

## JEE(MAIN) – 2018 TEST PAPER WITH ANSWER (HELD ON SUNDAY 08<sup>th</sup> APRIL, 2018)

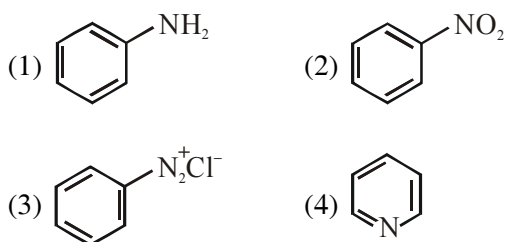
### PART A – CHEMISTRY

1. Which of the following salts is the most basic in aqueous solution ?

- (1)  $\text{CH}_3\text{COOK}$                       (2)  $\text{FeCl}_3$   
(3)  $\text{Pb}(\text{CH}_3\text{COO})_2$                 (4)  $\text{Al}(\text{CN})_3$

Ans. (1)

2. Which of the following compounds will be suitable for Kjeldahl's method for nitrogen estimation ?



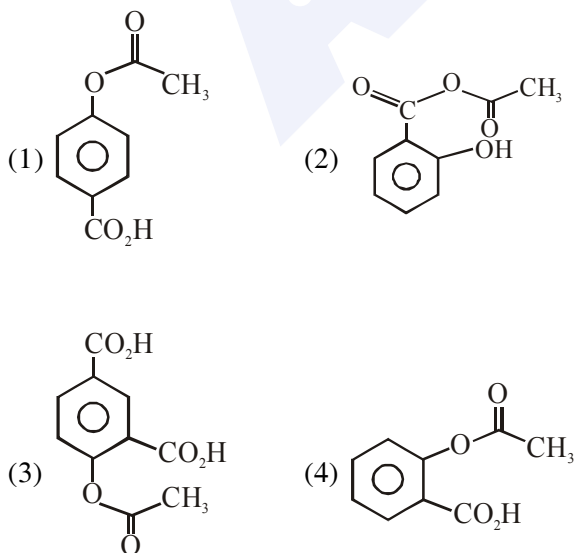
Ans. (1)

3. Which of the following are Lewis acids ?

- (1)  $\text{AlCl}_3$  and  $\text{SiCl}_4$   
(2)  $\text{PH}_3$  and  $\text{SiCl}_4$   
(3)  $\text{BCl}_3$  and  $\text{AlCl}_3$   
(4)  $\text{PH}_3$  and  $\text{BCl}_3$

Ans. (3)

4. Phenol on treatment with  $\text{CO}_2$  in the presence of  $\text{NaOH}$  followed by acidification produces compound X as the major product. X on treatment with  $(\text{CH}_3\text{CO})_2\text{O}$  in the presence of catalytic amount of  $\text{H}_2\text{SO}_4$  produces :



Ans. (4)

5. An alkali is titrated against an acid with methyl orange as indicator, which of the following is a correct combination ?

Base	Acid	End point
(1) Strong	Strong	Pinkish red to yellow
(2) Weak	Strong	Yellow to pinkish red
(3) Strong	Strong	Pink to colourless
(4) Weak	Strong	Colourless to pink

Ans. (2)

6. An aqueous solution contains 0.10 M  $\text{H}_2\text{S}$  and 0.20 M  $\text{HCl}$ . If the equilibrium constants for the formation of  $\text{HS}^-$  from  $\text{H}_2\text{S}$  is  $1.0 \times 10^{-7}$  and that of  $\text{S}^{2-}$  from  $\text{HS}^-$  ions is  $1.2 \times 10^{-13}$  then the concentration of  $\text{S}^{2-}$  ions in aqueous solution is :

- (1)  $3 \times 10^{-20}$                                       (2)  $6 \times 10^{-21}$   
(3)  $5 \times 10^{-19}$                                       (4)  $5 \times 10^{-8}$

Ans. (1)

7. The combustion of benzene (l) gives  $\text{CO}_2(\text{g})$  and  $\text{H}_2\text{O}(\text{l})$ . Given that heat of combustion of benzene at constant volume is  $-3263.9 \text{ kJ mol}^{-1}$  at  $25^\circ \text{C}$ ; heat of combustion (in  $\text{kJ mol}^{-1}$ ) of benzene at constant pressure will be -

$$(R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1})$$

- (1)  $-452.46$                                       (2)  $3260$   
(3)  $-3267.6$                                       (4)  $4152.6$

Ans. (3)

8. The compound that does not produce nitrogen gas by the thermal decomposition is

- (1)  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$   
(2)  $\text{NH}_4\text{NO}_2$   
(3)  $(\text{NH}_4)_2\text{SO}_4$   
(4)  $\text{Ba}(\text{N}_3)_2$

Ans. (3)

9. How long (approximate) should water be electrolysed by passing through 100 amperes current so that the oxygen released can completely burn 27.66 g of diborane ?

- (Atomic weight of B = 10.8 u)  
 (1) 0.8 hours                      (2) 3.2 hours  
 (3) 1.6 hours                      (4) 6.4 hours

Ans. (2)

10. Total number of lone pair of electrons in  $I_3^-$  ion is

- (1) 6                                      (2) 9  
 (3) 12                                   (4) 3

Ans. (2)

11. When metal 'M' is treated with NaOH, a white gelatinous precipitate 'X' is obtained, which is soluble in excess of NaOH. Compound 'X' when heated strongly gives an oxide which is used in chromatography as an adsorbent. The metal 'M' is

- (1) Ca                                      (2) Al  
 (3) Fe                                      (4) Zn

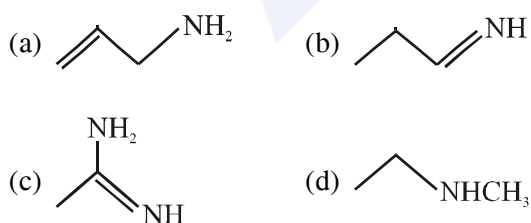
Ans. (2)

12. According to molecular orbital theory, which of the following will not be a viable molecule ?

- (1)  $He_2^+$                                   (2)  $H_2$   
 (3)  $H_2^2$                                    (4)  $He_2^{2+}$

Ans. (3)

13. The increasing order of basicity of the following compounds is :



- (1) (b) < (a) < (c) < (d)  
 (2) (b) < (a) < (d) < (c)  
 (3) (d) < (b) < (a) < (c)  
 (4) (a) < (b) < (c) < (d)

Ans. (2)

14. Which type of 'defect' has the presence of cations in the interstitial sites ?

- (1) Vacancy defect  
 (2) Frenkel defect  
 (3) Metal deficiency defect  
 (4) Schottky defect

Ans. (2)

15. Which of the following compounds contain(s) no covalent bond(s) ?

- KCl,  $PH_3$ ,  $O_2$ ,  $B_2H_6$ ,  $H_2SO_4$   
 (1) KCl,  $H_2SO_4$   
 (2) KCl  
 (3) KCl,  $B_2H_6$   
 (4) KCl,  $B_2H_6$ ,  $PH_3$

Ans. (2)

16. The oxidation states of Cr in  $[Cr(H_2O)_6]Cl_3$ ,  $[Cr(C_6H_6)_2]$ , and  $K_2[Cr(CN)_2(O)_2(O_2)(NH_3)]$  respectively are :

- (1) +3, +2, and +4  
 (2) +3, 0, and +6  
 (3) +3, 0, and +4  
 (4) +3, +4, and +6

Ans. (2)

17. Hydrogen peroxide oxidises  $[Fe(CN)_6]^{4-}$  to  $[Fe(CN)_6]^{3-}$  in acidic medium but reduces  $[Fe(CN)_6]^{3-}$  to  $[Fe(CN)_6]^{4-}$  in alkaline medium. The other products formed are, respectively :

- (1)  $(H_2O + O_2)$  and  $(H_2O + OH^-)$   
 (2)  $H_2O$  and  $(H_2O + O_2)$   
 (3)  $H_2O$  and  $(H_2O + OH^-)$   
 (4)  $(H_2O + O_2)$  and  $H_2O$

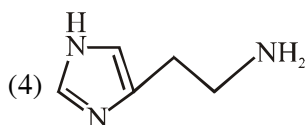
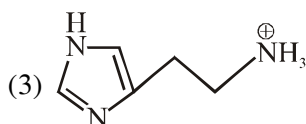
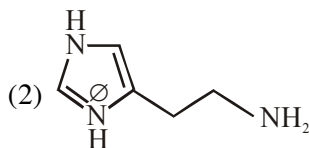
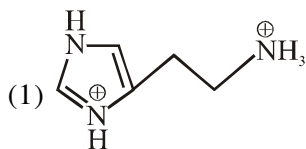
Ans. (2)

18. Glucose on prolonged heating with HI gives :

- (1) 1-Hexene  
 (2) Hexanoic acid  
 (3) 6-iodohexanal  
 (4) n-Hexane

Ans. (4)

19. The predominant form of histamine present in human blood is ( $pK_a$ , Histidine = 6.0)



Ans. (3)

20. The recommended concentration of fluoride ion in drinking water is up to 1 ppm as fluoride ion is required to make teeth enamel harder by converting  $[3Ca_3(PO_4)_2 \cdot Ca(OH)_2]$  to :

- (1)  $[3(CaF_2) \cdot Ca(OH)_2]$   
 (2)  $[3(Ca_3(PO_4)_2 \cdot CaF_2)]$   
 (3)  $[3(Ca(OH)_2) \cdot CaF_2]$   
 (4)  $[CaF_2]$

Ans. (2)

21. Consider the following reaction and statements :



- (I) Two isomers are produced if the reactant complex ion is a *cis*-isomer.  
 (II) Two isomers are produced if the reactant complex ion is a *trans*-isomer.  
 (III) Only one isomer is produced if the reactant complex ion is a *trans*-isomer.  
 (IV) Only one isomer is produced if the reactant complex ion is a *cis*-isomer.

The correct statements are :

- (1) (I) and (III)                      (2) (III) and (IV)  
 (3) (II) and (IV)                      (4) (I) and (II)

Ans. (1)

22. The *trans*-alkenes are formed by the reduction of alkynes with :

- (1)  $NaBH_4$   
 (2)  $Na/liq.NH_3$   
 (3)  $Sn-HCl$   
 (4)  $H_2-Pd/C, BaSO_4$

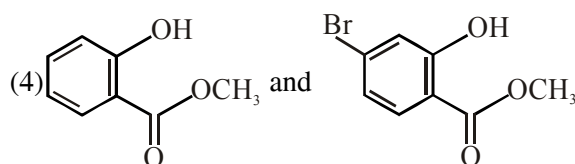
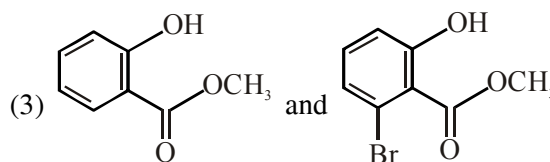
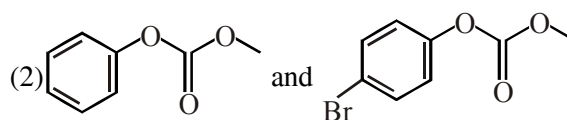
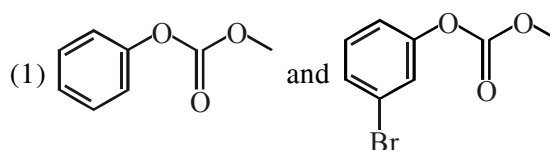
Ans. (2)

23. The ratio of mass percent of C and H of an organic compound ( $C_xH_yO_z$ ) is 6 : 1. If one molecule of the above compound ( $C_xH_yO_z$ ) contains half as much oxygen as required to burn one molecule of compound  $C_xH_y$  completely to  $CO_2$  and  $H_2O$ . The empirical formula of compound  $C_xH_yO_z$  is :

- (1)  $C_2H_4O$                               (2)  $C_3H_4O_2$   
 (3)  $C_2H_4O_3$                               (4)  $C_3H_6O_3$

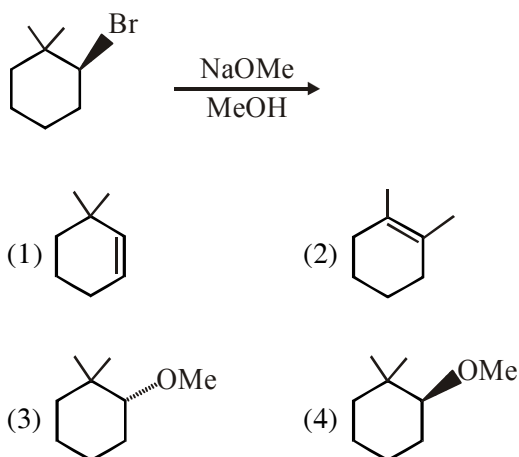
Ans. (3)

24. Phenol reacts with methyl chloroformate in the presence of  $NaOH$  to form product A. A reacts with  $Br_2$  to form product B. A and B are respectively :



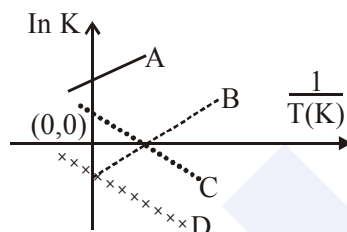
Ans. (2)

25. The major product of the following reaction is :



Ans. (1)

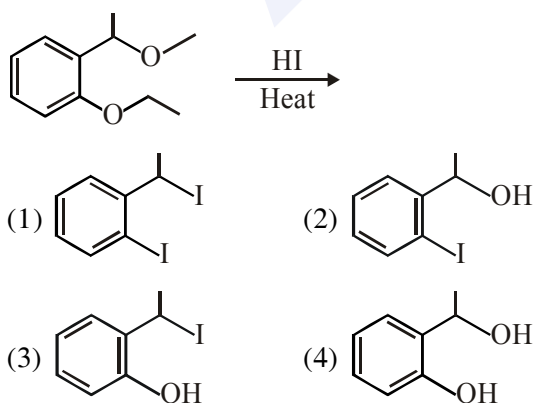
26. Which of the following lines correctly show the temperature dependence of equilibrium constant, K, for an exothermic reaction ?



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

Ans. (4)

27. The major product formed in the following reaction is :



Ans. (3)

28. A aqueous solution contains an unknown concentration of  $\text{Ba}^{2+}$ . When 50 mL of a 1 M solution of  $\text{Na}_2\text{SO}_4$  is added,  $\text{BaSO}_4$  just begins to precipitate. The final volume is 500 mL. The solubility product of  $\text{BaSO}_4$  is  $1 \times 10^{-10}$ . What is the original concentration of  $\text{Ba}^{2+}$  ?

- (1)  $2 \times 10^{-9}$  M  
 (2)  $1.1 \times 10^{-9}$  M  
 (3)  $1.0 \times 10^{-10}$  M  
 (4)  $5 \times 10^{-9}$  M

Ans. (2)

29. At  $518^\circ\text{C}$ , the rate of decomposition of a sample of gaseous acetaldehyde, initially at a pressure of 363 Torr, was  $1.00 \text{ Torr s}^{-1}$  when 5% had reacted and  $0.5 \text{ Torr s}^{-1}$  when 33% had reacted. The order of the reaction is :

- (1) 3                                      (2) 1  
 (3) 0                                      (4) 2

Ans. (4)

30. For 1 molal aqueous solution of the following compounds, which one will show the highest freezing point ?

- (1)  $[\text{Co}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$   
 (2)  $[\text{Co}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl} \cdot 2\text{H}_2\text{O}$   
 (3)  $[\text{Co}(\text{H}_2\text{O})_3\text{Cl}_3] \cdot 3\text{H}_2\text{O}$   
 (4)  $[\text{Co}(\text{H}_2\text{O})_6]\text{Cl}_3$

Ans. (3)