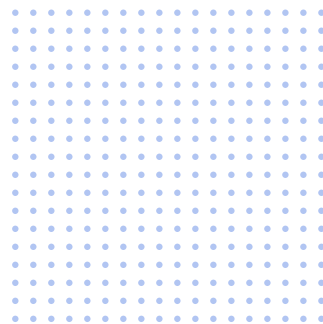




FOR JNU EE EXAM PREPARATION

JNU EE 2022

Question Paper · Ph.D Computational Biology and Bioinformatics - Track 1 Chemistry

EXAM	YEAR	TYPE
JNU EE	2022	Question Paper

SUBJECT
Ph.D Computational Biology and Bioinformatics - Track 1 Chemistry

Test Date : 10 Dec 2022

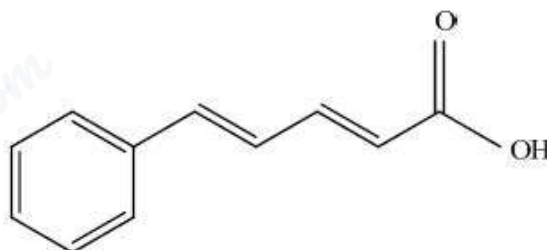
Test Slot : Slot 1

Subject : TRAC-Computational Biology & Bioinformatics Track -1 Chemistry

Sl. No.1

QBID:1092061

How many geometrical isomers are possible for the given compound



(A) 3

(B) 2

(C) 4

(D) 1

Choose the most appropriate answer from the options given below:

1. A Only

2. B Only

3. C Only

4. D Only

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17041]

2[Option ID=17042]

3[Option ID=17043]

4[Option ID=17044]

Sl. No.2

QBID:1092062

The correct order regarding the acidity of aromatic acids is

A. Benzoic acid < p-toluic acid < p-hydroxy benzoic acid

B. p-hydroxy benzoic acid < p-toluic acid < Benzoic acid

C. p-toluic acid < Benzoic acid < p-hydroxy benzoic acid

D. p-toluic acid < p-hydroxy benzoic acid < Benzoic acid

Choose the correct answer from the options given below:

1. A

2. B

3. C

4. D

- (1) 1
(2) 2
(3) 3
(4) 4

1[Option ID=17045]

2[Option ID=17046]

3[Option ID=17047]

4[Option ID=17048]

Sl. No.3

QBID:1092063

What is the relationship between the given pairs?



- A. diastereomers
B. enantiomers
C. identical
D. regioisomers

Choose the correct answer from the options given below:

1. A Only
2. B Only
3. C Only
4. D Only

- (1) 1
(2) 2
(3) 3
(4) 4

1[Option ID=17049]

2[Option ID=17050]

3[Option ID=17051]

4[Option ID=17052]

Sl. No.4

QBID:1092064

The number of unshared electrons on carbene carbon is

1. 1
2. 2
3. 3
4. 4

- (1) 1
(2) 2
(3) 3
(4) 4

1[Option ID=17053]
 2[Option ID=17054]
 3[Option ID=17055]
 4[Option ID=17056]

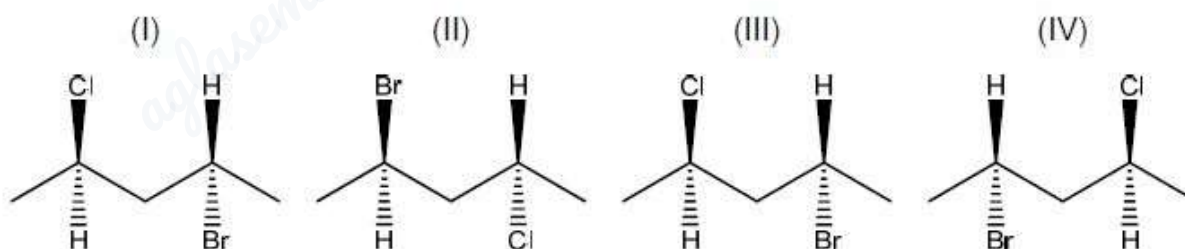
Sl. No.5

QBID:1092065

Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: For the following stereoisomers of 2-Bromo-4-Chloropentane,

- I & II are enantiomers
- III & IV are enantiomers



Reason R: Since they have mirror image relationships

In the light of the above statements, choose the *most appropriate* answer from the options given below

1. Both A and R are correct and R is the correct explanation of A
2. Both A and R are correct but R is NOT the correct explanation of A
3. A is correct but R is not correct
4. A is not correct but R is correct

- (1) 1
 (2) 2
 (3) 3
 (4) 4

1[Option ID=17057]
 2[Option ID=17058]
 3[Option ID=17059]
 4[Option ID=17060]

Sl. No.6

QBID:1092066

Match List I with List II

Method	Range of Half – Lives
A. Relaxation	I. $10^{-10} - 1$
B. Flow	II. $10^2 - 10^8$
C. Kinetic Spectroscopy	III. $10^{-10} - 1$
D. Conventional	IV. $10^{-15} - 10^{-10}$

Choose the correct answer from the options given below:

1. A $\rightarrow$ I; B $\rightarrow$ II; C $\rightarrow$ III; D $\rightarrow$ IV
2. A $\rightarrow$ III; B $\rightarrow$ II; C $\rightarrow$ IV; D $\rightarrow$ I
3. A $\rightarrow$ IV; B $\rightarrow$ II; C $\rightarrow$ I; D $\rightarrow$ III
4. A $\rightarrow$ II; B $\rightarrow$ III; C $\rightarrow$ IV; D $\rightarrow$ I

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17061]

2[Option ID=17062]

3[Option ID=17063]

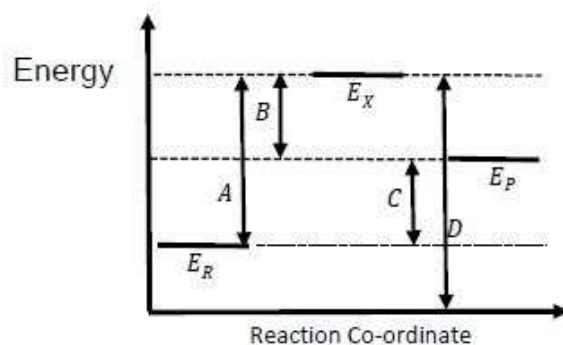
4[Option ID=17064]

Sl. No.7

QBID:1092067

Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: In the diagram, E_R, E_P, E_x represent the energy of the reactant, product and activated complex respectively. The activation energy of backward reaction is B.



Reason R: The backward reaction is exothermic in nature

In the light of the above statements, choose the *most appropriate* answer from the options given below

1. Both A and R are correct and R is the correct explanation of A
2. Both A and R are correct but R is NOT the correct explanation of A
3. A is correct but R is not correct
4. A is not correct but R is correct

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17065]

2[Option ID=17066]

3[Option ID=17067]

4[Option ID=17068]

Sl. No.8

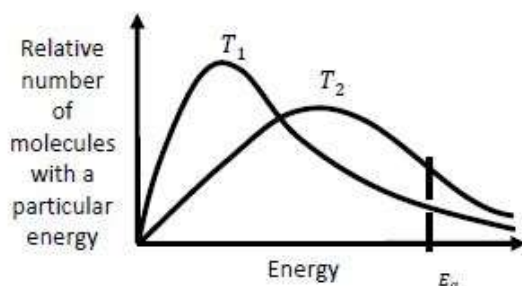
QBID:1092068

The distribution of molecular kinetic energy at two different temperatures is shown below

Given below are two statements:

Statement I: The number of molecules with energy equal to or greater than the activation energy, E_a , of a reaction is proportional to the area under the curve from and beyond E_a for each temperature.

Statement II: $T_2 < T_1$



In the light of the above statements, choose the *most appropriate* answer from the options given below

1. Both Statement I and Statement II are correct
2. Both Statement I and Statement II are incorrect
3. Statement I is correct but Statement II is incorrect
4. Statement I is incorrect but Statement II is correct

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17069]

2[Option ID=17070]

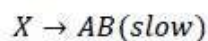
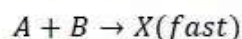
3[Option ID=17071]

4[Option ID=17072]

Sl. No.9

QBID:1092069

An exothermic chemical reaction occurs in two steps as given below



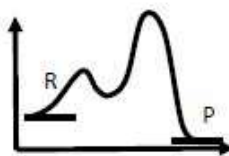
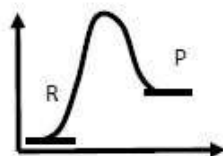
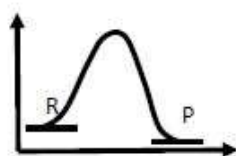
The progress of the reaction is best represented by

(1)

(2)

(3)

(4)



(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17073]

2[Option ID=17074]

3[Option ID=17075]

4[Option ID=17076]

Sl. No.10

QBID:1092070

Match List I with List II

Quantum Number

Properties

A. l

I. Indicates distance from the nucleus

B. s

II. Can have only two possible values

C. m

III. Possible values are $0 - (n - 1)$

D. n

IV. Indicates possible orientation in space

Choose the correct answer from the options given below:

1. $A \rightarrow I$; $B \rightarrow II$; $C \rightarrow III$; $D \rightarrow IV$

2. $A \rightarrow III$; $B \rightarrow II$; $C \rightarrow IV$; $D \rightarrow I$

3. $A \rightarrow IV$; $B \rightarrow II$; $C \rightarrow I$; $D \rightarrow III$

4. $A \rightarrow II$; $B \rightarrow III$; $C \rightarrow IV$; $D \rightarrow I$

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17077]

2[Option ID=17078]

3[Option ID=17079]

4[Option ID=17080]

Sl. No.11

QBID:1092071

Read the following statements

- A. Radial wave function of $2p_x$ & $2p_y$ orbitals are the same
- B. Angular wave function of $2p_x$ & $2p_y$ orbitals are the same
- C. Angular wave function of $2p_x$ & $3p_x$ orbitals are the same
- D. Radial wave function of $2p_x$ & $3p_x$ orbitals are the same

Choose the most appropriate answer from the options given below:

- 1. A, B Only
- 2. B, C Only
- 3. A, C Only
- 4. C, D Only

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17081]

2[Option ID=17082]

3[Option ID=17083]

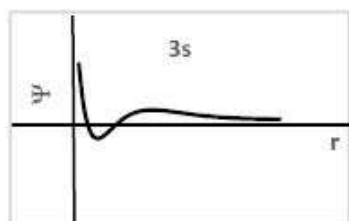
4[Option ID=17084]

Sl. No.12

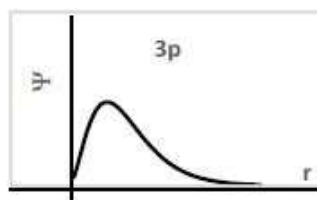
QBID:1092072

Given below are radial wave-function for various hydrogenic orbitals:

A



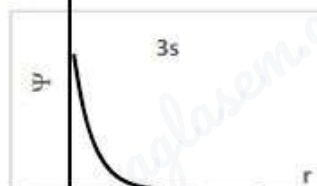
B



C



D



Choose the most appropriate graph from the options given below:

- 1. A, B Only
- 2. B, C Only
- 3. A, C Only
- 4. C, D Only

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17085]
 2[Option ID=17086]
 3[Option ID=17087]
 4[Option ID=17088]

Sl. No.13
 QBID:1092073

Given below are two statements:

Statement I: The number of radial nodes is given by $n - l$

Statement II: The radial probability density is given by $R_{n,l}^2(r)$

In the light of the above statements, choose the *most appropriate* answer from the options given below

1. Both Statement I and Statement II are correct
2. Both Statement I and Statement II are incorrect
3. Statement I is correct but Statement II is incorrect
4. Statement I is incorrect but Statement II is correct

- (1) 1
 (2) 2
 (3) 3
 (4) 4

1[Option ID=17089]
 2[Option ID=17090]
 3[Option ID=17091]
 4[Option ID=17092]

Sl. No.14
 QBID:1092074

The electronic configuration for excited state of $Ca - atom$ is given by $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 4d^1$. Orbital angular momentum for $d - electron$ is

1. $\sqrt{4}\hbar$
2. $\sqrt{6}\hbar$
3. $\sqrt{16}\hbar$
4. $\sqrt{2}\hbar$

- (1) 1
 (2) 2
 (3) 3
 (4) 4

1[Option ID=17093]
 2[Option ID=17094]
 3[Option ID=17095]
 4[Option ID=17096]

Sl. No.15
 QBID:1092075

What is the stabilization energy (in eV) for Be^{3+} in the first excited state?

1. 13.6
2. 27.2
3. 40.8
4. 54.4

- (1) 1
(2) 2
(3) 3
(4) 4

1[Option ID=17097]

2[Option ID=17098]

3[Option ID=17099]

4[Option ID=17100]

Sl. No.16

QBID:1092076

At $p = 0$: $\left(\frac{\partial Z}{\partial p}\right)_T$ is given by ($Z = \text{compressibility factor}$)

1. $\left(b - \frac{a}{RT}\right)$
2. $\frac{a}{(RT)^2} \left(2b - \frac{a}{RT}\right)$
3. $\frac{1}{RT} \left(b + \frac{a}{RT}\right)$
4. $\frac{1}{RT} \left(b - \frac{a}{RT}\right)$

- (1) 1
(2) 2
(3) 3
(4) 4

1[Option ID=17101]

2[Option ID=17102]

3[Option ID=17103]

4[Option ID=17104]

Sl. No.17

QBID:1092077

Read the following statements

- A. The standard boiling temperature is the temperature at which the vapour pressure of the substance is 1 bar
- B. The normal boiling temperature is the temperature at which the vapour pressure of the substance is equal to atmospheric pressure
- C. Substances for which $T < T_c$ and $p < p_c$ are called supercritical fluids

Choose the correct statements from the options given below:

1. A and B Only
2. B and C Only
3. A and C Only
4. A, B and C Only

- (1) 1
(2) 2
(3) 3
(4) 4

1[Option ID=17105]

2[Option ID=17106]

3[Option ID=17107]

4[Option ID=17108]

Sl. No.18
QBID:1092078

Given below are two statements:

Statement I: Joule-Thomson coefficient (μ_{JT}) is zero at inversion temperature

Statement II: A negative value of μ_{JT} (Joule-Thomson coefficient) corresponds to warming of gas on expansion

In the light of the above statements, choose the *most appropriate* answer from the options given below

1. Both Statement I and Statement II are correct
2. Both Statement I and Statement II are incorrect
3. Statement I is correct but Statement II is incorrect
4. Statement I is incorrect but Statement II is correct

- (1) 1
(2) 2
(3) 3
(4) 4

1[Option ID=17109]
2[Option ID=17110]
3[Option ID=17111]
4[Option ID=17112]

Sl. No.19
QBID:1092079

Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: At same temperature and pressure, the rate of diffusion of hydrogen gas is $3\sqrt{3}$ times that of a hydrocarbon of molecular formula C_4H_6 .

Reason R: The rate of diffusion for any gas is directly proportional to $\sqrt{\text{molecular weight}}$.

In the light of the above statements, choose the *correct* answer from the options given below

1. Both A and R are true and R is the correct explanation of A
2. Both A and R are true but R is NOT the correct explanation of A
3. A is true but R is false
4. A is false but R is true

- (1) 1
(2) 2
(3) 3
(4) 4

1[Option ID=17113]
2[Option ID=17114]
3[Option ID=17115]
4[Option ID=17116]

Sl. No.20
QBID:1092080

Comparing the boiling point of

- A. *He*
- B. *Ne*
- C. *Ar*
- D. *Kr*

Choose the correct answer from the options given below:

- 1. $A > B > C > D$
- 2. $A < B > C < D$
- 3. $A < B < C < D$
- 4. $A < B < C > D$

- (1) 1
- (2) 2
- (3) 3
- (4) 4

1[Option ID=17117]

2[Option ID=17118]

3[Option ID=17119]

4[Option ID=17120]

Sl. No.21

QBID:1092081

Match List I with List II

Thermodynamic Process

Equation

A. Constant volume

I. $TdS = dE + dW$

B. Reversible

II. $dE = C_v dT$

C. Irreversible

III. $dS = 0$

D. Reversible adiabatic

IV. $TdS - dE + dW > 0$

Choose the correct answer from the options given below:

- 1. $A \rightarrow \text{II}; B \rightarrow \text{IV}; C \rightarrow \text{I}; D \rightarrow \text{III}$
- 2. $A \rightarrow \text{II}; B \rightarrow \text{I}; C \rightarrow \text{IV}; D \rightarrow \text{III}$
- 3. $A \rightarrow \text{IV}; B \rightarrow \text{II}; C \rightarrow \text{I}; D \rightarrow \text{III}$
- 4. $A \rightarrow \text{IV}; B \rightarrow \text{III}; C \rightarrow \text{II}; D \rightarrow \text{I}$

- (1) 1
- (2) 2
- (3) 3
- (4) 4

1[Option ID=17121]

2[Option ID=17122]

3[Option ID=17123]

4[Option ID=17124]

Sl. No.22

QBID:1092082

Given below are two statements: For a thermodynamic system, enthalpy $H = U + pV$ (all symbols have their usual meanings)

Statement I: $T = \left(\frac{\partial H}{\partial S}\right)_V$

Statement II: $V = \left(\frac{\partial H}{\partial S}\right)_p$

In the light of the above statements, choose the *correct* answer from the options given below

1. Both Statement I and Statement II are true
2. Both Statement I and Statement II are false
3. Statement I is correct but Statement II is false
4. Statement I is incorrect but Statement II is true

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17125]

2[Option ID=17126]

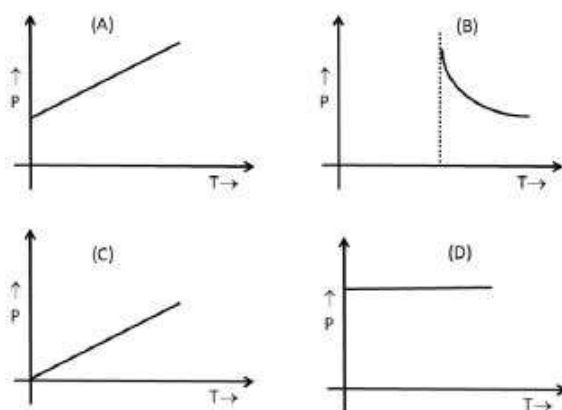
3[Option ID=17127]

4[Option ID=17128]

Sl. No.23

QBID:1092083

A gas obeys the equation of state $p(V - b) = RT$, where b is a constant. For this gas a plot of p versus T at constant p will be



Choose the most appropriate answer from the options given below:

1. A Only
2. B Only
3. C Only
4. D Only

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17129]

2[Option ID=17130]

3[Option ID=17131]

4[Option ID=17132]

Sl. No.24

QBID:1092084

A Carnot cycle operates between two reservoirs at temperature T_1 and T_2 , ($T_1 > T_2$). During each cycle, energy as heat Q_1 is extracted from reservoir at T_1 and that of Q_2 is delivered to reservoir at T_2 . Which statement is incorrect?

1. *work done is equal to $Q_1 - Q_2$ per cycle*
2. *$\frac{Q_1}{T_1} = \frac{Q_2}{T_2}$*
3. *Entropy of the hotter reservoir decreases*
4. *Entropy for the universe increases*

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17133]

2[Option ID=17134]

3[Option ID=17135]

4[Option ID=17136]

Sl. No.25

QBID:1092085

For an ideal gas in a closed system undergoing isothermal expansion the difference in an entropy is equal to (all symbols have usual meaning)

1. $\Delta S = nR \log \left(\frac{V_f}{V_i} \right)$
2. $\Delta S = nR \log \left(\frac{V_i}{V_f} \right)$
3. $\Delta S = nR^2 \log \left(\frac{V_f}{V_i} \right)$
4. $\Delta S = nR^2 \log \left(\frac{V_i}{V_f} \right)$

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17137]

2[Option ID=17138]

3[Option ID=17139]

4[Option ID=17140]

Sl. No.26

QBID:1092086

Given below are two statements (all symbols have their usual meanings)

Statement I: The translational entropy of a monoatomic ideal gas depends on the molar mass, so the translational heat capacity $(C_V)_t$, which depends on entropy, also depends on mass.

Statement II: Translational entropy of a monoatomic ideal gas is given by the

Sackur Tetrode equation as $S_t = \frac{5}{2}Nk + Nk \ln \left[\left(\frac{2\pi mkT}{h^2} \right)^{\frac{3}{2}} \times \frac{V}{N} \right]$

In the light of the above statements, choose the *correct* answer from the options given below

1. Both Statement I and Statement II are true
2. Both Statement I and Statement II are false
3. Statement I is correct but Statement II is false
4. Statement I is incorrect but Statement II is true

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17141]

2[Option ID=17142]

3[Option ID=17143]

4[Option ID=17144]

Sl. No.27

QBID:1092087

Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: The number of microstates for the distribution of 4 indistinguishable particles in 5 boxes is equal to 625.

Reason R: Number of microstates for distribution of n indistinguishable particles in l boxes = $\frac{(n+l-1)!}{n!(l-1)!}$

1. Both A and R are true and R is the correct explanation of A
2. Both A and R are true but R is NOT the correct explanation of A
3. A is true but R is false
4. A is false but R is true

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17145]

2[Option ID=17146]

3[Option ID=17147]

4[Option ID=17148]

Sl. No.28

QBID:1092088

Given below are two statements:

Statement I: The total molecular kinetic energy of a system is the sum of the individual molecular kinetic energies.

Statement II: The total molecular energy of a system composed of interacting molecules behaving as a real gas is not necessarily equal to the sum of the individual molecular energies.

In the light of the above statements, choose the *correct* answer from the options given below

1. Both Statement I and Statement II are true
2. Both Statement I and Statement II are false
3. Statement I is correct but Statement II is false
4. Statement I is incorrect but Statement II is true

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17149]

2[Option ID=17150]

3[Option ID=17151]

4[Option ID=17152]

Sl. No.29

QBID:1092089

For a classical two state system with energies ϵ and 2ϵ (and degeneracies $g_1 = g_2$), the average energy from the most probable distribution is given as

1. $\frac{(e^{-\beta\epsilon} + e^{-2\beta\epsilon})}{\epsilon e^{-\beta\epsilon} + 2\epsilon e^{-2\beta\epsilon}}$
2. $\frac{(\epsilon e^{-\beta\epsilon} + 2\epsilon e^{-2\beta\epsilon})}{e^{-\beta\epsilon} + e^{-2\beta\epsilon}}$
3. $\frac{\epsilon(e^{-\beta\epsilon} + e^{-2\beta\epsilon})}{e^{-\beta\epsilon} + e^{-2\beta\epsilon}}$
4. $\frac{(2\epsilon e^{-\beta\epsilon} + \epsilon e^{-2\beta\epsilon})}{e^{-\beta\epsilon} + e^{-2\beta\epsilon}}$

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17153]

2[Option ID=17154]

3[Option ID=17155]

4[Option ID=17156]

Sl. No.30

QBID:1092090

The molecular partition function for a classical system with nondegenerate and equispaced energy levels (with gap equal to $\Delta\epsilon$) is proportional to

1. $\frac{1}{1+e^{\beta\Delta\epsilon}}$
2. $\frac{1}{1+e^{-\beta\Delta\epsilon}}$
3. $\frac{1}{1-e^{\beta\Delta\epsilon}}$
4. $\frac{1}{1-e^{-\beta\Delta\epsilon}}$

- (1) 1
(2) 2
(3) 3
(4) 4

1[Option ID=17157]

2[Option ID=17158]

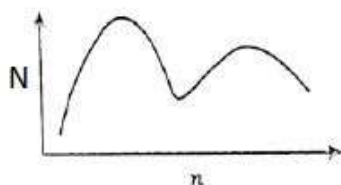
3[Option ID=17159]

4[Option ID=17160]

Sl. No.31

QBID:1092091

A particular population (N) distribution over n states of a diatomic molecule is represented as



which corresponds to

- A. Translation
- B. Rotation
- C. Vibration
- D. Electronic

Choose the most appropriate answer from the options given below:

1. A Only
2. B Only
3. C Only
4. D Only

- (1) 1
(2) 2
(3) 3
(4) 4

1[Option ID=17161]

2[Option ID=17162]

3[Option ID=17163]

4[Option ID=17164]

Sl. No.32

QBID:1092092

Given below are two statements:

Statement I: A photon of wavelength 400 nm corresponds to 25000 cm^{-1}

Statement II: The value of $J_{\max}$ for a rigid diatomic molecule, with rotational constant value of $1,566\text{ cm}^{-1}$ at 300 K is 7.65.

In the light of the above statements, choose the *correct* answer from the options given below

1. Both Statement I and Statement II are true
2. Both Statement I and Statement II are false
3. Statement I is correct but Statement II is false
4. Statement I is incorrect but Statement II is true

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17165]

2[Option ID=17166]

3[Option ID=17167]

4[Option ID=17168]

Sl. No.33

QBID:1092093

The intensity of spectral transition from state ψ_n to ψ_m , for a system, is proportional to

- A. $\langle \psi_n | \mu | \psi_m \rangle$
- B. $\langle \psi_n | \mu | \psi_m \rangle^2$
- C. $|\langle \psi_n | \mu | \psi_m \rangle|^{1/2}$
- D. $\langle \psi_m | \mu | \psi_n \rangle$

where μ is the electric dipole moment

Choose the most appropriate answer from the options given below:

1. A Only
2. B Only
3. C Only
4. D Only

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17169]
 2[Option ID=17170]
 3[Option ID=17171]
 4[Option ID=17172]

SI. No.34

QBID:1092094

In case of Born-Oppenheimer approximation, we consider

- A. $E_{elec} > E_{vib} > E_{rot} > E_{tr}$
- B. Electronic and nuclear motion are decoupled
- C. Electronic and nuclear motion cannot be decoupled
- D. $E_{vib} > E_{rot} > E_{tr} > E_{elec}$

Choose the most appropriate answer from the options given below:

- 1. A, B Only
- 2. B, C Only
- 3. A, C Only
- 4. A, B, C Only

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17173]
 2[Option ID=17174]
 3[Option ID=17175]
 4[Option ID=17176]

SI. No.35

QBID:1092095

Assuming the vibration of $^{35}\text{Cl}_2$ to be harmonic in nature with a force constant of 2298.8 Nm^{-1} , then the zero-point energy is equal to

- 1. $10.5 \times 10^{-21} \text{ J}$
- 2. $14.8 \times 10^{-21} \text{ J}$
- 3. $20.0 \times 10^{-21} \text{ J}$
- 4. $29.6 \times 10^{-21} \text{ J}$

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17177]
 2[Option ID=17178]
 3[Option ID=17179]
 4[Option ID=17180]

SI. No.36

QBID:1092096

The correct order of $C - O$ stretching vibrational frequency is

1. $[Ti(CO)_3]^{-2} > [V(CO)_6]^{-} > CO > [Cr(CO)_6]$
2. $[Cr(CO)_6] > CO > [V(CO)_6]^{-} > [Ti(CO)_3]^{-2}$
3. $CO > [V(CO)_6]^{-} > [Ti(CO)_3]^{-2} > [Cr(CO)_6]$
4. $CO > [Cr(CO)_6] > [V(CO)_6]^{-} > [Ti(CO)_3]^{-2}$

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17181]

2[Option ID=17182]

3[Option ID=17183]

4[Option ID=17184]

Sl. No.37

QBID:1092097

Consider a cell represented by $Cr|Cr^{+3}(aq)||Cu^{+2}(aq)|Cu$.

Given: $Cu^{+2} + 2e^{-} \rightleftharpoons Cu, E^{\circ} = -0.34 V$; $Cu^{+} + e^{-} \rightleftharpoons Cu, E^{\circ} = 0.52 V$; $Cr_2O_7^{-2} + 14H^{+} + 6e^{-} \rightleftharpoons 2Cr^{+3} + 7H_2O, E^{\circ} = 1.33 V$; $Cr^{+3} + 3e^{-} \rightleftharpoons Cr, E^{\circ} = -0.74 V$,

- A. Cell Reaction: $2Cr(s) + 3Cu^{+2}(aq) \rightleftharpoons 2Cr^{+3}(aq) + 3Cu(s)$; $E^{\circ} = 1.08 V$; reaction is spontaneous
- B. Cell Reaction: $:2Cr(s) + 3Cu^{+2}(aq) \rightleftharpoons 2Cr^{+3}(aq) + 3Cu(s)$; $E^{\circ} = -1.08 V$; reaction is spontaneous
- C. Cell Reaction: $:2Cr^{+3}(aq) + 3Cu(s) \rightleftharpoons 2Cr(s) + 3Cu^{+2}(aq)$; $E^{\circ} = -0.40 V$; reaction is non-spontaneous
- D. Cell Reaction: $2Cr^{+3}(aq) + 3Cu(s) \rightleftharpoons 2Cr(s) + 3Cu^{+2}(aq)$; $E^{\circ} = 0.40 V$; reaction is spontaneous

Choose the most correct answer from the options given below:

1. A Only
2. B Only
3. C Only
4. D Only

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17185]

2[Option ID=17186]

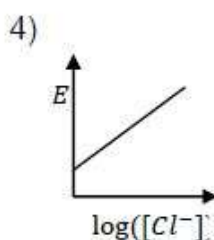
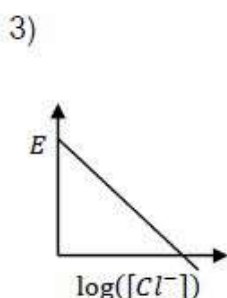
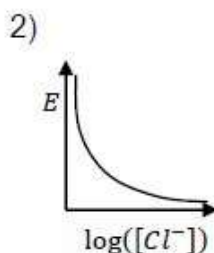
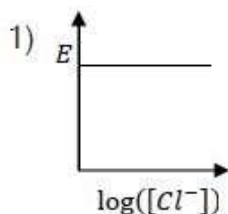
3[Option ID=17187]

4[Option ID=17188]

Sl. No.38

QBID:1092098

Variation of electrode potential for calomel half-cell, $Hg, Hg_2Cl_2 | Cl^-(aq)$, with $\log([Cl^-])$ is given by



(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17189]

2[Option ID=17190]

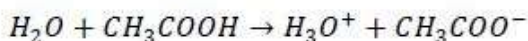
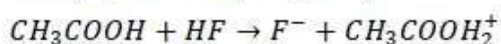
3[Option ID=17191]

4[Option ID=17192]

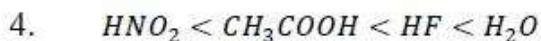
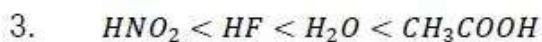
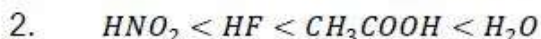
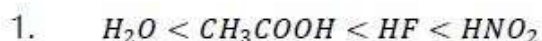
Sl. No.39

QBID:1092099

If the following reactions are spontaneous in the forward direction



Then the correct order of acidic strength is



(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17193]

2[Option ID=17194]

3[Option ID=17195]

4[Option ID=17196]

Sl. No.40

QBID:1092100

Which statement about the compounds of Mn is true?

1. $HMnO_4$ is amphoteric
2. $HMnO_2$ is acidic
3. $O_3Mn(OH)$ is basic
4. $HMnO_2$ is amphoteric and $HMnO_4$ is highly acidic

(1) 1

(2) 2

(3) 3

(4) 4

1[Option ID=17197]

2[Option ID=17198]

3[Option ID=17199]

4[Option ID=17200]