Grade 10 Science Tamil Nadu 2015

SECTION- A

Q1. Primitive man evolved in_____

(Africa, America, Australia, India)

Solution:

Africa

Q2. One of the means of indirect transmission of disease is (Sneezing, Droplet from the mouth, Placenta, Utensils of patients)

Solution:

Utensils of patients

Q3. If a water-soaked seed is pressed, a small drop of water comes out through _____ (stomata, lenticel, micropyle, radicle)

Solution:

Micropyle

Q4. The xylem in the plants are responsible for _____ (transport of water, transport of food, transport of amino acids, transport of oxygen)

Solution:

transport of water

Q5. What is called "black gold"?
(Hydrocarbons, Coal, Petroleum, Ether)

Solution:

Petroleum

Q6. The mixture of gases used by deep-sea divers is _____
(Helium-Oxygen, Oxygen-Nitrogen)

Solution:

Helium-Oxygen

Q7. Vinegar is present in acetic acid. ' Curd contains ' _____ acid' (Lactic acid/Tartaric acid)

Solution:

Lactic

Q8. Any metal mixed with mercury is called amalgam. The amalgam used for dental filling is _____
(Ag-Sn amalgam, Cu – Sn amalgam, Ag – Au amalgam)

Solution:

Ag-Sn amalgam

Q9. Number of periods in the Modern periodic table is _____ (7, 17, 8, 18)

Solution:

7

Q10. Even though it is a non-metal, graphite conducts electricity. It is due to the presence of_____ (free electrons/bonded electrons)

Solution:

free electrons

Q11. The freezing of biotechnology products like vaccines requires freezing systems.
(Helium, Nitrogen, Ammonia, Chlorine)

Solution:

Nitrogen

Q12. The potential difference required to pass a current of 0.2 A in a wire of resistance **20** ohms is _____ (100V, 4 V, 0.01 V, 40v)

Solution:

4V

Q13. Kilowatt-hour is the unit of _____
(potential difference, electric power, electric energy, charge)

Solution:

electric energy

Q14. An electric current through a metallic conductor produces_____ around it.
(heat, light, magnetic field, mechanical force)

Solution:

magnetic field

Q15. The defect myopia can be corrected by using a _____
(Convex lens, Concave lens, Concave mirror, Convex mirror)

Solution:

Concave lens

Section-II

Q16. Identical twins are syngenetic with similar chromosomal contents. Natural clones are those who possess identical chromosomes.

Fill up with the suitable word given in the brackets.
(a) Identical twins are _____
(natural clones/identical clones)
(b) Identical twins are _____
(dissimilar to each other/similar to each other)

Solution:

(a) natural clones
(b) Similar to each other

Q17. Match the following vitamins with their deficiency diseases.

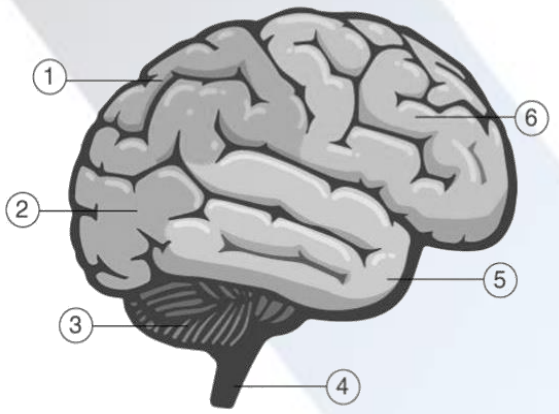
Vitamins	Deficiency diseases
(I) vitamin A	Beri Beri
(II) Vitamin B	Scurvy
(III) vitamin C	Rickets
(IV) vitamin D	Nyctalopia

Solution:

Vitamins	Deficiency diseases
(I) vitamin A	Nyctalopia
(II) Vitamin B	Beri Beri
(III) vitamin C	Scurvy
(IV) vitamin D	Rickets

Q18. This diagram is of a human brain, and the functions of different parts are given below. Mark A and B in the parts of the brain corresponding with the function.
(A) Seat of smell
(B) Seat of vision

Solution:



1 Parietal Lobe | 2 Occipital Lobe | 3 Cerebellum
4 Spinal Cord | 5 Temporal Lobe | 6 Friontal Lobe

(A) Seat of smell – Temporal lobe
(B) Seat of vision – Occipital lobe

Q19. Based on relationship fill in the blanks'-

Thyroxin: Personality hormone

Adrenalin: _____

Solution:

Emergency hormone

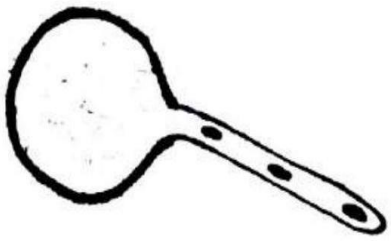
Q20. Correct the statements if they are wrong.
a. Alpha cells produce insulin, and beta cells produce glucagon.
b. The ovary produces eggs and Androgen.

Solution:

(a) The given statement is wrong. Alpha cells produce glucagon, and beta cells produce insulin

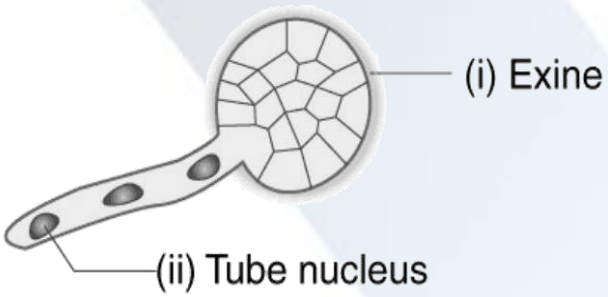
(b) The given statement is wrong. The ovary produces eggs (ova) and oestrogen and progesterone, not androgen.

Q21.



Redraw the diagram and label the following parts:
(a) Exine
(b) Tube nucleus

Solution:



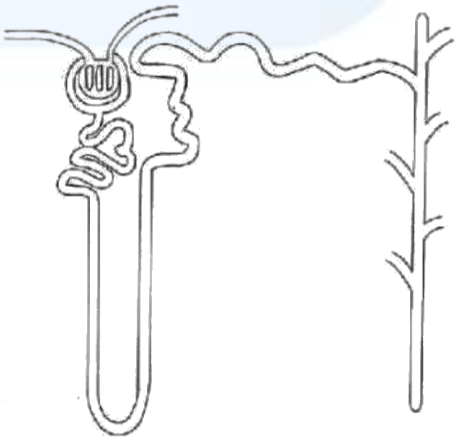
Q22. Based on relationship, fill up:

Whale: Baleen plates
Bats: _____

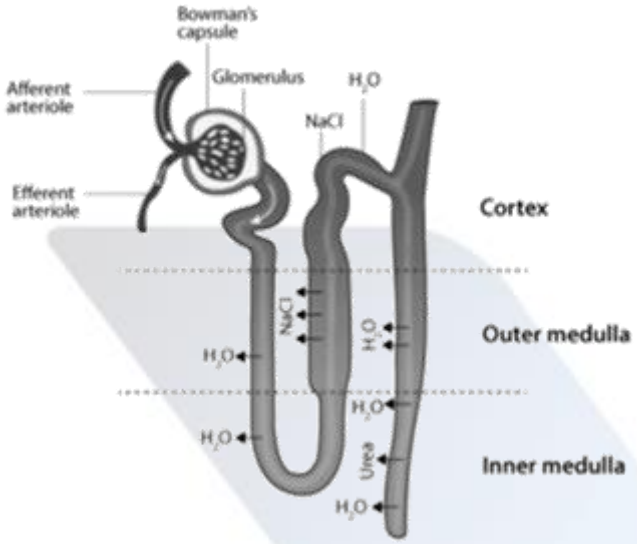
Solution:

Wings

Q23. Draw the diagram and label any two parts mentioned below :
(a) Bowman's capsule
(b) Glomerulus
(c) Loop of Henle
(d) Collecting duct



Solution:



Q24. Fill in the blanks.

a. Plasma: Fibrinogen ; RBC :

b. WBC: _____

Solution:

(a) haemoglobin

(b) antibodies

Q25. Pick the odd one out.

The parts of the alimentary canal are (Pharynx, Mouth, Buccal cavity, Pancreas)

Solution:

Pancreas is the odd one out. The pharynx, mouth, and buccal cavity are correct parts of the alimentary canal.

Pancreas is not part of the alimentary canal. It is an accessory organ of digestion that secretes digestive enzymes into the small intestine but is not part of the food passageway.

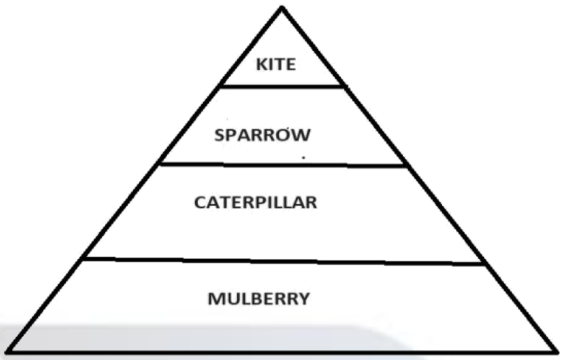
Q26. Study the food chain below, correct it and convert it into a pyramid of energy.

Mulberry → Sparrow → Caterpillar → Kite

Solution:

Mulberry → Caterpillar → Sparrow → Kite

Mulberry is the plant, so it is autotrophic. The caterpillar is the primary consumer and feeds on the mulberry. Sparrow is the secondary consumer and feeds the caterpillar. Finally, Kite is the tertiary consumer that feeds on the sparrow.



Q27. A non-renewable resource is a natural resource if it is replaced by a natural process, at a rate of consumption by a human. Read this statement and confirm whether it is correct or incorrect. If it is incorrect, give the correct statement.

Solution:

Statement is not valid. A non-renewable resource cannot be replaced via natural process.

Q28. The pie diagram represents survey results of infectious diseases of a village during 2008-2009. Analyse it and answer the following questions.

a. Which diseases affect the majority of the population?
b. How are these diseases transmitted?

Solution:

(a) From the pie diagram, it is evident that the majority of the population get dengue fever and chikungunya.
(b) Chikungunya and Dengue fever are transmitted via Aedes aegypti and Aedes albopictus mosquitoes.

Q29. Pick out the suitable appliances to conserve electrical energy.
[Fluorescent bulbs, Copper choke, Solar Water Heater, Electric Water Heater, Tungsten bulbs, Electronic choke]

Solution:

Among the given options, the most suitable appliance to conserve electrical energy is the Solar Water Heater.

Q30. Distinguish between the true solution and a colloidal solution.

Solution:

A true solution is a homogeneous mixture, while a colloidal solution is a heterogeneous mixture of two or more substances. A true solution is transparent, whereas a colloidal solution is translucent. For example, a sugar solution in water is a true solution, and starch dissolved in water is a colloidal solution.

Q31. Find the concentration of a solution in weight per cent, if 20 gm of common salt is dissolved in 50 grams of water.

Solution:

Given that,

Mass (Solute) $= 20\text{gm}$

Mass (Solvent) $= 50\text{gm}$

Calculate Mass of Solution = Mass of Solute + Mass of Solvent $= 20\text{gm} + 50\text{gm} = 70\text{gm}$

Hence, Mass % Solution $= \frac{\text{Mass (solute)}}{\text{Mass (Solution)}} \times 100 = \frac{20}{70} \times 100 = 28.57\%$

Q32. $_{18}\mathbf{Ar}^{40}$, $_{17}\mathbf{Cl}^{155}$, $_{20}\mathbf{Ca}^{40}$, $_{17}\mathbf{Cl}^{37}$

From the given examples form the pair of Isotopes and the pair of Isobars.

Solution:

Isotopes has the same atomic number but a different mass number, whereas isobars have a different atomic number but the same mass number.

Hence, the isotopes from here are $_{17}\text{Cl}^{55}$ and $_{17}\text{Cl}^{37}$, while the Isobars are $_{20}\text{Ca}^{40}$ and $_{18}\text{Ar}^{40}$.

Q33. What type of chemical reaction takes place when:

a. Limestone is heated

b. A magnesium ribbon is burnt in air

Solution:

(a) When limestone is heated decomposition reaction takes place

$\text{CaCO}_3(\text{s})$ (Limestone) $\rightarrow$ CaO(S) (Quicklime) $+ \text{CO}_2$

(b) When a magnesium ribbon is burnt in air, combination reaction takes place

$2\text{Mg(s)} + \text{O}_2(\text{g}) \rightarrow 2\text{MgO(s)}$

Q34. Match the following:

Source	Acid Present
Apple	Oxalic Acid
Lemon	Tartaric Acid
Grape	Malic Acid
Tomato	Citric Acid

Solution:

Apple	Malic Acid
Lemon	Citric Acid
Grape	Tartaric Acid
Tomato	Oxalic Acid

Q35. Iron reacts with conc. HCl and conc. H_2SO_4. However, it does not react with conc. HNO_3. Suggest an answer with proper reason.

Solution:

Conc. HNO_3 is a strong oxidising agent, and so it converts the iron to ferric oxide (Fe_2O_3) and forms a protective coating/layer around it. This layer prevents the iron metal from further coming into contact with the acid, stopping the reaction.

Q36. Write any two uses of aluminium.

Solution:

Some of the used of aluminium are given:

- Aluminium is commonly used in packaging to make coils, cans, foils, and wrapping materials.
- It is also used in everyday items like utensils and watches.
- In construction, aluminium is used to make doors, windows, wires, and roofing.

Q37. Match the following compounds with their functional groups.

Compounds	Functional groups
Alcohol	$> C = O$
Aldehyde	-OH
Ketone	-COOH
Carboxylic Acid	-CHO

Solution:

Compounds	Functional groups
Alcohol	-OH
Aldehyde	-CHO
Ketone	$>C=O$
Carboxylic Acid	-COOH

Q38. Fill in the blanks

a. Force = mass *X* acceleration, then momentum = _____

b. Liquid hydrogen is for rocket, then _____ is for MRI

Solution:

(a) Momentum is defined as the product of the mass of the body and its velocity.
Hence, momentum = mass X velocity.
(b) Liquid helium is for MRI

Q39. From the following statements write down the one, which does not apply to the mass of an object

a. It is a fundamental quantity

b. It is measured using physical balance

c. It is measured using a spring balance

Solution:

(c) It is measured using a spring balance. Spring balance is used to measure the weight of the substance. Meanwhile, weight is defined as the force experienced by the object due to earth's gravity. Mass is defined as the total amount of matter contained in an object.

Q40. Calculate the energy produced when I kg of substance is fully converted into energy. (Note: C=3 X 10 $^{\circ}ms^{-1}$)

Solution:

Given that,

mass (m) =1 kg

Speed of light, $C = 3 \times 10^8\ ms^{-1}$

Use the formula Energy, $E = mc^2$, where
Hence, $E = 1 \times (3 \times 10^s)^2 = 9 \times 10^{18}$ J

Q41. Correct the mistakes, if any, in the following statements:

a. A good source of energy would be one which does a small amount of work per unit

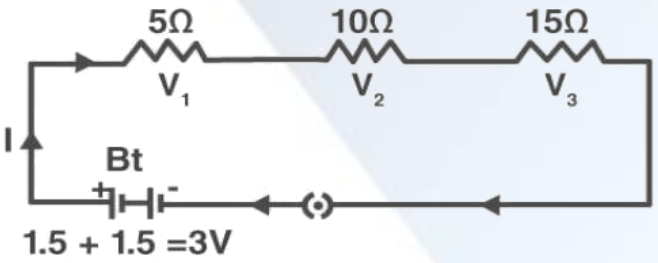
volume of mass.
b. Any source of energy we use to do work is consumed and can be used again.

Solution:

(a) This is a wrong statement because a good source of energy would be one which does a large amount of work per unit volume or mass.
(b) This is a wrong statement because any source of energy we use to do work is consumed and cannot be used again.

Q42. Draw the schematic diagram of an electric circuit consisting of a battery of two cells of 1.5 V each, three resistance of 5Ω, 10Ω and 15Ω, respectively and a plug key all connected in series

Solution:



Q43. Correct the mistakes, if any, in the following statements
a. The magnetic field is a quantity that has magnitude only
b. The magnetic field lines emerge from the South Pole and merge at the North Pole

Solution:

(a) This is an incorrect statement because the magnetic field is a quantity that has magnitude and direction.
(b) This is an incorrect statement because magnetic field lines emerge from the north pole of a magnet and merge at the south pole.

Q44. From the following description, write down the names of the parts in the human eye
a. The dark, muscular diaphragm that controls the pupil.
b. The screen where the lens forms the image.

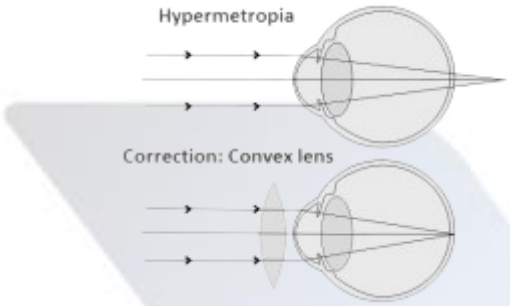
Solution:

(a) The dark, muscular diaphragm that controls the pupil is the Iris
(b) Retina is the screen where the lens forms the image.

Q45. You know that myopia is a common refractive defect of vision. A person with this defect can see only the nearby objects, clearly. Using a concave lens of suitable power, this defect is corrected.
a. Mention any other two types of defects like this
b. Explain how we can correct it.

Solution:

(a) Other two types of eye defects are hyperopia and presbyopia.
(b)Hyperopia and presbyopia can be rectified by using suitable lenses. Hyperopia can be corrected by using converging (convex) lenses.



Presbyopia can be treated with the use of simple eyeglasses with convex lenses (positive power). Contact lenses can also be used.

Part -I

Q46. What are the various applications of Biotechnology. Explain.

Solution:

Biotechnology is the use of living organisms, cells, or biological systems to create products and technologies that help in areas like medicine, agriculture, food, and the environment. It uses biological processes to solve problems and improve quality of life.

Applications of Biotechnology:

Medicine: Biotechnology helps create vaccines, antibiotics, and treatments for conditions like diabetes (e.g., insulin) and genetic diseases (e.g., gene therapy).

Agriculture: It is used to develop genetically modified crops (such as Bt cotton) that are more resistant to pests and provide higher yields. It also supports the use of biofertilizers and biopesticides.

Food Industry: Biotechnology aids in the production of fermented foods (like yogurt and cheese) and improves methods for preserving food.

Environment: Biotechnology helps clean up pollution through bioremediation, manage waste, and produce renewable biofuels like ethanol.

Industry: It is used to develop enzymes for cleaning products, create biodegradable plastics, and offer bioengineering solutions.

Overall, biotechnology plays a significant role in advancing health, agriculture, industry, and environmental sustainability, providing innovative solutions to global challenges.

Q47. There is a widespread outbreak of Malaria in your area.
a. Suggest some controlling measures to the local authorities concerned
b. Pick out the right symptom for Malaria.
(Chill and shiver and a rise in temperature, Diarrhoea)

Solution:

(a) Some controlling measures against Malaria are:

- To use mosquito repellent
- Avoid stagnation of water
- Wear long sleeves
- Educate the public about using bed nets, cleaning water sources, and seeking treatment early.
- Provide easy access to malaria tests and treatments.

(b) Chill and shiver and temperature rise are all symptoms of Malaria.

Part -II

Q48. Write any two events involved in the sexual reproduction of plants.
a. Discuss the first event and write the types.
b. Give the advantages and disadvantages of the event.

Solution:

(a) First Event: Pollination

Pollination is the process of transferring pollen from the male part (anther) to the female part (stigma) of the flower. It can occur through different methods like wind, insects, or animals.

Types of Pollination:

Self-pollination: Pollen from the same flower or plant fertilizes the ovule.

Cross-pollination: Pollen from one plant fertilizes the ovule of another plant
(b) Advantages and Disadvantages of Pollination:

Advantages:

- Genetic variation (in cross-pollination) leads to stronger plants.
- Increased chances of successful fertilization in flowers.

Disadvantages:

- Dependence on external factors (like wind or insects) for pollination.
- Reduced genetic diversity in self-pollination.

Q49. In your area, water is scarce, and due to this, people are affected. So, what are the measures to be taken by you to meet the scarcity of water?

Solution:

To address water scarcity in my area, the following measures can be taken:

Conserve water: Use water-saving devices, fix leaks, and avoid wasting water.

Rainwater harvesting: Collect rainwater to use for non-drinking purposes like gardening and cleaning.

Reuse water: Reuse water from activities like washing clothes for other purposes.

Promote awareness: Educate people about the importance of saving water and using it wisely.

Water recycling: Set up systems to treat and reuse wastewater for irrigation or industrial use.

Efficient irrigation: Encourage farmers to use drip irrigation to reduce water wastage.

Part-III

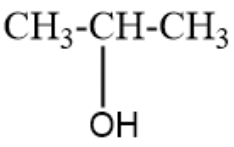
Q50. (a) Calculate the gram molecular mass of water from the values of the gram atomic mass of hydrogen and oxygen.
The gram atomic mass of hydrogen = 1 g
The gram atomic mass of oxygen = 16 g
(b) Atoms and molecules are the building blocks of matter. List out any three differences between them.

Solution:

(a) The gram molecular mass is calculated as the sum of the gram atomic masses.
The atomic mass of Hydrogen (H) = 1 and that of Oxygen (O) = 16.
Therefore, the Gram molecular mass = $2 \times 1 + 16 = 18$ g.
(b) The three differences between atoms and molecules:

- Atoms are the basic and smallest units of an element, whereas molecules are formed when two or more atoms combine.
- Atoms represent elements, and molecules combine to form compounds.
- An atom may not always be in a stable state, but molecules are formed in order to achieve stability.

Q51. Write the common name and the IUPAC name of the following:
a. CH_3CH_2CHO
b. CH_3COCH_3
c.



d. CH_3COOH
e. HCHO

Solution:

(a) Common name- methyl acetaldehyde, IUPAC name- Propanol
(b) Common name- acetone, IUPAC name- Propanone
(c) Common name- Isopropanol, IUPAC name- Propane-2-OI
(d) Common name- acetic acid, IUPAC name- Ethanoic acid
(e) Common name- formaldehyde, IUPAC name- Methanal

Part- IV

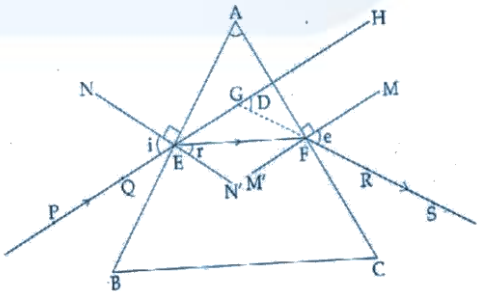
Q52. (a) Explain Newton's first law of motion with example
(b) $F = Gm_1m_2/d_2$ is the mathematical form of Newton's law of gravitation. State Newton's Law of Gravitation.

Solution:

(a) Newton's first law of motion states that an object will stay at rest or move in a straight line with constant speed unless acted upon by an unbalanced external force. All objects naturally resist changes in their motion. This resistance to changes in motion, whether at rest or in uniform motion, is called inertia. Hence, this law is also referred to as the law of inertia.

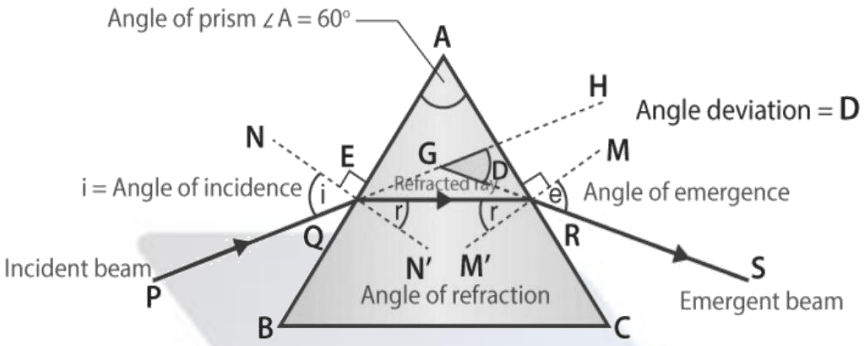
For example, a ball lying still on the ground will remain at rest unless a force, like a kick, is applied to it.
(b) Newton's Law of Universal Gravitation states that every particle attracts every other particle in the universe with a force that is directly proportional to the product of the masses and inversely proportional to the square of the distance between them.

Q53. Draw and label the diagram given below:
(i) Incident Ray
(ii) Refracted Ray
(iii) Emergent Ray
(iv) Angle of Refraction
(v) Angle of deviation
(vi) Angle of emergence



(b) The refractive index of diamond in 2.42. What is the meaning of this statement in relation to the speed of light?

Solution: (a)



Tracing the path of light ray through prism

(b) The refractive index of a material indicates how much the speed of light is reduced when it passes through that material. In this case, the refractive index of diamond is 2.42. This means that light travels 2.42 times slower in diamond than it does in a vacuum.