

## PROVISIONAL ANSWER KEY

Question 137/2023/OL

Paper Code:

Category 034/2022

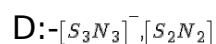
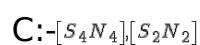
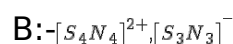
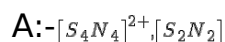
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Exam: Junior Research Officer (SR for ST)

Date of Test 04-08-2023

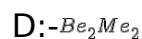
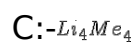
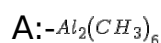
Department Food Safety

Question1:-The pairs of sulfur - Nitrogen Compounds/species with 10  $\pi$  electrons



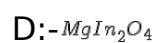
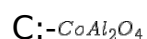
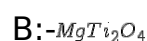
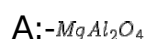
Correct Answer:- Option-B

Question2:-Which of the following organometallic compound has a 4c-2e bond if the bonding is purely covalent?



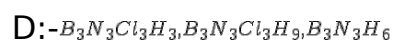
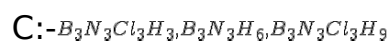
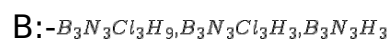
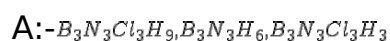
Correct Answer:- Option-C

Question3:-Which of the following adopts inverse spinel structure?



Correct Answer:- Option-D

Question4:- $NH_4Cl$  react with  $BCl_3$  produces a compound P, which on reduction with  $NaBH_4$  gives Q. Q on reaction with HCl gives R. Identify P, Q and R in the correct order



Correct Answer:- Option-C

Question5:-Which one of the following is not a zeolite?



B:-Sodalite

C:-Faujasite

D:-Mordenite

Correct Answer:- Option-A

Question6:-Which is a p-type semiconductor among the following?

A:- $Fe_2O_3$

B:- $MnO_2$

C:- $Cr_2O_3$

D:- $ZnO$

Correct Answer:- Option-C

Question7:-The auto ionization products of  $ICl_3$  are

A:- $ICl^+$  and  $ICl_2^-$

B:- $ICl_2^+$  and  $ICl_4^-$

C:- $ICl_2^+$  and  $ICl^-$

D:- $ICl_4^+$  and  $ICl_2^-$

Correct Answer:- Option-B

Question8:-The  $^{31}P$  spectrum of facial isomer of the complex  $[RhCl_3(PPH_3)_3]$  ( $^1J_{P-Rh} > ^2K_{(p-p)}$  and I value of Rh=1/2) consists of

A:-Two doublets and two triplets

B:-Two triplets and one singlet

C:-One doublet

D:-One doublet and one triplet

Correct Answer:- Option-C

Question9:-The correct match for radioisotopes in column A with its medical application in column B

Column A

Column B

(a)  $^{18}F$

(i) Mechanism of bone fracture healing

(b)  $^{131}I$

(ii) Defects in blood circulation

(c)  $^{24}Na$

(iii) Dopamine pathway in Brain

(d)  $^{35}S$

(iv) Brain Tumour Location

A:-(a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

B:-(a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)

C:-(a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

D:-(a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

Correct Answer:- Option-D

Question10:-The highest M-C bond length exhibited by  $[M(\eta^5-Cp)_2]$  complex is

A:- $[Ni(\eta^5-Cp)_2]$

B:- $[Co(\eta^5-Cp)_2]$

$$C:-[V(\eta^5-Cp)_2]$$

$$D:-[Cr(\eta^5-Cp)_2]$$

Correct Answer:- Option-C

Question11:-The correct order of isomeric shift in Sn compounds

$$A:-[Me_4Sn]>[Me_3SnCl]>[Me_2SnCl_2]$$

$$B:-[Me_2SnCl_2]>[Me_4Sn]>[Me_3SnCl]$$

$$C:-[Me_3SnCl]>[Me_2SnCl_2]>[Me_4Sn]$$

$$D:-[Me_2SnCl_2]>[Me_3SnCl]>[Me_4Sn]$$

Correct Answer:- Option-D

Question12:-Estimate the radius of  $^{234}Th$  nucleus

$$A:-2.29 \times 10^{-14} m$$

$$B:-9.24 \times 10^{-15} m$$

$$C:-1.51 \times 10^{-15} m$$

$$D:-5.30 \times 10^{-15} m$$

Correct Answer:- Option-B

Question13:-The X-S-X bond angle in  $SO_2X_2$  for different X is the order when X=F, Cl, OH or  $CF_3$

$$A:-SO_2(CF_3)_2 > SO_2(OH)_2 > SO_2Cl_2 > SO_2F_2$$

$$B:-SO_2(CF_3)_2 > SO_2Cl_2 > SO_2(OH)_2 > SO_2F_2$$

$$C:-SO_2Cl_2 > SO_2(OH)_2 > SO_2(CF_3)_2 > SO_2F_2$$

$$D:-SO_2F_2 > SO_2(OH)_2 > SO_2(Cl_2) > SO_2(CF_3)_2$$

Correct Answer:- Option-A

Question14:-The correct combination of catalyst and its application is

$$A:-[HFe(CO)_4]^- \text{ Hydroformylation}$$

$$B:-[HCo(CO)_4]^- \text{ - Alkene hydrogenation}$$

$$C:-Cis - [Rh(CO)_2I_2]^- \text{ - Monsanto acetic acid synthesis}$$

$$D:-[Ru(CO)_2I_3]^- \text{ - Water gas shift reaction}$$

Correct Answer:- Option-C

Question15:-The one-dimensional metal Pt complex is

$$A:-K_2Pt(CN)_4Br_{0.3} \cdot 3H_2O$$

$$B:-PtCl_2(NH_3)_2Br_{0.3}$$

$$C:-K_2PtCl_4Br_{0.3} \cdot 3H_2O$$

$$D:-K_2Pt(NO_2)_4Br_{0.3} \cdot 3H_2O$$

Correct Answer:- Option-A

Question16:-The STYX number of  $B_6H_{10}$  is

$$A:-4120$$

B:-4220

C:-4012

D:-4210

Correct Answer:- Option-B

Question17:-The correct match for metalloprotein in column A with its biological function in column B.

Column A	Column B
(a) Cytochrome P450	(i) $O_2$ transport
(b) Vitamin $B_{12}$	(ii) $O_2$ Storage
(c) Rubredoxin	(iii) Group transfer
(d) Hemocyanin	(iv) Electron transport
	(v) Iron storage
	(vi) Insertion of oxygen into C-H bond

A:-(a)-(vi), (b)-(iii), (c)-(iv), (d)-(i)

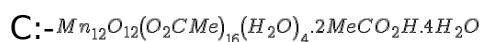
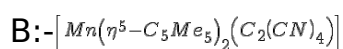
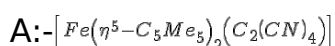
B:-(a)-(i), (b)-(ii), (c)-(iii), (d)-(vi)

C:-(a)-(iii), (b)-(vi), (c)-(iv), (d)-(i)

D:-(a)-(iv), (b)-(iii), (c)-(i), (d)-(iv)

Correct Answer:- Option-A

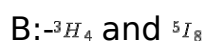
Question18:-Which one of the following is/are a single molecular magnet?



D:-All the above

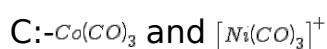
Correct Answer:- Option-D

Question19:-The ground state term symbols for  $Tm^{3+}$  and  $Tb^{3+}$  are



Correct Answer:- Option-A

Question20:- $Au(PPH_3)$  is isolobal with



Correct Answer:- Option-B

Question21:-Which of the following statement is/are correct about Ferro, Piezo- and Pyroelectric materials

(i) The crystal of Ferro-, Piezo- and Pyroelectric crystals are non-centrosymmetric

- (ii) All piezoelectric materials are pyroelectric  
 (iii) Ferroelectric materials are also pyroelectric and piezoelectric

A:-Only (ii) and (iii)

B:-Only (i) and (iii)

C:-All of the above (i, ii and iii)

D:-Only (i) and (ii)

Correct Answer:- Option-B

Question22:-The correct order of ligand reactivity for substitution of Cl on trans- $[Pt(Py)_2Cl_2]$  by the ligand Y in methanol (where the ligand Y is  $PR_3, SCN^-, Br^-$  and  $NH_3$ ) is

A:- $NH_3 > PR_3 > Br^- > SCN^-$

B:- $PR_3 > NH_3 > SCN^- > Br^-$

C:- $PR_3 > SCN^- > Br^- > NH_3$

D:- $SCN^- > Br^- > NH_3 > PR_3$

Correct Answer:- Option-C

Question23:-The electronic spectrum of  $Ni(H_2O)_6^{2+}$  appears at 8500, 13800 and 25300  $cm^{-1}$ . The energy transition corresponding to 8500  $cm^{-1}$  is

A:- ${}^3A_{2g}(F) \rightarrow {}^3T_{2g}(F)$

B:- ${}^3A_{2g}(F) \rightarrow {}^3T_{1g}(F)$

C:- ${}^3T_{2g}(F) \rightarrow {}^3A_{2g}(F)$

D:- ${}^3T_{2g}(F) \rightarrow {}^3T_{1g}(F)$

Correct Answer:- Option-A

Question24:-Which one of the following is Scherrer formula to determine the crystallite size of a material from XRD?

A:- $t = \frac{0.9\lambda}{B \cos \theta_B}$

B:- $t = \frac{B \cos \theta_B}{0.9\lambda}$

C:- $t = \frac{0.9\lambda}{B \sin \theta_B}$

D:- $t = \frac{B \sin \theta_B}{0.9\lambda}$

Correct Answer:- Option-A

Question25:-The Lande g-factor for  $Pr^{3+}$  is

A:-0.6

B:-1.25

C:-1

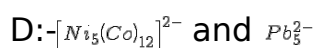
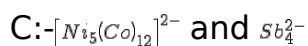
D:-0.8

Correct Answer:- Option-D

Question26:-Which of the following pairs have Arachno structures?

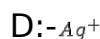
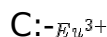
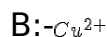
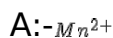
A:- $Sb_4^{2-}$  and  $Co_4(CO)_{12}$

B:- $Co_6(CO)_{16}$  and  $Pb_5^{2-}$



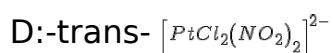
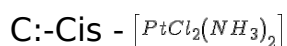
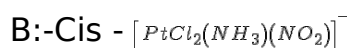
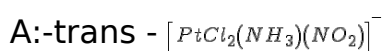
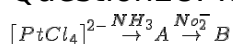
Correct Answer:- Option-C

Question27:-Which is the most commonly used activator ion for use in red phosphors for colour television screens?



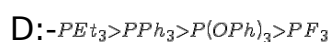
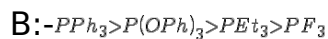
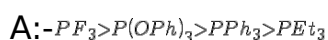
Correct Answer:- Option-C

Question28:-Identify the end product B in the following reaction sequence:



Correct Answer:- Option-B

Question29:-The correct order of basicity of phosphines is



Correct Answer:- Option-D

Question30:-Which is the correct option about the type of intrinsic defect observed in (i) MgO and (ii) CdTe?

A: i-Frenkel Defect, ii-Schottky Defect

B: i- Schottky Defect, ii- Frenkel Defect

C: Schottky Defects in both (i) and (ii)

D: Frenkel Defects in both (i) and (ii)

Correct Answer:- Option-B

Question31:-The IUPAC name of the following compound is



A: Spiro [5.4] deca-2,7-diene

B:-Spiro [4.5] deca-1,6-diene

C:-Spiro [4.5] hepta-1,6-diene

D:-Spiro [5.4] hepta-2,7-diene

Correct Answer:- Option-B

Question32:-Which is the same compound as the following?



A:-



B:-



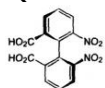
C:-



D:-

Correct Answer:- Option-D

Question33:-Which statement about the following compound is correct?



A:-Optically active due to the presence of asymmetric carbon

B:-Optically inactive due to the absence of asymmetric carbon

C:-Optically active due to restricted rotation

D:-Optically inactive due to plane of symmetry

Correct Answer:- Option-C

Question34:-Which of the following is incorrect for sydnone?

A:-Aromatic compound

B:-Mesoionic compound

C:-Heterocyclic compound

D:-None of the above

Correct Answer:- Option-D

Question35:-The major product of the following reaction will be



A:-



B:-

C:-Equal mixture of 1 and 2

D:-None of the above

Correct Answer:- Option-A

Question36:-Which among the following alkyl chlorides has the highest rate of hydrolysis through unimolecular mechanism?



A:-



B:-



C:-





D:-

Correct Answer:- Option-C

Question37:-Addition of bromine to alkene is

A:-Stereoselective

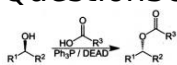
B:-Stereospecific

C:-Regioselective

D:-None of the above

Correct Answer:- Option-B

Question38:-Identify the following reaction



A:-Reimer-Tiemann reaction

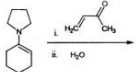
B:-Chichibabin reaction

C:-Mitsunobu reaction

D:-None of the above

Correct Answer:- Option-C

Question39:-Product of the following reaction is



A:-



B:-



C:-



D:-

Correct Answer:- Option-A

Question40:-Witting reaction is used for the conversion of

A:-Aldehyde or ketone to carboxylic acid

B:-Aldehyde or ketone to alcohol

C:-Ketone to alkene

D:-Alcohol to ether

Correct Answer:- Option-C

Question41:-Which among the following rearrangement proceeds through nitrene intermediate?

A:-Schmidt rearrangement

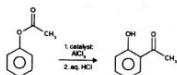
B:-Lossen rearrangement

C:-Curtius rearrangement

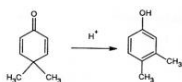
D:-All the above

Correct Answer:- Option-D

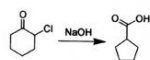
Question42:-Identify Favorskii rearrangement in the following



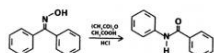
A:-



B:-



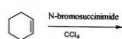
C:-



D:-

Correct Answer:- Option-C

Question43:-Product of the following reaction is



A:-



B:-



C:-



D:-

Correct Answer:- Option-A

Question44:-Lithium aluminium hydride reduces a nitrile to

A:-Amide

B:-Amine

C:-Isonitrile

D:-Alcohol

Correct Answer:- Option-B

Question45:-What is Jones reagent?

A:-Aqueous  $KMnO_4$

B:- $CrO_3$  is aqueous  $H_2SO_4$

C:-Chromium (VI) oxide with pyridine in  $CH_2Cl_2$

D:- $SeO_2$

Correct Answer:- Option-B

Question46:-Which of the following reaction proceeds through umpolung?

A:-Aldol condensation

B:-Stobbe condensation

C:-Darzens condensation

D:-Benzoin condensation

Correct Answer:- Option-D

Question47:-The catalyst for Suzuki coupling is

A:-Nickel(0) complex

B:-Nickel (II) complex

C:-Palladium (0) complex

D:-Platinum (0) complex

Correct Answer:- Option-C

Question48:-Lithium dialkyl cuprate is known as

A:-Grignard reagent

B:-Frankland reagent

C:-Gilman reagent

D:-Adam's catalyst

Correct Answer:- Option-C

Question49:-Which is the protecting group used for amino protection in peptide synthesis?

A:-Benzyloxycarbonyl

B:-t-butoxycarbonyl

C:-9-Fluorenylmethoxycarbonyl

D:-All the above

Correct Answer:- Option-D

Question50:-Which among the following is not using as phase transfer catalyst?

A:-Organic phosphonium salts

B:-Crown ethers

C:-Quaternary ammonium salts

D:-None of the above

Correct Answer:- Option-D

Question51:-Which among the following is a cause of high quantum yield of photochemical reactions

A:-Deactivation of reacting molecules

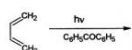
B:-Occurrence of reverse of primary reaction

C:-Occurrence of chain reaction per photon absorption

D:-None of the above

Correct Answer:- Option-C

Question52:-What is the product of photoreaction of 1,3-butadiene?



A:-



B:-



C:-

D:-All the above

Correct Answer:- Option-D

Question53:-Which among the following statements is incorrect for Paterno-Buchi reaction

A:-It is 2+2 photo cycloaddition reaction between an alkene and a carbonyl compound

B:-Reaction is between an excited an alkene reacting with the ground state carbonyl group

C:-The product of the reaction is an oxetane

D:-None of these

Correct Answer:- Option-B

Question54:-Rhodospin is a combination of \_\_\_\_\_ and protein opsin

A:-11-cis-retinal

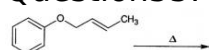
B:-11-trans-retinal

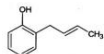
C:-10-cis-retinal

D:-10-trans-retinal

Correct Answer:- Option-A

Question55:-Which the main product of the following rearrangement?

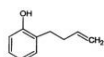




A:-



B:-



C:-



D:-

Correct Answer:- Option-B

Question56:-Which one is correct as per selection rule of Electrocyclic reactions

A:- $4n\pi$  system, thermally  $\rightarrow$  Disrotatory

B:- $4n\pi$  system, thermally  $\rightarrow$  conrotatory

C:- $(4n+2)\pi$  system, thermally  $\rightarrow$  conrotatory

D:- $(4n+2)\pi$  system, photochemically  $\rightarrow$  disrotatory

Correct Answer:- Option-B

Question57:-Edman's reagent for protein sequencing is

A:-Phenyl isothiocyanate

B:-Benzyl thiocyanate

C:-1-fluoro-2, 4-dinitrobenzene

D:-2,4- dinitrobenzene

Correct Answer:- Option-A

Question58:-Which is not stereoregular?

A:-Syndiotactic

B:-Isotactic

C:-Atactic

D:-None of the above

Correct Answer:- Option-C

Question59:-What is the name used to refer to the type of ion represented by:  $M^+$ .

A:-molecular radical cation

B:-cation

C:-radical

D:-molecule

Correct Answer:- Option-A

Question60:-Suggest the structural formula of the compound that gives two doublets with  $J = 3 \text{ Hz}$  in its proton NMR spectrum



A:-



B:-



C:-



D:-

Correct Answer:- Option-A

Question61:-The volume of gas at  $0^\circ\text{C}$  is 273 mL. Its volume at  $50^\circ\text{C}$  is

A:-273+50 mL

B:- $273 + \frac{273}{50}$

C:-273-50 mL

D:- $273 - \frac{273}{50}$

Correct Answer:- Option-A

Question62:-For a Van der waals gas, the Boyle temperature,  $T_B =$

A:- $\frac{b}{Ra}$

B:- $\frac{a}{Rb}$

C:- $\frac{2a}{Rb}$

D:- $\frac{2b}{Ra}$

Correct Answer:- Option-B

Question63:-An ionic compound  $A_xB_y$  occurs in FCC type crystal structure with B ions at the centre of each face and A ions occupy the corners of the cube, give the formula of  $A_xB_y$

A:- $A_2B_2$

B:- $AB_2$

C:- $A_2B_3$

D:- $AB_3$

Correct Answer:- Option-D

Question64:-The kerosene oil rises up in the wick of lantern because of

A:-Buoyant force of air

B:-Gravitational pull of air

C:-Surface tension

D:-Diffusion of oil through the wick

Correct Answer:- Option-C

Question65:-The liquid crystal phase show coloured effect is

A:-Nematic

B:-Smectic

C:-Cholesteric

D:-Discotic

Correct Answer:- Option-C

Question66:-Which one of the following thermodynamic processes approximate the steaming of food in pressure cooker?

A:-Isothermal

B:-Isochoric

C:-Isobaric

D:-Isenthalpic

Correct Answer:- Option-B

Question67:-The number of component (C), phase (P) and degree of freedom (F) are related by Gibbs phase rule as

A:- $F-P=C+2$

B:- $F-C=P+2$

C:- $F+C=P+2$

D:- $F+P=C+2$

Correct Answer:- Option-D

Question68:-Four distinguishable molecules are distributed in energy levels  $E_1$  and  $E_2$  with degeneracy of 2 and 3 respectively. Find the number of microstates with three molecules in  $E_1$  and one molecule in  $E_2$

A:-32

B:-96

C:-108



D:-16

Correct Answer:- Option-B

Question69:-The mean total energy of a classical three-dimensional harmonic oscillator in equilibrium with a heat reservoir at temperature T is

A:- $\frac{1}{2} kT$

B:- $kT$

C:- $2 kT$

D:- $3 kT$

Correct Answer:- Option-D

Question70:-In any reversible reaction, A is in equilibrium with B. If concentration of each substance is doubled, then its equilibrium constant will be

A:-Remains same

B:-Half

C:-Doubled

D:-Quadrupled

Correct Answer:- Option-A

Question71:-According to Freundlich adsorption isotherm, at high pressure value of  $x/m$  will be

A:-Inversely proportional to pressure

B:-Directly proportional to pressure

C:-Directly proportional to square of pressure

D:-Independent of pressure

Correct Answer:- Option-D

Question72:-Where do we obtain the magnified image of the specimen in SEM?

A:-Cathode ray tube

B:-Fluorescent screen

C:-Phosphorescent screen

D:-Screening generator

Correct Answer:- Option-A

Question73:-The electrolytic solution that is having smallest Debye length at 298 K

A:-NaCl

B:- $MgCl_2$

C:- $LaCl_3$

D:- $Na_2SO_4$

Correct Answer:- Option-C

Question74:-In polarography to get true diffusion current the polarographic maxima can be eliminated by

- A:-Giving mechanical stirring to test solution
- B:-KCl like supporting electrolyte is added
- C:-Oxygen is removed from the test solution
- D:-Addition of small amount of surface active agents

Correct Answer:- Option-D

Question75:-The potential developed by the liquid being forced to flow through a plug or diaphragm is called

- A:-Electrode potential
- B:-Streaming potential
- C:-Sedimentation potential
- D:-Electrophoretic potential

Correct Answer:- Option-B

Question76:-The reduction potential of saturated calomel electrode at 25°C is 0.2415 V, it indicates

- A:- $Hg_2Cl_2 + 2e^- \rightarrow 2Hg + 2Cl^-$
- B:- $2Hg + 2Cl^- \rightarrow Hg_2Cl_2 + 2e^-$
- C:- $Hg_2Cl_2 \rightarrow 2Hg + 2Cl^- + 2e^-$
- D:- $2Hg + 2Cl^- + 2e^- \rightarrow Hg_2Cl_2$

Correct Answer:- Option-A

Question77:-For a reaction, the rate constant k at 27°C is  $5.0 \times 10^{10} e^{-20}$ . The activation energy of the reaction is

- A:-500000  $Jmol^{-1}$
- B:-50  $Jmol^{-1}$
- C:-20  $Jmol^{-1}$
- D:-2000  $Jmol^{-1}$

Correct Answer:- Option-A

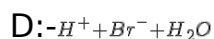
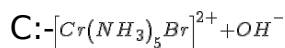
Question78:-Consider a second order reaction, if 'a' is the initial concentration of the reactants. Then, the half-life period of the reaction is directly proportional to

- A:-a
- B:- $a^{\frac{1}{2}}$
- C:-1/a
- D:- $a^2$

Correct Answer:- Option-C

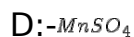
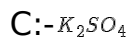
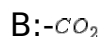
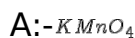
Question79:-For a given ionic strength I, rate of reaction is given by  $\ln\left(\frac{R}{R_0}\right) = -4 \times 0.5 \times I^{\frac{1}{2}}$   
Which of the following reaction show the above rate equation

- A:- $S_2O_8^{2-} + I_2$
- B:- $CH_3COOH + C_2H_5OH$



Correct Answer:- Option-C

Question80:-When oxalic acid is oxidised by acidified potassium permanganate, the compound produced during the reaction acts as auto-catalyst is



Correct Answer:- Option-D

Question81:-We have  $H\psi = a\psi$ , where H is Hamiltonian operator and a is eigen value, the 'a' will have dimension of

A:-Energy

B:-Momentum

C:-Angular momentum

D:-Force

Correct Answer:- Option-A

Question82:-What will be the zero point energy of particle confined in one dimensional box of length '2a'?

A:  $-\frac{h^2}{8ma^2}$

B:  $-\frac{h^2}{16ma^2}$

C:  $-\frac{h^2}{32ma^2}$

D:  $-\frac{h^2}{64ma^2}$

Correct Answer:- Option-C

Question83:-According to Planck's theory the average energy per oscillator is

A:  $-\frac{h^2v^2}{e^{kT}-1}$

B:  $-\frac{hv}{e^{(kT-1)}}$

C:  $-\frac{h^2v^2}{e^{kT}+1}$

D:  $-\frac{hv}{e^{kT}-1}$

Correct Answer:- Option-D

Question84:-If the momentum of a particle is increased to four times, then the de-broglie wavelength will become

A:-Two times

B:-Half times

C:-One fourth times

D:-four times

Correct Answer:- Option-C

Question85:-The point group symmetry of  $[PtCl_4]^{2-}$  is

A:- $C_{2v}$

B:- $D_{4h}$

C:- $D_{2h}$

D:- $C_{4v}$

Correct Answer:- Option-B

Question86:-Which among the following molecule is expected the smallest rotational partition function

A:- $H_2$

B:- $O_2$

C:- $B_2$

D:- $He_2$

Correct Answer:- Option-A

Question87:-When external magnetic field is applied to an odd mass number species, it spins on its own axis and magnetic moment produces, it creates

A:-Lorentz frequency

B:-Vibrational frequency

C:-Oscillation frequency

D:-Larmor frequency

Correct Answer:- Option-D

Question88:-Which computational method is used to solve the Schrodinger equation for systems with a large number of atoms?

A:-Valence bond method

B:-Semi-empirical method

C:-Density functional theory

D:-Coupled cluster method

Correct Answer:- Option-C

Question89:-Which law states that product of specific heat capacity and atomic weight of an element is always a constant

A:-Hardy-Schultz law

B:-Dulong-Petit law

C:-Fermi-Dirac law

D:-Maxwell -Boltzmann law

Correct Answer:- Option-B

Question90:-How many vibrational modes can have water molecule?

A:-3

B:-4

C:-6

D:-1

Correct Answer:- Option-A

Question91:-If the experimental value is close to the true value, then the experimental value is

A:-accurate

B:-precise

C:-suitable

D:-error

Correct Answer:- Option-A

Question92:-How many significant figures are there in the numbers 0.001023 and 0.001023000 respectively?

A:-4, 6

B:-4, 7

C:-5, 6

D:-5, 7

Correct Answer:- Option-B

Question93:-Which statement is true for a primary standard?

A:-Should be extra pure

B:-Should be stable

C:-Should be soluble in titration medium

D:-All of these

Correct Answer:- Option-D

Question94:-Which parameter is measured using differential thermal analysis?

A:-Change in mass

B:- $\Delta T$

C:-dH

D:-Volume

Correct Answer:- Option-B

Question95:-In gas chromatography, which is not used as a carrier gas?

A:-Argon

B:-Helium

C:-Oxygen

D:-Nitrogen

Correct Answer:- Option-C

Question96:-An example for piezoelectric material is

A:-Barium titanate

B:-Iron-Aluminium alloy

C:-Gallium nitride

D:-Lead telluride

Correct Answer:- Option-A

Question97:-The chemical species responsible for the ozone layer depletion is

A:-Fullerene

B:-Ferrocene

C:-DDT

D:-Freon

Correct Answer:- Option-D

Question98:-Which of the following synthetic method is a bottom-up approach for the synthesis of nanomaterials?

A:-Ball-milling

B:-Electron beam lithography

C:-Sol-gel synthesis

D:-None of these

Correct Answer:- Option-C

Question99:-The first talk on nanotechnology entitled 'There is plenty of room at the bottom' in 1959 was delivered by

A:-V Vogel

B:-S J Fonash

C:-K E Drexler

D:-Richard Feynman

Correct Answer:- Option-D

Question100:-The repeating unit in the structure of 18-crown-6 is

A:--N-CH<sub>2</sub>-CH<sub>2</sub>-

B:--S-CH<sub>2</sub>-CH<sub>2</sub>-

C:--O-CH<sub>2</sub>-CH<sub>2</sub>-

D:--CH<sub>2</sub>-CH<sub>2</sub>-

Correct Answer:- Option-C