



Previous Year Solved Question Paper  
of

**G.A.T.E. (XL) 2015**

**LIFE SCIENCES**

**XL: H Chemistry**

**Examination**

*(Original Question Paper with Answer Key)*

**GRADUATE APTITUDE TEST IN ENGINEERING**



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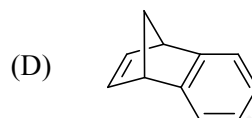
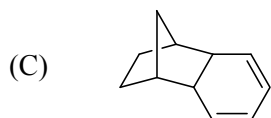
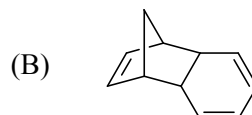
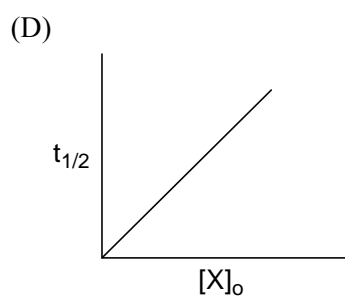
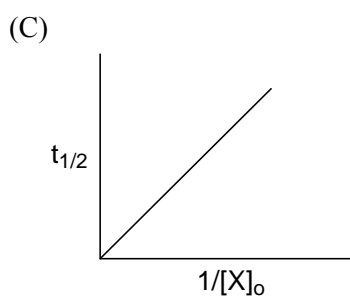
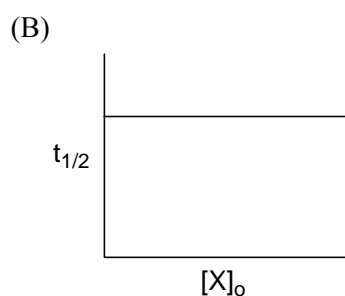
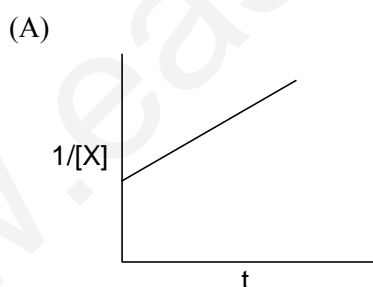
**H: CHEMISTRY (COMPULSORY)****Q. 1 – Q. 5 carry one mark each.**

Q.1 The molecule having net 'non-zero dipole moment' is

- (A)
- $\text{CCl}_4$
- (B)
- $\text{NF}_3$
- (C)
- $\text{CO}_2$
- (D)
- $\text{BCl}_3$

**Ans. B**

Q.2 The Diels-Alder adduct from the reaction between cyclopentadiene and benzyne is

**Ans. D**Q.3 The number of possible enantiomeric pair(s) in  $\text{HOOC}-\text{CH}(\text{OH})-\text{CH}(\text{OH})-\text{COOH}$  is \_\_\_\_\_**Ans. 1**Q.4 For the electrochemical reaction,  $\text{Cu}^{2+}(\text{aq}) + \text{Zn}(\text{s}) \rightleftharpoons \text{Cu}(\text{s}) + \text{Zn}^{2+}(\text{aq})$ the equilibrium constant at  $25^\circ\text{C}$  is  $1.7 \times 10^{37}$ . The change in standard Gibbs free energy ( $\Delta G^\circ$ ) for this reaction at that temperature will be \_\_\_\_\_  $\text{kJ mol}^{-1}$  (up to one decimal place).**(Given:  $R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$ )****Ans. -212.6 to -212.2**Q.5 Among the following diagrams, the one that correctly describes a zero order reaction ( $\text{X} \rightarrow \text{product}$ ) is**(Given:  $[\text{X}]_0$  = initial concentration of reactant X;  $[\text{X}]$  = concentration of reactant X at time  $t$  and  $t_{1/2}$  = half-life period of reactant X)****Ans. D**

**Q. 6 – Q. 15 carry two marks each.**

- Q.6 If the radius of first Bohr orbit is  $0.53 \text{ \AA}$ , then the radius of the third Bohr orbit is  
 (A)  $2.12 \text{ \AA}$  (B)  $4.77 \text{ \AA}$  (C)  $1.59 \text{ \AA}$  (D)  $3.18 \text{ \AA}$

**Ans. B**

- Q.7 If 50 mL of 0.02 M HCl is added to 950 mL of  $\text{H}_2\text{O}$ , then the pH of the final solution will be \_\_\_\_\_

**Ans. 3**

- Q.8 Stability of  $[\text{CrCl}_6]^{3-}$  (X),  $[\text{MnCl}_6]^{3-}$  (Y) and  $[\text{FeCl}_6]^{3-}$  (Z) follows the order  
 (Given: Atomic numbers of Cr = 24, Mn = 25 and Fe = 26)  
 (A)  $\text{X} > \text{Y} > \text{Z}$  (B)  $\text{X} < \text{Y} < \text{Z}$  (C)  $\text{Y} < \text{X} < \text{Z}$  (D)  $\text{X} < \text{Y} = \text{Z}$

**Ans. A**

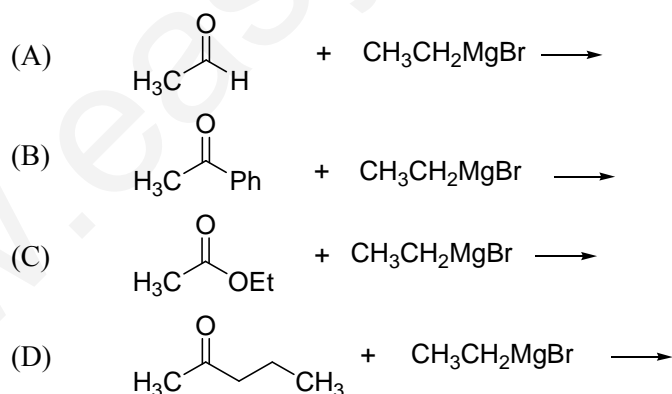
- Q.9 Among the following pairs, the paramagnetic and diamagnetic species, respectively, are  
 (A) CO and  $\text{O}_2^-$  (B) NO and CO (C)  $\text{O}_2^{2-}$  and CO (D)  $\text{NO}^+$  and  $\text{O}_2^-$

**Ans. B**

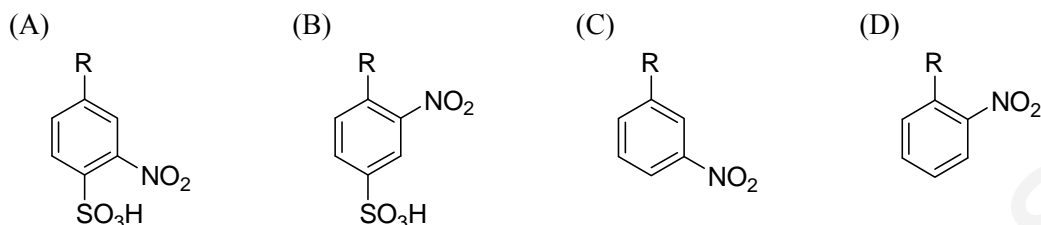
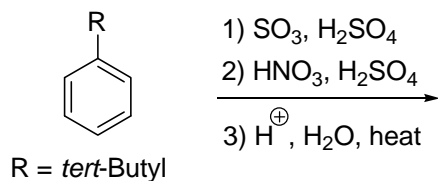
- Q.10 In compounds  $\text{K}_4[\text{Fe}(\text{CN})_6]$  (P) and  $\text{Fe}(\text{CO})_5$  (Q), the iron metal centre is bonded to  
 (A) C of  $\text{CN}^-$  in P and C of CO in Q  
 (B) N of  $\text{CN}^-$  in P and C of CO in Q  
 (C) C of  $\text{CN}^-$  in P and O of CO in Q  
 (D) N of  $\text{CN}^-$  in P and O of CO in Q

**Ans. A**

- Q.11 Among the following reactions, the one that produces achiral alcohol (after hydrolysis) is

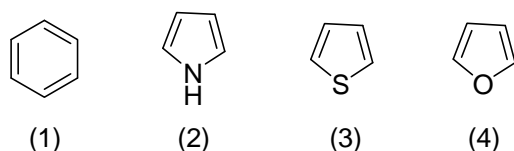
**Ans. C**

Q.12 The major product from the following reaction is



**Ans. D**

Q.13 The order of resonance energy for the following molecules is



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

**Ans. A**

Q.14 The molar enthalpy of vaporization for a liquid (normal boiling point = 78.3 °C) is 39 kJ mol<sup>-1</sup>. If the liquid has to boil at 25 °C, the pressure must be reduced to \_\_\_\_\_ Torr (up to one decimal place).

(Given: R = 8.314 JK<sup>-1</sup>mol<sup>-1</sup>; 1 atm = 760 Torr)

**Ans. 69.6 to 70.0**

Q.15 For the process, H<sub>2</sub>O(l) ⇌ H<sub>2</sub>O(s) at 0 °C and 1 atm, the correct statement is

- (A) ΔS<sub>system</sub> = 0            (B) ΔS<sub>total</sub> > 0            (C) ΔS<sub>total</sub> = 0            (D) ΔS<sub>total</sub> < 0

**Ans. C**

**END OF THE QUESTION PAPER**

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