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CLASS 9

Chemistry

GUESS PAPER 2027

Important Short and Long Questions

Question No. 2 (Short Questions)

1. Why is there a need to divide Chemistry into many branches? Give three reasons.
2. Most of the molecules we study in biochemistry are organic in nature. Where does the difference exist in organic and biochemistry branches of Chemistry?
3. Difference between organic and inorganic chemistry.
4. Difference between environmental and Analytical chemistry.
5. Difference between polymer and geochemistry.
6. What is meant by nuclear process?
7. Write the importance of inorganic Chemistry.
8. Define environmental chemistry with its scope.
9. What do you know about analytical chemistry?
10. Define nuclear chemistry and also write its application.
11. What are polymers? Also define polymer Chemistry.
12. What is the role of Medicinal Chemistry in our life?
13. Why compound show a chemical formula?
14. Differentiate between homogeneous mixture and heterogeneous mixture.
15. Differentiate between element and compound.
16. Differentiate between compound and mixture.
17. What is meant by symbol or element? Give example.
18. Name the elements that exist in liquid state.
19. Define solution. Give few characteristics of true solution.
20. Define suspension. Give few characteristics of suspension.
21. Define colloidal solution. Give few characteristics of colloidal solution.
22. What are true solutions?
23. Define a saturated solution and give example.
24. Differentiate between saturated and unsaturated solution.
25. Why is it said almost all the mass of an atom is concentrated in its nucleus?
26. Why does the energy of electron increase as we move from first shell to second shell?
27. Why is it needed to lower the pressure of the gas inside the discharge tube?
28. What is the classical concept of an electron? How has this concept changed with time?
29. Define nuclear force.
30. Differentiate between shell and sub shell with example of each.
31. Discuss characteristics of cathode rays.
32. Write the contributions of Neil Bohr's.
33. What are electrons and protons?
34. How did J.J Thomson discover the charge of the cathode rays?
35. Define shell according to Bohr's Atomic model.
36. Write postulates of Bohr's Atomic model.
37. What are energy levels? Give example.
38. How many subshells are present in each shell? Briefly explain.
39. Define proton number and Atomic number.
40. Define Nucleon number and atomic mass.
41. Why atom is neutral?
42. Calculate the number of neutrons, protons and electrons in the following atoms: Mn-55, Pt-195, I-127.
43. Define atomic mass unit. Why is it needed?
44. Define relative isotopic mass. How relative atomic mass can be determined?
45. What is meant by carbon dating or radio carbon dating?

46. Define relative atomic mass. Also write its units.
47. Define atomic mass unit (amu).
48. What type of elements lose their outer electron easily and what type of elements gain electron easily?
49. What is meant by duplet rule?
50. What is meant by octet rule?
51. Differentiate between Electropositive and Electronegative elements.
52. How do atoms succeed in lowering their energy?
53. Why Noble gases are stable elements?
54. What is principle of stability?
55. Why do atoms form bonds?
56. Write down dot and cross formula of HNO_3.
57. How many oxides does nitrogen form? Write down the formulae of oxides.
58. Define electronic configuration.
59. Define covalent bond with two examples.
60. Define coordinate covalent bond and show this bonding in hydroxonium ion.
61. Describe the application of ionic compounds.
62. Why do the ionic compounds have high melting and boiling points?
63. Ionic compounds are solids. Justify.
64. What is meant by bonding electrons?
65. What is meant by covalent bond?
66. What is meant by single covalent bond?
67. What is meant by double covalent bond? Give examples.
68. What is a triple covalent bond? Explain with an example.
69. Define coordinate covalent bond.
70. How is coordinate covalent bond formed in NH_4^+?
71. Differentiate between donor and acceptor atom.
72. Why is BF_3 electron deficient?
73. How hydronium ion is formed?
74. Define chemical bond.
75. How single, double and triple covalent bonds are represented?
76. Give examples of each double and triple covalent bond.
77. Draw dot and cross structure of Ammonia and Hydrogen cyanide.
78. Differentiate between polar covalent bond and non-polar covalent bond.
79. Define donor and acceptor.
80. Give chemical reaction between ammonia and HCl.
81. What are the conditions for an ionic bond to be formed?
82. Draw electron dot and cross structure of the following compounds: SiH_4, PCl_3, SO_2, SO_3.
83. How do metals conduct heat?
84. Define metallic bond.
85. Write some properties of the metals.
86. State the physical properties of metals.
87. Metals are good conductor of electricity. Why?
88. What do you mean by malleable and ductile?
89. Why metals lose electrons easily?
90. Why metallic bond in Mg is stronger than Na?
91. Give reasons of hardness of metals.
92. Give a comparison of metallic bond with an ionic bond.
93. Explain the electropositive character of metals.

94. Why sodium is more reactive than calcium?
95. Define electronegativity character of non-metals.
96. Write any two chemical properties of non-metals.
97. Why HF is a liquid while HCl is a gas?
98. Define intermolecular forces with two types.
99. Define dipole-dipole forces with structure of HCl.
100. Define hydrogen bonding. Give example.
101. Why water is liquid while H_2S is a gas?
102. Define intermolecular forces.
103. Write down the chemical formula of barium nitride.
104. Write down the chemical formulas of the following compounds: Calcium phosphate, Aluminium nitride, Sodium acetate, Ammonium carbonate and Bismuth sulphate.
105. Differentiate between ionic and covalent compounds.
106. Define chemical formula.
107. What is the significance of stoichiometry?
108. Define Stoichiometry.
109. Write the use of stoichiometry.
110. What is molecular formula? Give examples.
111. Why H_2O has same empirical and molecular formula?
112. Write molecular formula and empirical formula of hydrogen peroxide.
113. Write down the chemical formula of lithium oxide & magnesium nitride.
114. How can you differentiate between molecular formula and empirical formula?
115. Write steps for writing the formula of binary compounds.
116. How molecular formula of a compound can be found out?
117. How molecular formula is calculated from the empirical formula?
118. Different compounds will never have the same molecular formula but they can have the same empirical formula. Explain.
119. Write down the structural formula of sulphuric acid.
120. Write down the molecular and structural formula of calcium carbonate.
121. How many molecules are present in 1.5 g H_2O?
122. Why does Avogadro's number have an immense importance in chemistry?
123. Define Avogadro's number.
124. What are the significance of Avogadro's number?
125. What is the difference between a mole and Avogadro's number?
126. Define molar mass.
127. What is molar mass of $C_{12}H_{22}O_{11}$?
128. Determine the molar mass of sulphuric acid H_2SO_4.
129. What is the molar mass of Glucose?
130. Write down the chemical equation of the following reaction: Copper + Sulphuric acid → Copper sulphate + Sulphur dioxide + Water
131. Differentiate between reversible and irreversible reactions.
132. Differentiate between reactants and products.
133. Define reversible reaction.
134. Write 4 steps to write a chemical equation.
135. Write importance of chemical equation.

Question No. 3 (Short Questions)

136. Define System and Surrounding and also write one example.

137. Write differentiate between Exothermic reaction and Endothermic reaction.
138. Define Thermodynamics.
139. Write down about the work of Thomas Young.
140. Differentiate between system and surrounding.
141. Differentiate between chemical energy and heat energy.
142. Define endothermic and exothermic reaction.
143. Write the scope of chemical energetics.
144. What is the difference between enthalpy change and enthalpy?
145. Define Enthalpy and write its unit.
146. What is the importance of enthalpy?
147. Define standard enthalpy of reaction.
148. Why it is not possible to calculate the enthalpy of a system?
149. Why is breaking of a bond an endothermic process?
150. Explain why the reaction between atmospheric gases oxygen and nitrogen does not take place under normal conditions? But in the presence of lightning these gases react to give NO. The reaction stops as soon as the lightning stops.
151. What is heat content?
152. Define heat of the reaction and give one example.
153. Define combustion with example.
154. Is melting of ice an endothermic or exothermic change?
155. Define exothermic and endothermic reactions.
156. Depict the transition state for the following reaction: $H_2 + Cl_2 \rightarrow 2HCl$
157. Define excited molecule.
158. What is transition state?
159. What is Activation energy?
160. Give collision theory of reactions.
161. How catalyst increases the rate of reaction?
162. Define catalyst with an example.
163. What happens at transition state?
164. What is the role of glycogen in our body?
165. Define glycolysis.
166. Explain the role of lipid.
167. What is total heat of content?
168. Differentiate between aerobic and anaerobic respiration.
169. What happens during glycolysis?
170. Why are some reactions irreversible while others are reversible?
171. Why are combustion reactions generally irreversible?
172. Write formula and colour of Anhydrous Cobalt chloride.
173. Write two ways of disturbing a chemical reaction (at equilibrium).
174. What are irreversible reactions? Give few characteristics.
175. Define reversible reactions. Write their two characteristics.
176. How does a reversible reaction go to completion?
177. What is meant by irreversible change?
178. Why does a reversible reaction never go to completion?
179. How is dynamic equilibrium different from static equilibrium?
180. How can you decrease the time to attain the position of equilibrium in a reversible reaction?
181. Can you make an irreversible reaction reversible or irreversible and vice versa?
182. Define catalytic methanation.

183. Define forward and reverse reaction.
184. Write characteristics of dynamic equilibrium.
185. How is dynamic equilibrium achieved?
186. Write significance of dynamic equilibrium in chemical reactions.
187. Differentiate between natural & mineral acids.
188. Write down some organic acids and also their natural source.
189. Differentiate between organic acids and mineral acids. Give examples.
190. Define neutralization reaction.
191. Write down the uses of oxalic acid.
192. Name the bases that can burn your skin.
193. How does calcium metal react with dilute H_2SO_4?
194. Which salt is formed when HCl reacts with $BaCO_3$?
195. Why does Na_2CO_3 behave like a base in water?
196. Is $NaHCO_3$ a base or an acid? Justify.
197. According to Arrhenius, what is neutralization?
198. Mineral acids are generally very strong acids. Justify.
199. How does sulphuric acid ionize in two steps?
200. What is the role of water in Arrhenius concept of acids and bases?
201. Write down limitations of Arrhenius concept.
202. How can hyperacidity be caused and what are its symptoms?
203. Define acid according to Arrhenius.
204. Justify the statement that oxides of metals are basic in nature.
205. What is the role of hydrochloric acid in stomach?
206. What is the treatment of hyperacidity?
207. How will you justify that HSO_4^- is a Bronsted-Lowry acid?
208. What are the limitations of Arrhenius acids & bases?
209. Differentiate between Bronsted & Lowry acids & bases.
210. What is meant by amphoteric? Give an example.
211. Define Bronsted-Lowry acid and base.
212. Why does NH_3 act as a Bronsted-Lowry base?
213. What is the difference between Arrhenius base and Bronsted-Lowry base?
214. How can you justify that NH_3 is a Bronsted-Lowry base but not an Arrhenius base?
215. Why is water called an amphoteric compound?
216. What chemical name will you give to soap as a compound?
217. What is the difference between a strong acid and a concentrated acid?
218. Write some properties of bases.
219. How does acid rain affect aquatic life?
220. Why was atomic number chosen to arrange the elements in the periodic table?
221. What is the significance of the word “periodic”?
222. On what is the modern periodic table based upon?
223. Why are the properties of elements different in a period and same in a group?
224. How are elements arranged in the modern periodic table?
225. Differentiate between group and period.
226. What is meant by periodicity of the properties in periodic table?
227. Why are the most electronegative elements present in the sixth and seventh groups?
228. What is the first element of the periodic table? Will it lose an electron or gain it?
229. Difference between lanthanides and actinides.
230. Define normal or representative elements.

231. Define transition elements.
232. Write any two general properties of periods.
233. What is meant by family of elements? Give an example.
234. How did Mendeleev arrange the elements in the periodic table?
235. Define dipositive ions.
236. What are dinegative ions?
237. What do you mean by group number and period number?
238. Why are elements of group 1 electropositive in nature?
239. How do alkali metals react with water?
240. Write the reaction of alkali metals with halogens.
241. Why are elements of group 17 called halogens?
242. Why does the size of an element increase as we move down the periodic table (in a group)?
243. Which element has the maximum atomic radius and which element has the minimum atomic radius in the third period?
244. The first ionization energy value of magnesium is less than the second one. Give reason.
245. Atomic radii of boron and aluminum are 88 pm and 125 pm respectively. Which element is expected to lose electron(s) easily?
246. How would you find the atomic radius of an atom?
247. Define first ionization energy.
248. Why is second ionization energy greater than first ionization energy?
249. Describe the trends of electronegativity in a period and group.
250. Define atomic radius. Give example.
251. Define ionization energy.
252. Why does electron affinity decrease in a group?
253. What is the difference between first and second electron affinities?
254. Define electronegativity. Write the electronegativity trend of Nitrogen and Oxygen.
255. Why does the size of an atom increase in a group?
256. What is the trend of ionization energy in groups and periods?
257. Questions No. 4 (Short Questions)
258. Why does it become easier to cut an alkali metal when we move from top to bottom in Group I?
259. Name any three elements in the periodic table which exist as liquids.
260. What are alkali metals?
261. Why does reactivity of metals increase down the group?
262. How do alkali metals react with water?
263. Why does density of the atoms in a group increase gradually?
264. Predict the reactivity of potassium towards halogens.
265. Why does iodine exist in the solid state at room temperature?
266. How does an alkali metal react with chlorine?
267. How can the water of a swimming pool be sterilized?
268. What is the trend/variation of reactivity of halogens?
269. How are metal halides formed?
270. Define oxidation and reducing agent. Give example.
271. Define reduction and oxidizing agent.
272. Why are the melting and boiling points of Bromine and Iodine higher than those of chlorine and fluorine?
273. Why does the reactivity of halogens decrease down the group?
274. Write the colour of Bromine and Iodine.
275. Write the trend of thermal stability of hydrogen halides.

276. How do halogens react with water?
277. Why are transition elements different from normal elements?
278. What is the use of nickel as a catalyst?
279. What are transition elements?
280. Write any four properties of transition elements.
281. What is the role of iron in the Haber process?
282. What is a catalytic converter?
283. Write one application of nickel.
284. Which noble gas has the lowest boiling point and why?
285. What are noble elements?
286. Why do noble gases show very little chemical reactivity?
287. What is the main objective of environmental education?
288. Name two effects of excessive use of fertilizers.
289. Define atmosphere and name the major gases in its composition.
290. What is the difference between atmosphere and environment?
291. Write the composition of air.
292. In what way does sulphur present in fossil fuels become dangerous?
293. The percentage of CO_2 in air is only 0.04%. Then how does it become harmful for the ecosystem?
294. What are air pollutants? How can their concentration be expressed?
295. Which factors are responsible for environmental pollution?
296. How is ozone formed?
297. Define smog.
298. What are the harmful effects of hydrocarbons?
299. What is the difference between a pollutant and a contaminant?
300. How are sulphur-containing compounds emitted naturally?
301. CO is a hidden enemy. Explain its action.
302. State the major sources of CO and CO_2 emission.
303. Write the names of major air pollutants.
304. What are natural processes that cause air pollution?
305. Write the harmful effects of oxides of carbon.
306. Highlight the harmful effects of smog.
307. How does acid rain affect forests?
308. How is the excessive use of insecticides and pesticides harmful for birds?
309. How are acid droplets formed?
310. What are the effects of acid rain on soil?
311. How is acid rain produced?
312. Write the adverse effect of acid rain on soil.
313. What is the significance of plants for soil on hills and mountain areas?
314. What happens to the soil if trees are destroyed by acid rain?
315. Differentiate between an organic and an inorganic compound.
316. Why are organic compounds found in large numbers?
317. How are organic compounds useful for us?
318. Write down the names of five organic compounds that exist naturally.
319. How do you compare the melting and boiling points of inorganic and organic compounds?
320. What are hydrocarbons?
321. What do LPG and CNG stand for?
322. Define organic compounds.
323. Define catenation and give an example.

324. Why does carbon form covalent bonds?
325. What are saturated compounds? How are they represented?
326. Define structural formula with examples.
327. Write the importance of hydrocarbons.
328. Write down the molecular formula, structural formula and condensed structural formula for iso-butane.
329. Give the structural formula of Isopentane and Isobutane.
330. Why are alkanes called paraffins?
331. Write dot and cross structure of methane, ethane and propane.
332. What is meant by IUPAC nomenclature?
333. Write structural and dot formula of butane.
334. How is naphtha fraction decomposed to give lower hydrocarbons?
335. What do you know about hydrogenation of alkenes?
336. What is the importance of cracking of petroleum?
337. How is margarine produced?
338. What is meant by cracking?
339. How is naphtha produced?
340. How can alkane be prepared from alkenes and alkynes?
341. Convert chloromethane into methane.

Important Long Questions

Question No. 5

342. Explain with examples that Chemistry has many subfields and interdisciplinary fields.
343. Differentiate between the areas which are studied under inorganic and organic chemistry.
344. Discuss the forms of matter — element, compound and mixture — with examples and their significance.
345. What are compounds? Explain its classes with examples.
346. What are mixtures? Describe its types with examples.
347. Highlight the concept of solution, colloidal solution and suspension with suitable examples.
348. Preparation of solutions leads to an important process in chemistry which enables us to purify a compound through crystallization. Describe a process in which potassium nitrate is purified by crystallizing it in water.
349. What are saturated and unsaturated solutions? How are they formed? Explain your answer with examples.
350. Define the term solubility and explain it with an example.
351. How was the electron discovered?
352. What are cathode rays? How are these rays produced in a discharge tube? Also explain that these rays are electrons.
353. What are canal rays? How was the proton discovered from canal rays?
354. Write a note on the discovery of the Neutron.
355. How was the Nucleus discovered by Rutherford? Write about his experiments.
356. What is Bohr's atomic model?
357. Write detailed information about atomic number and mass number.
358. What are energy levels and orbits? Explain their position and the number of electrons in each shell and sub-shell.
359. A system just like our solar system exists in an atom. Comment on this statement.

Question No. 6

360. Why do atoms form chemical bonds and why are noble gases stable? Explain in detail.
361. Explain the formation of an ionic bond and a covalent bond.
362. Describe the formation of covalent bonds and their types with examples.
363. What are covalent compounds? Give examples and also explain the formation of different covalent compounds.
364. Describe polar and non-polar covalent bonds with examples.
365. Discuss the formation of coordinate covalent bonds with examples.
366. Explain the properties of metals keeping in view the nature of the metallic bond.
367. What is a metallic bond? On which factors does the strength of a metallic bond depend?
368. Describe the general properties and classification of acids on the basis of occurrence.
369. Explain the Arrhenius concept of acids and bases.
370. How does sulphuric acid react with the following compounds? NH_4Cl, NH_4NO_3, MgO, $MgCO_3$
371. What is observed when CO_2 is passed through lime water (i) for a short duration (ii) for a long duration?
372. Describe the strength of mineral acids and organic acids with examples.
373. Compare the Arrhenius and Bronsted-Lowry concepts of acids and bases.
374. Describe the chemical properties of acids with balanced chemical equations.

Question No. 7

375. Which information is needed to locate the elements in the periodic table if you do not know its atomic number? Is atomic mass helpful for this purpose?
376. How many blocks of elements are present in the periodic table? Are these blocks helpful in studying the properties of elements?
377. Arrangement of the elements in the form of a periodic table is a remarkable achievement of chemists. Comment on this statement citing the benefits of this table.
378. The modern periodic table is the amended form of the earlier table developed by Mendeleev. Elaborate how these two tables are different from each other.
379. What is meant by periods? Discuss the periods of the periodic table.
380. What are groups? Explain the properties of groups.
381. How many blocks are in the periodic table? Briefly explain each block.
382. Explain the variation in the following properties across periods, giving reasons: (a) Atomic radius (b) Ionization energy
383. Define electron affinity and electronegativity with examples. Also discuss the trend of these properties in the periodic table and their relation with the size of atoms.
384. Describe the harmful effects of the major pollutants present in the air. OR What are air pollutants? Discuss major air pollutants and their sources in detail.
385. Describe the adverse effects of acid rain in detail.