. The major product of following reaction is :



- (1) RCHO (2) RCOOH  
(3) RCH<sub>2</sub>NH<sub>2</sub> (4) RCONH<sub>2</sub>

Ans. (1)

15. In general, the properties that decrease and increase down a group in the periodic table, respectively, are :

- (1) electronegativity and electron gain enthalpy.  
(2) electronegativity and atomic radius.  
(3) atomic radius and electronegativity.  
(4) electron gain enthalpy and electronegativity.

Ans. (2)

16. A solution of sodium sulfate contains 92 g of Na<sup>+</sup> ions per kilogram of water. The molality of Na<sup>+</sup> ions in that solution in mol kg<sup>-1</sup> is:

- (1) 16 (2) 8 (3) 4 (4) 12

Ans. (4)

17. A water sample has ppm level concentration of the following metals: Fe=0.2; Mn = 5.0; Cu = 3.0; Zn = 5.0. The metal that makes the water sample unsuitable drinking is :

- (1) Zn (2) Fe (3) Mn (4) Cu

Ans. (3)

18. The increasing order of pK<sub>a</sub> of the following amino acids in aqueous solution is :

Gly Asp Lys Arg

- (1) Asp < Gly < Arg < Lys  
(2) Arg < Lys < Gly < Asp  
(3) Gly < Asp < Arg < Lys  
(4) Asp < Gly < Lys < Arg

Ans. (4)

19. According to molecular orbital theory, which of the following is true with respect to Li<sub>2</sub><sup>+</sup> and Li<sub>2</sub><sup>-</sup>?

- (1) Both are unstable  
(2) Li<sub>2</sub><sup>+</sup> is unstable and Li<sub>2</sub><sup>-</sup> is stable  
(3) Li<sub>2</sub><sup>+</sup> is stable and Li<sub>2</sub><sup>-</sup> is unstable  
(4) Both are stable

Ans. (4)

20. The following results were obtained during kinetic studies of the reaction :



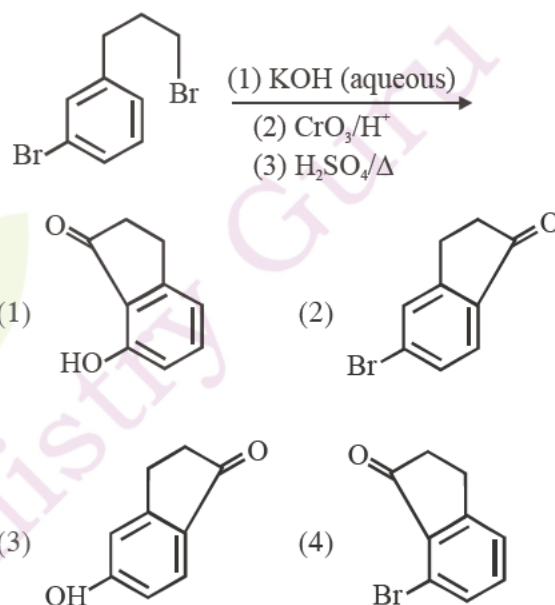
Experiment	[A] (in mol L <sup>-1</sup> )	[B] (in mol L <sup>-1</sup> )	Initial Rate of reaction (in mol L <sup>-1</sup> min <sup>-1</sup> )
(I)	0.10	0.20	6.93 × 10 <sup>-3</sup>
(II)	0.10	0.25	6.93 × 10 <sup>-3</sup>
(III)	0.20	0.30	1.386 × 10 <sup>-2</sup>

The time (in minutes) required to consume half of A is :

- (1) 10 (2) 5 (3) 100 (4) 1

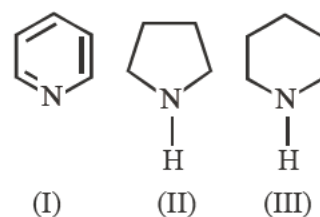
Ans. (2)

21. The major product of the following reaction is:



Ans. (2)

22. Arrange the following amines in the decreasing order of basicity:



- (1) I > II > III (2) III > II > I  
(3) I > III > II (4) III > I > II

Ans. (4)



23. Which amongst the following is the strongest acid ?

- (1)  $\text{CHI}_3$  (2)  $\text{CHCl}_3$   
(3)  $\text{CHBr}_3$  (4)  $\text{CH}(\text{CN})_3$

Ans. (4)

24. The anodic half-cell of lead-acid battery is recharged using electricity of 0.05 Faraday. The amount of  $\text{PbSO}_4$  electrolyzed in g during the process in : (Molar mass of  $\text{PbSO}_4 = 303 \text{ g mol}^{-1}$ )

- (1) 22.8 (2) 15.2 (3) 7.6 (4) 11.4

Ans. (2)

25. The one that is extensively used as a piezoelectric material is :

- (1) Quartz (2) Amorphous silica  
(3) Mica (4) Tridymite

Ans. (1)

26. Aluminium is usually found in +3 oxidation state. In contrast, thallium exists in +1 and +3 oxidation states. This is due to :

- (1) lanthanoid contraction  
(2) lattice effect  
(3) diagonal relationship  
(4) inert pair effect

Ans. (4)

27. The correct match between Item -I and Item-II is :

Item - I (drug)		Item - II (test)	
(A)	Chloroxylenol	(P)	Carbylamine Test
(B)	Norethindrone	(Q)	Sodium Hydrogen carbonate Test
(C)	Sulphapyridine	(R)	Ferric chloride test
(D)	Penicillin	(S)	Bayer's test

- (1)  $A \rightarrow Q$  ;  $B \rightarrow P$  ;  $C \rightarrow S$  ;  $D \rightarrow R$   
(2)  $A \rightarrow R$  ;  $B \rightarrow P$  ;  $C \rightarrow S$  ;  $D \rightarrow Q$   
(3)  $A \rightarrow R$  ;  $B \rightarrow S$  ;  $C \rightarrow P$  ;  $D \rightarrow Q$   
(4)  $A \rightarrow Q$  ;  $B \rightarrow S$  ;  $C \rightarrow P$  ;  $D \rightarrow R$

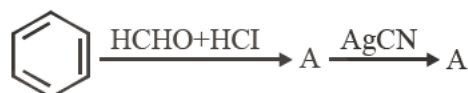
Ans. (3)

28. The ore that contains both iron and copper is:

- (1) malachite  
(2) dolomite  
(3) azurite  
(4) copper pyrites

Ans. (4)

29. The compounds A and B in the following reaction are, respectively:



- (1) A = Benzyl alcohol, B = Benzyl isocyanide  
(2) A = Benzyl alcohol, B = Benzyl cyanide  
(3) A = Benzyl chloride, B = Benzyl cyanide  
(4) A = Benzyl chloride, B = Benzyl isocyanide

Ans. (4)

30. The isotopes of hydrogen are :

- (1) Tritium and protium only  
(2) Deuterium and tritium only  
(3) Protium and deuterium only  
(4) Protium, deuterium and tritium

Ans. (4)