Department of Chemistry

College Of Engineering and Technology

SRMIST, Kattankulathur

MCQs /Virtual Examination

Program: B.Tech   **Sub/Code: Chemistry/ 18CYB101J**

**Sem: I and II**   **Max.Marks:2 Marks**

Module I

1) Which of the following pairings is incorrect?

a) 1s orbital; zero radial node.

b) 3s orbital; one radial node.

c) 2p orbital; no radial nodes.

d) 3d orbital; no radial nodes.

2) s-p mixing that is seen in lighter second period elements are due to the

a) **effective nuclear charge that increases to the right of the period, stabilizing the 2s orbital more drastically than the 2p orbital.**

b) effective nuclear charge that decreases to the right of the period, stabilizing the 2s orbital more drastically than the 2p orbital.

c) effective nuclear charge that increases to the right of the period, stabilizing the 2p orbital more drastically than the 2s orbital.

d) Both b and c

3) What is the bond order of BC^{-1}?

a) 1

b) 2

c) 1.5

d) 2.5

4) An electron is bound in one-dimensional box of size 6×10^{-10} m. What will be its minimum energy?

a) 1.86 eV

b) 1.04 eV

c) 1.27 eV

d) 1.64 eV

5) Which of the following statement in incorrect?

a) Benzene is less reactive than 1,3,5 – hexatriene

b) Highest occupied molecular orbitals (HOMO) of benzene are higher in energy than the highest occupied molecular orbital (HOMO) of hexatriene.

c) Highest occupied molecular orbitals (HOMO) of benzene are lower in energy than the highest occupied molecular orbital (HOMO) of hexatriene.

d) Highest occupied molecular orbitals (HOMO) of benzene and the highest occupied molecular orbital (HOMO) of hexatriene is at same energy level

6) Which of the following is the most paramagnetic in nature?

a) NF

b) BC

c) NO

d) O_2

7) Arrange the following molecules in the order of increasing stability.

a) $N_2^+ < N_2 < N_2^- < N_2^{2-}$

b) $N_2^{2-} < N_2^- < N_2 < N_2^+$

c) $N_2^{2-} < N_2^- = N_2^+ < N_2$

d) $N_2 < N_2^+ = N_2^- < N_2^{2-}$

8) The wave function for which quantum state is shown in the figure?
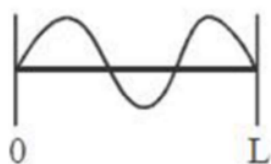
a) 1

b) 2

c) 3

d) 4

9) A quantum particle confined to one-dimensional box of width 'a' is known to be in its first excited state. Determine the probability of the particle in the central half

a) 0

b) 1

c) 1/2

d) ∞

10) For the energy level n=3, the probability density for a particle of mass m in a one-dimensional box of width L is given by
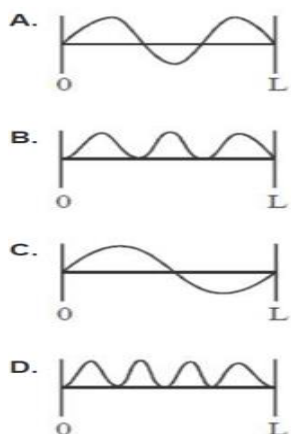
Answer: B

11) Arrange the following molecules in decreasing bond length.

a) $O_2 > O_2^- > O_2^+ > O_2^{2-}$

b) $O_2^{2-} > O_2^- > O_2 > O_2^+$

c) $O_2^{2-} > O_2^- > O_2^+ > O_2$

d) $O_2^- > O_2^+ > O_2^{2-} > O_2$

12) In the molecular orbital diagram of NO molecule, how many unpaired electrons would be present?

    a) three

    b) Two

    c) Zero

    d) One

13) Which of the following statements is wrong?

a) When two orbitals overlap in-phase with each other, a bonding molecular orbital form.

b) When two orbitals overlap out-of-phase with each other, an antibonding molecular orbital form.

c) When one of two atoms connected by a σ bond rotates about the bond axis, orbital overlap is lost.

d) When one of two atoms connected by a π bond rotates about the bond axis, orbital overlap is lost.

14) Gold has a work function of 5.1 eV. Find the cut off wavelength for the photoelectric effect.

    a) 286 nm

    b) 243 nm

    c) 186 nm

    d) 267 nm

15) Bond Order of CO, B_2, F_2 respectively are _____

    a) +3, +2, +1

    b) +2, +3, +1

    c) +3, +1, +1

    d) +2, +2, +1

16) Which of the following statement is FALSE

a) the 1s from one atom overlaps the 1s from the other atom to form a σ1s bonding molecular orbital and a σ*1s antibonding molecular orbital.

b) When p orbitals overlap end to end, they create σ and σ* orbitals.

c) Except for their orientation, the πpy and πpz orbitals are identical and have the same energy.

d) The energy difference between 2s and 2p orbitals in Neon is smaller than that in Boron.

17) For a particle in a 1-D box, which of the following statement is INCORRECT?

a) The energy of a particle is quantized.

b) The lowest possible energy for a particle is NOT zero even at 0 K.

c) The probability changes with decreasing energy of the particle and depends on the position in the box you are attempting to define the energy for.

d) The square of the wavefunction is related to the probability of finding the particle in a specific position for a given energy level.

18) Which of the following molecular orbital has two nodal planes?

a) σ2s

b) π2py

c) π*2py

d) σ*2px

19) The highest occupied pi molecular orbital of butadiene will have how many nodes?

a) 2

b) 1

c) 0

d) 3

20) The Energy of the particle is proportional to _____

a) L

b) L/2

c) $1/L^2$

d) L^2

21) For a one-dimensional gallium arsenide quantum well of width 21 nm, calculate the difference in energies between the n = 2 and n = 3 states for travel of conduction electrons across the width of the well. The mass of gallium arsenide is ($0.067 \times 9.109 \times 10^{-31}$ kg)

a) 0.064 eV

b) 0.098 eV

c) 1.15 eV

d) 0.24 eV

Module II

1. The wavelength of a radiation is 5 μm. What is wavenumber and frequency? ($c=$ 2.998 x 10^8 ms^{-1})

a) 2000 cm^{-1} and 59.95x10^{14} Hz

b) 2000 cm^{-1} and 59.95x10^{12} Hz

c) 2 cm and 59.95x10^{12} Hz

d) 59 cm^{-1} and 2000 Hz

2. Among the complexes $[Cr(NH_3)_6]^{3+}$ and $[V(NH_3)_6]^{2+}$ which one possesses larger value of Δ_o ?

a) $[Cr(NH_3)_6]^{3+}$

b) $[V(NH_3)_6]^{2+}$

c) $[V(NH_3)_6]^{4+}$

d) Same Δ_o

3. Calculate the CFSE values for d^3 and d^8 configurations of weak field octahedral complexes.

a) 0 Δ_o and -1.2 Δ_o

b) 1.2 Δ_o and -1.2 Δ_o

c) -1.2 Δ_o and -1.2 Δ_o

d) -1.2 and 0

4. Calculate the CFSE values for d^4 and d^7 configurations of high spin tetrahedral complexes.

a) 0 Δ_o and 0 Δ_o

b) 0.18 Δ_o and 0.54 Δ_o

c) -0.54 Δ_o and -0.18 Δ_o

d) -0.18 Δ_o and -0.54 Δ_o

5. Identify the increasing order of spectrochemical series

a) $I^- < Br^- < S^{2-} < en < NO_2^- < CN^- < CO$

b) $I^- < Br^- < S^{2-} < en < NO_2^- < CO < CN^-$

c) $CO > CN^- > NO_2^- > en > I^- < Br^- < S^{2-}$

d) $I^- < Br^- < S^{2-} = en = NO_2^- = CN^- < CO$

6. Calculate the magnetic moment of $Na_3[Fe^{3+}F_6]$

a) 4.9 BM

b) 5.92 BM

c) 0 BM

d) 2.80 BM

7. Calculate the number of fundamental vibrations for CO_2 and HCl molecules

a) 1 and 3

b) 4 and 1

c) 0 and 1

d) 3 and 4

8. Among bending and stretching of a CO_2 molecule which mode occurs at low wavenumber?

a) Bending

b) Stretching

c) Both bending and stretching

d) Stretching followed by bending

9. What happens to the vibrational frequency of molecule upon increasing bond strength

a) Decreases

b) Remains same

c) Increases

d) No dependence

10. Identify the finger print and functional group regions of IR spectroscopy

a) $400 – 140$ cm^{-1} and $140 – 500$ cm^{-1}

b) $1400 – 500$ nm and $4000 – 1400$ nm

c) $4000 – 1400$ cm^{-1} and $1400 – 500$ cm^{-1}

d) $1400 – 500$ cm^{-1} and $4000 – 1400$ cm^{-1}

11. Identify the regions of Bracket, Balmer and Lyman series of hydrogen atomic spectrum.

a) IR, UV-Vis and UV

b) UV-Vis, IR and UV

c) UV, IR and UV-Vis

d) UV-Vis, UV and IR

12. What happens to the absorbance of the sample upon increasing the path length (from 0.1 to 1 cm) of the sample tube?

a) Decreases

b) No change

c) Increases

d) Sample's absorbance and path length are independent

13. Identify the allowed spin selection and forbidden Laporte selection rule of electronic spectroscopy

a) singlet $\rightarrow$ triplet and $u \rightarrow u$

b) triplet $\rightarrow$ triplet and $u \rightarrow g$

c) triplet $\rightarrow$ singlet and $u \rightarrow u$

d) triplet $\rightarrow$ triplet and $u \rightarrow u$

14. Which among the following doesn't show rotational spectrum?

a) HCl

b) O_2

c) HBr

d) H_2O

15. The unit of rotational constant is

a) cm^{-1}

b) cm

c) Joule

d) unit less

16. In NMR spectra, "up-field" and "downfield" describe the relative location of peaks.

a) **Up-field means to the right. Downfield means to the left**

b) Up-field means to the left. Downfield means to the right

c) no preference

d) Up-field and downfield remain same

17. The ^1H NMR spectrum of ethanol consists of

a) 0 signals

b) 1 signal

c) 3 signals

d) 10 signals

18. Calculate the magnetic moment of $Na_2[Co^{2+}F_4]$ compound.

a) 4.9 BM

b) 3.87 BM

c) 2.84 BM

d) 1.73 BM

19. How many signals does the aldehyde $(CH_3)_3CCH_2CHO$ have in ^1H NMR and ^{13}C NMR spectra?

a) five ^1H signals and six ^{13}C signals

b) three ^1H signals and four ^{13}C signals

c) five ^1H signals and four ^{13}C signals

d) three ^1H signals and six ^{13}C signals

20. Identify the correct sequence with increasing order for Δ_o

a) $[CrCl_6]^{3-} > [Cr(H_2O)_6]^{3+} > [Cr(NH_3)_6]^{3+} > [Cr(CN)_6]^{3-}$

b) $[Cr(CN)_6]^{3-} > [CrCl_6]^{3-} > [Cr(NH_3)_6]^{3+} > [Cr(H_2O)_6]^{3+}$

c) $[Cr(H_2O)_6]^{3+} > [Cr(NH_3)_6]^{3+} > [CrCl_6]^{3-} > [Cr(CN)_6]^{3-}$

d) $[Cr(NH_3)_6]^{3+} > [CrCl_6]^{3-} > [Cr(CN)_6]^{3-} > [Cr(H_2O)_6]^{3+}$

21. The wavelength range for rotational spectroscopy in the electromagnetic spectrum include

a) 200-800 mm

b) 100-150 nm

c) 800-1500 nm

d) 0.75 - 3.75 mm

Module III

1. Choose the correct statement(s) among the following:

a) [FeCl₄]⁻ has tetrahedral geometry

b) $[Co(en)(NH_3)_2Cl_2]^+$ has 2 geometrical isomers

c) $[FeCl_4]^-$ has low spin

d) The cobalt ion in $[Co(en)(NH_3)_2Cl_2]^+$ has $sp^3 d^2$ hybridization

2. The order of increasing ionic radius of the following is

a) $K^+ < Li^+ < Mg^{2+} < Al^{3+}$

b) $K^+ < Mg^{2+} < Li^+ < Al^{3+}$

c) $Li^+ < K^+ < Mg^{2+} < Al^{3+}$

d) $Al^{3+} < Mg^{2+} < Li^+ < K^+$

3. Which of the following ions is most unlikely to exist?

a) Li^-

b) Be^-

c) B^-

d) F^-

4. The kinetic energy of the ejected photoelectron is dependent upon the energy of which of the following?

a) Ions around

b) Photons around

c) Material

d) Impinging photon

5. X-ray diffractometers provide _____ information about the compounds present in a solid sample.

a) Quantitative

b) Qualitative

c) Quantitative and qualitative

d) Either quantitative or qualitative

6. Between these two complexes $Ni(CO)_4$ and $[Ni(CN)_4]^{2-}$ which of the following statement is correct,

a) nickel is in the same oxidation state in both

b) both have tetrahedral geometry

c) both have square planar geometry

d) both have tetrahedral and square planar geometry respectively

7. The number of unidentate ligands in the complex ion is called

a) EAN

b) Coordination number

c) Primary valency

d) Oxidation number

8. How many geometrical isomers are possible for $[Co(NH_3)_3(NO_2)_3]$ complex

a) 2

b) 3

c) 4

d) 0

9. Which of the following compounds show optical isomerism?

a) cis−$[Co(NH_3)_4Cl_2]^+$

b) trans−$[Co(en)_2Cl_2]^+$

c) cis−$[Co(en)_2Cl_2]^+$

d) $[Co(en)_3]^{3-}$

10. Identify the reagent, among the following, which one will provide distinction between the ionisation isomers of the formula $Co(NH_3)_5BrSO_4$.

a) BaCl_2

b) HCl

c) H_2SO_4

d) Fenton's reagent

11. The compound $[Pt(NH_3)Cl_2]$ can exhibit

a) Linkage isomerism

b) Coordination isomerism

c) Optical isomerism

d) Geometrical isomerism

12. In PCl_5, the bond between P and Cl is?

a) Ionic with no covalent character

b) Covalent with some ionic character

c) Covalent with no ionic character

d) Ionic with some metallic character

13. When EDTA solution is added to Mg^{2+} ion solution, then which of the following statements is not true?

a) Four coordinate sites of Mg^{2+} are occupied by EDTA and remaining two sites are occupied by water molecules

b) All six coordinate sites of Mg^{2+} are occupied

c) pH of the solution is decreased

d) Colorless $[Mg–EDTA]^{2-}$ chelate is formed

14. The first, 2nd and 3rd ionization enthalpies of gallium are 579 $KJmol^{-1}$, 1979 $KJmol^{-1}$ and 2962 KJ mol^{-1} even though the 3rd I.P is highest, Ga^{3+} is the most stable because-----.

a) The energy loss is maximum resulting greater stability

b) The size of Ga^{3+} is smallest

c) Ga^{3+} is most reactive

d) It attains a stable configuration

15. Choose the correct statement

a) As shielding effect increases electro negativity decreases

b) As shielding effect increases electro negativity increases

c) As ionization potential increases metallic property increases

d) As +ve charge on species increases ionic radii increases

16. Amorphous solids may be classified as

a) isotropic and supercooled liquids

b) anisotropic and supercooled liquids

c) iso enthalpic and superheated liquids

d) isotropic and superheated solids

17. Which of the following gas is adsorbed most by activated charcoal?

a) CO_2

b) N_2

c) CH_4

d) Ar

18. Which of the following may act as an oxidizing as well as a reducing agent?

a) H_2S

b) H_2SO_4

c) SO_2

d) NaCl

19. Among the following which is least soluble in water

a) $CaSO_4$

b) $MgSO_4$

c) Na_2SO_4

d) $BaSO_4$

20. The effective nuclear charge realised by 1s electron of helium atom is____

a) 0.70

b) 0.30

c) 2.00

d) 1.70

21. According to Fajan`s rule, covalent bond is favoured by____

a) Large cation and small anion

b) Large cation and large anion

c) Small cation and large anion

d) Small cation and small anion

Module IV

1) Which of the following metal ions for sulphides?

a) Ca^{2+} and Al^{3+}

b) Ag^+ and Hg^{2+}

c) Ca^{2+} and Ag^+

d) Al^{3+} and Hg^{2+}

2) One mole of an ideal gas expands against a constant external pressure of 1 atm from a volume of 10 dm^3 to a volume of 30 dm^3. Calculate work done by the gas in joules.

a) 3026 J

b) 2026 J

c) -3026 J

d) -2026J

3) Which molecule has zero standard molar enthalpy of formation at 298 K

a) $Cl_2(g)$

b) H_2O

c) Br_2 (g)

d) CH_4 (g)

4) Calculate the standard free energy change of the reaction. Is this reaction feasible at standard state (25 C and 1 atm)?

$CO(g) + \frac{1}{2}O_2(g) \rightarrow CO_2(g)$ $\Delta H° = -282.84kJ$
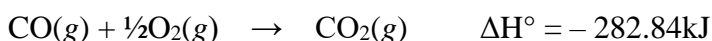
$\Delta S°$ for CO = 197.9 J K^{-1} mol^{-1} ; $\Delta S°$ for O_2 = 205.01 J K^{-1} mol^{-1}; $\Delta S°$ for CO_2 = 213.80 J K^{-1} mol^{-1}

a) 469.03 kJ and reaction is not feasible

b) 257.03 kJ and reaction is not feasible

c) -469.03 kJ and reaction is not feasible

d) -257.03 kJ and reaction is not feasible

5) One mole of an ideal gas at 300 K in thermal contact with surroundings expands isothermally from 1.0 L to 2.0 L against a constant pressure of 3.0 atm. In this process, the change in entropy of surroundings (ΔS_{surr}) in JK^{-1} is (1 L atm = 101.3 J)

a) 5.763

b) 1.013

c) - 1.013

d) - 5.763

6) STATEMENT-1: For every chemical reaction at equilibrium, standard Gibbs energy of reaction is zero.

and

STATEMENT-2: At constant temperature and pressure, chemical reactions are spontaneous in the direction of decreasing Gibb's energy.

a) STATEMENT-1 is True, STATEMENT-2 is True; STATEMENT-2 is a correct explanation for STATEMENT-1

b) STATEMENT-1 is True, STATEMENT-2 is True; STATEMENT-2 is NOT a correct explanation for STATEMENT-1

c) STATEMENT-1 is True, STATEMENT-2 is False

d) STATEMENT-1 is False. STATEMENT-2 is True

7) A process is carried out at constant volume and at constant entropy. It will be spontaneous if:

a) $\Delta H < 0$

b) $\Delta U < 0$

c) $\Delta A < 0$

d) $\Delta G < 0$

8) The value of $\log_{10} K$ for a reaction $A \rightleftharpoons B$

(Given $\Delta_r H^o_{298K} = - 54.07$ kJ mol^{-1}, $\Delta_r S^o_{298K} = 10$ J K^{-1}mol^{-1} and R = 8.314 JK-1mol-1; 2.303x8.314x298 = 5705)

a) 100

b) 50

c) 10

d) 5

9) For the following electrochemical cell at 298 K,

Pt(s) │ H$_2$(g,1atm) │ H$^+$(aq,1M) ‖ M^{4+}(aq),M^{2+}(aq) │ Pt(s)

E$_{cell}$ = 0.092 V when [M^{2+}(aq)] /[M^{4+}(aq)] = 10^x ; Given : E$^0_{M2+/M4+}$ = 0.151 V; 2.303 RT/F = 0.059 V

The value of **x** is

a)2

b)1

c)-1

d)-2

10) For a potentiometric titration, in the curve of emf (E) vs volume (V) of the titrant added, the equivalence point is indicated by

a) $|dE/dV| = 0$, $|d^2E/dV^2| = 0$

b) $|dE/dV| > 0$, $|d^2E/dV^2| = 0$

c) $|dE/dV| = 0$, $|d^2E/dV^2| > 0$

d) $|dE/dV| > 0$, $|d^2E/dV^2| > 0$

11) The Daniel Cell is:

a) $Pt_I(s) | Zn(s) | Zn^{2+}(aq) \| Cu^{2+}(aq) | Cu(s) | Pt_{II}(s)$

b) $Pt_I(s) | Zn(s) | Zn^{2+}(aq) \| Ag^+(aq) | Ag(s) | Pt_{II}(s)$

c) $Pt_I(s) | Fe(s) | Fe^{2+}(aq) \| Cu^{2+}(aq) | Cu(s) | Pt_{II}(s)$

d) $Pt_I(s) | H_2(s) | H_2SO_4(aq) \| Cu^{2+}(aq) | Cu(s) | Pt_{II}(s)$

12) The cell potential for a Zn/Cu cell when [Zn2+] = 10 M and [Cu2+] = 1 M at 25 °C, where for $Cu^{2+}(aq) + 2e^- \rightarrow Cu(s)$, $E^o = + 0.34$ V and $Zn(s) \rightarrow Zn^{2+}(aq) + 2e^-$ $E^o = + 0.76$ V.

a) 1.07 V

b) 2.14 V

c) 1.10 V

d) 2.20 V

13) The standard electrode potentials (E^o) for Fe^{3+}/F^{2+} and Fe^{2+}/Fe electrodes are + 0.77V and - 0.44 V respectively at 300 K. The E^o of Fe^{3+}/Fe electrode at the same temperature is

a) – 0.11 V

b) 1.21 V

c) 0.33 V

d) – 0.04 V

14) Which type of chemical reaction is observed at cathode, in electrochemical corrosion?

a) Reduction reaction

b) Peretectic reaction

c) Oxidation reaction

d) Radical reaction

15) Newman projections I, II, III and IV are shown below:
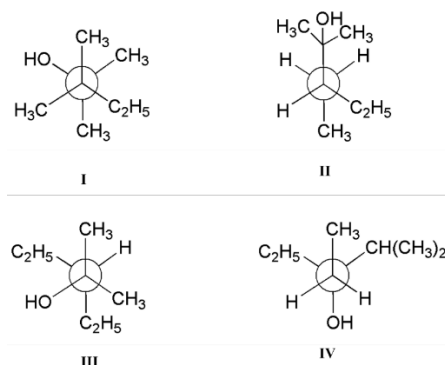
Which one of the following options represents identical molecules?

a) II and III

b) III and IV

c) II and IV

d) I and II

16) The number of structural isomers for C_6H_{14} is

a) 2

b) 3

c) 4

d) 5

17) The correct statement about the compound given below is
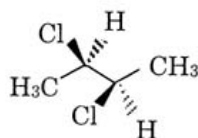
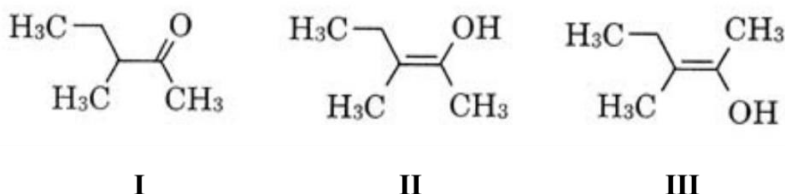a) The compound is optically active and possesses plane of symmetry

b) The compound possesses center of symmetry and plane of symmetry

c) The compound possesses plane of symmetry and axis of symmetry

d) The compound is optically active and possesses axis of symmetry

18) For the following structures I, II and III

      I   **II**   **III**

i) I, II and III are resonance structures

ii) I, II and I, III are tautomer

iii) II and III are geometrical isomers

iv) II and III are diastereomers

Among the statement(s) given above, which is (are) correct?

a) i only

b) i and ii only

c) i, ii, iii only

d) ii, iii and iv only

19) The correct statement(s) about the compound $H_3C(HO)HC-CH=CH-CH(OH)CH_3$ is

a) The total number of stereoisomers possible is 6 and if the stereochemistry about the double bond in the compound is *cis*, the number of enantiomers possible is 2

b) The total number of diastereomers possible is 3 and if the stereochemistry about the double bond in the compound is *trans*, the number of enantiomers possible is 4

c) The total number of stereoisomers possible is 3 and if the stereochemistry about the double bond in the compound is *cis*, the number of enantiomers possible is 4

d) The total number of diastereomers possible is 6 and if the stereochemistry about the double bond in the compound is *trans*, the number of enantiomers possible is 2

20) The two compounds given below are
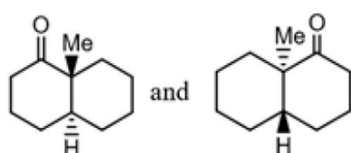
a) Enantiomers

b) Identical

c) Diastereomers

d) Regio isomers

21) Identify two enantiomers among the following compounds
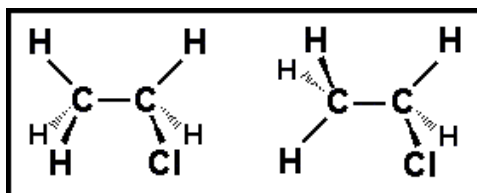

a) A and B

b) B and D

c) C and D

d) A and C

Module V

1. Which of the following Fischer projections is different from the other three?
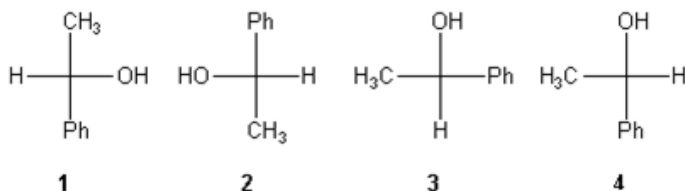
a) 1

b) 2

c) 3

d) 4

2. Which of the following is an alkane which can exhibit optical activity?

a) Neopentane

b) Isopentane

c) 3–Methylpentane

d) 3–Methylhexane

3. The number of racemic forms of molecules having (n) different chiral carbons is

_____

a) 2n

b) 2^n

c) 2^{n-1}

d) 2^{n+1}

4. What is the relationship between the structures shown?

(a) structural isomers

(b) geometric isomers

(c) identical structures

(d) **conformational structures**

5. The molecular formula C_5H_{12} contains how many isomeric alkanes?

   a) 1

   b) 2

   c) 3

   d) 4

6. How many optically active stereoisomers are possible for butane-2,3-diol?

   a) 1

   b) 2

   c) 3

   d) 4

7. Which of the following pairs represents linkage isomers?

(a) [Pd(PPh$_3$)$_2$ (NCS)$_2$] and [Pd(PPh$_3$)$_2$(SCN)$_2$]

(b) [Co (NH3)5 NO3]SO4 and [Co(NH3)5SO4] NO3

(c) [Pt Cl2(NH3)4]Br2 and [PtBr2(NH3)4]Cl2

(d) [Cu(NH3)4] [PtCl4] and [Pt(NH3)4] [CuCl4]

8. The reactivity order of alkyl halides in S_N2 is _____

a) CH₃ X > 1⁰ > 2⁰ > 3⁰

b) $CH_3 X > 2^0 > 1^0 > 3^0$

c) $CH_3 X > 3^0 > 1^0 > 2^0$

d) $CH_3 X > 3^0 > 2^0 > 1^0$

9. Arrange the following in the decreasing order of leaving group in nucleophilic substitution reaction.
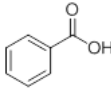
a) $H^- > Cl^- > HO^- > Br^- > CH_3COO^-$
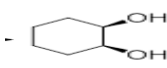
b) $Cl^- > Br^- > HO^- > H^- > CH_3COO^-$

c) Cl⁻ > Br⁻ > CH₃COO⁻ > HO⁻ > H⁻

d) $HO^- > CH_3COO^- > H^- > Br^- > Cl^-$

10. Predict the product in the following reaction oxidised by $KMNO_4$:
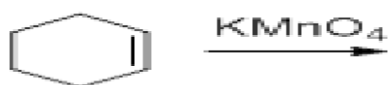
a)   b)   c) $CH_3(CH_2)_6CO_2H$ d)

Answer: a)

11. Correct steps for the mechanism of action of the drug acetaminophen can be?

I. Decreases in prostaglandin synthesis

II. Increase in prostaglandin synthesis

III. Stimulation of COX-2

IV. Inhibition of COX-2

a) I – IV

b) III – II

c) IV – I

d) I – III

12. The rate of nucleophilic substitution reactions are higher in the presence of

_____

a) Electron withdrawing groups

b) Electron releasing groups

c) Both electron withdrawing and releasing groups

d) Initiators

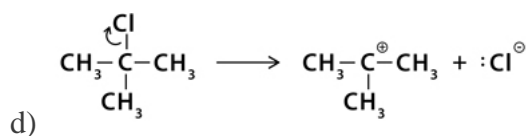13. Identify the incorrect statement regarding cycloalkanes.

a) These have sp3 hybridized carbons

b) These have tetrahedral bond angles

c) Stability of the cycloalkanes varies directly with their respective size

d) These undergo nucleophilic substitution reactions

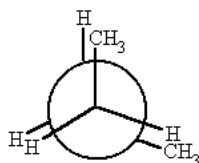14. Which of the following reaction is an example for E2 mechanism?
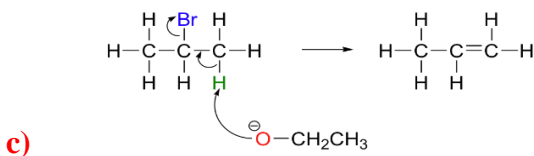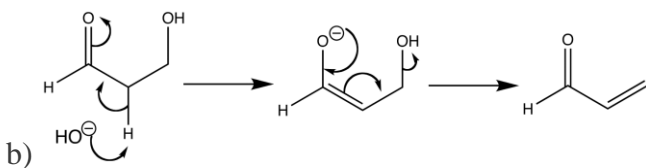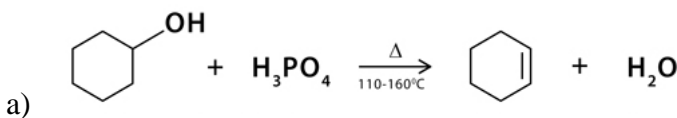
a)

b)

c)

d)

15. Which of the following substances can act as both oxidising and reducing agent?

    a. $KMnO_4$

    b. $K_2Cr_2O_7$

    c. HNO_3

    d. H_2O_2

15. What is the dihedral angle for the given conformation?

(a) 0^0

(b) 120^0

(c) 360^0

(d) 300^0

17. **In which of the following complex, the oxidation number of Fe is +1?**

(a) $Fe_4[Fe(CN)_6]_3$

(b) $[Fe(H_2O)_5NO]SO_4$

(c) $[FeBr_4]^-$

(d) $[Fe(H_2O)_6]^{2-}$

18. The energy required to rotate n-butane molecule about the carbon-carbon bond is called _____
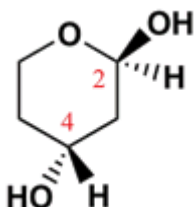
a) Rotational energy
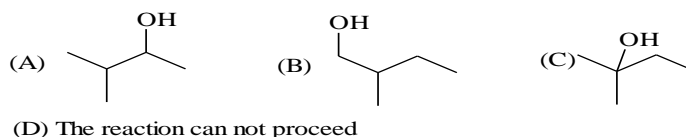
b) Torsional energy

 c) Enantiomeric energy

d) Potential energy

19. Which is the correct assignment of chirality at C_2 and C_4 of the following molecule?

a) 2S,4S   **b) 2R,4R**   c) 2S,4R   d) 2R,4S

20. Predict the major product for the following reaction:

(D) The reaction can not proceed

Answer: C

21. The conformations n-butane commonly known as gauche, eclipsed and anti-conformations can be inter-converted by rotation around

a) C-H bond of methyl group

b) C_1-C_2 linkage

c) C_2-C_3 linkage

d) C-H bond of methylene group