Quiz-1 for CH 101

Instructions:
1) Read the question carefully and provide your answer by selecting given correct option/options.
2) Your Exam will automatically start at 8 AM and You have to submit the answers on or before 8:45 PM, after this given time you will NOT BE ABLE TO SUBMIT YOUR ANSWERS.
3) At the end you will see your score, CONTACT WITH US ONLY WHEN IF YOU HAVE ANY MAJOR ISSUE WITH THE SCORE, OTHERWISE ADEQUATE STEP WILL BE TAKEN.
4) Total Marks: 15, Duration of Quiz: 45
ALL THE BEST !

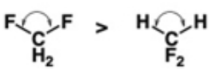
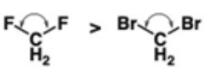
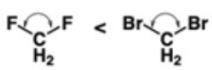
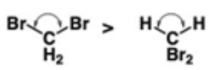
Points: -/15

1

Question
(-/0.5 Points)

Which of the following are true when one compares the bond angles

Options:

(A)  (B)  (C)  (D) 

- A
- B
- C
- D

2

Question
(-/2.5 Points)

Given the Planck's radiation law $\rho(\upsilon)d\upsilon = \frac{8\pi h\upsilon^3}{c^3}\frac{1}{e^{\frac{h\upsilon}{kT}}-1}d\upsilon$, the expression for $\rho(\upsilon)$ at high temperature would be,

(A) $\frac{8\pi v^3}{c^3 kT}$; (B) $kT\frac{8\pi v^3}{c^3}$; (C) $\frac{8\pi v^2}{c^3 kT}$; or (D) $\frac{8\pi v^2}{c^3}kT$

- A
- B
- C
- D

3

Question
(-/0.5 Points)

In which of the following case **Red-shift** will be observed.

Options:

(A) *p*-Nitrophenol + base (B) *p*-Nitrophenol + acid

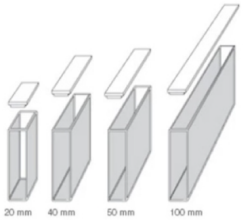
(C) *p*-Nitroaniline + base (D) *p*-Nitroaniline + acid

- A
- B
- C
- D

4

Question
(-/0.5 Points)

The value mention in the bottom of the cuvette shown corresponds to their path length. For a 0.1 M solution of a given compound has an absorption of 0.25 in a 10 mm cuvette. When a 0.5 M solution of the same compound is filled and measured the UV spectra which cuvette would give an absorbance of 5.



Options:

(A) 20 mm cuvette

(B) 50 mm cuvette

(C) 40 mm cuvette

(D) 100 mm cuvette

- A
- B
- C
- D

5

Question
(-/1 Points)

Determine whether TRUE (T) or False (F) and tick the correct combination

(i) CFSE follows the trend; $[Cr(CN)_6]^{3-} > [Cr(NH_3)_6]^{3+} > [CrCl_6]^{3-}$

(ii) CFSE follows the trend; $[Rh(H_2O)_6]^{3+} < [Co(H_2O)_6]^{3+} < [Co(H_2O)_6]^{2+}$

(iii) Effective nuclear charge for 3*d* and 4*s* electron in zinc are 4.35 and 8.85 respectively.

(iv) Trend in first Ionization potential; B > Be < C > O < N < F < Ne

Options:

A. FTFT
B. FFTT
C. TFFF
D. FFFT

- A
- B
- C

D

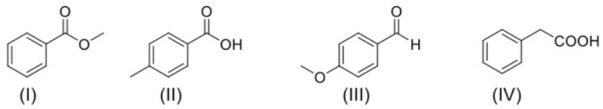
6

Question
(-/0.5 Points)

Identify the structure of the compound from their IR absorption bands

MF: $C_8H_8O_2$.

IR(KBr): 2967, 3155, 1745, 1250 cm^{-1}



(I) (II) (III) (IV)

Options:

(A) I

(B) II

(C) III

(D) IV

A

B

C

D

7

Question
(-/0.5 Points)

The correct order of energy of their electromagnetic radiation is;

(A) radio > UV > IR > Vis;

(B) UV > Vis > IR > radio

(C) IR > Vis > UV > radio;

(D) Vis > IR > UV > radio

A

B

C

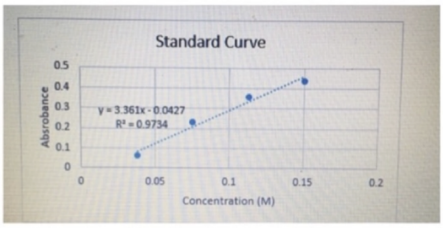
D

8

Question
(-/0.5 Points)

From the plot of concentration vrs. absorbance given below. (a) What would be the concentration (in M) of a solution having an absorbance of 0.3?

and (b) What would be the absorbance of a solution having concentration 0.075 M



Options:

(A) 0.1 M and 0.2

(B) 0.01 M and 0.2

(C) 0.1 M and 0.25

(D) 0.15 M and 0.25

- (●) A
- ( ) B
- ( ) C
- ( ) D

9

Question
(-/1 Points)

Determine whether TRUE (T) or False (F) and tick the correct combination

(i) N_2 has a very high electron affinity

(ii) For the isoelectronic pair Br^- and Rb^+, the one with the larger radius is Br^-

(iii) For the Compounds EH_3 (E = As, N and P), the increasing order of their H-E-H bond angles is $AsH_3 < PH_3 < NH_3$

Options:

A. FTT
B. TFT
C. FFF
D. TTT

- (●) A
- ( ) B

C

D

10

Question
(-/0.5 Points)

Which of the following statement is/are TRUE?

(i) The right side of the x-axis in UV-vis spectrum has lower energy than the left

(ii) The n-π* transition in a molecule required more energy than π-π* transition.

(iii) Usually π-π* transition has higher extinction coefficient than n-π* transition

(iv) Molecule having only "n-electrons" are capable of absorbing UV-Vis region

(v) In the IR the region between 600-4000 cm^{-1} is called "functional group" region

Options:

(A) (i), (iii) and (v) only

(B) (i), (ii) and (iv) only

(C) (ii), (iii) and (v) only

(D) (i) and (iii) only

A

B

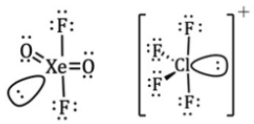
C

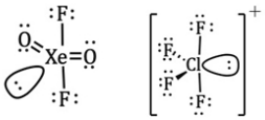
D

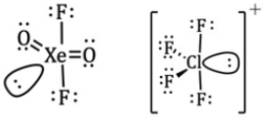
11

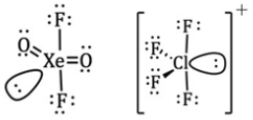
Question
(-/1 Points)

The correct Lewis structures of XeO_2F_2 and ClF_4^+ with appropriate molecular geometry are.

A. 

B. 

C. 

D. 

A

B

C

D

12

Question
(-/1 Points)

Indicate the correct d-orbital splitting pattern for a square planar complex:

A. $d_{z2} < d_{x2-y2} < d_{xy} < d_{xz} < d_{yz}$
B. $d_{xy} < d_{z2} < d_{x2-y2} < d_{xz} < d_{yz}$
C. $d_{xz}=d_{yz} < d_{z2} < d_{x2-y2} < d_{xy}$
D. $d_{xz}=d_{yz} < d_{z2} < d_{xy} < d_{x2-y2}$

A

B

C

D

13

Question
(-/2.5 Points)

For a particle-in-a-box of length L, the wavefunction is written as $\Psi(x) = \sqrt{\frac{2}{L}} \sin \frac{n\pi x}{L}$. If for the first excited state (n=2), the value of energy is **5.5×10^{-19} J**, then the de Broglie wavelength of the particle (in **Å**) would be about, Use $h = 6.630 \times 10^{-34}$ Js and $m = 9.11 \times 10^{-31}$ kg

(A) 3.315; **(B) 4.42;** **(C) 6.63;** **(D) 8.84**

A

B

C

D

14

Question
(-/0.5 Points)

The correct order of energy required for the transitions is;

(A) Vibrational < rotational < electronic transition < nuclear spin transition

(B) Rotational < vibrational < electronic transition < nuclear spin transition

(C) Nuclear spin transition < rotational < vibrational < electronic transition

(D) Rotational < vibrational < nuclear spin transition < electronic transition

A

B

C

D

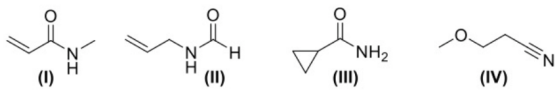
15

Question
(-/0.5 Points)

Identify the structure of the compound from their IR absorption bands

MF:C_4H_7NO.

IR(KBr): 3375, 3165, 2986, 2823, 2728, 1685, 1660 cm^{-1}



Options:

(A) I

(B) II

(C) III

(D) IV

A

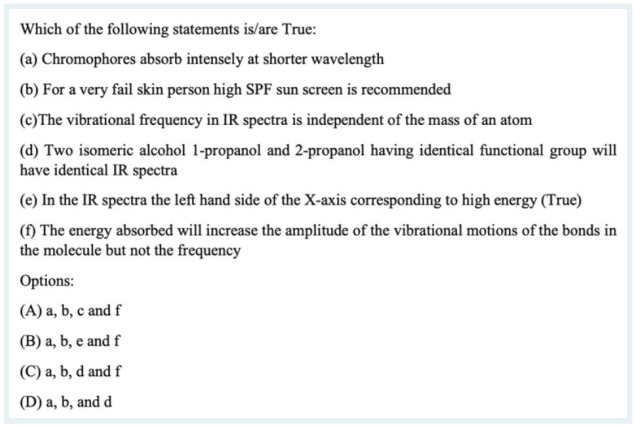
B

C

D

16

Question
(-/0.5 Points)


Which of the following statements is/are True:

(a) Chromophores absorb intensely at shorter wavelength

(b) For a very fail skin person high SPF sun screen is recommended

(c)The vibrational frequency in IR spectra is independent of the mass of an atom

(d) Two isomeric alcohol 1-propanol and 2-propanol having identical functional group will have identical IR spectra

(e) In the IR spectra the left hand side of the X-axis corresponding to high energy (True)

(f) The energy absorbed will increase the amplitude of the vibrational motions of the bonds in the molecule but not the frequency

Options:

(A) a, b, c and f

(B) a, b, e and f

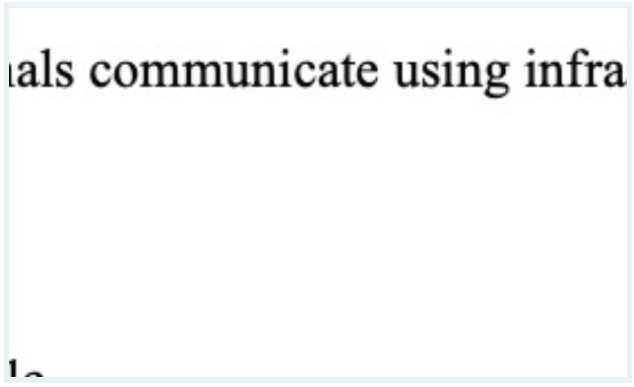
(C) a, b, d and f

(D) a, b, and d

- A
- B
- C
- D

17

Question
(-/0.5 Points)



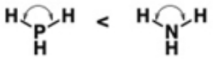
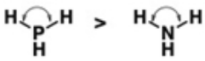
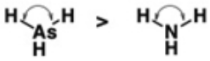
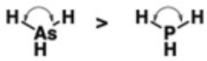
- A
- B
- C
- D

18

Question
(-/0.5 Points)

Which of the following are true when one compares the bond angles

Options:

(A)  (B)  (C)  (D) 

- A
- B
- C
- D