

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY
THIRUVANANTHAPURAM – 695 011, KERALA ,INDIA

Chemical Sciences
Entrance Exam January 2024

Sl No.	Question	Option 1	Option 2	Option 3	Option 4	Correct Option
1	What is the IUPAC name of the molecule shown above?	Benzyl propanoate	Phenyl butanoate	Phenyl propanoate	Propyl benzoate	4
2	The equation $DH = DU + PDV$ is applicable	Always	Only for constant pressure processes	Only for constant temperature processes	Only for constant entropy processes	2
3	Infrared (IR) spectroscopy is useful for determining certain aspects of the structure of organic molecules because	All molecular bonds absorb IR radiation	Most organic functional groups absorb in a characteristic region of the IR spectrum	Each element absorb at a characteristic wavelength	IR peak intensities are related to molecular mass	2
4	The rate, r , of a zero order chemical reaction $A \rightarrow B$ can be expressed as which of the following?	$r = k \ln[A]$	$r = k [A]^2$	$r = k [A]$	$r = k$	4
5	Which is the strongest acid?	Hydrofluoric acid	Hydrobromic acid	Fluoroantimonic acid	Sulphuric acid	3
6	Of the following compounds which has the lowest melting point?	HCl	CCl_4	AgCl	$CaCl_2$	1
7	Assuming complete dissociation, of the following solutions, which will have the highest ionic strength?	0.05M $AlCl_3$	0.1 M NaCl	0.1 M HCl	0.05 M $CaCl_2$	1
8	Which of the following is an n-type semi conductor?	Silicon	Arsenic doped silicon	Gallium doped silicon	Diamond	2

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9	A catalyst increases rate of reaction by _____	Decreasing enthalpy	Decreasing internal energy	Decreasing activation energy	Increasing activation energy	3
10	The unit of intrinsic viscosity is	dL/g	g/s	g/dL	dL/s	1
11	Organic chemistry is the chemistry of the compounds of	Oxygen	Carbon	Hydrogen	All the above	2
12	In Friedel- Crafts alkylation, the electrophile is typically a/an	Anion	Cation	Carbanion	Carbocation	4
13	Aprotic solvents dissolve ionic compounds chiefly through their solvation of	Anions	Cations	Both	None	2
14	How many moles of sodium ions are contained in 4.13 g of Na ₂ SO ₄ 10H ₂ O	0.0401 mol Na ⁺	0.0616 mol Na ⁺	0.0256 mol Na ⁺	0.0596 mol Na ⁺	3
15	For a polydisperse polymer system –	M _w / M _n = 1	M _w / M _n < 1	M _w / M _n > 1	M _n / M _w > 1	3
16	How many grams of solute are contained in 27.0 ml of 8.75×10 ⁻⁴ M benzoic acid (122g/mol)?	2.51g	2.88 ×10 ⁻³ g	2.88 ×10 ⁻² g	0.251g	2
17	Which of the following is used as an indicator for the argentometric determination of chloride, bromide and cyanide?	Sodium carbonate	Sodium sulphate	Sodium chromate	Sodium nitrite	3
18	Which of the following is the most reduced form of carbon?	R-CH ₃	R-COOH	CO ₂	R-CHO	1
19	A radioactive isotope which is used in diagnostic imaging has a half-life of 6.0 hours. If a quantity of this isotope has an activity of 150mCi when it is delivered to a	75	37.5	18.75	9.375	4

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hospital, how much activity will remain 24 hour after delivery?

20	Nitrogen is comparatively an inert element since _____	Its atom has stable electronic configuration	It has low atomic radius	Its electronegativity is sufficiently high	Its molecule has high dissociation energy	4
21	Which of the following type of spectroscopy is a light scattering technique?	Nuclear magnetic resonance	Infra red spectroscopy	Raman Spectroscopy	UV-Vis	3
22	The average life of a radioactive substance is given by the expression	Total no. of atoms/atoms which disintegrate	The sum of the lives of all the atoms/total no. of atoms	Total no. of atoms/the sum of the lives of all the atoms	None of the above	2
23	The Mark-Houwink equation for a polymer solution is	$[\eta] = KM^{1/n}$	$[\eta] = KM^n$	$[\eta] = KM^a$	$[\eta] = aM^k$	3
24	If one mole of an ideal gas doubles its volume as it undergoes an isothermal expansion, its pressure is?	quadrupled	doubled	unchanged	halved	4
25	Electromagnetic radiation emitted from a nucleus is most likely to be in the form of	Gamma rays	Ultraviolet radiation	Infrared radiation	Microwaves	1
26	Which one of the following techniques relies on the spin angular momentum of a photon?	Fluorescence spectroscopy	CD spectroscopy	IR spectroscopy	Raman spectroscopy	2
27	At isoelectric pH, an amino acid exists as	Cation	Anion	Zwitterion	None	3

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28	How many grams of NaBr do we need in order to prepare one liter of a 10-milimolar NaBr solution? (Atomic mass of Na = 23 g/mol; atomic mass of Br = 80 g/mol.)	103	10.3	1.03	0.103	3
29	What is the pH of a 10^{-2} N NaOH solution?	8	12	10	11	2
30	Why is it generally preferable to use absorbance as a measure of quantification rather than % transmittance in UV-Vis spectrophotometry?	%T cannot be measured as accurately as absorbance	%T is dependent on the power of incident radiation	Absorption is proportional to concentration of the analyte whereas %T is not	None of the above	3
31	Which of the following equipment can be used to measure the glass transition temperature?	Spectrophotometer	DSC	TGA	Viscometer	2
32	An example of aprotic solvent	water	formic acid	ammonia	dimethyl sulphoxide	4
33	Flexible PVC tubes are used for watering. If some organic solvents are passed through this tube, it becomes stiff. This is due to the fact that the organic solvents	plasticize PVC and raise Tg.	remove plasticizer and raise Tg.	remove plasticizer and lower Tg.	react with PVC and increase Tg	2
34	The compound shown in this figure is a	Triterpene	Triglyceride	Tripeptide	None of the above	3
35	Hybridization of xenon in XeF_2 is	sp	sp^2	sp^3	sp^3d	4
36	The total number of possible stereoisomers for the compound with the structural formula	2	3	4	6	3

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CH₃CH(OH)CH=CHCH₂CH₃ is

_____.

37	Which of the following is least basic?	aniline	p-methylaniline	diphenylamine	triphenylamine	4
38	Which of the following is weakest acid?	benzenesulphonic acid	benzoic acid	benzyl alcohol	phenol	3
39	Which of the following is a strong electrophile?	NO ₂ ⁺	NO ₂	NO ⁺	NO	1
40	The lower critical solution temperature (LCST) of temperature-sensitive polymer Poly(N-isopropyl acrylamide) PNIPAM is _____	31	32.5	32	37	3
41	Different forms of CaP ceramics are used as biomaterials, Which among the following is the chemical formula of brushite?	CaHPO ₄ ·2H ₂ O	CaHPO ₄	Ca ₃ (PO ₄) ₂	Ca ₈ H ₂ (PO ₄) ₆ ·5H ₂ O	1
42	The normal modes of a CO ₂ molecule that is IR active include which of the following? I. Bending, II. Symmetric stretching, III. Asymmetric stretching	I and II only	II and III only	I and III only	I, II and III	3
43	A colloidal solution exhibits _____	Low osmotic pressure	High osmotic pressure	No osmotic pressure	Very high osmotic pressure	1
44	Oil soluble dye is mixed with a emulsion which remains colourless. Type of emulsion must be _____	water in oil	oil in water	water in water	oil in oil	2

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45	An emulsifier _____	Homogenises an emulsion	Accelerates dispersion	Stabilises an emulsion	Helps in the flocculation of an emulsion	3
46	Which of the following forms the most stable gaseous negative ion? The element having highest ionization enthalpies within their periods are called _____	F	Cl	Br	I	2
47	Considering the elements B, Al, Mg and K, the correct order of their metallic character is _____	Noble gases	Halogens	Alkali metals	Transition elements	1
48	Which of the following does not reflect the periodicity of elements?	B > Al > Mg > K	Al > Mg > B > K	Mg > Al > K > B	K > Mg > Al > B	4
49	Which of the following is incorrect with respect to the property indicated?	Bonding behaviour	Electronegativity	Ionization potential	Neutron / Proton ratio	4
50	The IUPAC name of isoprene is	Electronegativity: $F_2 > Cl_2 > Br_2$	Electron affinity: $Cl_2 > F_2 > Br_2$	Oxidising power: $F_2 > Cl_2 > Br_2$	Bond energy: $F_2 > Cl_2 > Br_2$	4
51	Amongst the following, a free radical inhibitor is	2-methyl-but-2,3 diene	2-methyl-but-1,3 diene	2-methyl-but-1,4 diene	2-methyl-but-1,2 diene	2
52	The maximum number of isomers for an alkene with molecular formula C_4H_8 is	benzyl peroxide	benzene	hydroquinone	hydrocarbons	3
53	Which of the following general behavior is shown by polymers	5	4	3	2	2
54	Migration of a protein in an SDS polyacrylamide gel is inversely proportional to?	Newtonian	Elastic	Viscous	Viscoelastic	4
55		Molecular weight	log of molecular weight	negative charge	isoelectric point	2

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56	Which of the following best predicts the direction of a chemical reaction?	G (Gibbs free energy change)	H (enthalpy change)	E (internal energy change)	S (entropy change)	1
57	Which of the following polymer is not suitable for complexing with DNA?	Polyethyleneimine	Polyarginine	Poly L-Lysine	Polyacrylates	4
58	The intrinsic fluorescence of proteins is mainly due to the presence of	Alanine	Histidine	Tryptophan	Methionine	3
59	Cobalt-60 is used in the radiation therapy of cancer and can be produced by bombardment of cobalt-59 with which of the following?	Neutrons	Alpha particles	Beta particles	X-rays	1
60	The surface tension of a liquid vanishes at	triplet point	the boiling point	critical temperature	none of the above	3
61	One-tenth of one bag of potatoes weighs the same as one-seventh of one bag of small pebbles. What is the ratio of the weight of 2 bags of potatoes to 3 bags of pebbles?	7:15	20:21	21:20	3:2	2
62	A and B started a business by investing Rs. 36,000 and RS. 63,000. Find the share of each, out of the annual profit of Rs. 5500.	Rs. 2000, Rs. 3500	Rs. 2500, Rs. 3500	Rs. 3500, Rs. 2500	None of these	1
63	A sum of Rs. 13,950 should be divided among three persons A, B and C. B must get the double of A's share and C must get Rs. 50	Rs. 1950	Rs. 1981.25	Rs. 2000	Rs. 2007.75	3

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	less than the double of B's share. The share of A will be _____.					
64	GENEALOGY: ANCESTRY, ENTOMOLOGY: _____ If 'a' is the smallest prime number greater than 39 and 'b' is the largest prime number less than 10, then ab = _____. Find the odd number from the series 8, 64, 99, 216, 343, 729, 1728	WORDS	INSECTS	FOSSILS	INSCRIPTIONS	2
65		299	287	229	261	2
66		64	216	729	99	4
67	A person has the capability of thinking 100 lines of code in five minutes and can type 100 lines of code in 10 minutes. He takes a break for five minutes after every ten minutes. How many lines of codes will he complete typing after an hour?	100	250	350	600	2
68	Which number comes next in this sequence? 1, 1.5, 2.5, 4, ____?	9	8	7	6	4
69	If 3 less than twice a certain number is equal to 2 more than 3 times the number, then 5 less than 5 times the number is _____.	-30	-20	-5	0	1
70	Complete the equation by correctly identifying the incomplete number of the calculation from the list of options	2	4	6	8	2

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given below.-

Equation: $(4.25 + 2.75)^2 + \underline{\hspace{1cm}} = 53 - (9 \times 8)$

71	A pescatarian is someone who eats _____.	Egg	Chicken	Fish	None of the above	3
72	Chandrayaan-3 was launched from _____.	Satish Dhawan Space Centre	VSSC Thumba	Abdul Kalam Island Odisha	Kennedy Space Centre Cape Canaveral	1
73	In doing action research what is the usual sequence of steps?	Reflect, Observe, Plan, Act	Plan, Act, Observe, Reflect	Plan, Reflect, Observe, Act	Act, Observe, Plan, Reflect	2
74	When you reverse the age of the father you will get the age of the son. One year ago the age of the father was twice that of son's age. What are the current ages of son and father?	37 and 73	24 and 42	13 and 31	15 and 51	1
75	The perimeters of a circle, a square and an equilateral triangle are equal. Which one of the following statements is true?	The circle has the largest area.	The square has the largest area.	The equilateral triangle has the largest area.	All the three shapes have the same area.	1
76	The radius as well as the height of a circular cone increases by 10%. The percentage increase in its volume is _____.	17.1	21.0	33.1	72.8	3
77	If the average of 5 numbers is 36 and the average of four of those numbers is 34, then what is the value of the fifth number?	2	34	35	44	4

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78	A, B and C are intelligent, A, D and E are laborious and D, C and E are honest and . A, B, and E are ambitious. Who is neither laborious nor honest?	A and D	B	E	C	2
79	Although it does contain some pioneering ideas, one would hardly characterize the work as _____.	Orthodox	Conventional	Original	Trifling	3
80	A car got 33 Km per liter using petrol that cost Rs.89.5 per liter. Approximately what was the cost, in Rupees of the petrol used in driving the car 350 Km?	1000	880	950	1100	3
81	A certain jar contains 60 jelly beans — 22 white, 18 green, 11 yellow, 5 red, and 4 purple. If a jelly bean is to be chosen at random, what is the probability that the jelly bean will be neither red nor purple?	0.09	0.15	0.85	0.91	3
82	Which pair of words among the following are odd ones Crime and Punishment, Exercise and Health, Judgement and Advocacy, Hardwork and Success, Slowth and Failure?	Slowth and Failure	Hardwork and Success	Judgement and Advocacy	Exercise and Health	3
83	What is the greatest value of x for which $(3x-2)(x+1) = 0$?	-1	$\frac{2}{3}$	$-\frac{2}{3}$	1	2

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84	Which of the following numbers is farthest from the number 1 on the number line?	0	5	-10	10	3
85	Select the lettered pair that best expresses a relationship similar to that expressed in the original pair Antidote : Poison	Cure : recovery	Tonic : lethargy	Narcotic : sleep	Stimulant : relapse	2
86	Choose word or phrase that is most nearly opposite in meaning to the word ENERVATE	Recuperate	Resurrect	Strengthen	Gather	3
87	The sum of three numbers is 98. If the ratio of the first to second is 2:3 and that of the second to the third is 5:8, then the second number is?	20	30	40	58	2
88	Distance between two stations, X and Y is 778 km. A train covers the journey from X to Y at 84 Km per hour and returns back to X with a uniform speed of 56 Km per hour. Find the average speed of the train during the whole journey?	67 Km/hr	67.2 Km/hr	69 Km/hr	69.2 Km/hr	2
89	Due to an increase in taxes on electronic devices, the price of a cooler has increased to Rs. 8450, which is 30% increase of the original price. What was the original price of the cooler prior to the increase?	5154.5	5915	6500	6760	3

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90	If one-third of one-fourth of a number is 15, then three-tenth of that number is	25	35	45	54	4
91	Three times the first of three consecutive odd integers is 3 more than twice the third. The third integer is ____.	15	13	11	9	1
92	The difference between a two-digit number and the number obtained by interchanging the positions of its digits is 36. What is the difference between the two digits of that number?	3	4	9	Cannot be determined	2
93	Which is the odd word?	Inch	Yard	Ounce	Centimeter	3
94	Two ships are sailing in the sea on the two sides of a lighthouse. The angle of elevation of the top of the lighthouse is observed from the ships are 30° and 45° respectively. If the lighthouse is 100 m high, the distance between the two ships is ____m.	173	200	273	300	3
95	The angle of elevation of a ladder leaning against a wall is 60° and the foot of the ladder is 4.6 m away from the wall. The length of the ladder is ____m.	2.3	4.6	7.8	9.2	4
96	From a point P on a level ground, the angle of elevation of the top tower is 30°. If the tower is 100 m	149	156	173	200	3

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	high, the distance of point P from the foot of the tower is ____m.					
	Choose the word which best expresses the meaning of the word CORPULENT					
97		Lean	Emaciated	Obese	Gaunt	3
98	In a shower, 5 cm of rain falls. The volume of water that falls on 1.5 hectares of ground is ____.	75 cu. m	750 cu. m	7500 cu. m	75000 cu. m	2
99	A hall is 15 m long and 12 m broad. If the sum of the areas of the floor and the ceiling is equal to the sum of the areas of four walls, the volume of the hall is ____m ³	720	900	1200	1800	3
100	A and B invest in a business in the ratio 3: 2. If 5% of the total profit goes to charity and A's share is Rs. 855, the total profit is Rs._____.	1425	1500	1537.5	1576	2