CBSE Class 09

Science

Sample Paper 2 (2019-20)

Maximum Marks: 80

Time Allowed: 3 hours

General Instructions:

i. The question paper comprises three sections - A, B and C. Attempt all the sections.
ii. All questions are compulsory. Internal choice is given in each section.
iii. All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
iv. All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50 - 60 words each.
v. All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80 – 90 words each.
vi. This question paper consists of a total of 30 questions.

Section A

1. Name the three sub-atomic particles in an atom.

2. What is an ion? Give one example.

3. Fish is a cheap source of animal protein for our food. Fish liver oil is rich in vitamin A and D. Basically fisheries are of two types:

   i. **Fin fishery:** It includes capturing, management and exploitation of cartilaginous and bony fishes.
   ii. **Shell fishery:** It includes capturing, management and exploitation of crustaceans (prawns, crabs) and molluscs (oysters, mussels etc.).

   Depending upon the mode of obtaining fish, fisheries are of two types:

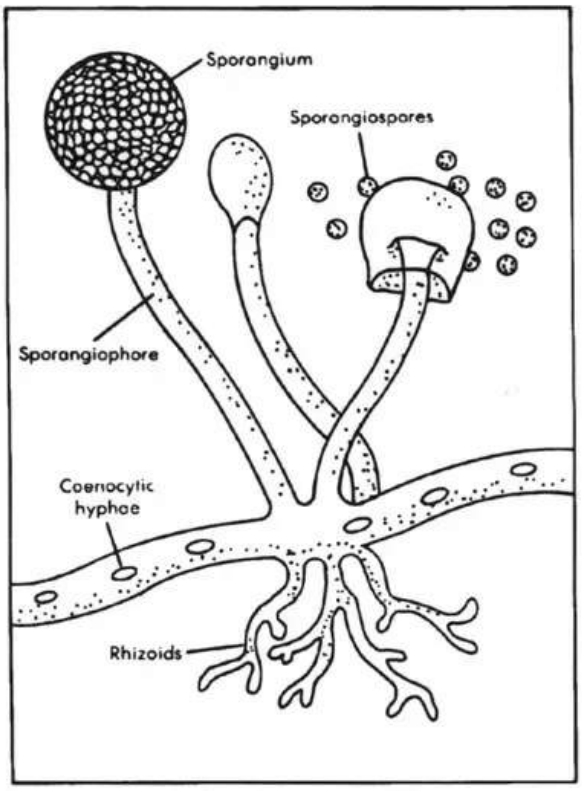
   i. **Capture fishing:** The fish is caught from water, both marine and inland.

ii. **Culture fishing:** It is cultivating, rearing and harvesting of fish. Culture fishery is also called fish farming or pisciculture and aquaculture.

Answer the following question:

i. Mention the two types of fisheries depending upon the mode of obtaining fish.
ii. Which fatty acid is exclusively found in fishes?
iii. Is Rohu is a bony fish or not? In which type fisheries it is used?
iv. Name the vitamin found in fish liver oil.

4. Fungi is a eukaryotic organism that includes microorganisms such as yeasts, moulds, and mushrooms. These organisms are classified under kingdom fungi. The organisms found in Kingdom fungi contain a cell wall and are omnipresent. They are classified as heterotrophs among living organisms. Fungi usually grow in places that are moist and warm enough to support them.



The structure of fungi can be explained in the following points:

- Almost all the fungi have a filamentous structure except yeast cells.
- They can be either single-celled or multicellular organisms.
- Fungi consist of long thread-like structures known as hyphae. These hyphae together form a mesh-like structure called mycelium.
- Fungi possess a cell wall that is made up of chitin and polysaccharides.
- The cell wall comprises of protoplast which is differentiated into other cell parts such as cell membrane, cytoplasm, cell organelles and nuclei.
- The nucleus is dense, clear, with chromatin threads. The nucleus is surrounded by a nuclear membrane.

By following the above-given facts, answer the following questions:

i. Name the chemical which is found in the cell wall of fungi.
ii. Mention the basic structure of fungi.
iii. Give some examples of fungi.
iv. What is the ideal condition for their growth?

5. If the initial velocity is zero then the force acting is _____.

a. Acceleration

b. Both

c. Retarding

d. None

OR

A force of 7 kg-wt acts on a body of mass 10 kg calculates the acceleration produced.

a. $10\ \mathrm{ms}^{-2}$
b. $7\ \mathrm{ms}^{-2}$
c. $8\ \mathrm{ms}^{-2}$
d. $6\ \mathrm{ms}^{-2}$

6. If the bulbs of 60 W and 40 W are connected in series to a 220 V source the bulb which glows brighter is

   a. 60 W
   b. Depends on the make of the bulb
   c. Both glow equally bright
   d. 40 W

7. The heart does 1.5 J of work in each heartbeat. How many times per minute does it beat if its power is 2watt?

   a. 80 times

   b. 60 times

   c. 8 times

   d. 10 times

8. In the experiment of finding speed of a pulse propagated through a slinky, the pulse is produced.

   a. by giving a jerk to slinky in a direction perpendicular to its length.

b. by giving a jerk to slinky in vertically upward direction.

c. by pushing the slinky so as to compress it.

d. by pulling the slinky towards us.

OR

Two objects of masses m_1 and m_2 are dropped in vacuum from a height above the surface of the earth (m_1 is greater than m_2). Which one will reach the ground first and why?

9. Vegetables and fruits are rich in-

   a. Proteins

   b. Fats

   c. Carbohydrates

   d. Vitamins & minerals

10. To prepare a colloidal solution of starch, we should :

    a. add thin paste of starch to hot water with stirring

    b. add starch powder to cold water and boil

    c. add starch powder to boiling water and cool

    d. heat starch, add it to cold water and then bring it to boil

11. Lipids in the diet**:**

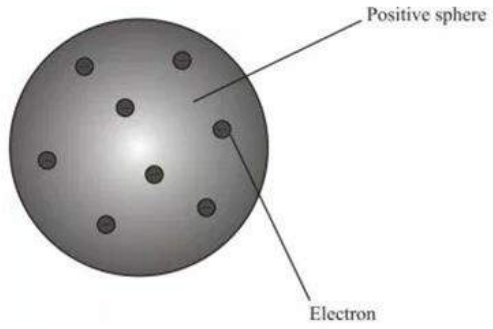
    a. Are always dangerous.

    b. Increase the bulk.

    c. Make the food less tasty.

    d. Enable the absorption of some vitamins.

12. The following figure shows the atomic model of _____.



a. Rutherford

b. J.J. Thomson

c. Chadwick

d. Bohr's

OR

The melting point of a substance is defined as the constant temperature at atmospheric pressure when:

a. Both the solid & liquid exist together

b. The solid starts melting.

c. The solid is completely changed into liquid.

d. Only liquid is present

13. **Assertion:** Gaseous state of ammonia is not regarded as vapours.

Reason: As the volume of a substance increases, its density increases.

a. Both assertion(A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

c. Assertion (A) is true but reason (R) is false.

d. Assertion (A) is false but reason (R) is true.

14. **Assertion:** The speedometer of an automobile measure the average speed of the automobile.

    Reason: Average velocity is equal to total displacement per total time-taken.

    a. Both assertion(A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

    b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

    c. Assertion (A) is true but reason (R) is false.

    d. Assertion (A) is false but reason (R) is true.

15. i. White leghorn is an exotic breed of an animal. Name the animal.
    ii. Name the two vitamins, which are added in the poultry feed.
    iii. What are exotic breeds in terms of cattles?

16. A health food store has a large display of bracelets made of copper metal. The storekeeper claims that the copper atoms from the bracelet diffuse into the body and the wearer is protected against rheumatoid diseases. Kuber wants to buy a bracelet for his grandmother who is suffering from arthritis. But his friend Ramesh suggests him against it. He says that it is a superstitious belief and wearing any metal on the body does not cure someone of the disease.
    Answer the following questions based on the above information:

    i. Do you think that Kuber should agree to Ramesh's advice and not buy the bracelet? Give one reason.
    ii. What values are displayed by Ramesh through his suggestion?
    iii. Suggest one activity to promote these values.

OR

Hydrogen has three isotopes. State the composition of their nuclei and write their mass number. Also represent them in the form of symbols.

17. If a huge force acts on an object, but the displacement of the object is zero then what can we say about the work done?

18. State the reason for the following:

    i. Excess burning of coal causes greenhouse effect.
    ii. Soil is a mixture,
    iii. Temperature ranges from - 190 to 110° on the surface of the Moon.

OR

Anurag's friend visits his house for the weekend. He observes the following undesired practices without much care for water:

a. Plants are watered 2-3 times a day excessively.
b. Taps are often running even when not required.
c. Cars are being washed by wrong methods leading to lot of wastage of water.

He talks to Anurag about the wrong practices resulting in wastage of water and tells him that water should be used judiciously.
Answer the following questions based on the above information:

i. Which values are being neglected in the activities in the above situation?
ii. What are the adverse effects of the activities observed at Anurag's house?
iii. How can the values related to minimisation of wastage of water in everyday life be promoted?

19. Do you agree "A cell is a building unit of an organism". If yes, explain why.

20. If a potted plant is covered with a glass jar, water vapours appear on the walls of the glass jar. Explain why?

21. Classify the following as chemical or physical changes:-

    1. Cutting of trees

2. Melting of butter in a pan
3. Rusting of almirah
4. Boiling of water to form steam
5. Passing of electric current through water and the water breaking down into hydrogen and oxygen gases
6. Dissolving common salt in water
7. Making a fruit salad with raw fruits
8. Burning of paper and wood

22. A ball is thrown vertically upwards with a velocity of 49 m/s. Calculate

    i. the maximum height to which it rises.
    ii. the total time it takes to return to the surface of the earth.

23. i. Explain, why is it difficult to walk on sand?
    ii. Why is the recoil of a heavy gun, on firing, not so strong as that of a light gun using the same cartridge?

24. If a body falls from a height bounces from the ground and again goes upwards with loss of a part of its energy.

    i. How will its potential energy change?
    ii. What are various energy conversions taking place?
    iii. What will be its ultimate energy?

OR

On the basis of the number of protons, neutrons and electrons in the samples given below identify

i. the cation.
ii. the pair of isobars, and
iii. the pair of isotopes.

Sample	**Protons**	**Neutrons**	**Electrons**
A	17	18	16
B	18	19	18

C	17	20	17
D	17	17	17

25. Which separation techniques will you apply for the separation of the following?

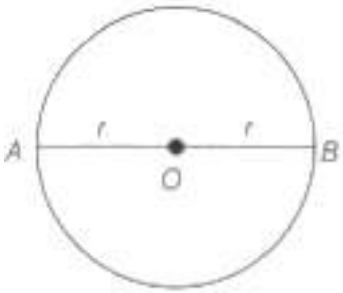
    i. Sodium chloride from its solution in water.
    ii. Ammonium chloride from a mixture containing sodium chloride and ammonium chloride.
    iii. Small pieces of metal in the engine oil of a car.
    iv. Different pigments from an extract of flower petals.
    v. Butter from curd.
    vi. Oil from water.
    vii. Tea leaves from tea.
    viii. Iron pins from sand.
    ix. Wheat grains from husk.
    x. Fine mud particles suspended in water.

OR

Classify each of the following as a physical or a chemical change. Give reasons.

    i. Drying of a shirt in the sun.
    ii. Rising of hot air over a radiator.
    iii. Burning of kerosene in a lantern.
    iv. Change in the colour of black tea on adding lemon juice to it.
    v. Churning of milk cream to get butter.

26. i. What is the importance of a reference point?
    ii. Is it possible that the train in which you are sitting appears to move while it is at rest?
    iii. Odometer measures the displacement of the vehicle. Correct this statement.
    iv. A particle is moving in a circular path of radius r. What will be the displacement after half a circle?



v. In which condition, will the magnitude of the displacement be equal to the distance travelled by an object?

27. Explain the significance of the following:

i. Hair-like structures on epidermal cells.
ii. The epidermis has a thick waxy coating of cutin in desert plants.
iii. Small pores in epidermis of leaf.
iv. Numerous layers of epidermis in cactus.
v. Presence of a chemical suberin in cork cells.

28. Fill in the table with appropriate term

Disease	Microbe	Target Organ	Mode of Transmission
Meningitis	Virus	_ (i) _	Faecal contamination
Hepatitis	_ (ii) _	_ (iii) _	Contaminated water
_ (iv) _	Bacteria	Lungs	_ (v) _
Ringworm	Fungus	_ (vi) _	Indirect contact
_ (vii) _	Virus	Lungs	_ (Viii) _
Dengue fever	_ (ix) _	Whole-body	_ (x) _

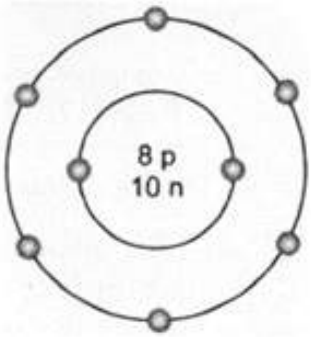
OR

i. Write one point difference between each of the following:
   a. Amphibians and reptiles
   b. Aves and mammals
   c. Gymnosperms and angiosperms
ii. Classify the following into respective Phylum, class: jellyfish; earthworm;

cockroach; rat.

29. i. Prove that, if the earth attracts two bodies placed at the same distance from the centre of the earth with equal force, then their masses will be the same.
    ii. Mathematically express the acceleration due to gravity in terms of mass of the earth and radius of the earth.
    iii. Why is G called a universal constant?

30. The given figure depicts the atomic structure of an atom of an element 'X'. Write the following information about the element 'X'.



a. Atomic number of 'X'
b. Atomic mass of 'X'
c. Valence electrons
d. Valency of 'X'
e. 'X' should be metal or non-metal.

OR

A metal weighing 6g formed diatomic oxide upon heating in the presence of air. The oxide thus formed weighed 10g. Write the chemical name of the compound.

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Science

Sample Paper 2 (2019-20)

Solution

Section A

1. Matters are made of tiny particles called atom. Atom is made of three particles; electron, proton and neutron. These particles are called fundamental particles of an atom or subatomic particles.

2. An ion is a positively or negatively charged atom (or group of atoms). For example:,. $PO_4^{3-}, H^+ Pb^+$

3. i. The two types of fisheries depending upon the mode of obtaining fish are capture and culture fisheries.
   ii. Omega 3 fatty acid is exclusively found in the fishes.
   iii. Yes, Rohu is a bony fish. It can be used in fin fishery.
   iv. The vitamins found in fish liver oil is Vitamin A and D.
4. i. The cell wall is made up of chitin.
   ii. It is made up of thread-like structures called hyphe. The network of such structures together forms mycelium.
   iii. Some common examples are yeast, mushroom, bread moulds.
   iv. They are mostly found in a moist environment and warm places.
5. (c) Retarding

   Explanation: Retarding depends on the final velocity.

   If final velocity is less then initial velocity then there will be retardation and viceversa.

   OR

   (b) $7\ ms^{-2}$ Explanation: Force = 7 kg-wt = 7×10 = 70 N, mass = 10 kg. therefore, acceleration produced in the body = F/a = 70/10
   = 7 ms-2.
6. (d) 40 W **Explanation:** In series 40W bulb glow brighter as

P = VI (P – power)

$P = I^2R$ (V= IR)

therefore power is directly proportional to resistance. the resistance of 40w bulb is higher.

So it will have more power and it will glow brighter.

7. (a) 80 times

   Explanation: Total work = p x t =120 J ,

   Number times heartbeat in 1 min. = total work done / work done in each beat

   = $\frac{120}{1.5}$ = 80 times

8. (b) by giving a jerk to slinky in vertically upward direction.

   Explanation: A transverse wave is developed. A wave or pulse is generated in the slinky. While moving the pulse through the slinky, a particular position of the wave is noted and the timer is started.

OR

Both will reach the ground at the same time because acceleration due to gravity is independent of the masses of freely falling bodies.

9. (d) Vitamins & minerals

   Explanation: Vegetables and fruits are rich in vitamins and minerals that increase the disease-fighting ability and provide minerals and vitamins.

10. (a) add thin paste of starch to hot water with stirring

    Explanation: The colloid of starch is prepared by dispersion method. 2-3 g of powdered/crushed starch is dissolved in 3- 4 ml of water to make a thin paste. This paste is added to100 ml of boiling water while stirring. Allow the solution to cool and filter. The filtrate is colloid of starch.

11. (d) Enable the absorption of some vitamins.

    Explanation: Lipids are an important component of living cells. Together with carbohydrates and proteins, lipids are the main constituents of plant and animal cells. Lipids in the diet enable the absorption of some vitamins from the diet. They also provide energy in the absence of carbohydrates and proteins.

12. (b) J.J. Thomson

Explanation: J. J. Thomson proposed his model of an atom in 1903.

1. An atom consists of a sphere of positive charge with negatively charged electrons embedded in it.

2. The positive and negative charges in an atom are equal in magnitude, due to which atom is electrically neutral.

OR

(a) Both the solid & liquid exist together
Explanation: Melting point is defined as the constant temperature at which the solid and the liquid phases of substance coexist.

13. (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
Explanation: A substance which is liquid at room temperature, then its gaseous state is regarded as vapour. Ammonia is gas at room temperature , hence its gaseous state is not regarded as vapour.
14. (d) Assertion (A) is false but reason (R) is true.
Explanation: Speedometer measures instantaneous speed of automobile.
15. i. It is a popular exotic breed of hen that produces long, white eggs and requires less amount of feed.
ii. Vitamin-A and vitamin-K are added in the poultry feed.
iii. Exotic breeds are not native to that place, e.g. Brown Swiss and Jersey Swiss are the exotic breeds of cow in India.

16. (i) Yes, Because it is a superstition and not a scientifically proven fact.
(ii) Awareness, scientific attitude, helpfulness.
(iii) Group discussion on value clarification/Roleplay.

OR

Isotopes of hydrogen are: Protium ${}_1H^1$ (1 proton, 0 neutrons), Mass no. :1,

Deuterium ${}_1H^2$ (1 proton, 1 neutron), Mass no.: 2

Tritium ${}_1H^3$ (1 proton, 2 neutrons), Mass no.: 3

17. Work done on the body is defined as the force applied on the body producing a net displacement on the body.
    Work Done = Force $\times$ Displacement
    If the application of force produces no displacement the work done on the body is zero.

18. i. Excess burning of coal adds a lot of CO_2 to the atmosphere. Carbon dioxide is a greenhouse gas, which allows solar radiation to strike the Earth's surface, but prevents the escape of long-wave radiations from the Earth's atmosphere. Thus, causing the greenhouse effect.
    ii. Soil is a mixture as it consists of particles (sand, silt, clay and humus) of different types that do not get dissolved in water but settle down in layers, depending on their size.
    iii. The Moon is at the same distance from the sun as the Earth. But there are very cold and hot temperature variations, from - 190° C to 110° C on the Moon. This is because the Moon has no atmosphere. The atmosphere plays a very important role in temperature control. It checks the excessive rise of temperature during the day and excessive cooling during the night.

OR

    i. Judicial use of natural resources, management of natural resources.
    ii. Wastage of water results in reduced ground water, less water for drinking.
    iii. - Turning off water taps when not in use, Repair of leaking taps, Watering plants with a watering can once a day, washing/cleaning cars with a dry/wet cloth instead of water running through a pipe, etc.
    - Creating consciousness about limited water resources and its judicious use.

19. An organism is made up of various organ systems like digestive system, nervous system, etc. These organ systems, in turn, are made up of various organs which are made up of tissues. Also, tissues are a group of cells performing the same function. Hence, a cell is the building unit of an organism.
    Cell -> tissue -> organ -> organ system -> organism

20. When a potted plant is covered with a glass jar, water lost by the plant appears on the

walls of the glass jar as water vapours. Plants always lose water to the atmosphere from the surface of the leaves. This process is known as transpiration. Water reaches leaves by xylem vessels, where evaporation takes place through the stomata.

21.

1.	Cutting of trees	Physical change
2.	Melting of butter in a pan	Physical change
3.	Rusting of almirah	Chemical change
4.	Boiling of water to form steam	Physical change
5.	Passing of electric current through water and the water breaking down into hydrogen and oxygen gases	Chemical change
6.	Dissolving common salt in water	Physical change
7.	Making a fruit salad with raw fruits	Physical change
8.	Burning of paper and wood	Chemical change

22. i. Given, initial velocity, u = 49 m/s

At the maximum height, velocity becomes zero.

$\therefore$ Final velocity, v = 0

From the third equation of upward motion,

$v^2 = u^2 - 2gh$

$0 = (49)^2 - 2 \times 9.8 \times h$

$\therefore h = \frac{49^2}{2 \times 9.8} = 122.5m$

Maximum height attained = 122.5 m

ii. Time is taken by the ball to reach the maximum height.

From the first equation of motion, v = u - gt

or 0 = 49 - 9.8 $\times$ t

$t = \frac{49}{9.8} = 5s$

For the motion against gravity, the time of descent is the same as the time of ascent. So, time taken by the ball to fall from maximum height is 5 s.

$\therefore$ Total time taken by the ball to return to the surface of the earth = 5 + 5 = 10 s

23. i. While walking on sand, the sand gets pressed down, impacting less reaction force on the person.
    ii. The mass of the heavy gun is higher. So, its recoil velocity is less.
24. i. When it strikes ground, its PE is zero and after bouncing, its potential energy increases gradually.
    ii. At the time it strikes the ground, it has maximum KE and after it bounces, its KE starts changing into potential energy.
    iii. The ultimate or total energy remains constant at any point of time during the motion.

OR

i. Sample A has more protons than electrons. Hence, it is a cation.
ii. Sample B and C have same mass number (Mass number = Number of protons + number of neutrons = 37) but different atomic numbers (i.e. 18 and 17respectively). Hence, they are a pair of isobars.
iii. Samples C and D have same atomic number but different mass numbers. Hence, they are a pair of isotopes.

25. i. Evaporation and crystallization
    ii. Sublimation
    iii. Filteration
    iv. Chromatography
    v. Centrifugation
    vi. By using separating funnel
    vii. Filteration
    viii. Magnetic separation
    ix. Winnowing
    x. Loading and decantation

OR

i. It is a physical change because moisture in the shirt is converted from its liquid state to gaseous state because of the heat of the Sun.
ii. It is a physical change because water in the radiator is converted from a liquid state to gaseous state.
iii. It is a chemical change because combustion of kerosene occurs and new products are formed.
iv. It is a chemical change because there is a reaction between citric acid present in lemon and the compounds of the tea resulting in the formation of new products.
v. It is a physical change because the cream suspended in milk is separated by churning (centrifugation).

26. i. Reference point is important because it states the position of object correctly, as motion is relative in nature.
ii. Yes, if other train is moving in adjacent line to the train we are sitting, then it seems that our train is moving in the opposite direction.
iii. No, Odometer measures distance covered by a vehicle.
iv. After half the circle, the particle will reach the diametrically opposite point, i.e. from point A to B.
∴ Displacement after half circle = AB = r + r = 2r.
v. If an object moves in a straight line from one point to another, then the magnitude of displacement and distance will be equal.

27. i. They increase the total absorptive surface area and help in absorption.
ii. Cutin has a waterproof quality and helps in preventing water loss due to transpiration. It also protects plants from the entry of pathogens, etc.
iii. They help in the gaseous exchange and transpiration process.
iv. To prevent water loss.
v. Suberin makes cork cells impervious to gases and water.

28. i. Brain
ii. Virus
iii. Liver
iv. Tuberculosis
v. Air contaminated by droplets of cough, sneeze, etc.
vi. Skin

vii. Influenza
viii. Contact and droplet infection.
ix. Virus
x. Vector mediated transmission, i.e. the bite of Aedes mosquito.

OR

i. The differences are:
   a. Amphibians have moist, smooth and glandular skin while reptiles have a scaly non-glandular, dry and keratinized skin.
   b. Bones of Aves are hollow or pneumatic, while in mammals, bones do not have air cavities.
   c. In gymnosperms, seeds are naked while in angiosperms seeds are enclosed in a fruit wall.

ii. The given animals are classified as follows:
Jellyfish: Phylum-Coelenterata
Earthworm: Phylum-Annelida
Cockroach: Phylum-Arthropoda
Rat: Phylum-Chordata, Class-Mammalia

29. i. Let the two bodies have masses m_1 and m_2 and they are placed at the same distance R from the centre of the earth. According to the question, if the same force acts on both of them, then
$F_1 = \frac{GMm_1}{R^2}$ ....(i)
and $F_2 = \frac{GMm_2}{R^2}$ ....(ii)
As, $F_1 = F_2$
Hence, $\frac{GMm_1}{R^2} = \frac{GMm_2}{R^2}$
So, $m_1 = m_2$, their masses will be the same.

ii. Mathematically, $g = \frac{GM}{R^2}$
Where, g = acceleration due to gravity
G = universal gravitational constant, M = mass of the earth and R = radius of the earth

iii. G is known as the universal gravitational constant because its value remains the same all the time everywhere in the universe, applicable to all bodies whether

celestial or terrestrial.

30. a. Atomic number of 'X' = Number of protons in 'X' = 8
    b. Atomic mass of 'X' = Number of protons in 'X' + Number of neutrons in 'X' = 8 + 10 = 18 u
    c. Valence electrons = Electrons in outermost shell = 6
    d. Valency = Number of valence electrons (for 4 or lesser valence electrons); Valency = 8 - Number of valence electrons (for more than 4 valence electrons)
    Therefore, valency of 'X' = 8 - 6 = 2
    e. 'X' should be non-metal because there are six valence electrons, hence it will tend to gain two more electrons to complete its outermost shell in order to achieve a noble gas configuration.

OR

Suppose the metal is M. The oxide being diatomic, should have the formula as MO.
The amount of oxygen present in the oxide = 10 - 6 = 4g

$\because$ 32g O_2 = 1 mol

$\therefore$ 4g O_2 = 0.125 mol

The reaction for the formation of oxide can be written as

$M + O_2 \longrightarrow MO$

Upon balancing we get,

$2M + O_2 \longrightarrow 2MO$

$\because$ 1 mole O_2 reacts with 2 moles of metal

$\therefore$ 0.125 mole O_2 reacts with 0.25 mole of metal

Hence, we get 0.25 mole of metal = 6g
or 1 mole of metal = 24g
Thus, the metal is magnesium and oxide is magnesium oxide (MgO).