

Rajasthan Board Class 10 General Science 2019 Question Paper with
Solutions

Section-A

1. **Which teeth are used in tearing and chopping of the food?**

Answer: Canines are used to tear the food and Incisors are used for chopping pieces of food.

2. **Who classified the blood into different groups?**

Answer: Karl Landsteiner classified the blood into different groups.

3. **Write the full form of C.N.G.**

Answer: The full form of C.N.G is Compressed Natural Gas.

4. **Write the definition of potential energy.**

Answer: Potential energy is the energy held by an object because of its position relative to other objects, stresses within itself, its electric charge, or other factors. It is a form of energy that results from the alteration of its position or state.

5. **Give one example of a renewable resource.**

Answer: Solar energy and biofuels are examples of renewable energy.

6. **Write the scientific name of a coffee plant.**

Answer: Coffea canephora is the scientific name of the coffee plant.

7. **Define genetic diversity.**

Answer: Genetic diversity is defined as genetic variability present within species. Genetic diversity is the product of recombination of genetic material in the process of inheritance. It changes with time and space. Different breeds of dogs or different varieties of roses are all examples of genetic diversity.

8. **Which element takes part in the formation of haemoglobin in the blood?**

Answer: Iron is the element that takes part in the formation of haemoglobin in the blood.

9. **Which antibody participates in allergic reactions?**

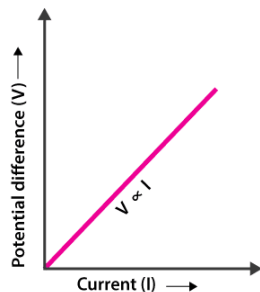
Answer: IgE antibody, the primary antibody that participates in allergic reactions.

10. Which antigen is found on the surface of the red blood corpuscles in addition to “A” and “B”?

Answer: A is the antigen found on the surface of the RBC's with blood group A, while the B blood group will have B antigen. Same ways, for AB blood group, both antigens A and B will present. However, for Blood group, there will not be any antigen as there is no antigen O.

11. Draw a graph between the potential difference(V) and electric current(I) according to ohm's law.

Answer:



Section-B

12. What is the name of the natural satellite of earth? How did this satellite originate? Mention its importance for the earth. Give two points.

Answer: The [moon](#) that we see almost every night is a natural satellite of the Earth. This means that the moon revolves around the earth on a steady path. The gravitational attraction between the earth and the natural satellite holds it in its orbit even as the moon revolves around the earth. Now, the giant impact hypothesis is one of the theories for the origin of the moon. As per the theory, a Mars-sized object had hit Earth obliquely some 4.5 billion years ago, thus ejecting many materials that created a disk around Earth. From this disk, a single huge moon was formed. Now, for its importance for the earth. The moon is important, as it affects the earth's climate as well as the tides. The moon also reflects the light from the sun.

13. Explain the process of fossil formation. By which method can the age of a fossil be determined?

Answer: Carbon dating method is used to determine the age of the fossil. Fossils are the remains or traces of ancient life that have been preserved by natural processes, from spectacular skeletons to tiny seashells. Imprints, tracks and trails can also become fossilised, like dinosaur footprints or worm burrows. These are called trace fossils. Hence, a fossil can be defined as, “A remnant, impression, or trace of an organism of past geologic ages that has been preserved in the earth's crust”. Learn more about [fossil formation](#) here.

14. Write the name of the first astronaut. Which facilities are available to solve the problem of food and living in Weightlessness on the International Space Station?

Answer: The name of the first astronaut was Yuri Gagarin. Astronauts are sent freeze-dried, dehydrated, pre-cooked meals at the start of the journey. Freeze drying food removes close to 97% of the water from the food, making it lighter and easier to send more food to space. The astronauts need to add water and heat the food before eating it. In space, exercising is also essential. Once awake, astronauts have to start their morning routine of brushing, using the toilet and having a bath. In space, water does not flow like a liquid. Instead, it forms round, bubble-like beads. Astronauts use a few beads of water to brush (their toothbrush and toothpaste remain the same as on earth) and then spit out the toothpaste into a paper towel or sometimes swallow it (not recommended for earthlings). Having a bath in space is not as comfortable as on earth because there is no gravity to drain the water off your body. Astronauts use rinseless shampoos, liquid soap, and beads of water to cleanse themselves and wipe off excess water with a towel.

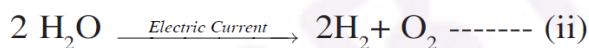
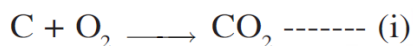
15. (a) Why should high beams of lights be used in highways?
 (b) For safe driving, which type of mirrors are used in headlights and rearview mirrors of vehicles?

Answer: (a) Highways are big wide roads, and hence high beam of lights are used to see carefully.
 (b) Concave mirrors are used in headlights and rearview mirrors of vehicles for safe driving.

16. (a) Write the name of the pathogen of Naru (Bala) disease.
 (b) Write the name of two alkaloids found in opium.
 (c) Write the name of the disease caused by chewing gutkha.

Answer: (a) The pathogen of Naru (Bala) disease is *Dracunculus medinensis*.
 (b) Morphine and Codeine are two alkaloids found in opium.
 (c) Oral cancer is a disease caused by chewing gutkha.

17) In the following chemical equations-



- Identify equations (i) and (ii) and write it types
- Write any one difference between equation (i) and (ii)
- Write one difference between catalytic inhibitor catalytic promoter

Answer: (a) (i) is a combination reaction in which carbon and oxygen combine to form carbon dioxide. Meanwhile, equation (ii) is a decomposition reaction in which one reactant breaks down into two or more products.
 (ii) The critical difference between combination and decomposition reaction is that in combination reaction, two reactants combine to give a single product. In contrast, decomposition reaction

involves the breakdown of a single compound into two or more products. A decomposition reaction can be both endothermic and exothermic.

(iii) Catalytic inhibitors or promoters are not catalysts, but they affect the efficiency of catalysts and influences the rate of reaction. Promoters boost the efficiency of the catalyst, thus increasing the rate of the reaction. Alternatively, a catalyst inhibitor will inhibit the function of the catalysts, thus decreasing the rate of the reaction.

18. How does forest protect fertile soil? Write four measures adopted for the protection of forests.

Answer: Forests help to stabilise the soil, prevent further soil erosion as well as it enhances the land's capacity to store the water, moderate air and soil temperatures and so on. Meanwhile, effective forest management practices such as the measures to introduce or maintain forest cover on erosion-prone soils and run off pathways help to bring down the risk of soil erosion and landslides. Forest restoration in the dry lands is vital to protect the soil. Meanwhile, given here are some measures to protect the forests:

- One major cause of deforestation is the cutting of trees. So, regulated and planned cutting of trees helps to reduce this.
- Proper utilisation of the forest products and resources is another method to protect the forests.
- Controlling the wildfire is another measure to protect the forests.
- The Indian government has also passed specific rules and policies related to environment and biodiversity.

19. The ancient grantha "Charak Samhita" has been written in which language? Explain the knowledge of charak about genetics.

Answers: The ancient grantha "Charak Samhita" was written in Sanskrit. Acharya Charak, famous as a great physician of the time, was also the Father of medicine. He was considered as the encyclopaedia of Ayurveda medicine. Born 300 BC, Acharya Charak was one of the key contributors to Ayurveda's ancient art and science, medicine and lifestyle system developed in Ancient India. He has excellent knowledge of genetics. He was also the first doctor to give the concept of digestion, metabolism and body immunity. As per him, the three primary defects in the functioning of the human body includes Pitt, Vaat and Kaf. Imbalance of these three could cause various diseases. Some 200 Before Christ, he wrote one of the ancient surviving books on ancient medicine, the Charak Samhita. He also discussed the principles of Charak.

20. (a) Write the name of one monomer used in terylene.

(b) Write the structural formula for marsh gas.

(c) Write I.U.P.A.C. name of $\text{CH}_3\text{-CH-CH}_2\text{-CH=CH}_2$



Answer: (a) One monomer of terylene is Terephthalic acid (1,4 benzene dicarboxylic acid)

(b) Marsh gas is also known as methane. It has a structural formula of CH_4 , where one carbon has bonded with four hydrogens using a single covalent bond.

(c) Chlorocyclopentane is the I.U.P.A.C name for $\text{C}_5\text{H}_9\text{Cl}$.

21. What are biomedical wastes? Please mention the name of two diseases caused by them. Explain the process of their disposal by incineration method.

Answer: Biomedical waste is the hospital waste or any waste, which consists of infectious (or potentially infectious) materials. These wastes are generated from biological or medical sources or from activities that are related to prevention, diagnosis or treatment of diseases. This includes surgical items, pharmaceuticals, blood, body parts, wound dressing materials, needles and syringes. HIV, Tuberculosis, Pneumonia are some diseases that are caused by the improper management of biomedical waste disposal. Now, for waste disposal using the incineration method. In this process, the waste is fed to a combustion chamber, where the combustion air begins to dry and facilitates waste volatilization. Thus, carbon dioxide and other excess gases are released into the atmosphere. The second type of incineration method is the excess air process.

Part -C

- 22. (a) Which nutritive element is found in abundance in fish?
(b) Give two examples of freshwater fishes.
(c) What is their diet?
(d) How maximum production of fishes is done in ponds?**

Answer: (a) Calcium is one nutrition found in abundance in fish.
(b) Katla and Rohu are examples of freshwater fishes.
(c) Fishes will eat the plants and numerous parasites found in the water
(d) [Fish farming](#), the main form of aquaculture involves raising fishes commercially in tanks or enclosures such as fishponds, to be sold as food.

- 23. Explain Mendel's Law of Dominance with example.
Write any two importance of Mendel's laws of inheritance.**

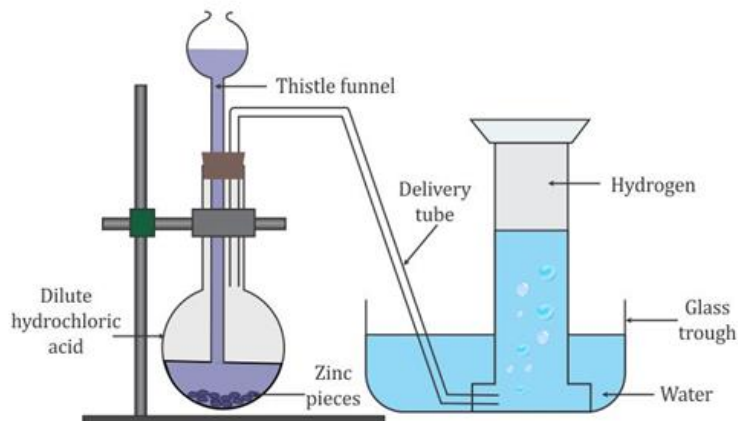
Answer: [Mendel's Law of Dominance](#) states the following --"When parents with pure, contrasting traits are crossed together, only one form of trait appears in the next generation. The hybrid offspring will exhibit only the dominant trait in the phenotype." For example, if one parent has two copies of allele X – the dominant allele, and the other parent has two copies of allele x – the recessive allele, in that case, the child inherits Xx genotype exhibiting the dominant phenotype. We call a trait to be dominant when it is always expressed and appears in the offspring. Dominance illustrates the equation between the two alleles. An allele is said to be dominant if the offspring inherits two distinct alleles from each of the two parents and only one allele is evident in the offspring through its phenotype. Also, learn more about the significance of [Mendel's laws of inheritance](#), here.

- 24. (a) Give reasons for the following statements:**
(i) Milk of magnesia is used for the treatment of acidity in the stomach
(ii) Industrial development of any country is measured based on consumptions of sulphuric acid.
- (b) Draw a labelled diagram for preparation of hydrogen gas.**

Answer: (a) (i) Milk of Magnesia [$Mg(OH)_2$] is used for the treatment of acidity. Because it is basic in nature, it is used to neutralise the effect of HCl(Hydrochloric acid) in the stomach, providing relief.

(b) Yes, it is true. Sulphuric acid, the largest-volume industrial chemicals produced in the world, is used in everything we consume. It is used in batteries, ore processing, paint, as fertiliser, steel production or water treatment. It is also a building block for various products such as nylon, fertilisers - especially phosphate fertilisers from wet-process phosphoric acid, and we even use it to pickle our food.

(b)



Preparation of Hydrogen gas

25. Explain the construction and the working of alternating current generator.

Answer: AC generator, also known as alternators, is a machine that converts mechanical energy into electrical energy. The generated electrical energy is in the form of an alternating current sinusoidal output waveform. The mechanical energy is usually supplied by steam turbines, gas turbines, and combustion engines.

26. (a) A person of 75 kg climbs up to a height of 5 m in 25 seconds. Calculate the power consumed by the person. ($g = 10 \text{ m/s}^2$).

(b) A block of 9 kg is moving with a velocity of 4 m/s on a frictionless surface. The block comes into rest by compressing the spring. If the spring constant is $4 \times 10^4 \text{ N/m}$, then find the compression in the spring.

Answer: (a) Given mass (m) = 75 kg

Height (h) = 5 m

Acceleration due to gravity (g) = 10 m/s²

Time interval (t) = 25 seconds

Then, to calculate power (P) = ?

Apply the formula $W = m g h = 75 \times 10 \times 5 = 3750 \text{ Joule}$

Then $P = W / t = 3750 / 25 = 150 \text{ Joule / sec}$

Hence, the power is 150 Joule/ sec.

(b) Apply the formula from the law of conservation of energy $P.E = K.E$

That is P.E = K.E= $\frac{1}{2} p x^2 = \frac{1}{2} m v^2 = x^2 = mv^2 /$
So, $x^2 = 9 \times 4 / (4 \times 10^4)$
And, $x = \sqrt{9 \times 4 / 40000} = 3 \times 2 / 200 = 3/100$

27. What do you mean by biodiversity? Explain any two importance of biodiversity.

Answer: Biodiversity is the variation among living organisms from different sources including terrestrial, marine and desert ecosystems, and the ecological complexes of which they are a part. Biodiversity holds ecological and economic significance. It provides us with nourishment, housing, fuel, clothing and several other resources. It also extracts monetary benefits through tourism. Therefore, it is very important to have a good knowledge of biodiversity for a sustainable livelihood.

Or

What do you mean by genetic biodiversity? Explain any two reasons for threats to biodiversity.

Answer: It refers to the variations among the genetic resources of the organisms. Every individual of a particular species differs from each other in their genetic constitution. That is why every human looks different from each other. Similarly, there are different varieties of the same species of rice, wheat, maize, barley, etc. Human activities have caused the loss of biodiversity, which has led to sudden changes in climate, causing a significant threat to biodiversity. There has also been an increased demand for natural resources along with the growing population leading to more waste generation. Some major causes that have resulted in the loss of biodiversity are mentioned below:

1. Hunting of the wild animals for commercialisation of their products had been a significant reason for the loss of biodiversity. Since the year 2013, more than 90 rhinos were killed by the poachers for their horns, and as per the records of 2016, 9 Indian Rhinos have been killed in Kaziranga National Park of Assam.
2. The exploitation of the medicinal plants for several laboratory purposes has resulted in the extinction of these species. Also, several animals are sacrificed for various research in science and medicine.
3. Natural calamities like floods, earthquakes, forest fires also lead to the loss of biodiversity.
4. Air pollution has a major role in the loss of biodiversity. Rapid cutting down of the trees has resulted in the increase of carbon dioxide in the atmosphere leading to climate change. As a result, there has been an increase in the land and ocean temperature, leaving an adverse impact on species.

Section-D

- 28. (a) What is excretion?**
(b) Explain the mechanism of glomerular formation in urine formation.

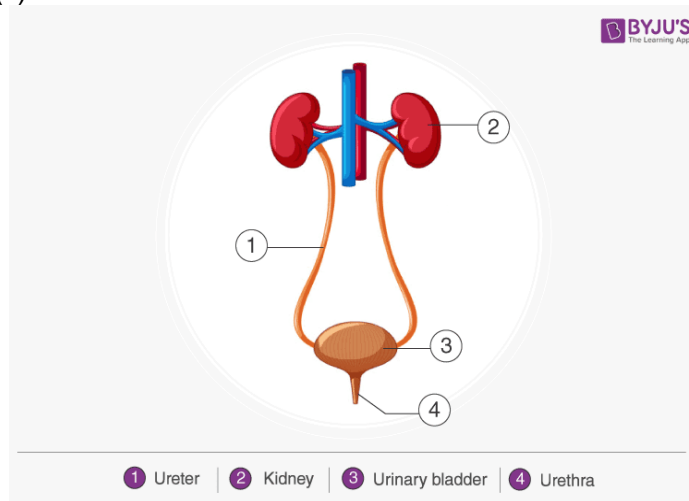
(c) Draw a labelled diagram of the human excretory system.

Answer: (a) Excretion is a biological process, which plays a vital role by eliminating toxins and other waste products from the body. In plants and animals, including humans, as part of metabolism, many waste products are produced. Plants usually excrete through the process of transpiration and animals excrete the wastes in different forms such as by urine, sweat, faeces and tears. Among all these, the usual and the main form of excretion is urine.

(b) Glomerular filtration occurs in the glomerulus where blood is filtered. This process occurs across the three layers- epithelium of Bowman's capsule, endothelium of glomerular blood vessels, and a membrane between these two layers.

Related Article: Learn more about [excretion and urine formation](#).

(c)



Or

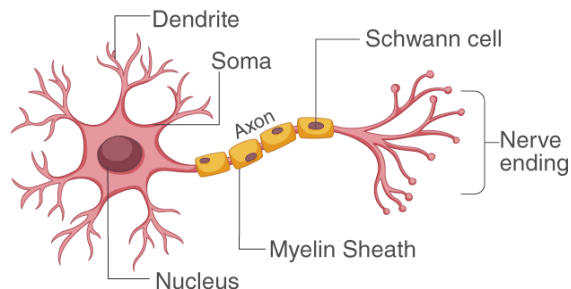
- Which part of the nervous system increases the secretion of digestive juices?
- Define nerve impulse and Synapse.
- Draw a labelled diagram of a structure of a neuron.

Answer: (a) The autonomous nervous system increase the secretion of the digestive juices

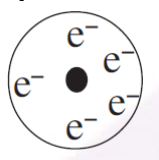
(b) Find details about [Impulse](#) here. Also, find notes about [Synapse](#) from here.

(c)

STRUCTURE OF NEURON



29. (a) Explain why the atomic size of elements increases from top to bottom in a group?
 (b) Write the name of a scientist who has given the octave's rule for classification of elements. Explain octave's rule.
 (c) Write the name of atomic particle present at the centre of the electrons that represents Rutherford's model. Write one characteristic of this model.



- Answer:** (a) From top to bottom in a group, the atomic radii of the elements increase. This is the result of the increase in the number of electrons and protons across a period. It is seen that one proton has more effect than one electron and so the electrons are attracted towards the nucleus, thus resulting in a smaller radius. Atomic radius increases from top to bottom within a group as a result of electron shielding.
 (b) John Alexander Newlands is the Scientist who has given the Octave's rule for classification. Meanwhile, the [law of octaves](#) states that every eighth element has similar properties when the elements are arranged in the increasing order of their atomic masses.
 (c) The atomic particle found at the centre of the electrons, represented in Rutherford's model is the nucleus, made up of positive protons. Electrons being negatively charged and the nucleus being a densely concentrated mass of positively charged particles are held together by a strong electrostatic force of attraction.

OR

- a. Explain why the metallic character of elements decreases from left to right in a period.
 b. Write the name of the scientist who has given a triad law for the classification of elements. Explain the law of triad.
 c. Write the name of the atomic particle present in the sphere of represented Thomson atomic model. Explain the model with one example.



Answer: (a) Metallic character decreases from left to right in a period. This takes place when the atoms more readily accept electrons to fill a valence shell than lose them to remove the unfilled shell. Metallic character increases as you move down an element group in the periodic table.

(b) Johann Wolfgang Dobereiner, the German chemist has given the triad law of classification. Learn more about [Dobereiner's Triad](#).

(c) Thomson proposed that the shape of an atom resembles that of a sphere having a radius of the order of 10^{-10} m. The positively charged particles are uniformly distributed with electrons arranged in such a manner that the atom is electrostatically stable.

[Thomson's atomic model](#) was also called the plum pudding model or the watermelon model. It had the protons and electrons, but no neutron was present.

30. (a) Write the definition of the refractive index of a medium.

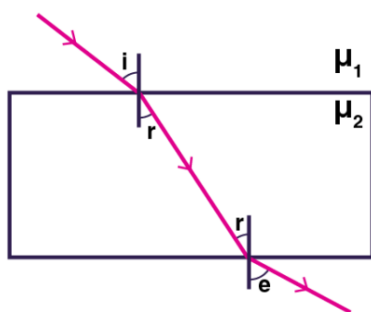
(b) What is myopia? How can this defect be corrected?

(c) Draw a ray diagram of refraction of light in a glass slab.

Answer: (a) [Refractive index](#) is defined as the ratio of the speed of light in a vacuum to its speed in a specific medium.

(b) Myopia is also known as near-sightedness or short-sightedness. What happens here is that light rays do not focus on the surface of the retina but in front of it. This results in images being blurry when perceived. In such a case, distant images appear out of focus, but objects nearby are seen clearly. This is why myopia is also called near or short-sightedness. Learn the definition of [myopia and how the defects are corrected](#)

(c)



Or

a. **What is magnification?**

b. **Define the power of accommodation of an eye and the range of vision.**

c. An object is situated between infinite and pole of a convex mirror. Explain the position of the image with a ray diagram.

Answer: (a) Magnification of a lens is defined as the ratio of the height of an image to the height of an object. It is also given in terms of image distance and object distance. It is equal to the ratio of image distance to that of object distance.

Here, $m = h_i/h_o = v/u$, where m is the magnification h_i = height of the image and h_o = height of the object.

(b) The process by which certain muscles (called ciliary muscles) function, to change the focal length of the eyes so that the image is formed on the retina is called the accommodation of the eye. This will vary for near and distant objects and also for objects moving away or towards the eye. By adjusting the focal length, the eye is changing its lens power as well. This is called the [accommodating power of the eye](#). Meanwhile, the range of vision is the distance between the near point and far point of the eye. The clear range of vision for a normal is up to 25 cm.

(c) When an object is placed at a finite distance from the mirror, a virtual image is formed between the pole and the focus of the convex mirror. The size of the image is smaller than compared to that of the object.

