Section 1 - Section 1

Question No.1   4.00

Bookmark ☐

The hybridization of iodine in ICl_2^+ is

○ sp^3d

○ sp

○ sp^3

○ sp^2

Question No.2   4.00

Bookmark ☐

Sulfite ion on treatment with O-atom forms sulfate ion. For this observation, which of the followings is not correct?

○ Sulfate ion is the electron donor in the formation of dative bond.

○ O-atom behaves as a Lewis base.

○ Sulfate ion donates a pair of electron to O-atom.

○ O-atom attains octet configuration.

Question No.3   4.00

Bookmark ☐

The charge to mass ratio (e/m) of positive particles

○ Varies with the nature of gas in discharge tube

○ Is independent of the gas in discharge tube

○ Is constant

○ None of the above

Question No.4   4.00

Bookmark ☐

Optical activity is shown by a molecule

○ Contains at least three asymmetric centres

○ Is asymmetric as a whole

○ Contains a double bond

○ Has a centre of symmetry

Question No.5   4.00

Bookmark ☐

For an ionic crystal of formula AX, the radius ratio lies between 0.732 and 0.414. Its co-ordination number is

○ 4

○ 8

○ 6

○ 12

Question No.6   4.00

Bookmark ☐

AgCl dissolves in aqueous ammonia and not in water because

○ Ammonia is a stronger base than water

○ Chloride has more affinity for ammonia

○ Aqueous ammonia is a better solvent than water

○ Silver ions forms soluble complex with ammonia

Question No.7   4.00

Bookmark ☐

At infinite dilution, the molar conductance of sodium acetate, hydrochloric acid and sodium chloride are 0.0091, 0.0426 and 0.0126 S m^2 mol^{-1}, respectively. What would be the molar conductance of acetic acid at that dilution?

○ 390×10^4

○ 0.0039

○ 0.039

○ 3.9×10^{-4}

Question No.8   4.00

Bookmark ☐

During one's first few months in a new culture, one should learn the manners that are customary and _____.

○ the language that is speaking

○ the spoken there language

○ the language that is spoken there

○ to be speaking language

Question No.9   4.00

Bookmark ☐

The entropy change involved in melting of one gram of a solid at 0°C is ------ cal K^{-1} g^{-1}. [Heat of fusion of the solid = 273 cal/g]

○ 0.1

○ 1

○ 10

○ 100

Question No.10   4.00

Bookmark ☐

If Priya was selected, she _____ a good surgeon.

○ can make

○ will make

○ would have made

○ would make

Question No.11   4.00

Bookmark ☐

Which one of the following is not a primary standard substance to be used in titrimetric analysis?

○ Ferrous ammonium sulfate

○ Potassium dichromate

○ Oxalic acid

○ Potassium permanganate

Question No.12   4.00

Bookmark ☐

In nitrate ion the N-O bond distance is observed to be 121 pm, which is shorter than N-O (136 pm) and longer than N≡O (115 pm). This is due to

○ Existence of resonance in the molecule.

○ Charge transfer from O-atom to N-atom.

○ Nitrate ion is non-linear.

○ Nitrogen is less electropositive than oxygen.

Question No.13   4.00

Bookmark ☐

Diborane consists of ------ (2c - 2e) and ------- (3c – 2e) bonds.

○ 2 and 6

○ 4 and 2

○ 2 and 3

○ 4 and 6

Question No.14   4.00

Bookmark ☐

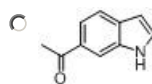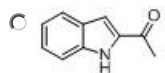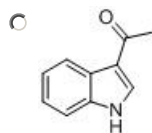The maximum number of 90° angles between bond pair-bond pair of electrons is observed in -----
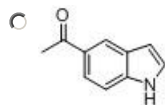hybridization.

○ sp^3d

○ dsp^2
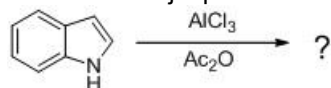
○ dsp^3

○ sp^3d^2

Question No.15   4.00

Bookmark ☐
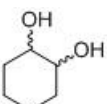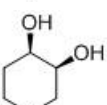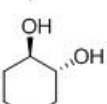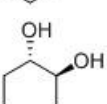
Predict the major product of the reaction.

○

○

○

○

Question No.16
4.00

Identify the major product in the following reaction.

○

○

○

○

Question No.17
4.00

Which has maximum ionization potential?

○ Na

○ O^+

○ O

○ N

Question No.18
4.00

Which of the following nuclei is unstable?

○ $^8O^{16}$

○ $^4Be^{10}$

○ $^5B^{10}$

○ $^7N^{14}$

Question No.19
4.00

Identify the adverb in the following sentence:
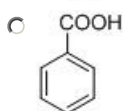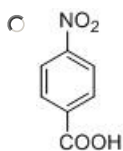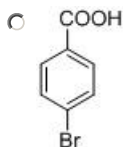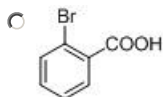We started early in order to see the sunrise.

○ to see

○ early

○ started

○ in order

Question No.20   4.00

Pick the more acidic compound from the lot.

○ 2-bromobenzoic acid structure (Br, COOH)

○ 4-bromobenzoic acid structure (COOH, Br)

○ 4-nitrobenzoic acid structure (NO_2, COOH)

○ benzoic acid structure (COOH)

Question No.21   4.00

Inert pair effect is shown by

○ D-block

○ S-block

○ B-block

○ F-block

Question No.22   4.00

Study the following information carefully and answer the question below it

In a family, Isha is the granddaughter of Asha. Deepa is the mother of Hansa. Charan is the son of Anand. Radha is the mother of Isha. Deepa is the sister of Vinod and Charan. Nagesh has two children, Gita and Hansa. Emesh is the only grandson in the family. Charan is not married. Radha is the daughter-in-law of Anand.
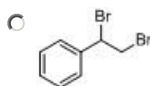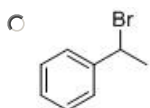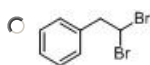
Who is the daughter of Anand?

○ Gita

○ Deepa

○ Hansa

○ Isha

Question No.23

4.00

Bookmark ☐

Predict the major product in the following reaction.

$$\text{HBr/H}_2\text{O}_2$$?

○ (phenyl with CH$_2$CH$_2$Br)

○ (phenyl with CH$_2$CHBr with Br)

○ (phenyl with CHBr-CH$_3$)

○ (phenyl with CHBr-CH$_2$Br)
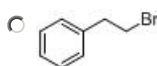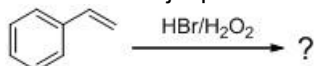
Question No.24

4.00

Bookmark ☐

The metal ion with which one of the following configurations would show strong tetragonal distortion?

○ $t_{2g}^3 e_g^2$

○ $t_{2g}^6 e_g^3$

○ $t_{2g}^6 e_g^4$

○ $t_{2g}^4 e_g^0$
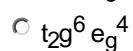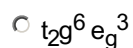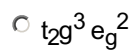
Question No.25

4.00

Bookmark ☐

You are looking at an IR spectrum which measures $\bar{\nu}$ in cm^{-1}. How would you convert the frequency to m^{-1}?

○ Divide by 1000
○ Divide by 100
○ Multiply by 1000
○ Multiply by 100

Question No.26

4.00

Bookmark ☐

Skew conformation is an intermediate arrangement between

○ Enantiomers and diastereomers
○ d and l conformation
○ Cis and trans isomers
○ Eclipsed and staggered forms

Question No.27   4.00

The amount of oxalic acid dehydrate required to prepare 10 liters of desi-normal solution is ------.

- ○ 6.3 g
- ○ 63 g
- ○ 0.63 g
- ○ 630 g

Question No.28   4.00

Amongst the following substituent's in electrophilic substitution reaction the meta directing group is

- ○ $-COCH_3$
- ○ -OH
- ○ -NHCOR
- ○ $-NH_2$

Question No.29   4.00

Which of the following postulates of Debye-Huckel theory is/are true?

- ○ The strong electrolyte is completely ionised at all dilutions
- ○ The oppositely charged ions are completely distributed in the solution but the cations tend to be found in the vicinity of anions and vice-versa
- ○ Decrease in equivalent conductance with increase in concentration is due to fall in mobilities of ions due to inter-ionic effect
- ○ All of the above

Question No.30   4.00

Porphyrins are

- ○ bidentate
- ○ tetradentate
- ○ ambidentate
- ○ triidentate

Question No.31   4.00

Study the following information carefully and answer the question below it:

Aasha, Bhuvnesh,Charan, Danesh, Ekta, Farhan, Ganesh and Himesh are sitting around a circle, facing the centre. Aasha sits fourth to the right of Himesh while second to the left of Farhan. Charan is not the neighbour of Farhan and Bhuvnesh. Danesh sits third to the right of Charan. Himesh never sits next to Ganesh.

Three of the following are alike in a certain way based on their positions in the seating arrangement and so form a group. Which is the one that does not belong to that group?

- ○ DaneshCharan
- ○ Himesh Farhan
- ○ BhuvneshDanesh
- ○ Ganesh Ekta

Question No.32   4.00
Bookmark ☐

A man complete a journey in 10 hours. He travels first half of the journey at the rate of 21 km/hr and second half at the rate of 24 km/hr. Find the total journey in km.

- ○ 224
- ○ 230
- ○ 220
- ○ 250

Question No.33   4.00
Bookmark ☐

Which of the following isotope is used for the treatment of leukemia

- ○ sp^3d
- ○ sp
- ○ sp^2
- ○ sp^3

Question No.34   4.00
Bookmark ☐

Which one of the following metal ions doesn't form inner-sphere octahedral complex?

- ○ Sc(II)
- ○ Ni(II)
- ○ Co(III)
- ○ Fe(III)

Question No.35   4.00
Bookmark ☐

The maximum convertibility of heat into work can be achieved by subjecting one mole of an ideal gas to the following operations (in sequence).

- ○ Adiabatic expansion, isothermal expansion, adiabatic compression and isothermal compression
- ○ Isothermal expansion, adiabatic expansion, isothermal compression and adiabatic compression
- ○ Adiabatic expansion, adiabatic compression, isothermal expansion and adiabatic compression
- ○ Isothermal compression, adiabatic compression, adiabatic expansion and isothermal expansion

Question No.36   4.00
Bookmark ☐

The number of unpaired electron present in the HOMO of O_2^{2+} and O_2^- are found to be ------ and ------, respectively.

- ○ 1 and 0
- ○ 1 and 1
- ○ 0 and 0
- ○ 0 and 1

Question No.37 4.00

Bookmark ☐

If 0.10 M solution of sucrose is reduced to 0.05 M in 10 hours and to 0.025 M in 20 hours through fermentation in an enzyme solution, what is the rate constant for the reaction?

○ $1.9 \times 10^{-5} \, s^{-1}$

○ $0.693 \, s^{-1}$

○ $6.93 \times 10^{-2} \, s^{-1}$

○ $0.01155 \, s^{-1}$

Question No.38 4.00

Bookmark ☐

The stereochemical character of S_N^2 reaction is

○ retention

○ racemization

○ reduction

○ inversion

Question No.39 4.00

Bookmark ☐

The formula used for the determination of surface tension by capillary rise method is

○ $2 \, \gamma = \pi \, hr^2 dg$

○ $2 \, \gamma = hr^2 dg$

○ $2 \, \gamma = hrdg$

○ $2 \, \gamma = \pi \, r \cos \theta$

Question No.40 4.00

Bookmark ☐

Choose the correct meaning to the italicized idiom.
Vijay does not *see eye to eye* with me in this matter.

○ To have same opinion

○ To give a correct decision

○ To have the same eyesight

○ To obtain suitable punishment

Question No.41 4.00

Bookmark ☐

Which of the following represent equilibrium constants?

○ Weak acid or weak base dissociation constant

○ K_c for a reaction

○ Concentration of a strong acid in water

○ (a) and (b) represent equilibrium constants

Question No.42 4.00

Bookmark ☐

A regular cubic system consists of ---- planes and ----- axes of symmetry.

○ 6 and 12

○ 4 and 1

○ 6 and 3

○ 9 and 13

Question No.43
4.00

The total number of atoms in a body centred cubic unit cell is

○ 3

○ 4

○ 1

○ 2

Question No.44
4.00

Which one of the following conditions represents a spontaneous reaction?

○ ΔS = positive

○ ΔG = 0

○ ΔH = negative

○ ΔG = negative

Question No.45
4.00

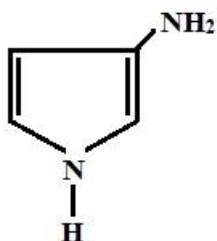Which one of the followings will not obey 18 electron rule?

○ $[Mn(CO)_5]$

○ $[Mn_2(CO)_{10}]$

○ $[Fe(CO)_4]^{2-}$

○ $[Fe(CO)_5]$

Question No.46
4.00

The correct IUPAC name of the compound

○ 2-aminopyrrole

○ 3-aminopyridine

○ 2-aminopyridine

○ 3-aminopyrrole

Question No.47
4.00

While titrating 0.1 M acetic acid taken in a clean conical flask against 0.1 M sodium hydroxide as titrant, what would be the pH value of the solution in the conical flask initially? [Given that: the dissociation constant of acetic acid is 0.000018

○ 1.8

○ 0.18

○ 2.87

○ 7.000018

Question No.48
4.00

Bookmark ☐

At isoelectric point the conjugate acid of glycine is -----.

○ $H_3N^+CH_2COOH$

○ $H_2NCH_2COO^-$

○ H_2NCH_2COOH

○ $H_3N^+CH_2COO^-$

Question No.49
4.00

Bookmark ☐

Which of the following is not aromatic

○

○

○

○

Question No.50
4.00

Bookmark ☐

13, 35, 57, 79, 911, ?

○ 1311

○ 1315

○ 1113

○ 1112

Question No.51
4.00

Bookmark ☐

Choose the correct meaning of the italicized idiom.
The father was right in giving a *piece of his mind* to the son.

○ Speaking sadly

○ Speaking cheerfully

○ Speaking sharply

○ Speaking kindly

Question No.52   4.00

Differentiate the following equation: $y = 6x^{-3}$

- ○ $\dfrac{dy}{dx} = -3x^{-2}$

- ○ $\dfrac{dy}{dx} = -18x^{-2}$

- ○ $\dfrac{dy}{dx} = -12x^{-3}$

- ○ $\dfrac{dy}{dx} = -18x^{-4}$

Question No.53   4.00

John teller effect affects the geometry of ………

- ○ $[Ni(NH_3)_6]^{2+}$
- ○ $[MnCl_4]^{2-}$
- ○ $[NiCl_4]^{2-}$
- ○ $[Cu(NH_3)_6]^{2+}$

Question No.54   4.00

In cubic close packed (ccp) pattern of a metallic crystal, the co-ordination number is

- ○ 8
- ○ 4
- ○ 12
- ○ 6

Question No.55   4.00

Soret band is an intense ----- absorption band in the near UV region of a heme protein.

- ○ $\pi \rightarrow \sigma^*$

- ○ $n \rightarrow \pi^*$

- ○ $\pi \rightarrow \pi^*$

- ○ $\sigma \rightarrow \pi^*$

Question No.56
4.00

Bookmark ☐

The standard electrode potential for the conversion of Cr(III) to Cr(VI) is −1.33 V. Which one of the following statements is not correct?

○ Cr(III) cannot lose three electrons spontaneously.

○ Cr(VI) can act as an oxidizing agent.

○ Cr(VI) is not a reducing agent.

○ Cr(III) is an oxidizing agent.

Question No.57
4.00

Bookmark ☐

The number of unshared electrons present on the carbon atom of carbene is

○ 1

○ 2

○ 3

○ 4

Question No.58
4.00

Bookmark ☐

Find the determinant of

$$\begin{pmatrix} 2 & 5 & 8 \\ 5 & 3 & 7 \\ 4 & 6 & 9 \end{pmatrix}$$

○ 29

○ -89

○ 199

○ 259

Question No.59
4.00

Bookmark ☐

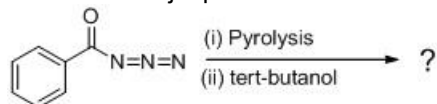Which one of the following complexes would have relatively lower CFSE value?

○ $[Ni(H_2O)_6]^{2+}$

○ $[Co(NH_3)_6]^{3+}$

○ $[Mn(H_2O)_6]^{2+}$

○ $[CoF_6]^{3-}$

Question No.60
4.00

Bookmark ☐

Predict the major product of the following reaction.

○

○

○

○

Question No.61
4.00

Bookmark ☐

Choose the best antonym of the italicized word.
Keerthi did not like her husband being *obsequious* to his boss.

○ gentle

○ indifferent

○ defiant

○ courteous

Question No.62
4.00

Bookmark ☐

Satements: All dogs are tall, All cats are tall.
Conclusion:
I.All dogs are cat
II. All cats are dogs

○ If neither I nor II follows

○ If either I or II follows

○ If only conclusion I follows

○ If only conclusion II follows

Question No.63
4.00

Bookmark ☐

In the following question, the first two words (given in italics) have a definite relationship. Choose one word out of the given four alternatives which will fill the blank space and show the same relationship with the third word as between the first two.

Orange is to *Peel* as *Tooth* is to ………?………….

○ Enamel

○ Joints

○ Gums

○ Brush

Question No.64
4.00

Bookmark ☐

Which one of the followings is correct in an isothermal expansion of an ideal gas?

○ $\Delta U = +$ and $\Delta H = 0$

○ $\Delta U = 0$ and $\Delta H = +$

○ $\Delta U = +$ and $\Delta H = +$

○ $\Delta U = 0$ and $\Delta H = 0$

Question No.65
4.00

Bookmark ☐

Steam is passed on iron rod which forms iron oxide and hydrogen. If the reactants and products are in equilibrium, the number of components and phases present are ------, respectively.

○ 1 and 2

○ 3 and 3

○ 4 and 2

○ 4 and 3

Question No.66　　　4.00

Bookmark ☐

Which of the following iron complex is involved in electron transfer in plants and bacteria?

○ Transferin

○ Ferrintin

○ Myoglobin

○ Ferridoxins

Question No.67　　　4.00

Bookmark ☐

-I effect is largest for

○ Br

○ F

○ Cl

○ I

Question No.68　　　4.00

Bookmark ☐

The entropy of the system increases in the order

○ Gas < liquid < solid

○ Solid< liquid< gas

○ Gas

○ None of these

Question No.69　　　4.00

Bookmark ☐

How many geometrical isomers are possible for [Mabcd]? Where a, b, c and d are modentate ligands.

○ Three

○ One

○ Four

○ Two

Question No.70　　　4.00

Bookmark ☐

What is the effective atomic number of the metal atom in ferrocence?

○ 18

○ 50

○ 36

○ 26

Question No.71　　　4.00

Bookmark ☐

Adsorbate is that substance

○ Which concentrates on the surface

○ Where adsorption takes place

○ Which evaporates from the surface of metals

○ None of these

Question No.72   4.00

Bookmark ☐

The number of photons that pass through a unit area in a unit time is called

○ Amplitude of light

○ Intensity of light

○ Wavelength of light

○ Frequency of light

Question No.73   4.00

Bookmark ☐

The hybridization of the carbon atom of the carbocation is of the type

○ dsp^2

○ sp^2

○ sp

○ sp^3

Question No.74   4.00

Bookmark ☐

The shape of $XeOF_4$ is

○ Pyramidal

○ T-Shaphed

○ Octahedral

○ Square pyramidal

Question No.75   4.00

Bookmark ☐

Based on the information given, answer the below question.
1. A,B,C,D,E and F are travelling in a bus.
2. There are two reporters, two mechanics, one photographer and one writer in the group.
3. Photographer A is married to D who is a reporter.
4. The writer is married to B who is of the same profession as that of F.
5. A,B,C,D are two married couples and no one in this belong to the same profession.
6. F is the brother of C.

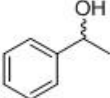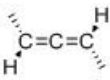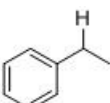Which of the following is the pair of mechanics?

○ Cannot be determined

○ AF

○ BF

○ CE

Question No.76   4.00

Bookmark ☐

Which one of the following molecules is optically active?

Question No.77   4.00
Bookmark ☐

Complete the following nuclear reaction $_{13}Al^{27} + _{2}He^{4} \rightarrow _{14}P^{30} + ...$?

○ $_{1}H^{2}$

○ $_{-1}e^{0}$

○ $_{0}n^{1}$

○ $_{1}H^{1}$

Question No.78   4.00
Bookmark ☐

Study the following information carefully and answer the question below it

(i) There is a group of five persons- A, B, C, D and E
(ii) One of them is manual scavenger, one is sweeper, one is watchman, one is human scarecrow and one is grave-digger
(iii) Three of them – A, C and grave-digger prefer tea to coffee and two of them – B and the watchman prefer coffee to tea
(iv) The human scarecrow and D and A are friends to one another but two of these prefer coffee to tea.
(v) The manual scavenger is C's brother

Who is a sweeper?

○ D
○ C
○ E
○ A

Question No.79   4.00
Bookmark ☐

If BAT= 40, AT= 20 then CAT= ?

○ 60
○ 50
○ 43
○ 80

Question No.80   4.00
Bookmark ☐

The wavelength of large objects is of no significance as it is too _____ to be measurable.

○ Large
○ Small
○ Heavy
○ None of these

Question No.81   4.00

Which one of the following decay takes place in phosphorescence

○ $S_1 \rightarrow S_0$

○ $T_1 \rightarrow S_0$

○ $T_2 \rightarrow T_1$

○ $T_2 \rightarrow S_1$

Question No.82   4.00

According to Pearson's HSAB principle, which one of the followings doesn't exists in nature?

○ HgS

○ MgS

○ Al_2O_3

○ CaO

Question No.83   4.00

Which of the following molecules will not show infrared spectrum

○ HCl

○ H_2

○ H_2O

○ CH_4

Question No.84   4.00

The cell constant can be obtained by

○ Dividing specific conductance by observed conductance

○ Multiplying specific conductance by observed conductance

○ Multiplying specific conductance by equivalent conductance

○ Dividing observed conductance by specific conductance

Question No.85   4.00

Which group of compound does not involve the π-π* transition in UV visible spectroscopy?

○ Alkenes

○ Alcohols

○ Cyanides

○ Azo compounds

Question No.86   4.00

The difference between the molar heat capacity of a gas at constant pressure and at constant volume is equal to --------.

○ 1.987 J

○ 8.314 J
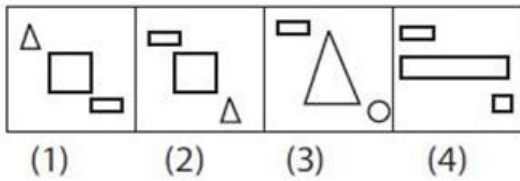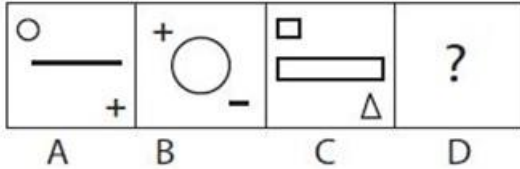
○ 8.314 kJ/mol

○ 2 kcal

Question No.87
4.00

Bookmark ☐

In alkene, electrophilic addition occurs via ----- type of intermediate.

- ○ Free radical
- ○ carbene
- ○ Carbanion
- ○ Carbocation

Question No.88
4.00

Bookmark ☐

- ○ 4
- ○ 2
- ○ 1
- ○ 3

Question No.89
4.00

Bookmark ☐

Statement: Among all the articles, Prices of laptops show the highest decline from June 2017 to December 2017.
Assumptions:
I. Comparative prices of all articles were available from June 2017 to December 2017.
II. The prices laptops were higher in the first 6 months than the last 6 months.

- ○ If neither I nor II is implicit
- ○ If only assumption II is implicit
- ○ If both I and II are implicit
- ○ If only assumption I is implicit

Question No.90
4.00

Bookmark ☐

Only after food has been dried_____

- ○ it should be stored for later consumption
- ○ that is should be stored for later consumption
- ○ should it be stored for later consumption
- ○ should be stored for later consumption

Question No.91
4.00

Bookmark ☐

Choose the best synonym of the italicized word.
The security arrangements made for the visiting dignitary were *impeccable.*

- ○ elaborate
- ○ flawless
- ○ grand
- ○ tight

Question No.92 4.00

The order of stability of the following is represented correctly in

○ $CH_3 < CF_3 > C(CF_3)_3$

○ $CH_3 > CF_3 > C(CF_3)_3$

○ $CH_3 > CF_3 < C(CF_3)_3$

○ $CH_3 < CF_3 < C(CF_3)_3$

Question No.93 4.00

In a solid lattice, a cation has left a lattice site and is present in interstitial position, the lattice defect is

○ Schottky defect

○ Vacancy defect

○ Interstitial defect
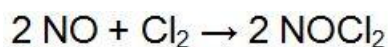
○ Frenkel defect

Question No.94 4.00

How many isomers of $[Co(NH_3)_4 (H_2O)_2]^{3+}$

○ 5

○ 4

○ 3

○ 2

Question No.95 4.00

$2 NO + Cl_2 \rightarrow 2 NOCl_2$
The rate of the above reaction was found to
be doubled when the chlorine concentration
is doubled and increases by a factor of eight
when the concentrations of both the reactants
are doubled. What is the overall order of the
reaction?

○ Four

○ Two

○ One

○ Three

Question No.96   4.00

Bookmark ☐

The reagent used in Stobbe condensation is
- ○ Anhy. $AlCl_3$
- ○ Zn/HCl
- ○ KNH_2 in liq. NH_3
- ○ $KOC(CH_3)_3$

Question No.97   4.00

Bookmark ☐

Which three factors affect the rate of a chemical reaction?
- ○ Temperature, reactant concentration and pressure
- ○ Temperature, pressure and humidity
- ○ Temperature, reactant concentration and catalyst
- ○ Temperature, product concentration and container volume

Question No.98   4.00

Bookmark ☐

Multi-molecular layers are formed in
- ○ Chemisorption
- ○ Physical adsorption
- ○ Reversible adsorption
- ○ Absorption

Question No.99   4.00

Bookmark ☐

Choose the missing term:FLP, INS,LPV, ?
- ○ VXZ
- ○ ORY
- ○ SYZ
- ○ UXZ

Question No.100   4.00

Bookmark ☐

The metal required in enzymes to maintain sexual maturity and reproduction process is ---------.
- ○ Copper
- ○ Molybdenum
- ○ Iron
- ○ Zinc