# JEE MAIN-2017

## CHEMISTRY

## Important Instructions:

1. Immediately fill in the particulars on this page of the Test Booklet with ***only Black Ball Point Pen*** provided in the examination hall.

2. The Answer Sheet is kept inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars carefully.

3. The test is of **3 hours** duration.

4. The Test Booklet consists of **90** questions. The maximum marks are **360**.

5. Candidates will be awarded marks as started above in instruction No. 5 for correct response of each question. ¼ (one fourth) marks of the total marks allotted to the question (i.e. 1 mark) will be deducted for indicating incorrect response of each question. No deduction from that total score will be made if no response is indicated for an item in the answer sheet.

6. There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instruction 6 above.

7. For writing particulars / marking responses on ***Side–1*** and ***Side–2*** of the Answer Sheet use ***only Black Ball Point Pen*** provided in the examination hall.

8. No candidate is allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, any electronic device, etc. except the Admit Card inside the examination room/hall.

9. Rough work is to be done on the space provided for this purpose in the Test Booklet only. This space is given at the bottom of each page and in **four** pages (Page **20-30**) at the end of the booklet.

10. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room / Hall. ***However, the candidates are allowed to take away this Test Booklet with them***.

11. The CODE for this Booklet is **D**. Make sure that the CODE printed on **Side–2** of the Answer Sheet and also tally the serial number of the Test Booklet and Answer Sheet are the same as that on this booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.

12. **Do not fold or make any stray mark on the Answer Sheet.**

*61. 1 gram of a carbonate $(M_2CO_3)$ on treatment with excess HCl produces 0.01186 mole of $CO_2$. The molar mass of $M_2CO_3$ in g $mol^{-1}$ is:

(1) 84.3

(2) 118.6

(3) 11.86

(4) 1186

*62. Given $C_{(graphite)} + O_2(g) \rightarrow CO_2(g);$

$\Delta_r H^0 = -393.5 kJ\,mol^{-1}$

$H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(1);$

$\Delta_r H^0 = -285.8 kJ\,mol^{-1}$

$CO_2(g) + 2H_2O(1) \rightarrow CH_4(g) + 2O_2(g);$

$\Delta_r H^0 = +890.3 kJ\,mol^{-1}$

Based on the above thermochemical equations, the value of $\Delta_r H^0$ at 298 K for the reaction $C_{(graphite)} + 2H_2(g) \rightarrow CH_4(g)$ will be:

(1) +144.0 kJ $mol^{-1}$

(2) −74.8 kJ $mol^{-1}$

(3) −144.0 kJ $mol^{-1}$

(4) +74.8 kJ $mol^{-1}$

63. The freezing point of benzene decreases by $0.45°C$ when $0.2$ g of acetic acid is added to $20$g of benzene. If acetic acid associates to form a dimer in benzene, percentage association of acetic acid in benzene will be: $\left(K_f \text{ for benzene} = 5.12\ K \text{ kg mol}^{-1}\right)$

(1) 80.4%

(2) 74.6%

(3) 94.6%

(4) 64.6%

*64. The most abundant elements by mass in the body of a healthy human adult are: Oxygen $(61.4\%)$; Carbon $(22.9\%)$, Hydrogen $(10.0\%)$; and Nitrogen $(2.6\%)$. The weight which a $75$ kg person would gain if all $^1H$ atoms are replaced by $^2H$ atoms is:

(1) 37.5 kg

(2) 7.5 kg

(3) 10 kg

(4) 15 kg

*65. $\Delta U$ is equal to

(1) Isobaric work

(2) Adiabatic work

(3) Isothermal work

(4) Isochoric work

66. The formation of which of the following polymers involves hydrolysis reaction?

(1) Bakelite

(2) Nylon 6, 6

(3) Terylene

(4) Nylon 6

67. Given

$E^0_{Cl_2/Cl^-} = 1.36V$, $E^0_{Cr^{3+}/Cr} = -0.74\,V$

$E^0_{Cr_2O_7^{2-}/Cr^{3+}} = 1.33V$, $E^0_{MnO_4^-/Mn^{2+}} = 1.51\,V$

Among the following, the strongest reducing agent is

(1) $Mn^{2+}$

(2) $Cr^{3+}$

(3) $Cl^-$

(4) Cr

68. The Tyndall effect is observed only when following conditions are satisfied:

(a) The diameter of the dispersed particles is much smaller than the wavelength of the light used.

(b) The diameter of the dispersed particle is not much smaller than the wavelength of the light used.

(c) The refractive indices of the dispersed phase and dispersion medium are almost similar in magnitude.

(d) The refractive indices of the dispersed phase and dispersion medium differ greatly in magnitude.

(1) (b) and (d)

(2) (a) and (c)

(3) (b) and (c)

(4) (a) and (d)

*69. In the following reactions, ZnO is respectively acting as *a/an*:

(a) $ZnO + Na_2O \rightarrow Na_2ZnO_2$

(b) $ZnO + CO_2 \rightarrow NnCO_3$

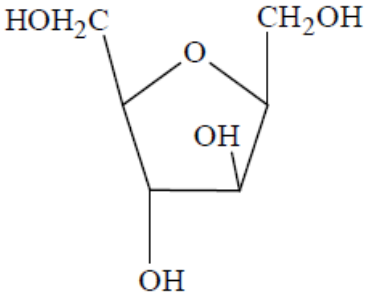
(1) base and base

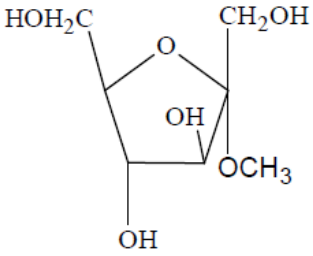
(2) acid and acid

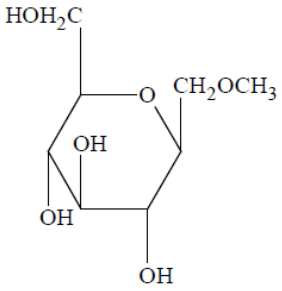
(3) acid and base

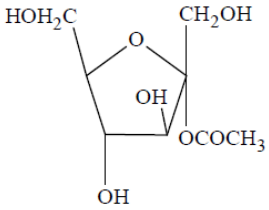
(4) base and acid

70. Which of the following compounds will behave as a reducing sugar in an aqueous KOH solution?

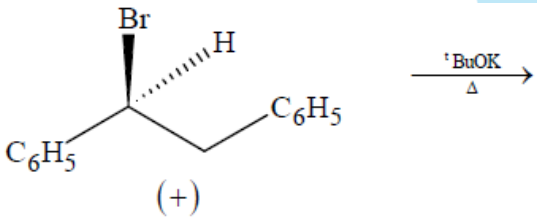
(1) 

(2) 


(3) 


(4) 


71. The major product obtained in the following reaction is:




(1) $C_6H_5CH=CHC_6H_5$

(2) $(+)C_6H_5CH(O^tBu)CH_2C_6H_5$

(3) $(-)C_6H_5CH(O^tBu)CH_2C_6H_5$

(4) $(\pm)C_6H_5CH(O^tBu)CH_2C_6H_5$

*72. Which of the following species is **not** paramagnetic?

(1) CO

(2) $O_2$

(3) $B_2$

(4) NO

73. On treatment of 100 mL of 0.1M solution of $CoCl_3 . 6H_2O$ with excess $AgNO_3$; $1.2 \times 10^{22}$ ions are precipitated. The complex is:

(1) $\left[Co(H_2O)_3 Cl_3\right].3H_2O$

(2) $\left[Co(H_2O)_6\right]Cl_3$

(3) $\left[Co(H_2O)_5 Cl\right]Cl_2.H_2O$

(4) $\left[Co(H_2O)_4 Cl_2\right]Cl.2H_2O$

*74. $pK_a$ of a weak acid $(HA)$ and $pK_b$ of a weak base $(BOH)$ are 3.2 and 3.4, respectively. The pH of their salt $(AB)$ solution is:

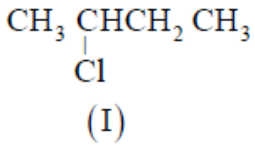
(1) 6.9

(2) 7.0

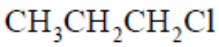
(3) 1.0

(4) 7.2

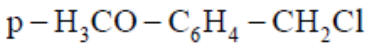
75. The increasing order of the reactivity of the following halides for the $S_N1$ reaction is:



(I)



(II)



(III)

(1) (II) < (I) < (III)

(2) (I) < (III) < (II)

(3) (II) < (III) < (I)

(4) (III) < (II) < (I)

*76. Both lithium and magnesium display several similar properties due to the diagonal relationship; however, the one which is incorrect, is:

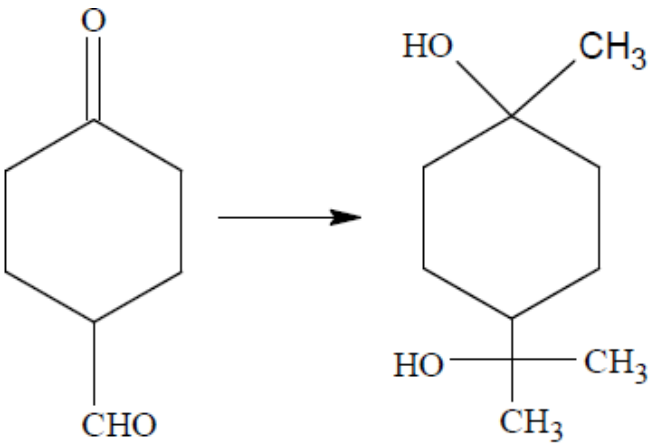
(1) both form soluble bicarbonates

(2) both from nitrides

(3) nitrates of both Li and Mg yield $NO_2$ and $O_2$ on heating

(4) both form basic carbonates

77. The correct sequence of reagents for the following conversion will be:



(1) $CH_3MgBr,\ H^+/CH_3OH, \left[Ag(NH_3)_2\right]^+ OH^-$

(2) $CH_3MgBr,\ \left[Ag(NH_3)_2\right]^+ OH^-, H^+/CH_3OH$

(3) $\left[Ag(NH_3)_2\right]^+ OH^-,\ CH_3MgBr,\ , H^+/CH_3OH$

(4) $\left[Ag(NH_3)_2\right]^+ OH^-, H^+/CH_3OH, CH_3MgBr$

78. The products obtained when chlorine gas reacts with cold and dilute aqueous NaOH are:

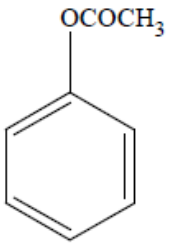
(1) $ClO_2^-$ and $ClO_3^-$

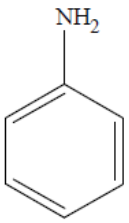
(2) $Cl^-$ and $ClO^-$

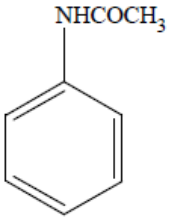
(3) $Cl^-$ and $ClO_2^-$

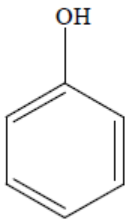
(4) $ClO^-$ and $ClO_3^-$

79. Which of the following compounds will form significant amount of *meta* product during mono-nitration reaction?

(1) 


(2) 

(3) 


(4) 


*80. 3-Methyl-pent-2-ene on reaction with HBr in presence of peroxide forms an addition product. The number of possible stereoisomers for the product is :

(1) Zero

(2) Two

(3) Four

(4) Six

81. Two reactions $R_1$ and $R_2$ have identical pre-exponential factors. Activation energy of $R_1$ exceeds that of $R_2$ by $10\,\text{kJ mol}^{-1}$. If $k_1$ and $k_2$ are rate constants for reactions $R_1$ and $R_2$ respectively at $300\,\text{K}$, then $\ln(k_1/k_2)$ is equal to :

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

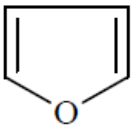
(1) 12

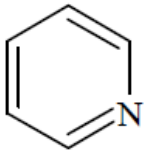
(2) 6

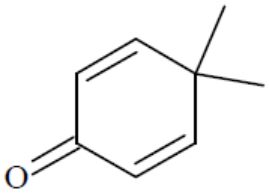
(3) 4

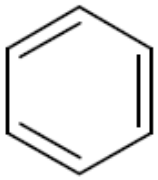
(4) 8

*82. Which of the following molecules is least resonance stabilized?

(1) 


(2) 


(3) 


(4) 

*83. The group having isoelectronic species is:

(1) $O^-, F^-, Na, Mg^+$

(2) $O^{2-}, F^-, Na, Mg^{2+}$

(3) $O^-, F^-, Na^+, Mg^{2+}$

(4) $O^{2-}, F^-, Na^+, Mg^{2+}$

*84. The radius of the second Bohr orbit for hydrogen atom is:

(Planck's Const. $h = 6.6262 \times 10^{-34}\ Js$ mass of electron $= 9.1091 \times 10^{-31}\text{kg}$; charge of electron $e = 1.60210 \times 10^{-19}\text{C}$; permittivity of vacuum $\in_0 = 8.854185 \times 10^{-12}\text{kg}^{-1}\text{m}^{-3}\text{A}^2$)

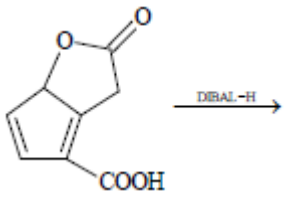
(1) $4.76\,\text{Å}$

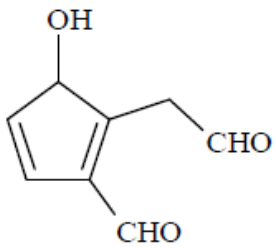
(2) $0.529\,\text{Å}$

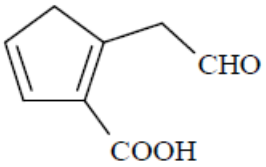
(3) $2.12\,\text{Å}$

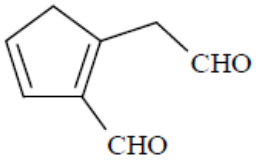
(4) $1.65\,\text{Å}$

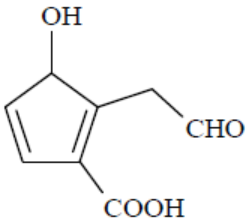
85. The major product obtained in the following reaction is:




(1) 


(2) 

(3) 


(4) 


*86. Which of the following reactions is an example of a redox reaction?

(1) $XeF_2 + PF_5 \rightarrow [XeF]^+ PF_6^-$

(2) $XeF_6 + H_2O \rightarrow XeOF_4 + 2HF$

(3) $XeF_6 + 2H_2O \rightarrow XeO_2F_2 + 4HF$

(4) $XeF_4 + O_2F_2 \rightarrow XeF_6 + O_2$

87. A metal crystallises in a face centred cubic structure. If the edge length of its unit cell is '$a$', the closest approach between two atoms in metallic crystal will be:

(1) $2\sqrt{2}a$

(2) $\sqrt{2}a$

(3) $\frac{a}{\sqrt{2}}$

(4) $2a$

88. Sodium salt of an organic acid ' X ' produces effervescence with conc. $H_2SO_4$. ' X ' reacts with the acidified aqueous $CaCl_2$ solution to give a white precipitate which decolourises acidic solution of $KMnO_4$. ' X ' is:

(1) HCOONa

(2) $CH_3COONa$

(3) $Na_2C_2O_4$

(4) $C_6H_5COONa$

*89. A water sample has ppm level concentration of following anions

$F^- = 10; SO_4^{2-} = 100; NO_3^- = 50$

The anion/anions that make/makes the water sample unsuitable for drinking is/are:

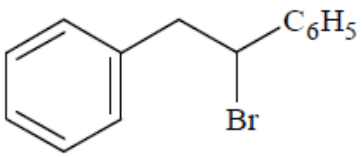
(1) both $SO_4^{2-}$ and $NO_3^-$

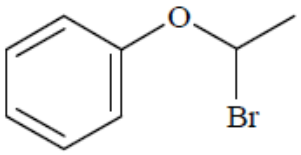
(2) only $F^-$

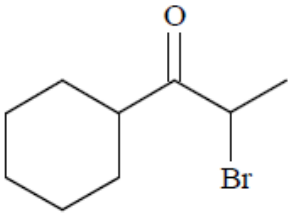
(3) only $SO_4^{2-}$

(4) only $NO_3^-$

90. Which of the following, upon treatment with *tert*-BuONa followed by addition of bromine water, fails to decolourize the colour of bromine?

(1) 


(2) 


(3) 


(4)