



Previous Year Solved Question Paper  
of

**G.A.T.E. (XL) 2019**

**Life Sciences**

**Chemistry  
Examination**

*(Original Question Paper with Answer Key)*

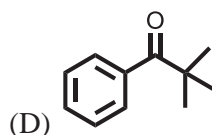
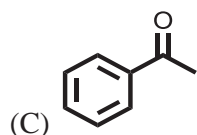
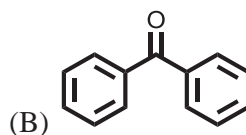
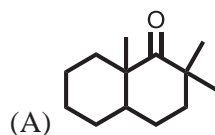
**GRADUATE APTITUDE TEST IN ENGINEERING**



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**XL-P: Q. 1 – Q. 5 carry one mark each & Q. 6 – Q. 15 carry two marks each**

Q.1 The compound that provides a carboxylic acid, upon treatment with  $\text{Br}_2 / \text{NaOH}$  followed by acidification, is.



*Ans. C*

Q.2 The boiling point of halogens from  $\text{F}_2$  to  $\text{I}_2$  increases due to

- (A) decrease in electron affinity  
 (B) decrease in ionization potential  
 (C) dipole-dipole interaction  
 (D) induced dipole – induced dipole interaction

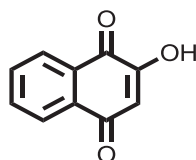
*Ans. D*

Q.3 According to VSEPR theory, the species that has the smallest F-X-F angle (where X = central atom) is

- (A)  $\text{BF}_3$                       (B)  $\text{PF}_3$                       (C)  $\text{BF}_4^-$                       (D)  $\text{IF}_4^-$

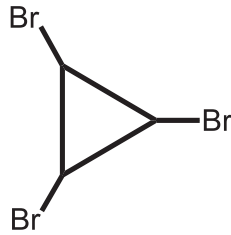
*Ans. D*

Q.4 The total number of tautomers for the following molecule (including the structure provided below) is \_\_\_\_\_.



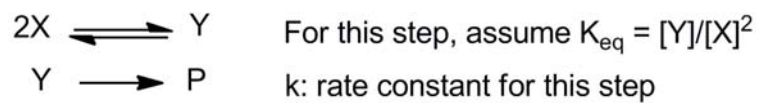
*Ans. 3 to 3*

Q.5 The total number of stereoisomers possible for the following structure is \_\_\_\_



Ans. 2 to 2

Q.6 For the reaction mechanism,



the rate law is .

- (A)  $\frac{d[P]}{dt} = K_{eq}[Y]$
- (B)  $\frac{d[P]}{dt} = k [X]^2$
- (C)  $\frac{d[P]}{dt} = k K_{eq}[Y]$
- (D)  $\frac{d[P]}{dt} = k K_{eq} [X]^2$

Ans. D

Q.7 Match the type of reaction in Group-1 with the most appropriate description in Group-2

	Group 1		Group 2
P	Hydroboration-oxidation	1	Electrophilic aromatic substitution
Q	Nucleophilic aromatic substitution	2	Oxaphosphetane intermediate
R	Wittig reaction	3	Meisenheimer complex
S	Friedel-Crafts reaction	4	Anti-Markownikoff's product

(A) P-2, Q-4, R-1, S-3

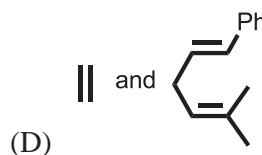
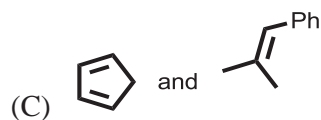
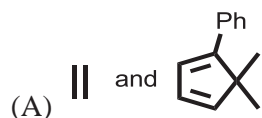
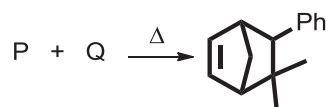
(B) P-4, Q-3, R-1, S-2

(C) P-4, Q-3, R-2, S-1

(D) P-2, Q-1, R-4, S-3

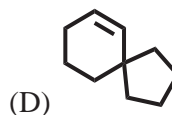
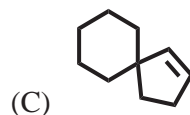
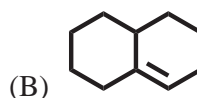
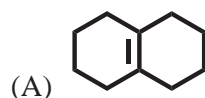
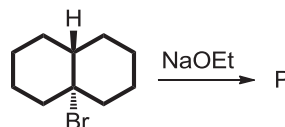
Ans. C

Q.8 The reactants P and Q in the following reaction are



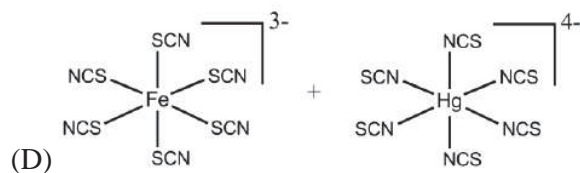
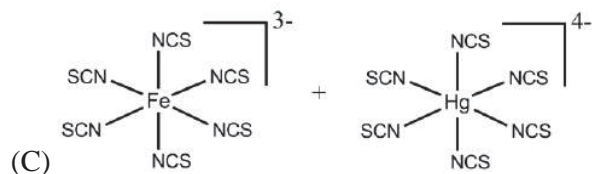
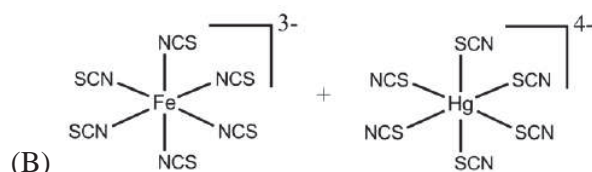
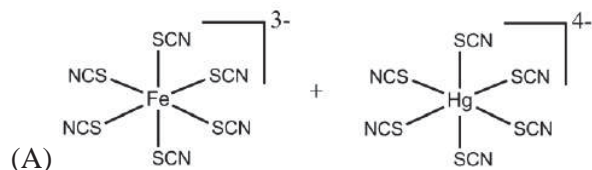
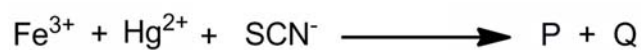
Ans. C

Q.9 The major product formed in the following reaction is



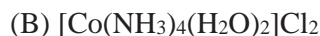
A

Q.10 The most stable coordination complexes P and Q formed in the following reaction are



Ans. B

Q.11 A coordination complex **Y** upon reaction with  $\text{AgNO}_3$  solution does **NOT** give any precipitation. Complex **Y** possesses two isomers, of which one has zero dipole moment. The crystal field stabilization energy of **Y** is either  $-0.8 \Delta_o$  or  $-0.8 \Delta_t$ . The magnetic moment for **Y** is found to be 3.9 Bohr Magneton. The coordination complex **Y** is



Ans. D

Q.12 A protein in denatured state (D) is in equilibrium with native state (N).



At 360 K, both N and D states are equally populated. If the standard entropy change for the reaction at this temperature  $\Delta S^0 = -139 \text{ J K}^{-1} \text{ mol}^{-1}$ , then the corresponding standard enthalpy change  $\Delta H^0$  for the reaction in  $\text{kJ mol}^{-1}$  (**rounded off to one decimal place**) is

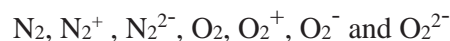
\_\_\_\_\_

Ans. -51 to -49

Q.13 The pH of a 1.0 L buffer solution containing 0.2 mol of acetic acid ( $\text{CH}_3\text{COOH}$ ) and 0.3 mol of sodium acetate ( $\text{CH}_3\text{COONa}$ ) is 5.0. The  $K_a$  of acetic acid is  $P \times 10^{-5}$ , where the numerical value of P (**rounded off to one decimal place**) is \_\_\_\_\_

Ans. 1.4 TO .16

Q.14 Based on molecular orbital theory, the number of paramagnetic species in the following list



is \_\_\_\_\_

(assume that there is no change in energy of the orbitals upon addition/removal of electrons in a molecule)

.

Ans. 5 TO 5

Q.15 Given the standard reduction potentials,  $E_{\text{Cu}^{2+}/\text{Cu}}^0 = 0.34 \text{ V}$  and  $E_{\text{Ag}^+/\text{Ag}}^0 = 0.80 \text{ V}$ , the standard free energy change ( $\Delta G^0$ ) for the reaction



in  $\text{kJ mol}^{-1}$  (**rounded off to one decimal place**;  $F = 96500 \text{ C mol}^{-1}$ ), is \_\_\_\_\_

Ans. -89.8 TO -87.8

**END OF THE QUESTION PAPER**

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