Science and Technology Part 1

SSC Board Exam March 2027 – Practice Paper No. 2

Practice Question Paper

Time: 2 hours **Max. Marks: 40**

(1) All questions are compulsory.
(2) Use of a calculator is not allowed.
(3) The numbers to the right of the questions indicate full marks.
(4) In case of MCQs [Q.1(A)], only the first attempt will be evaluated and will be given credit.
(5) For each MCQ, the correct answer must be written along with its alphabet, e.g. (A) ..... / (B) .....
(6) Scientifically correct, labelled diagrams should be drawn wherever necessary.

Q.1 (A) Choose the correct alternative and write its alphabet. **[5]**

(i) According to Kepler's third law, the square of the period of revolution of a planet around the Sun (T^2) is directly proportional to _____ (r = mean distance of the planet from the Sun).

(A) r (B) r^2

(C) r^3 (D) $1/r^2$

(ii) In the reaction $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$, the reductant (reducing agent) is _____.

(A) Fe_2O_3 (B) CO

(C) Fe (D) CO_2

(iii) In the modern periodic table, the elements of the d-block (groups 3 to 12) are called _____.

(A) noble gases (B) transition elements

(C) metalloids (D) alkaline earth metals

(iv) Which of the following metals is found in the free state in nature?

(A) Sodium (B) Gold

(C) Aluminium (D) Calcium

(v) In an electric motor, the direction of current in the coil is reversed after every half rotation with the help of _____.

(A) carbon brushes alone (B) split rings

(C) the axle (D) the horseshoe magnet

Q.1 (B) Answer the following. **[5]**

(i) Find the odd one out: Methane, Ethane, Ethene, Propane

(ii) Complete the correlation:
Specific latent heat of fusion of ice : 80 cal/g :: Specific latent heat of vaporization of water : _____

(iii) Match the column:
Column A: Iris
Column B: (a) Changes the focal length of the eye lens (b) Controls the size of the pupil (c) Forms the image of the object

(iv) State whether the following statement is true or false:
The critical velocity of an artificial satellite does not depend on the mass of the satellite.

(v) Write the name: The polymer formed from the monomer ethylene (ethene).

Q.2 (A) Give scientific reasons. (Any two) **[4]**

(i) Aluminium is a reactive metal, yet aluminium utensils and window frames do not corrode easily.

(ii) The bottom of a swimming pool filled with water appears to be raised (the pool looks shallower than it really is).

(iii) On winter mornings, drops of water are seen on the leaves of plants and on grass.

Q.2 (B) Answer the following. (Any three) **[6]**

(i) Two cargo ships of masses 3×10^6 kg and 4×10^6 kg are anchored 2 km apart at a port near Mumbai. Calculate the gravitational force between them. ($G = 6.67 \times 10^{-11}$ N m^2/kg^2)

(ii) State Newlands' law of octaves. Write any two limitations of this law.

(iii) The speed of light in a transparent medium A is 2.5×10^8 m/s and in another medium B is 2×10^8 m/s. Find (a) the absolute refractive index of medium A and (b) the refractive index of medium B with respect to medium A. (Speed of light in vacuum = 3×10^8 m/s)

(iv) State the right hand thumb rule. Draw a diagram showing the magnetic lines of force around a straight conductor carrying current (conductor perpendicular to the page, current coming out of the page).

(v) Write two differences between saturated and unsaturated hydrocarbons. Give one example of each.

Q.3 Answer the following. (Any five) **[15]**

(i) In a house in Nashik, 300 g of hot water at 80 °C from a solar water heater is mixed with 200 g of tap water at 30 °C in an insulated bucket. (Specific heat of water = 1 cal/g °C; assume no heat is lost to the surroundings or the bucket.)
(a) State the principle of heat exchange.
(b) Find the final temperature of the mixture.
(c) How much heat is gained by the tap water?

(ii) A navigation satellite revolves in a circular orbit of radius 1.6×10^7 m measured from the centre of the Earth. (For the Earth take $GM = 4 \times 10^{14}$ N m^2/kg, i.e. $6.67 \times 10^{-11} \times 6 \times 10^{24}$ rounded; radius of the Earth R = 6400 km, $\pi = 3.14$)
(a) Find the critical velocity of the satellite.
(b) Find the time it takes to complete one revolution.
(c) Find its height above the Earth's surface and name the type of orbit.

(iii) An object 8 cm high is placed 36 cm in front of a concave lens of focal length 12 cm.
(a) Find the position of the image.
(b) Find the magnification and the height of the image.
(c) State the nature of the image.

(iv) Write balanced chemical equations, with physical states, for the following and name the type of each reaction.
(a) Aqueous sodium sulphate is added to aqueous barium chloride.
(b) Electric current is passed through acidulated water.
(c) Hydrogen gas combines with chlorine gas.

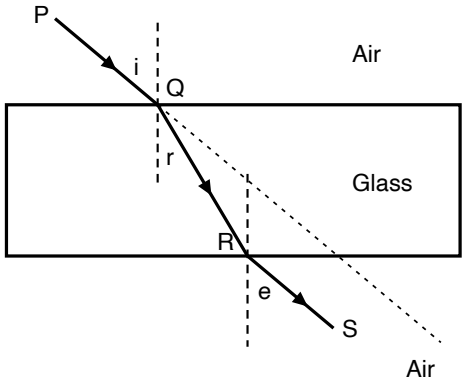
(v) Mendeleev left some places vacant in his periodic table. For one of them, below silicon, he predicted an element called eka-silicon with atomic mass 72.
(a) Which element was later discovered to fill this place?
(b) State Mendeleev's periodic law.
(c) Explain why the position of hydrogen was a demerit of Mendeleev's periodic table.

(vi) Observe the figure, in which a ray of light PQ passes through a rectangular glass slab, and answer the questions.

(a) Name the rays QR and RS.

(b) What is the relation between angle i and angle e? What is the relation between ray PQ and ray RS?

(c) If the glass slab is replaced by a slab of the same size made of a material of greater refractive index, will angle r increase or decrease? Why?



(vii) Iron and other metals are protected from corrosion by different methods. Explain the following methods with one example each:

(a) Galvanizing

(b) Tinning

(c) Electroplating

(viii) A planet X has a mass 6 times the mass of the Earth and a radius 2 times the radius of the Earth. (g on Earth = 9.8 m/s^2)

(a) Write the formula for the acceleration due to gravity g on the surface of a planet of mass M and radius R.

(b) Find the value of g on the surface of planet X.

(c) A stone dropped from rest on planet X takes 2 s to reach the ground. From what height was it dropped?

Q.4 Answer the following in detail. (Any one) **[5]**

(i) Read the information and answer the questions.

A family in Pune uses an electric geyser rated 2400 W, 240 V. During the month of November (30 days), it is used for 1 hour every day.

(a) Find the current drawn by the geyser.

(b) Find the resistance of its heating coil.

(c) How much heat (in joule) does it produce in 5 minutes?

(d) How many units of electrical energy does it consume in November? Find the cost at ₹ 7 per unit.

(e) If the supply voltage drops to 120 V, what will be the power of the geyser? (Assume the resistance remains the same.)

(ii) Read the paragraph and answer the questions.

A compound A (molecular formula C_2H_6O) is obtained by fermentation of molasses in sugar factories of Maharashtra and is used as a solvent in tincture iodine. When small pieces of sodium are put in A, a combustible gas B is given out. When A is heated at 170 °C with excess concentrated sulphuric acid, an unsaturated compound C is formed. C reacts with hydrogen in the presence of nickel to form D. When A is oxidised with alkaline potassium permanganate, compound E is formed, which gives effervescence with sodium bicarbonate.

(a) Identify A and write its structural formula.

(b) Write the chemical equation for the reaction of A with sodium and name the gas B.

(c) Write the chemical equation for the formation of C. What is the role of concentrated sulphuric acid?

(d) Name D and the type of reaction in which C changes to D.

(e) Identify E and write the chemical equation for its reaction with sodium bicarbonate.

All the best for your exam!