Subject: Science
Std: X

Q.1(A) Answer any two of the following (6)

(1) Describe with figure, the destructive distillation of mineral coal.

(2) With a neat and labelled diagram, explain the working of Internal Combustion heat engine

(3) State various kinds of proteins and write its importance

(B) Answer the following in short (Any five) (10)

(1) Distinguish between petrol and Diesel (four points)

(2) Use of solar energy is better compared to that of other energies? why?

(3) What are the specific characteristics of rocket fuel?

(4) State the four remedies to meet the energy crisis?

(5) Write four advantages of a biogas plant?

(6) Which factors are responsible food spoilage?.

(C) Answer the following in one sentence (4)

(1) What is the wavelength in metres of electromagnetic waves?

(2) Which fuel has the maximum calorific value and how much?

(3) How many horse power equals 746×10^3 watts?

(4) which energy source on the earth would be scarce after two centuries?

Q.2(A) Answer the following. (any two) (6)

(1) Give the names of four minerals useful to human body. Write their sources and functional roles in our body.

(2) How do biotic factors affect the stored food grains?

(3) How do different animals play their role in spreading diseases?

Q2(B) Answer the following in short (Any five) (10)

(1) Write two points of difference between vitamin C and vitamin D.

(2) State any four alters which occur in stored food by abiotic factors.

(3) The food products are preserved in refrigerators, Give two reasons.

(4) What is the importance of soil in the production of crops?

(5) Write a precise note on 'Diabetes'.

(6) Write names of any four well known hybrids of cows?

(C) Answer the following in one sentence. (4)

(1) What is the use of trowel in agriculture?

(2) Name the institution which develops the new techniques of preventing spoilage of food stuffs.

(3) What is 'Rontgen'?

(4) Which toxic substance does opium contain?

Q3(A) Answer any two (6)

(1) State the advantages of the balanced ecosystem Explain the role of animals in the balance of the ecosystem.

(2) Water is an important medium for living things Explain

(3) Describe the process for the purification of bauxite to obtain pure alumina.

(B) Answer in short (any five) (10)

(1) What is biogeochemical cycle?

(2) Explain how plants get free nitrogen from the atmosphere

(6) Give two names of ores of calcium. also write their chemical formulae.

(C) Answer in one sentence (4)

(1) The mineral of which metal is known as 'Malachite'?

(2) Which process is used to manufacture sodium carbonate industrially.

(3) What is catenation?

(4) How many carbon atoms are found in the chain of fatty acids?

Q5 (A) Answer ~~any~~ any two (6)

(1) Write a short note on 'The rockets with solid fuel'.

(2) What are artificial satellites? Explain its importance.

(3) Explain the method of preparation of Sodium Carbonate

(B) Answer in Short (Any five) (10)

(1) How many Supernova explosions have been recorded so far? When?

(2) Write two points of difference between Venus and Jupiter.

(3) Give brief information about comets.

(4) Explain 'Violet Shift'

(5) Write a short note on 'Meteors'

(6) Write the monomer of artificial rubber and also State two advantages of artificial rubber.

(C) Answer in one sentence (4)

(1) What is pulsar?

(2) Which are the two planets between the orbits of which asteroids are found.

(3) Give two points of difference between True solution and suspension solution.
(4) State any four characteristics of potable water.
(5) Give molecular and structural formulae of normal butane.
(6) Write the chamical formula and two important uses of plaster of paris
(C) Answer in one sentence (4)
(1) What is the diameter of the colloidal particle in cm?
(2) What is solvent?
(3) State the present safety limit for nuclear radiation.
(4) What is Sanctuary?

Q4(A) Answer any two (6)
(1) Describe the process used for the concentration of sulphide ores.
(2) Describe the process of preparing ethene gas in laboratory. Write its four properties
(3) Describe the preparation of carbon fibres. Write its two properties and two uses.
(B) Answer in short (Any five) (10)
(1) Arrange the following metals according to their order of decreasing reactivity. Fe, Sn, Zn, Ni
(2) When copper reacts with hot and concentrated nitric acid, state your observations giving Chemical equation.
(3) Give two points of difference between soap and Detergents.
(4) Write four uses of Sulphur
(5) Yellow phosphorus is kept under water. Why?

Ans (4) ½ mark for each use.

(1) manufacture of Sulphuric acid
(2) preparation of ointment for skin deseases
(3) preparation of gun powder
(4) In vulcanization of rubber
(5) preparation of solvent like Carbon disulphide
(6) preparation of insecticides.

Ans (5)

1) It is highly reactive
2) reacts with oxygen and catches fire
3) heavier than water, it is insoluble in water
4) To keep away from oxygen, kept under water.

Ans (6) ½ mark for name of ore and ½ for its formula.

Ores of calcium:

1) Limestone $CaCO_3$
2) Dolomite $CaCO_3 \cdot MgCO_3$
3) Gypsum $CaSO_4 \cdot 2H_2O$.

Q4(C) (1) Malachite

(2) Solvay ammonia soda process
(3) catenation is the unique property of forming bonds between carbon atoms thereby forming a long chain of carbon atoms
(4) 16 to 18 carbon atoms.

Q5(A) (1) Construction:

→ The walls of the rocket with solid fuel are made up of special alloys.
→ fuel used in solid state
→ To ignite wick ammunition or chemical reactions of chlorides is used.

(3) What is the percentage of carbon dioxide on the planet Venus?

(4) ~~What~~ Which method is used to determine the age of the earth?

Solution

Q 1(A) (1)

Aim: To examine the components obtained by destructive distillation of coal.

Apparatus - Materials: glass test tube, corks, bent glass tubes, stand, gas burner, mineral coal. (1)

Figure: T.B.(2.1) (½)

procedure: Arrange apparatus as shown in figure. Take some mineral coal in a hard glass test tube. Heat the test tube by the flame of a gas burner. When coal is heated to high temp in absence of air its components gets separated. (1)

Observation: ① The gas will come out from the top of the bent glass tube.

② Examine the dark black coloured liquid collected at the bottom of the test tube containing water. This is coal tar

③ The ammonia gas dissolved in water is tested by Red litmus paper. It will turn blue. (1)

④ The matter remaining in hard glass test tube is coke

Conclusion:- During this process, coal gas, coal tar, ammonia and coke are formed. (½)

(2) Diagram T.B. (3.3) 1 mark

Construction (1) movable piston in cylinder 1 mark
(2) piston linked with crankshaft
(3) two valves and a spark plug at one end of cylinder
Working: five stages → 1 mark.
1) Intake of fuel and air
2) Compression
3) Ignition
4) Expansion
5) Exhaust.

(3) Types of proteins. | Functional roles

1) Enzymes ;	All biochemical reactions (1/2)
2) Transport proteins	Distribution of different (1/2)
Eg.	compounds / elements through
	Circulating fluids
3) Contractile proteins →	contraction of muscular
	tissues (1/2)
4) Harmones →	Regulation / integration of
	Physiological processes (1/2)
5) Structural proteins →	organization of cells and (1/2)
	tissues
6) Immuno proteins →	providing defence against (1/2)
	infections

Q1(B) (1)

Petrol	Diesel.
1) obtained in the temp range 30°C to 120°C	1) obtained in the temp range 260°C to 340°C
2) Number of carbon atoms 5 to 10	2) No. of carbon atoms 14 to 20
3) ~~boiling point is low~~	3) Thermal energy 45 k.Joule/gm
3) Thermal energy 47 k.Joule/gm	

(3) combustible gas.
(4) reacts with bromine and almond colour of bromine disappeared.

Ans (3)

Regenerated fibres or artificial fibres when heated in absence of oxygen carbon fibres are formed. 1 mark

V Properties : ½ mark for each.
(1) Very tough (2) resistant to wear and tear.

Uses: (1) . ½ mark for each.
(1) preparation of parts of space ships.
(2) In manufacturing of sports goods

Q: 4 (B)

Ans (1) Metals according to their order of decreasing reactivity are as follows: Zn, Fe, Ni, Sn.

Ans (2) copper reacts with hot and concentrated nitric acid copper nitrate and reddish brown nitrogen dioxide gas are obtained (1 mark)

$Cu + 4HNO_3 \longrightarrow (CuNO_3)_2 + 2H_2O + 2NO_2\uparrow$ (1 mark)

Ans (3) 1 mark for each correct points.

Soap	Detergents
1) prepared by the reaction between oil and sodium hydroxide	(1) prepared from petroleum hydro carbons
2) contains sodium carboxylate ($COONa$) group	2) contains sodium sulphonate (SO_3Na) group
3) reacts with calcium and magnesium present in hard water	3) does not react with such salts in hard water
4) use is decreased slowly	4) use is increased.

4) Used in motor car, scooter etc } 4) used in bus, truck, railway engine etc.

Ans Solar energy -

(2) (1) can be transformed into heat and electrical energy

(2) pollution free

(3) Inexhaustible

(4) Conventional sources produce pollution. Which affects living things.

(3) Characteristics

(1) Should burn immediately

(2) must get fully converted into gaseos form

(3) Should not left any residue.

Ans(4) Remedies to meet energy crisis

(1) Efficiency of vehicles should be maintained.

(2) Old Machinary should be replaced

(3) Use of renewable energy sources

4) Thoughful uses of Non renewable sources

Ans(5) Advantages of bio gas plant four points - 2 marks

(1) Garbage of rural area can be got rid of

(2) harmless and free from unpleasant smell

(3) Do not produce smoke

(4) by product is used as organic manure

(5) Used for lighting and cooking purpose

Ans 6 1) Temperature

2) higher atmospheric humidity

3) excessive moisture

4) type of metal container used for storage

(½ mark for each point)

Q4(A) (1) Froth floatation process.

figure T.B. (12.1)

Method: powdered ore is taken in a big vessel containing water and turpentine.

→ Air is introduced
→ causes frothing
→ Sulphide particles come to surface of liquid.
→ sand dust particles get wet due to water. and settle down

(2) Preparation of ethene gas in laboratory

Aim: To prepare ethene gas is laboratory

Apparatus: Hard glass test tube, rubber cork with a hole delivary tube, glass vessel, gas jars, burner, stand

Substances: Kerosene, sand, pieces of porcelain,

figure: T.B. (14.2)

procedure: Mix some sand with Kerosene and take this in a hard glass test tube.

→ Introduce broken china clay in the front top portion of the test tube
→ heat porcelain (or china clay) pieces till red hot
→ then heat the sand portion
→ Heat both alternately
→ Ethene gas is liberated & it is collected in gas jar by downward displacement of water.

Properties: (1) colourless, odourless
(2) Insoluble in water

Q1: C (1) 10^{-14} met to 10^{5} met

(2) 10 horse power = 7.46×10^{3} watts.

(3) Hydrogen - 150 Kilo Joule / gm

(4) Mineral coal.

Q2(A)(1)

Minerals	Functions
1) Calcium	1) Structural composition of bones & teeth. 2) For coagulation of blood 3) For conduction of nerve impulses
2) Iron	1) For the formation of haemoglobin
3) Phosphorus	1) formation of bones and teeth 2) formation of ATP
4) Iodine	1) Synthesis of hormone thyroxin
5) Magnesium	1) formation of bones
6) Sulphur	1) formation of amino acids which contain sulphur
7) Sodium	1) Conduction of impulses 2) maintaining acid-base balance.

Sources

1) Calcium: Milk, ilS products, green leafy vegetables, cereals, soyabeans etc.

2) Iron - Eggs, green leafy vegetables, bajra, fenugreek etc

3) Phosphorus - Milk, fish, green leafy vegetables, walnut-, Soyabean

4) Iodine - Fish, marine food, Iodized salt-

5) Magnesium - cereals

6) Sulphur - Onions; dry fruits

True solution	Suspension solution
1) Solute exists in the form of molecules or ions	1) Solute particles are in suspension
2) diameter of solute particles is upto about 10^{-8} cm	2) more than 2×10^{-5} cm
3) Solute particles cannot be seen under a microscope	(3) can be seen under a microscope.

(4) Characteristics of potable water

(1) hygienically harmless

(2) odourless, colourless and free from microorganisms

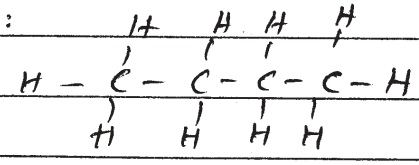
(3) soft and not contain more than 500 ppm.

(4) Contain proper amount of iodine

(5) Should not contain more than 0.6 to 0.8 ppm of flouride

(5) Molecular formulae of n-butane is C_4H_{10}

Structural formula:



(6) Chemical formula of plaster of paris: $(CaSO_4)_2 \cdot H_2O$

Uses: (1) Sealing agent in laboratory

(2) For bone setting

(3) Preparation of idols

(4) making ceilings.

Q. 3(C)

(1) 10^{-7} to 10^{-5} cm

(2) Solvant: The component present in a larger proportion in a solution is called Solvent

(3) It has been accepted at 250 milli rontgen per week

(4) A limited area in which wild animals are protected and can move about freely without any fear is called Sanctuary.

(2) Effect of biotic factors

1) Increase in bacteria.
2) Increase in Fungi
3) Rats
4) Birds (excrete etc contain Salmonella)
5) Insect and their larvae.

(3) 1) Protozoa - cause malaria.
2) Roundworm. Filaria cause Elephantiasis
3) tapeworms, hookworms, Ascaris cause diseases of alimentary canal.
4) Cyclop cause guina worm
5) rats, & flea rat flea ca spread plague
6) Tetanus is caused by tetanus virus found in dung of horse and cattle
7) Rabies is caused by rabies virus when animals such as dog or bite a man.

Q2(B)

Ans (1)

Vitamin C	Vitamin D
1) water soluble	1) fat soluble
2) cannot be synthesized in the body	2) can be synthesized in the body
3) Obtained from citrus fruits.	3) obtained from milk, egg, cod-liver oil, & butter etc

Ans (2) (1) Due to moisture, microorganism increase.
2) Due to moisture - rapid enzymatic changes occur
3) physio-chemical changes occur in stored grain
4) rate of growth of fungi increase

$Al_2O_3 + 2NaOH \xrightarrow[5-6 \text{ Atmosphere}]{160^\circ C} 2\,NaAlO_2 + H_2O$

→ Insoluble impurities collected at the bottom are filtered.

→ filterate gets hydrolysed in presence of water.

→ Constant stirring gives white precipitate of Aluminium hydroxide

$NaAlO_2 + 2H_2O \xrightarrow{\text{hydrolysis}} Al(OH)_3 \downarrow + NaOH$

→ The precipitates are washed out with water and dried

→ On heating this dried precipitate at 1100°C aluminium oxide is formed.

$2\,Al(OH)_3 \xrightarrow{1100^\circ C} Al_2O_3 + 3H_2O$

By this process 99.5% pure alumina (Al_2O_3) is obtained.

Q3(B) Ans(1) Exchange of mineral, elements and other materials takes place between biotic and abiotic components of an ecosystem.

The cyclic flow of elements such as carbon, oxygen, nitrogen .etc between the ecosystem and the physical environment is known as biogeochemical cycle

Ans(2) (1) Rhizobium bacteria in the root-nodules of ~~plants~~. leguminous plants, blue green algae in the roots of other plants take nitrogen from atmosphere (2) fix it by converting into salts like ammonium nitrate and ammonium nitrite.

(3) plants absorb these salts.

Ans(3)

Ans(3)(1) Growth of pathogenic microorganism is inhibited
(2) Enzymatic reactions become slow
3)

Ans(4) (1) It is a natural medium
(2) Physical, Chemical, biological changes go on in the soil
(3) plants get water and minerals through roots from soil.
4) provides necessary oxygen.

Ans(5) Two types of Diabetes
(1) Diabetes mellitus (2) Diabetes insipedus
(1) Diabetes mellitus –
(1) blood sugar level is much higher
(2) Caused due to deficiency of harmone – insulin
2) Diabetes insipedus –
(1) Urination becomes more frequent, as reabsorption in the kidney becomes very low
(2) The urine is very dilute
(3) caused due to deficiency of ADH hormone

Ans 6 well known hybrids of cows are
1) Santa Gertudis (2) Jersey (3) Friesian Sahival
4) Brown Swiss.

Q2(C) (1)
(1) Trowel is used for removal of weeds in agriculture
(2) Central Food Technology Institute (CFTI) develops the new techniques of preventing spoilage of food stuff
(3) Rontgen is a unit for measuring the amount of radiation
(4) Opium contains toxic substance named morphine.

Q3(A) Ans -(1) Advantages of Balanced Ecosystem: 1 mar

1) Proportion of gases on the earth is maintained
2) Cycles of gases like CO_2, Oxygen, nitrogen run in a balanced manner
3) Role of animals
1) Use oxygen and give out CO_2
2) provide food to carnivores
3) maintain and regulate proportion of different organisms
4) help in dispersal of seeds
5) decomposers, transformers cause disintegration of the dead bodies

Ans (2) (i) water is a basic necessity for growth and development
(2) for various physical and chemical processes of the body
(3) plants absorb mineral salts from soil through water
(4) Important for exchange of gases in the transportation of organic food in plant
(5) It is useful as a solvant for many substances
(6) The turgid cells keeps the plant erect
(7)

Ans(3) Bayer's process
→ Bauxite is roasted, ferrous oxide is converted into ferric oxide. Then it is dried and powdered.
→ 45% solution of NaOH is added to it & heated to about 160°C in a closed vessel for 6 to 8 hrs, 5 to 6 atmospheres.

(1) AD 1006 and AD1054
(2) Third explosion in year 1572
(3) fourth - Johan Kepler in 1604
(4) fifth - by Shelton on Feb 24, 1987

Ans(2)

Venus	Jupiter
(1) large proportion of CO_2	(1) mainly consists liquid hydrogen
(2) Inner planet	(2) outer planet
(3) no radiation belts around it	(3) Intense radiation
(4) No satellite	(4) 12 satellites

Ans (3)
(1) bright ball of dust and gas with long tail
(2) revolution period around the sun is large.
(3) Halley's comet - period is 76 years
(4) It was seen in 1986 and next in 2062.

Ans (4) If a star is moving towards earth, then the frequency of light emitted by it when received by observer on the earth would increase and position of the spectral line shift toward violet this is called violet shift.

Ans (5) Meteors
1) particles wandering through solar system
2) Heavenly bodies
3) enter earth's atmosphere with high velocity.
4) they start burning
5) Light is seen in sky.

Ans (6) Monomer of artificial rubber is chloroprene,
Uses: (1) does not burn quickly

figure. 1 mark

Working: combustion starts by igniting a wick
In the upper portion of combustion chamber
→ temperature of combustion chamber becomes more than 3000 K
→ The gas produced rush out from the lower end of the rocket ~~with~~.
→ It exert a thrust to rocket in upward direction
1 mark for working.

Ans (2) The objects set afloat in the orbit around the earth by man are called artificial satellites (1 mark)
Uses:
(1) for TV and radio broadcasting
(2) Weather monitoring
(3) for agriculture
(4) for talk back channel
(5) In defence

Ans (3) Solvay's ammonia process
pure Sodium chloride solution is saturated with ammonia at 0°C & passing CO_2 gas.

$$NaCl_{(aq)} + H_2O_{(l)} + CO_{2(g)} + NH_{3(g)} \longrightarrow NaHCO_3 + NH_4Cl$$

$$NaHCO_{3(s)} \longrightarrow Na_2CO_{3(s)} + H_2O_{(g)} + CO_{2(g)}$$

Q5 (C) (1) The neutron star rotating on its own axis emits the radio waves and is called PULSAR

(2) Mars and Jupitar

(3) 97%.

(4) Radio malric dating.