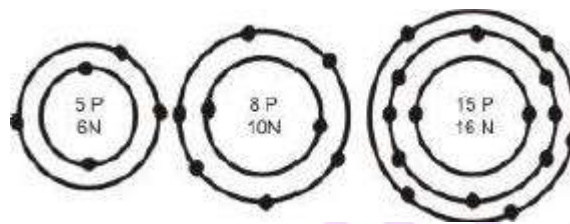


**Q1)** List any three human activities which would lead to an increase in the carbon dioxide content of the air.

- Ans 1.** i) Burning of fossil fuels such as petrol diesel, transportation and Industrial purpose.  
ii) Burning of wood and charcoal for heating and cooking.  
iii) Cutting of trees /deforestation.

**Q2)** What information do you get from the figure given below about the atomic number, at the mass number and valency of atoms X, Y, and Z.



**Ans 2.**

Atoms	Atomic No.	Mass No.	Valency
X	5	11	3
Y	8	18	2
Z	15	31	3, 5

**Q3)** Write the given statement in your answer books after filling in the blanks?

- a) Pila and Unio have an external shell and belong to the phylum\_\_\_\_\_.  
b) Free-living marine animals with water driven tube system are in the phylum \_\_\_\_\_.  
c) To which phylum do sponges belong\_\_\_\_\_.

- Ans 3.** (a) Mollusca  
(b) Echinodermata  
(c) Porifera

**Q4)** Differentiate between monocots and dicots. Give two differences and one example of each?

**Ans 4. Monocots** - One cotyledon/ parallel venation/ fibrous roots, wheat, maize, rice.

**Dictos** - Two cotyledons /reticulate venation/tap root, green gram, pea.

**Q5)** Define Sanyam and Svasthya? How are the two related?

**Ans 5.** I have the feeling of Sanyama for the body and the body has Svasthya, Sanyam is basic to Svasthya. Sanyam is the feeling of responsibility in the self to ensure the nurturing, protection and right utilization of the body. Svasthya has two elements one that body acts according to the self and secondly there is a harmony between the parts of the body.

**Q6)** (a) State the law of Constant Proportion. 13

(b) In a compound Carbon and Oxygen react in a ratio 3: 8 by mass to form carbon dioxide. What mass of oxygen is required to react completely with 9g Carbon?

**Ans 6.** (a) In a chemical substance the elements are always present in definite proportion by mass.

(b) For 3g of Carbon, 8g of Oxygen are needed.

(c) For 1g of Carbon,  $\frac{8}{3}$ g of Oxygen are needed.

(d) For 9g of Carbon,  $\frac{8}{3} \times 9 = 24$ g Oxygen are needed.

**Q7)** (a) What are the conditions for work to be done?

(b) An electric bulb of 60W is lighted for 10 hours a day. What is the amount to be paid in a month of 30 days, if one unit of electricity costs Rs. 3.50?

**Ans 7.** a) Two conditions need to be satisfied for work to be done:

(i) a force should act on an object, and

(ii) the object must be displaced.

b)  $P = 60\text{W}$ ,  $t = 10$  hours

$E = P \times t = 60 \times 10 = 600 \text{ Wh} = 0.6 \text{ kWh}$

Bill =  $0.6 \times 3.5 \times 30 = \text{Rs. } 63$

**Q8)** List any three ways of preventing the spread of air-borne diseases.

**Ans 8.**

- Avoiding direct contact with the infected persons
- Not sharing articles used by infected persons
- Use of mask/gloves/handkerchief

**Q9)** (i) State "Archimedes principle".

(ii) The volume of 50g of a substance is 20 cm<sup>3</sup>. If the density of water is 1 gm cm<sup>-3</sup>, will the substance float or sink?

**Ans 9.** (i) Archimedes principle states that when a body is immersed fully or partially in fluid (liquid) it experiences an upward force that is equal to the liquid (fluid) displaced.

(ii) In present problem density of water

$$PW = 1 \text{ gm cm}^{-3}$$

$$\text{mass} = 50 \text{ gm}$$

$$\text{Volume} = 20 \text{ cm}^3$$

(iii) Density of substance =  $m/v = 50 \text{ gm} / 20 \text{ cm}^3 = 2.5 \text{ gm cm}^{-3}$ , greater density will sink. So it will sink.

**Q10)** (a) On which characteristics of sound wave do the following properties depend?

(i) loudness (ii) Pitch

(b) Calculate the time for which the sensation of sound persists in our brain if the minimum distance of the obstacle from the source of sound is 17.2m (speed of sound in air = 344m /s)

**Ans 10.**

(a) Loudness depends on amplitude while pitch depends on frequency.

$$(b) 2d = v \times t$$

$$2 \times 17.2 = 344 \times t$$

$$T = 34.4 / 344 = 0.1s$$

**Q11)** (a) What is the causal organism for Swine flu?

(b) Suggest two measures that the local authorities of your neighbourhood should take to bring down the incidence of diseases like malaria, typhoid, and dengue?

**Ans 11.** (a) Virus (H1N1)

(b) Spraying pesticides/ cleaning of garbage dumps/ disposal of sewage /cleaning of drains and sewers.

**The Questions number from 12 to 20 below carries 5 marks each:**

**Q12)** a) A child hears an echo from a cliff 4 seconds after the sound from a powerful cracker is produced. How far away is the cliff from the child? Speed of sound = (340 m/s).

b) Derive a relation between wavelength, frequency and wave velocity.

**Ans 12.**

(i) (a) Time taken by sound to travel from child to

cliff  $t = 4/2 = 2$  s

speed of sound in air,  $v = 340$  m/s

Distance of cliff from the child =  $v \times t = 340\text{m/s} \times 2 \text{ s} = 680 \text{ m}$

b) Since wave length is the distance travelled by the wave during the time particle of the medium complete one vibration, therefore, if  $\lambda$  wave length and T is the time period, then the wave travels a distance  $\lambda$  in time T,

hence wave velocity = Distance/ time

or  $\lambda = V \times T$

or  $V = \lambda / T$

**Q13)** Draw a neatly labeled structure of the human ear and its working.

**Ans 13.**



**Q14)** Give reasons for the following:

(a) Bryophytes are called “amphibians of the plant kingdom.”

(b) Spiders and scorpions are very different from each other but are placed in the same phylum –Arthropoda.

(c) Platyhelminths and Nematodes possess a Pseudocoelom. Write the name of the following:-

(i) Body is segmented

(ii) Reptile which has four chamber heart.

**Ans 14.**

(a) They are found on land but need water to complete their life cycle.

(b) They possess jointed legs.

(c) True internal body cavity is absent

(i) Earth worm

ii) Crocodile

**Q15)** Write the main characteristics of phylum Porifera and Aves give one example of each with its diagram.

**Ans 15.**

<b>Porifera</b>	<b>Aves</b>
Organisms are non motile / mostly marine/having pores/simplest multicellular/diploblastic / canal system/ skeleton/Calcareous or siliceous <b>e.g.</b> Euspongia / spong/ sycon.	Warm Blooded / fore –limbs modified into wings/ adaptation flight / four chambered heart / uricotelic animals / bones are air space light and spongy <b>e.g.</b> Birds

**Q16)** An Element “X” has 13protons, 13electrons and 14 neutrons.

Answer the following questions:

a) What is its atomic number of “X”?

b) Identify the element.

c) What is its valency? What is the number of valence electrons is “X”?

d) What is the type of ion formed by “X”? Why?

e) Name the scientists who discovered electrons and protons.

**Ans 16.** (a) 13

(b) Al

(c) Valency , Valence Electrons = 3

(d) Ion formed by x = Cat ion as it needs to lose 3 electrons to acquire an octate

(e) Discoverer of proton = E Goldstein and that of electron was JJ Thomson.

**Q17)** (a) Describe Bohr's model of an atom.

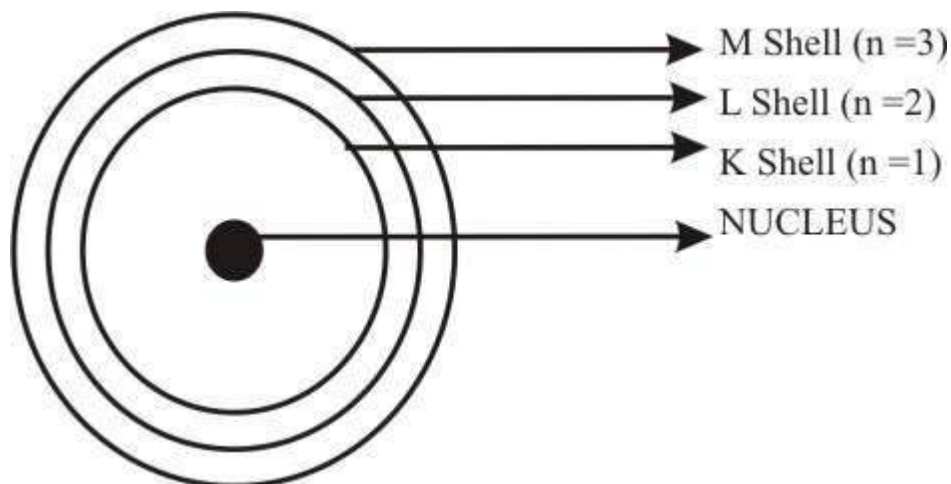
(b) Draw a sketch of Bohr's model of an atom with 3 shells.

(c) What was the drawback of Rutherford's model of an atom?

**Ans 17.**

a) Only certain special orbits called discrete orbits are present in an atom. While revolving in Discrete orbits, the electrons do not radiate energy.

b)



c) The orbital revolution of the electrons is not expected to be stable. Any particle in a circular orbit would undergo acceleration during which charged particles would radiate energy and fall into the nucleus. However this is not so as atoms are highly stable.

**Q18)** (a) Prove the law of conservation of energy for a stone moving vertically down.

(b) A boy of mass 50kg runs up a staircase of 45 steps in 9s. If the height of each step is 15cm, find his power [ $g = 10 \text{ ms}^{-2}$ ]

**Ans 18.**

(a) Consider a ball at a height  $h$  above the ground, say at point A

At A  $\rightarrow$  P.E. =  $mgh$ , K.E. = 0

Total energy =  $mgh + 0 = mgh$

Now let it fall freely from this height

At point B at a height  $h/2$

P.E. =  $mgh/2$ ,

K.E. =  $\frac{1}{2}mv^2 = \frac{1}{2} \times m \times (2gh/2) = mgh/2$

Total energy =  $mgv/2 + mgh/2 = mgh$

At point C just above the ground

P.E. = 0, K.E. =  $\frac{1}{2}mv^2 = \frac{1}{2} \times m \times 2gh = mgh$ ,

Energy at A = Energy at B = Energy at C

(b) Weight of the boy,  $mg = 50 \text{ kg} \times 10 \text{ ms}^{-2}$

= 500N

Height of the staircase,  $H = 45 \times 15 / 100 \text{ m} = 6.75 \text{ m}$

Time taken to climb,  $t = 9 \text{ s}$

Power,  $P = \text{Work done} / \text{time taken}$

=  $mgh / t$

=  $500 \text{ N} \times 6.75 \text{ m} / 9 \text{ s}$

= 375 W.

**Q19)** (a) Define the term, “kinetic energy”.

(b) Derive an expression for kinetic energy for an object of mass “m” moving with a velocity “v”.

(c) A certain force acting on a 20 kg mass changes its velocity from 5m/s to 2 m/s. Calculate the work done by the force.

**Ans 19.**

(a) Kinetic energy is the energy possessed by an object due to its motion

(b) **Derivation:**

Consider an object of mass,  $m$  moving with a uniform velocity,  $u$ . Let it now be displaced through a distance  $S$  when a constant force,  $F$  acts on it in the direction of its displacement.

The work done,  $W$  is  $F \times s$

The work done on the object will cause a change in its velocity.

Let its velocity change from  $u$  to  $v$

Let  $a$  be the acceleration produced.

K.E. =  $W = FS = mas = \frac{1}{2} m (v^2 - u^2)$ , From  $(v^2 - u^2) = 2as$

If  $u = 0$ , K.e. =  $\frac{1}{2} mv^2$

(c)  $W = \text{change in “kinetic energy”} = \frac{1}{2} m (v^2 - u^2)$

=  $\frac{1}{2} \times 20 \times (4 - 25)$

=  $\frac{1}{2} \times 20 \times (-21) = -210 \text{ J}$

**Q20)** (a) What are the greenhouse gases?

(b) Give a diagrammatic representation of the Carbon Cycle in nature.

**Ans 20.**

(a) Green house gases are:

(i)  $\text{CO}_2$

(ii)  $\text{CH}_4$

(iii) Nitrogen Oxide

(iv) Chlorofluoro Carbon

(b) Draw a neat diagram of Carbon Cycle.

