

## TN Board Class 10 Science 2016 Question Paper with Solutions

### PART-III

Section-I

15 x1=15

1.  
2. Which of the following is inheritable?  
(an altered gene in sperm, an altered gene in liver cells, an altered gene in skin cells, an altered gene in udder cells.)

**Answer:** an altered gene in sperm

3. \_\_\_\_\_ is a bacterial disease.  
(Meningitis, Rabies, Tetanus, Small Pox)

**Answer:** Meningitis

4. The part of the brain which controls emotional reactions in our body is \_\_\_\_\_.  
(Cerebellum, Cerebrum, Thalamus, Hypothalamus)

**Answer:** Hypothalamus

5. Post - fertilisation, the ovule changes into a/ an \_\_\_\_\_.  
(seed, fruit, endosperm, pericarp)

**Answer:** seed

6. Normal body temperature of a man is \_\_\_\_\_.  
(98.4° - 98.6 °F, 96.6° - 96.8 °F, 94.4° - 98.6 °F, 98.4° - 99.6 °F)

**Answer:** 98.4° - 98.6 °F

7. \_\_\_ of green plants are called factories of food production.  
(Mitochondria, Chloroplasts, Endoplasmic-reticulum, Nucleus)

**Answer:** Chloroplasts

8. \_\_\_\_\_ is used in seeding clouds.  
(Potassium iodide, Calcium carbonate, Sulphur dioxide, Ammonium phosphate)

**Answer:** Potassium iodide

9. \_\_\_\_\_ is the chief component of natural gas.  
(Ethane, Methane, Propane, Butane)

**Answer:** Methane

10. In an endothermic process, solubility increases with \_\_\_\_\_ in temperature.  
(increase/ decrease)

**Answer:** increase

11. Chemical volcano is an example of \_\_\_\_\_  
(combination reaction/ decomposition reaction)

**Answer:** decomposition reaction

12. \_\_\_\_\_ is used in making automobile parts  
(Nickel steel, Stainless steel, Bronze, Magnalium)

**Answer:** Magnalium

13. Buckminster fullerene is the allotropic form of \_\_\_\_\_  
(Nitrogen, Carbon, Sulphur)

**Answer:** Carbon

14. The momentum of a massive object at rest is \_\_\_\_\_  
(very large, very small, zero, infinity)

**Answer:** zero

15. \_\_\_\_\_ surface absorbs more heat than any other surface under identical conditions.  
(White, Rough, Black, Yellow)

**Answer:** black

16. The phenomenon of producing an emf in a circuit whenever the magnetic flux linked with a coil changes is \_\_\_\_\_  
(electromagnetic induction, inducing current, inducing voltage, change in current)

**Answer:** electromagnetic induction

### Section-I

20 x 2=40

17. Here are certain important hereditary jargons. Fill in the blanks by choosing a suitable one from the list given. (allele, variation, speciation, gene, allelomorphs)

(i) \_\_\_\_\_ are the factors which form the physical basis of inheritance.

(ii) \_\_\_\_\_ is the alternate form of the same gene.

**Answer:** (i) gene  
(ii) allele

18. What are the variations? Mention their types.

**Answer:** Sexual reproduction that involves meiosis helps in the recombination of genes during the process of gametic fusion. This causes differences called a variation in the phenotype of the offspring from its parents. Variation is essential for evolution. The types of variations are:

- **Somatic variation:** are not heritable and affect the body (somatic) cells of the organisms. They occur due to environmental factors.
- **Germinal variation:** are inherited and are produced in germ cells of an organism. They may be present in ancestors or may occur suddenly. They are classified into two types:
  - **Continuous variation**-small variations also called fluctuating variations that take place among individuals of a population. These occur due to gradual accumulation in a population. e.g. skin colour, height and weight of an individual, the colour of the eye, etc.
  - **Discontinuous variation**- sudden changes that occur in an organism, as a result of mutations and do not have any intermediate forms. These large variations are not useful for evolution. e.g. short-legged Ancon sheep, six or more digits (fingers) in human, etc.

19. Match the following by identifying the pairs  
(medicines, fuel, microbes, metabolism, organic acids)

(i) Vaccine	
(ii) Natural gas	
(iii) Citric acid	
(iv) Vitamins	

**Answer:**

(i) Vaccine	Microbes
(ii) Natural gas	Fuel
(iii) Citric acid	Organic acid
(iv) Vitamins	Metabolism

20. What are the symptoms of a common cold?

(i) \_\_\_\_\_ (ii) \_\_\_\_\_

**Answer:** (i) Runny nose and flow of mucous  
(ii) Sneezing and chest congestion

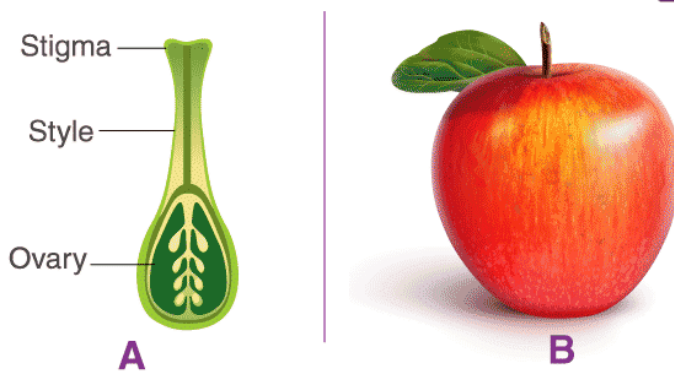
21. Pick out the item, which has a sequential arrangement.
- (i) Zygotene → Leptotene → Pachytene → Diplotene → Diakinesis  
 (ii) Diakinesis → Zygotene → Leptotene → Pachytene → Diplotene  
 (iii) Leptotene → Zygotene → Pachytene → Diplotene → Diakinesis

**Answer:** (iii) Leptotene → Zygotene → Pachytene → Diplotene → Diakinesis

Meiosis I Prophase I is longer than the mitotic prophase and is further subdivided into 5 substages,

- Leptotene
- Zygotene
- Pachytene
- Diplotene
- Diakines

22. (a) Identify figure A and B.  
 (b) Which part of A is modified into B.



**Answer:** (a) A is the image of reproductive parts of a plant, while B is the image of a fruit  
 (b) Ovary of a plant is modified into the fruit

23. **Assertion (A)** Mammalian heart is called myogenic heart.  
**Reason (R):** Heart-beat is regulated by a specialised muscle bundle (pacemaker) in mammals.
- (a) Both (A) and (R) are true and (R) explains (A)  
 (b) Both (A) and (R) are true but (R) doesn't explain (A)  
 (c) (A) is true but (R) is false  
 (d) (A) is false but (R) is true

**Answer:** (a) Both (A) and (R) are true and (R) explains (A)

The entire heart is made of cardiac muscles. A specialised cardiac muscle bundle called the nodal tissue is also distributed in the heart i.e. sino-atrial node (SAN- A patch of this tissue is present in the right upper corner of the right atrium) and atrioventricular node (AVN- mass of this tissue is seen in the lower-left corner of the right atrium close to the atrioventricular septum). The nodal musculature can generate action potentials without any external stimuli (i.e., it is auto excitable). For this reason, the mammalian heart is called myogenic heart as a heartbeat is regulated by a specialised muscle bundle (pacemaker) in mammals.

24. Name the three important blood proteins seen in Plasma. Add a note on their functions.

**Answer:** The three important blood proteins seen in Plasma include Albumin, Globulin and Fibrinogen. Now check out their main functions below:

- Albumin is used to maintain the osmotic pressure of blood.
- Globulins are of 3 types, alpha, gamma and beta. The alpha and beta globulins are transport proteins that transport lipid and fat-soluble vitamins. Alternatively, the gamma globulins are the antibodies that function in immunity.
- Fibrinogen meanwhile is made in the liver and is one of the 13 coagulation factors that help in normal blood clotting. During this process of blood clotting, the fibrinogen found in the blood is converted to fibrin that helps to form the stable clot at the site of bleeding.

25. The master chemists of our body are the kidneys. Justify.

- Kidneys filter all chemicals in the body
- Kidneys maintain the chemical composition of blood
- Kidneys eliminate all chemicals absorbed by the body
- Kidneys store the chemicals accumulated in the body

**Answer:** (b) Kidneys maintain the chemical composition of blood

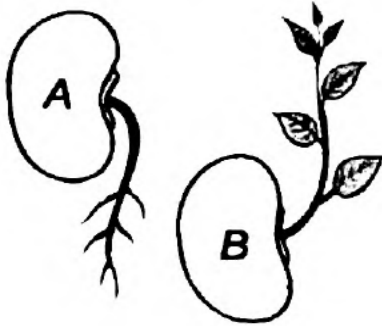
26. Match the methods of nutrition of special organs with suitable example.

Autotrophs	Mycorrhiza	Cuscutta
Parasites	Chlorophyll	Monotropa
Saprophytes	Haustoria	Hibiscus

**Answer:**

Autotrophs	Chlorophyll	Hibiscus
Parasites	Haustoria	Cuscutta
Saprophytes	Mycorrhiza	Monotropa

27. **Observe the diagram :**  
**(a) Mention the type of movements shown in figure A and B.**  
**(b) How does this movement differ from the movement of Mimosa?**



**Answer:** (a) Geotropism is the movement of the plant parts in response to gravity. The roots grow towards gravity and are hence called positively geotropic. The stem, on the other hand, is negatively geotropic. Here, figure A depicts Geotropism. Meanwhile, figure B is for phototropism. In phototropism, the plant grows in the direction of light. The plants have a chemical called auxin, which reacts in response to light. This causes the cells of the plants to elongate. Growth towards light is positive phototropism, while that away from the light is negative phototropism. The stem grows towards the direction of light and is called positively phototropic. However, the root is called negatively geotropic since it grows away from the light source.

(b) Here, the movements in geotropism and phototropism are dependent on growth, while in Mimosa, the movement is independent of growth. Also, learn more about [Movement due to growth](#).

28. **What is respiration? Give a balanced equation for aerobic respiration.**

**Answer:** Respiration involves the exchange of gases between the organism and the external environment. The plants obtain oxygen from their environment and release carbon dioxide and water vapour. This exchange of gases is known as external respiration. It is a physical process. When the biochemical process occurs within cells where the food is oxidised to obtain energy, it is known as cellular respiration.

Meanwhile, [Aerobic respiration](#) is the type of cellular respiration in which organic food is completely oxidised with the help of oxygen into carbon dioxide, water and energy. It occurs in most plants and animals.



29. **Depict a food chain by placing the following organisms in the correct trophic levels. (snake, grass, eagle, frog, grasshopper)**

**Answer:** The food chain for this will be as given below:

Grass → Grasshopper → Frog → Snake → Eagle

The grass will be the producer and grasshopper the primary consumer (herbivores). At the same time, the frog will be the secondary consumer or the primary carnivores, and the snake will be the tertiary consumer or secondary carnivores. Eagle will be the tertiary consumer or top predators.

30. Find the odd one out:  
(a) bio-alcohol, green diesel, bio-ethers, petroleum  
(b) cholera, typhoid, scabies, dysentery

**Answer:** (a) Odd man out is petroleum as it is a non-renewable resource, while the other three are renewable resources.

(b) Scabies is the odd man out, as the other three are all water-borne disease, and scabies is not.

31. Substituting energy efficient Compact Fluorescent Light bulbs (CFL) for standard incandescent bulbs will save on an average up to 6,000 megawatts of electricity each year.

Raise questions

(a) \_\_\_\_\_ ? (b) \_\_\_\_\_ ?

**Answer:** (a) How do Compact Fluorescent Light bulbs (CFL) and incandescent bulbs work?

(b) What is the material used in Compact Fluorescent Light bulbs (CFL) and incandescent bulbs?

32. Write any four liquid bio-fuels for transportation.

**Answer:** Biofuels are the liquid or gaseous fuels used for transportation. Four of the liquid biofuels are:

- Bio-alcohol or ethanol
- Green diesel
- Bio-diesel
- Vegetable oil

33. (a) Which gas is dissolved in soft drinks?  
(b) What will you do to increase the solubility of this gas?

**Answer:** (a) Carbon dioxide is dissolved in soft drinks

(b) Henry's law states that: " The solubility of a gas in a liquid is directly proportional to the pressure of the gas at the surface of the solution". So to increase the solubility of this gas, you can increase the pressure.

34. What is the Tyndall Effect?

**Answer:** The [Tyndall effect](#) is the phenomenon in which the particles in a colloid scatter the beams of light that are directed at them.

35. Calculate the number of molecules in 11 g of CO<sub>2</sub>.

**Answer:** If the Gram molecular weight of CO<sub>2</sub> = 12+2 × 16 = 44g.

Then, 44g of  $\text{CO}_2$  contains  $6.023 \times 10^{23}$  molecules.

Hence, number of molecules in 11g of  $\text{CO}_2 = (11 \times 6.023 \times 10^{23}) / 44 = 1.51 \times 10^{23}$  molecules.

36. Identify the wrong statements and correct them.

- (a) Sodium benzoate is used in food preservative.
- (b) Nitric acid is not used as fertiliser in agriculture.
- (c) Sulphuric acid is called the king of chemicals.
- (d) The pH of acid is greater than 7.

**Answer:** (a) True. Yes, Sodium benzoate is used in food preservative.

(b) False. Nitric acid is used as a fertiliser in agriculture.

(c) True. Yes, Sulphuric acid is called the king of chemicals.

(d) False. pH value of acid is less than 7. Bases have pH value greater than 7.

37. The hydrogen ion concentration of a solution is 0.001 M. What is the pH of the solution?

**Answer:**  $\text{pH} = -\log_{10}[\text{H}^+] = -\log_{10}(0.001) = -\log_{10}(10^{-3})$

$\text{pH} = -(-3)\log_{10}10$

Hence, pH of the solution is 3.

38. Correct the mistakes, if any, in the following statement.

**In a period, the metallic character of the element increases while their non-metallic character decreases.**

**Answer:** Metallic character decreases from left to right across each Period, while the non-metallic character increases.

39. **Assertion (A): Electroplating method not only protects but also enhances the metallic appearance.**

**Reason (R): Electroplating is a method of coating one metal with another by passing electric current.**

- (a) (A) is right, (R) is wrong.
- (b) (A) is right, (R) is not relevant.
- (c) (A) is right, (R) is relevant.

**Answer:** (c) (A) is right, (R) is relevant

40. **Diamond is the hardest allotrope of carbon. Give a reason for its hardness.**

**Answer:** Diamond is the hardest allotrope of carbon. It is hard because breaking a diamond crystal involves rupturing numerous strong covalent bonds. Breaking covalent bonds is no easy task. This property makes this carbon allotrope the hardest element on earth.

41. **Assertion (A) Liquefied cryogenic gases are sprayed on underground electric cables in big cities.**

**Reason (R) Liquefied cryogenic gases prevent wastage of power.**

- (a) (A) is incorrect and (R) is correct.



- (b) (A) is correct and (R) is incorrect.
- (c) Both (A) and (R) are incorrect.
- (d) (A) is correct and (R) supports (A).

**Answer:** (d) (A) is correct and (R) supports (A).

**42. As a matter of convention, an anticlockwise moment is taken as \_\_\_\_\_ and a clockwise moment is taken as \_\_\_\_\_**

**Answer:** As a matter of convention, an anticlockwise moment is taken as positive and a clockwise moment is taken as negative.

**43. Match the following:**

(1) Potential Difference	(a) Coulomb
(2) Current	(b) Volt
(3) Electric Charge	(c) Ohm
(4) Resistor	(d) Newton
	(e) Ampere

**Answer:**

(1) Potential Difference	(b) Volt
(2) Current	(e) Ampere
(3) Electric Charge	(a) Coulomb
(4) Resistor	(c) Ohm

**44. Fuse wire is made up of an alloy of \_\_\_\_\_ which has high resistance and \_\_\_\_\_ melting point**

**Answer:** Fuse wire is made up of an alloy of tin and lead, which has high resistance and low melting point.

**45. In the list of sources of energy given below, find the odd one out. (Solar energy, Thermal energy, Hydropower, Biomass)**

**Answer:** Biomass is the odd man out because it is an example of renewable energy, from living species.

46. The focal length of a concave lens is 2 m. Calculate the power of the lens.

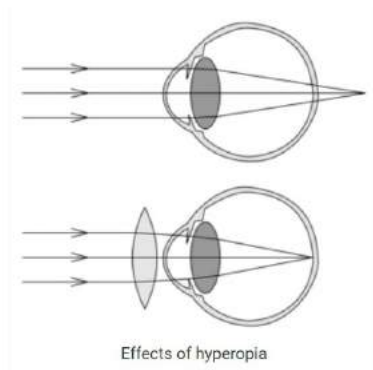
**Answer:** Use the formula for power of the lens  $(P) = 1/f$   
Focal length of the concave lens  $(f) = -2$  m  
Hence,  $P = 1/-2$   
So, the power of the lens  $P$  would be 0.5 Dioptre

47. Define Fleming's left-hand rule.

**Answer:** Fleming's left-hand rule states that "When a current-carrying conductor is placed in an external magnetic field, the conductor experiences a force perpendicular to both the fields and to the direction of the current flow."

48. Observe the diagram and fill up the following:

- (a) \_\_\_\_\_ defect of eye.  
(b) \_\_\_\_\_ lens is used to correct the defect.



**Answer:** (a) hypermetropia or hyperopia  
(b) powered convex lens

### Section-III

4 x 5=20

#### Part-1

49. Kala has delivered a baby.

- (a) Suggest the immunisation schedule for the baby, in the first six months.  
(b) What are the diseases that can be cured as per the schedule?

**Answer:** (a) A baby has to be given immunisations against diphtheria, tetanus, pertussis (whooping cough), polio, Haemophilus influenzae type b (Hib), hepatitis B, rotavirus and

meningococcal group B disease (MenB) at 8 weeks. At 12 weeks, the baby will have immunisations against diphtheria, tetanus, pertussis (whooping cough), polio, Haemophilus influenzae type b (Hib), hepatitis B, pneumococcal disease and rotavirus. Then, at sixteen weeks, the baby will have immunisations against diphtheria, tetanus, pertussis (whooping cough), polio, Haemophilus influenzae type b (Hib), hepatitis B and meningococcal group B disease (MenB). Finally, when the baby is 6 months, it will be given Typhoid Conjugate Vaccine (TCV#).

(b) Diseases that are cured as per the schedule are:

- BCG vaccine for tuberculosis (TB)
- DTP vaccine for diphtheria, tetanus, pertussis (whooping cough)
- Hepatitis A vaccine for hepatitis A
- Hepatitis B vaccine for hepatitis B
- HiB vaccine for haemophilus influenzae type B
- MMR for measles, mumps, rubella
- OPV (oral polio) and IPV (injectable polio vaccine) for polio
- Rotavirus vaccine for rotavirus gastroenteritis
- Typhoid Conjugate Vaccine (TCV) for typhoid

50. Describe the structure of a neuron with the help of a neat, labelled diagram.

**Answer:** "[Neurons](#) are the fundamental unit of the nervous system specialised to transmit information to different parts of the body."

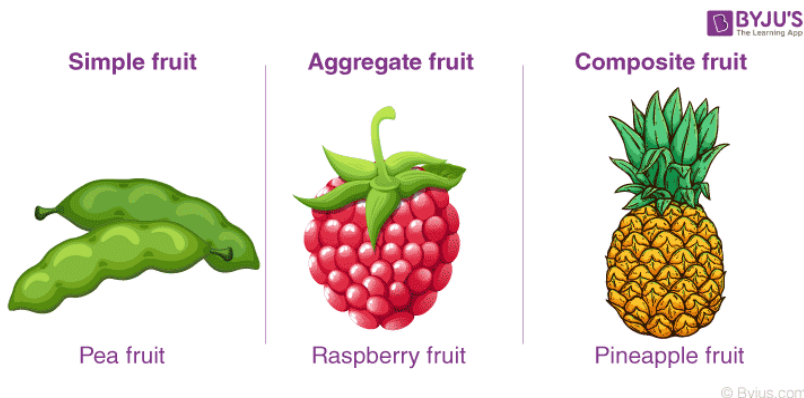
### Part-II

51. (a) Fruit is the product of fertilisation. Are there any fruit, which is formed without the act of fertilisation ?

(b) Represent the classification of fruits in a diagrammatic sketch.

**Answer:** (a) Some Parthenocarpic fruits are formed without the act of fertilisation.

(b)



**52. List out the harmful effects of burning coal.**

**Answer:** [Burning of coal and diesel](#) releases the sulphur dioxide gas. This gas is extremely corrosive and suffocating in nature. Petrol gives off oxides of nitrogen. The oxides of sulphur and nitrogen get dissolved in rainwater and form acids. This is known as acid rain. This water is very harmful to plants, animals, and various monuments.

**Part- III**

**53. (a) What are Isotopes ?**

**(b) Write any three applications of Avogadro's law?**

**Answer:** (a)The term “isotope” mainly refers to the variation in the atomic mass or weight of an element. [Isotopes](#) are the variants of chemical elements that possess the same number of protons and electrons, but a different number of neutrons. In other words, isotopes are variants of elements that differ in their nucleon numbers due to a difference in the total number of neutrons in their respective nuclei.

Learn more about [Isotopes of elements](#) here.

(b) According to the [Avogadro's law](#), equal volumes of gases at the same temperature and pressure should contain an equal number of molecules.

**54. What are the evil effects of consuming alcohol?**

**Answer:** Given here are some evil effects of consuming alcohol:

- Immediate physical effects might result in extreme rough behaviour. However, a very high dosage might lead to death in extreme cases.
- A person suffering from alcohol abuse commonly becomes dull, antisocial, depressed, tired, aggressive, etc.
- Alcohol usage ultimately leads to failure of vital organs like the liver and kidneys.

**Part-IV**

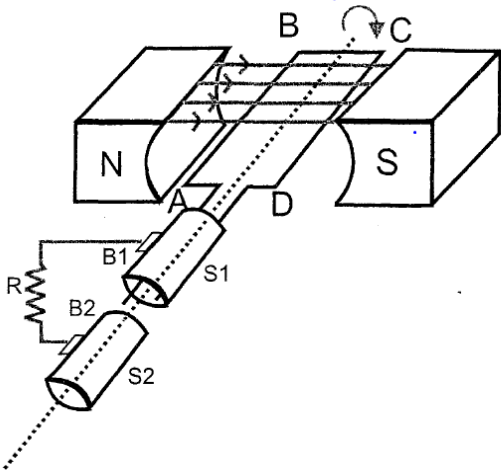
**55. Write any five achievements of Chandrayaan - I.**

**Answer:** Given below are some achievements of Chandrayaan-I:

1. Chandrayaan-1 carried 11 scientific instruments built in India, the USA, Germany, UK, Sweden and Bulgaria. Five of these instruments were built in India.
2. The mission made more than 3400 orbits around the moon.
3. The mission sent back to earth 70000 images of the lunar surface. Some images had a good resolution of 5 m while many other moon missions provided only a 100 m resolution.
4. Chandrayaan has confirmed the magma ocean hypothesis which implies that the moon was completely molten once.

5. The mission also detected titanium, confirmed the presence of calcium and also acquired the most accurate measurements of iron, aluminium and magnesium on the moon.

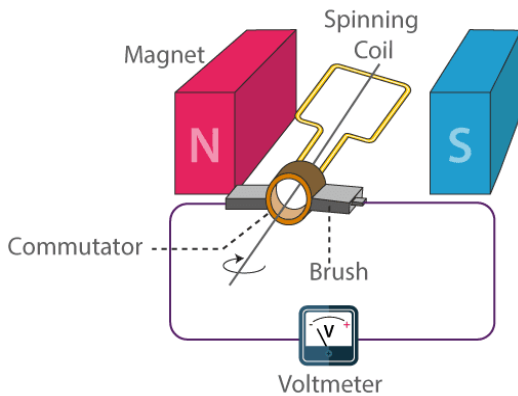
55.



- (a) Redraw the diagram.  
 (b) This diagram represents \_\_\_\_\_  
 (c) Label the parts of the diagram.  
 (d) Mention the principle used in the device denoted by this diagram.

**Answer:** (a) Dynamo functions on the principle of electromagnetic induction.  
 Meanwhile, Check out the [working of a dynamo](#) here.

**SIMPLE DYNAMO**



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- (b) dynamo  
 (c) Magnet, Spinning coil, Commutator, Brush, Voltmeter