Previous Year Question Paper

of

G.A.T.E. (XL) 2016

LIFE SCIENCES

XL-H: Chemistry (Compulsory)

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 species having shortest B–F bond distance is

(A) BF_3 (B) $[BF_4]^-$ (C) $H_3N{\cdot}BF_3$ (D) $(CH_3)_2O{\cdot}BF_3$

Ans. A

Q.2 The total number of chair conformations possible for 1,2-dimethylcyclohexane is _____.

Ans. 4 : 4

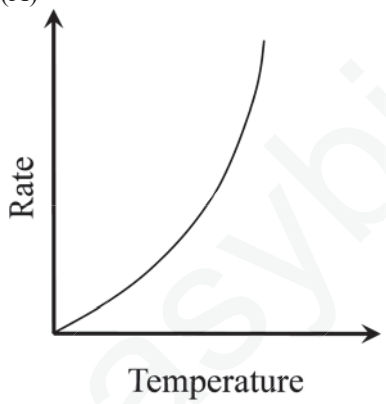
Q.3 'A harmful substance persists in the environment for a very long period of time'. The UNACCEPTABLE statement for this fact is

(A) the substance degrades by second-order kinetics
(B) the substance degrades by first-order kinetics
(C) the substance is not biodegradable
(D) the substance has long half-life

Ans. B

Q.4 For an enzyme catalyzed reaction, the plot that correctly represents the relationship between the rate and temperature is

(A)



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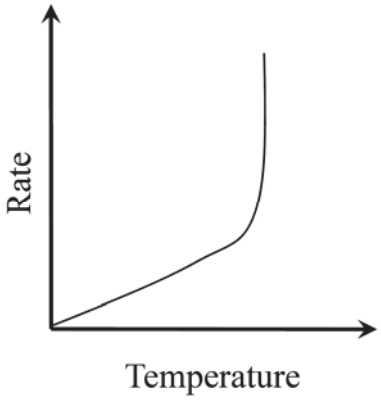

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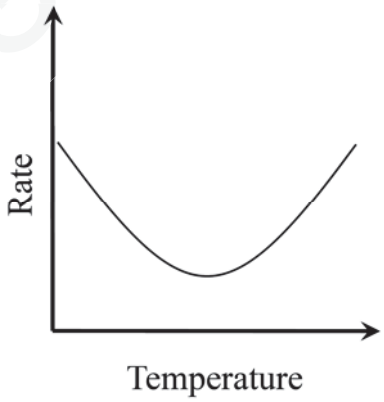

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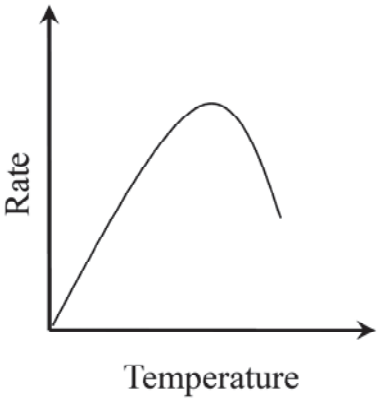

Ans. D

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Q.5 Combinations of a process and equation are given below. The INCORRECT combination is

(A) Constant pressure heating with no phase change; $w = -\int_1^2 P\, dV$
(B) Reversible adiabatic process in a perfect gas; $\Delta U = \int_1^2 C_p(T)dT$
(C) Reversible isothermal process in a perfect gas; $w_{rev} = -\int_1^2 P\, dV$
(D) Constant volume heating with no phase change; $\Delta U = \int_1^2 C_v dT$

Ans. B

Q. 6 – Q. 15 carry two marks each.

Q.6 The correct comparison of pK_a's of $[Fe(H_2O)_6]^{2+}$, $[Fe(H_2O)_6]^{3+}$, V_2O_5 and N_2O_5 is

(A) $[Fe(H_2O)_6]^{3+} < [Fe(H_2O)_6]^{2+}$ and $V_2O_5 < N_2O_5$
(B) $[Fe(H_2O)_6]^{3+} < [Fe(H_2O)_6]^{2+}$ and $V_2O_5 = N_2O_5$
(C) $[Fe(H_2O)_6]^{2+} = [Fe(H_2O)_6]^{3+}$ and $N_2O_5 < V_2O_5$
(D) $[Fe(H_2O)_6]^{3+} < [Fe(H_2O)_6]^{2+}$ and $N_2O_5 < V_2O_5$

Ans. D

Q.7 **Given**: The potential energy of two electrons separated by Bohr radius is 27.211 eV. The first Bohr radius of hydrogen is 0.5292 Å. The electron makes an orbit of radius 0.5295Å around the nucleus in hydrogen.
The calculated ionization energy (eV) of hydrogen atom is _____.

Ans. 13.55 : 13.64

Q.8 The crystal field stabilization energy (excluding pairing energy, if any) of $[CoCl_4]^{2-}$ in Δ_o units is _____.

Ans. 0.52 : 0.54

Q.9 The correct statement is

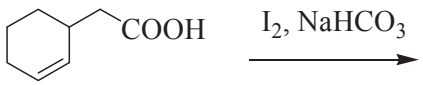
(A) $TlBr_3$ is less soluble in water than TlBr
(B) Ag_2S is more soluble in water than Ag_2O
(C) LiF is less stable than CsF
(D) $[Co(NH_3)_5I]^{2+}$ is less stable than $[Co(NH_3)_5F]^{2+}$

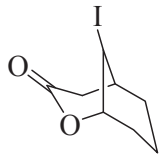
Ans. D

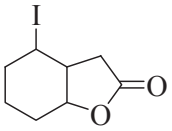
Q.10 Ferrous sulfate on reaction with potassium hexacyanochromate(III) produces a brick red complex. The number of unpaired electrons on Fe in the red complex is _____.

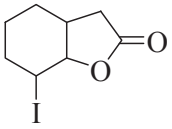
Ans. 4 : 4

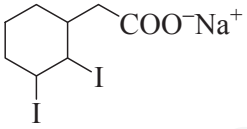
Q.11 The major product formed in the following reaction is (ignore product stereochemistry)



(A) 

(B) 

(C) 

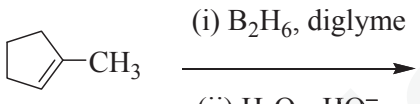
(D) 

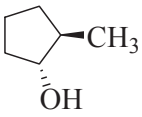
Ans. C

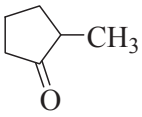
Q.12 When 1.0 g of urea (Molecular Weight = 60) is dissolved in 200 g of solvent **S**, the freezing point of **S** is lowered by 0.25 °C. When 1.5 g of a non-electrolyte **Y** is dissolved in 125 g of **S**, the freezing point of **S** is lowered by 0.20 °C. The molecular weight of **Y** is _____.

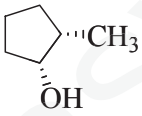
Ans. 180 : 182

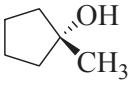
Q.13 The major product formed in the following reaction is



(A) 

(B) 

(C) 

(D) 

Ans. A

Q.14 For a weak acid at 298 K the molar conductivities (in $ohm^{-1}\ m^2\ mol^{-1}$), at infinite dilution and 0.04 mol dm^{-3} are 4.3×10^{-3} and 1.0×10^{-3}, respectively. The degree of dissociation of the acid (0.04 mol dm^{-3}) at 298 K is _____.

Ans. 0.22 : 0.24

Q.15 For propene at 298 K, the molar enthalpy of hydrogenation is –124.27 kJ mol^{-1} and the standard enthalpy of formation is 20.42 kJ mol^{-1}. For propane at 298 K, the standard enthalpy of formation in kJ mol^{-1} is_____.

Ans. -105 : -102

END OF THE QUESTION PAPER

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