JEE (MAIN) – 2018 TEST PAPER WITH ANSWER
(HELD ON SUNDAY 08TH APRIL, 2018)
PART – A CHEMISTRY

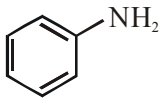
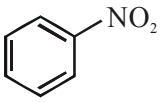
1. Which of the following salts is the most basic in aqueous solution ?

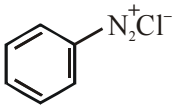
(1) CH_3COOK (2) $FeCl_3$

(3) $Pb(CH_3COO)_2$ (4) $Al(CN)_3$

Ans. (1)

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

(1)  (2) 

(3)  (4) 

Ans. (1)

3. Which of the following are Lewis acids ?

(1) $AlCl_3$ and $SiCl_4$

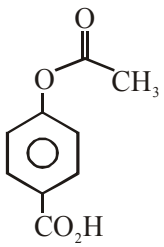
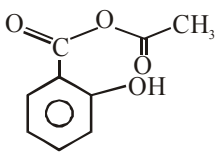
(2) PH_3 and $SiCl_4$

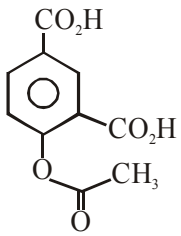
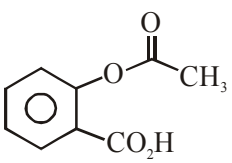
(3) BCl_3 and $AlCl_3$

(4) PH_3 and BCl_3

Ans. (3)

4. Phenol on treatment with CO_2 in the presence of NaOH followed by acidification produces compound X as the major product. X on treatment with $(CH_3CO)_2O$ in the presence of catalytic amount of H_2SO_4 produces :

(1)  (2) 

(3)  (4) 

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 H_2S and 0.20 M HCl. If the equilibrium constants for the formation of HS^- from H_2S is 1.0×10^{-7} and that of S^{2-} from HS^- ions is 1.2×10^{-13} then the concentration of S^{2-} ions in aqueous solution is :

(1) 3×10^{-20} (2) 6×10^{-21}

(3) 5×10^{-19} (4) 5×10^{-8}

Ans. (1)

7. The combustion of benzene (l) gives CO_2(g) and H_2O(l). Given that heat of combustion of benzene at constant volume is –3263.9 kJ mol^{-1} at 25° C ; heat of combustion (in kJ mol^{-1}) of benzene at constant pressure will be -

(R = 8.314 JK^{-1} 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) $(NH_4)_2Cr_2O_7$

(2) NH_4NO_2

(3) $(NH_4)_2SO_4$

(4) $Ba(N_3)_2$

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

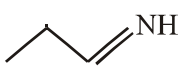
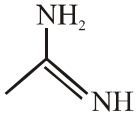
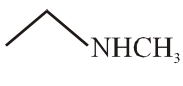
Ans. (2)

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 :
(a)  (b) 
(c)  (d) 
(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)

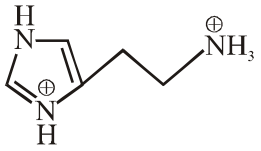
17. Hydrogen peroxide oxidises $[Fe(CN)_6]^{4-}$ to $[Fe(CN)_6]^{3-}$ in acidic medium but reduces $[Fe(CN)_6]^{3-}$ to $[Fe(CN)_6]^{4-}$ in alkaline medium. The other products formed are, respectively :
(1) $(H_2O + O_2)$ and $(H_2O + OH^-)$
(2) H_2O and $(H_2O + O_2)$
(3) H_2O and $(H_2O + OH^-)$
(4) $(H_2O + O_2)$ and H_2O

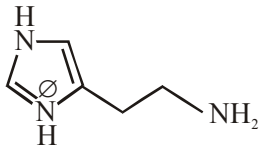
Ans. (2)

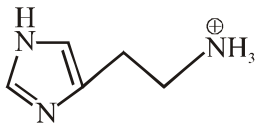
18. Glucose on prolonged heating with HI gives :
(1) 1–Hexene
(2) Hexanoic acid
(3) 6-iodohexanal
(4) n-Hexane

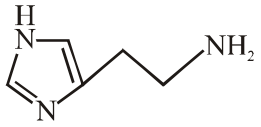
Ans. (4)

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

(1) 

(2) 

(3) 

(4) 

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 :

$[Co(NH_3)_4Br_2]^+ + Br^- \rightarrow [Co(NH_3)_3Br_3] + NH_3$

(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)

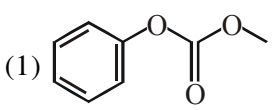
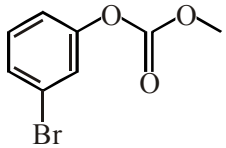
23. The ratio of mass percent of C and H of an organic compound ($C_XH_YO_Z$) is 6 : 1. If one molecule of the above compound ($C_XH_YO_Z$) contains half as much oxygen as required to burn one molecule of compound C_XH_Y completely to CO_2 and H_2O. The empirical formula of compound $C_XH_YO_Z$ is :

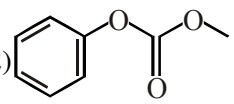
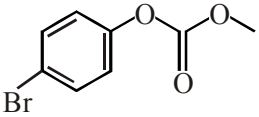
(1) C_2H_4O (2) $C_3H_4O_2$

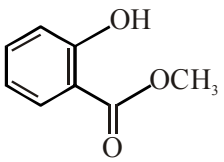
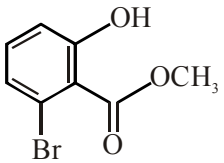
(3) $C_2H_4O_3$ (4) $C_3H_6O_3$

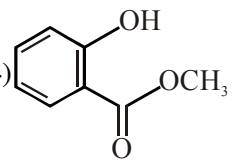
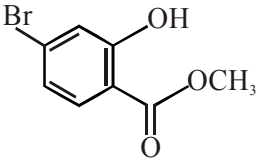
Ans. (3)

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 :

(1)  and 

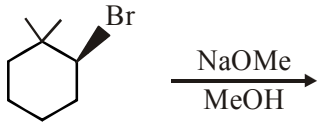
(2)  and 

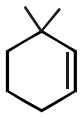
(3)  and 

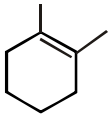
(4)  and 

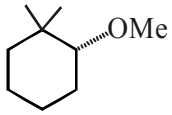
Ans. (2)

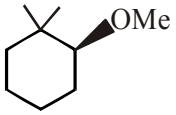
25. The major product of the following reaction is :



(1) 

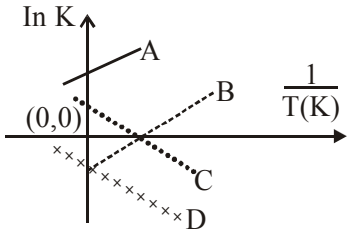
(2) 

(3) 

(4) 

Ans. (1)

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

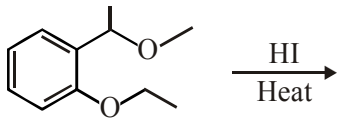


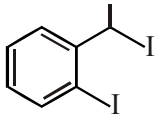
(1) B and C (2) C and D

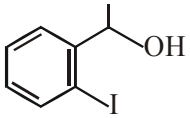
(3) A and D (4) A and B

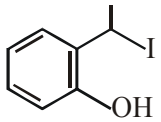
Ans. (4)

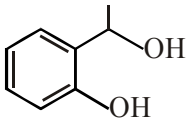
27. The major product formed in the following reaction is :



(1) 

(2) 

(3) 

(4) 

Ans. (3)

28. A aqueous solution contains an unknown concentration of Ba^{2+}. When 50 mL of a 1 M solution of Na_2SO_4 is added, $BaSO_4$ just begins to precipitate. The final volume is 500 mL. The solubility product of $BaSO_4$ is 1×10^{-10}. What is the original concentration of Ba^{2+} ?

(1) 2×10^{-9} M

(2) 1.1×10^{-9} M

(3) 1.0×10^{-10} M

(4) 5×10^{-9} M

Ans. (2)

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

(1) 3 (2) 1

(3) 0 (4) 2

Ans. (2)

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

(1) $[Co(H_2O)_5Cl]Cl_2.H_2O$

(2) $[Co(H_2O)_4Cl_2]Cl.2H_2O$

(3) $[Co(H_2O)_3Cl_3].3H_2O$

(4) $[Co(H_2O)_6]Cl_3$

Ans. (3)