

**KARNATAKA SECONDARY EDUCATION EXAMINATION BOARD  
MODEL PAPER - 1 FOR THE YEAR 2019-20**

**REGULAR FRESH**

**Subject: Science**

**Code: 83E**

**Duration: 3 hours**

**Max. Marks: 80**

**I. Four alternatives are provided for each of the following questions or incomplete statements. Choose the most appropriate alternative and write with its alphabet. 8x1 = 8**

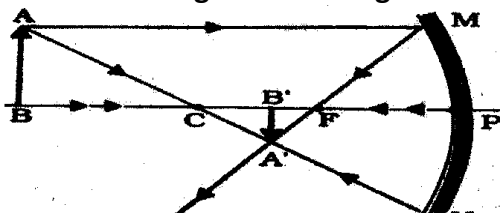
**1. Identify the correct statement among the following with respect to plant hormones.**

- A) Cytokinin promotes wilting of leaves                      B) Auxin inhibits stem elongation  
**C) Abscisic acid inhibits growth of plants**                      D) Gibberellin promotes falling of leaves

**2. A heat producing device should be used in an electric circuit. This device should have**

- A) High resistance and low melting point                      B) Low resistance and high melting point  
**C) High resistance and high melting point**                      D) Low resistance and low melting point

**3. Observe the figure. The image formed in the figure is**



- A) Real, inverted, diminished**                      B) Virtual, erect, diminished  
 C) Virtual, erect, enlarged                      D) Real, inverted, enlarged

**4. Reactive metals are good reducing agents. The most suitable example related to this is:**

- A)  $\text{PbO} + \text{C} \longrightarrow \text{Pb} + \text{CO}$                       **B)  $3\text{MnO}_2 + 4\text{Al} \longrightarrow 2\text{Al}_2\text{O}_3 + 3\text{Mn}$**   
 C)  $\text{ZnO} + \text{C} \longrightarrow \text{Zn} + \text{CO}$                       D)  $\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$

**5. The traditional method of sustainable natural resource management is:**

- A) Following water harvesting method**                      B) Minimising the establishment of factories  
 C) Using fossil fuels abundantly                      D) Preventing overgrazing of cattle in forest areas

**6. The group of compounds which are in homologous series is:**

- A)  $\text{CH}_4, \text{C}_2\text{H}_4, \text{C}_2\text{H}_2$                       B)  $\text{CH}_4, \text{CH}_3\text{OH}, \text{HCHO}$   
**C)  $\text{CH}_4, \text{C}_2\text{H}_6, \text{C}_3\text{H}_8$**                       D)  $\text{C}_2\text{H}_2, \text{C}_3\text{H}_6, \text{C}_4\text{H}_{10}$

**7. Observe the following table**

a) Reverses the direction of electric current	i) Galvanometer
b) Safety device	ii) Commutator
c) Detects the presence of electric current	iii) Fuse

**The correct arrangement is**

- A) a - iii, b - i, c - ii    B) a - ii, b - i, c - iii    **C) a - ii, b - iii, c - i**                      D) a - iii, b - ii, c - i

**8.  $\text{CH}_3 - \text{CH}_2\text{OH} \xrightarrow{\text{ConcH}_2\text{SO}_4} \text{CH}_2 = \text{CH}_2 + \text{H}_2\text{O}$  This chemical reaction is**

- A) Neutralization reaction because water is released  
 B) Oxidation reaction because oxygen is removed from the reactant  
 C) Addition reaction because hydrogen is added to the reactant  
**D) Dehydration reaction because water is removed from the reactant**

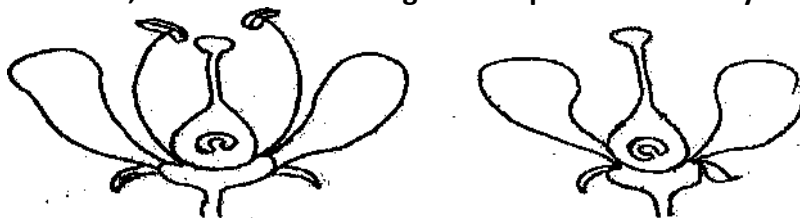
**II. Answer the following questions:**

**8x1=8**

**9. Define one volt (1V) potential difference.**

**If 1 Joule of work is required to move a charge of 1 coulomb from one point to another, then the potential difference between the two points is 1 V.**

10. Among the flowers A and B, which flower undergoes self-pollination? Why?



Flower A can undergo self-pollination.

11. You are given a copper coil, 6V battery and iron filings. What effects of electric current can you demonstrate using these materials?

Magnetic effect of electric current.

12. Write the formula to calculate the magnification produced by a spherical mirror.

$$\text{Magnification } m = \frac{h'}{h} = \frac{-v}{u}$$

13. What is the meaning of “Repurpose” with respect to conservation of environment?

In repurpose or reuse, you simply use things again and again instead of throwing away. For example postal envelopes can be reversed and used again for writing.

14. What is an exothermic reaction? Which of the following is an exothermic reaction?

i) Heating calcium carbonate ii) Adding water to calcium oxide

A Reaction in which heat is released along with formation of products is called exothermic reaction. Adding water to calcium oxide is an exothermic reaction.

15. Aqueous solutions of sodium chloride, sodium sulphate and calcium chloride are taken in three separate test tubes. Using aqueous barium chloride how do you identify sodium sulphate?

Sodium sulphate reacts with barium chloride to give a white precipitate of insoluble barium sulphate.

16. Copper when exposed to air for a long time acquires a green coat. Why?

Copper reacts with moist carbon dioxide in the air and slowly loses its shiny brown surface and form green coat of copper carbonate.

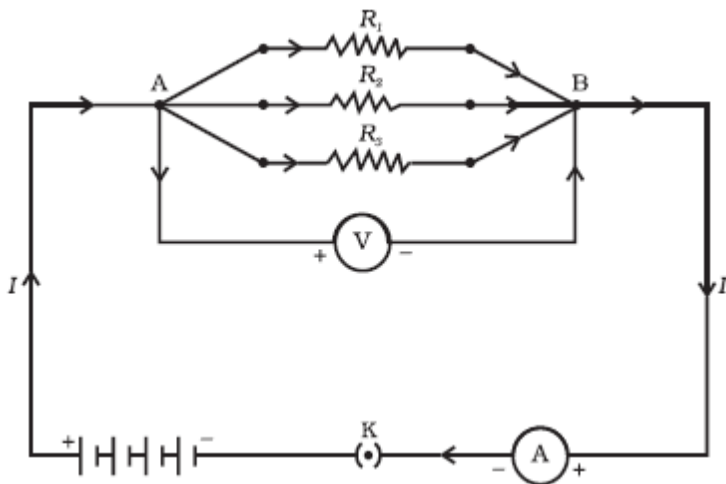
III. Answer the following questions.

8x2 = 16

17. How does nervous system differ from the endocrine system in forming control and co-ordination in animals?

Endocrine System	Nervous system
Uses chemical signaling (hormones, produced by glands)	Uses electrical signaling (neural impulses)
The signal transmission of endocrine system is slow.	The signal transmission of the nervous system is fast because neurons are interconnected.

18. Draw the circuit diagram showing the combination of resistors R1, R2 and R3 in parallel including ammeter and voltmeter and mark the direction of current.



19. What are ionic compounds? Mention any two properties of ionic compounds.

The compounds formed by the transfer of electrons from a metal to a non-metal are known as ionic compounds or electrovalent compounds.

Properties:

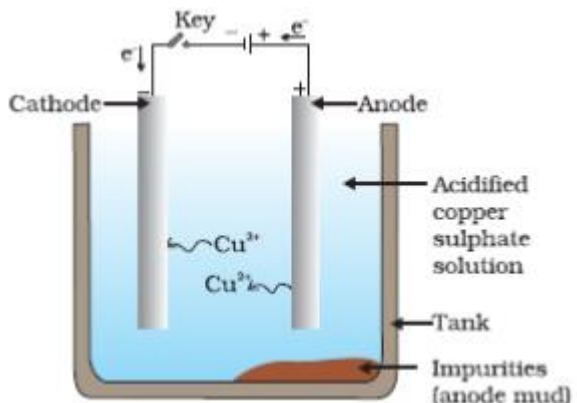
- Ionic compounds are solids. They are brittle and break into pieces when pressure is applied.
- Ionic compounds have high melting and boiling points.
- Ionic compounds are soluble in water and insoluble in organic solvents such as kerosene, petrol etc.
- Ionic compounds conduct electricity in molten state.

OR

Name any two metals that react with cold water very quickly. Write the products formed when these metals react with cold water.

Sodium, potassium and calcium react with cold water. The products formed when metals react with cold water are metal hydroxide and hydrogen gas.

20. Draw the diagram of the apparatus used in electrolytic refining of copper and label the electrode where pure copper is deposited.



21. What are the methods used by plants to get rid of excretory products?

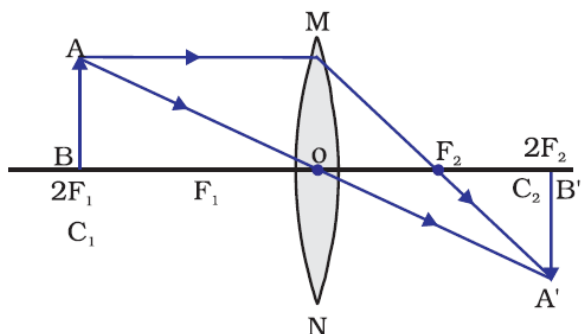
Plants can get rid of excess of water by transpiration. Waste materials may be stored in the cell vacuoles or as gum and resin, especially in old xylem. It is also stored in the leaves that later fall off. Plants also excrete some waste substances into the soil around them.

OR

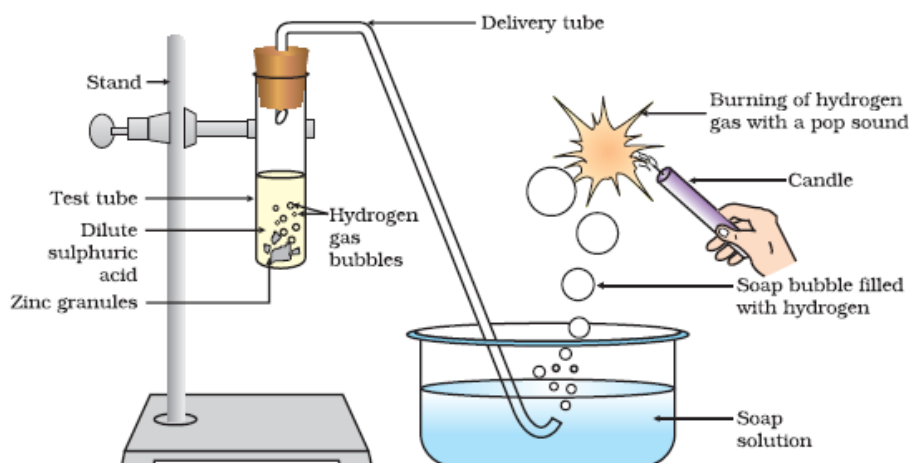
Mention the importance of transpiration in plants.

- Transpiration helps in the absorption and upward movement of water and minerals dissolved in it from roots to the leaves.
- It helps in temperature regulation.

22. Draw the ray diagram showing the position of the object and image, to get the real inverted image whose size is same as the object using a convex lens.



23. Draw the diagram of the arrangement of apparatus showing the reaction of zinc granules with dilute sulphuric acid and testing hydrogen gas by burning and label the soap bubbles filled with hydrogen.



24. Imagine that in an area containing green bushes, almost equal number of brown grasshoppers and green grasshoppers are living. Which grasshoppers would be eaten by the birds easily? Why? Population of which grasshoppers increases gradually? Name the phenomenon which directs evolution here.

Brown grasshoppers would be eaten by birds easily because birds can see brown grasshopper in the green bushes. Population of green grasshoppers will increase gradually. The phenomenon is called natural selection.

IV. Answer the following questions

9x3=27

25. Define the rule used to identify the direction of induced current in an electric generator. How can we increase the amount of electric current produced in the electric generator? Mention the property of the current produced by AC generator. Mention an important advantage of this type of current.

Stretch the thumb, forefinger and middle finger of right hand so that they are perpendicular to each other. If the forefinger indicates the direction of the magnetic field and the thumb shows the direction of motion of conductor, then the middle finger will show the direction of induced current.

The amount of electric current produced can be increased:

- By increasing the number of turns in the coil.
- By increasing the strength of magnet.
- By increasing the speed of rotation of coil.
- By winding the coil on a soft iron core.

There are five properties of AC power - Amplitude, Cycles, Frequency, Peak to Peak voltage, and RMS (Root Mean Square) voltage.

The major advantage that AC electricity has over DC electricity is that AC voltages can be to higher or lower voltage. High voltages are more efficient for sending electricity great distances. AC electricity has an advantage over DC.

OR

**On what principle an electric motor works? Define the rule used to identify the direction of force on the conductor in an electric motor. Explain the parts used in a commercial motor.**

An electric motor works on the principle that a current carrying conductor placed in a magnetic field experiences a force.

Fleming's left hand rule is used to find the direction of force in an electric motor.

Stretch the thumb, forefinger and middle finger of your left hand such that they are mutually perpendicular. If the first finger points in the direction of magnetic field and the second finger in the direction of current, then the thumb will point in the direction of motion or the force acting on the conductor.

The parts of the motor are:

- a) Field magnet: It is a strong horse shoe type magnet with concave poles.
- b) Armature: It is a rectangular coil having a large number of turns of thin insulated copper wire wound over a soft iron core.
- c) Split ring commutator: A device that reverses the direction of flow of current through a circuit.
- d) Brushes: It is made of graphite. It maintains a sliding contact with split rings.

**26. Explain the flow of energy and harmful chemicals in an ecosystem.**

1) Energy falling on the leaves of green plants is used by the plants in the process of photosynthesis and stored as the chemical energy of food.

2) When plants are eaten by herbivores, the chemical energy stored in the plants is transferred to them.

3) The herbivores are then consumed by carnivores, and the chemical energy stored in the flesh of the herbivores is transferred to the carnivores.

4) Some of the energy from producers and consumers is also utilised for the life processes of micro-organisms called decomposers. Decomposers, in turn, release the unutilised energy into the environment as heat. The energy that is not utilised by producers, consumers and decomposers is lost in the environment as heat. This heat is called community heat.

Chemical substances such as pesticides are sprayed over crop plants to protect them from pests and diseases. When herbivorous animals eat plant food, these poisonous chemical pesticides go into their bodies. Man, being an omnivore, eats plant food as well as the flesh of herbivores. Thus, the pesticides present in plant food and in the bodies of herbivores are transferred to the bodies of humans through food. In this way, harmful chemicals enter our bodies.

**27. What is nuclear energy? What are the hazards of nuclear power generation?**

Nuclear Energy is the energy in the core of an atom. It is discharged by nuclear reactions either by fission or fusion.

The major hazard of nuclear power generation is the storage and disposal of spent or used fuels – the uranium still decaying into harmful subatomic particles (radiations). Improper nuclear-waste storage and disposal result in environmental contamination.

**OR**

**List the four characteristics of a good source of energy. Name any two sources of energy which are dependent on solar energy.**

A good source of energy:

- a) should give large amount of energy per unit volume or mass.
- b) must be easily accessible.
- c) must be easy to store and transport.
- d) must be economical.

Fossil fuels, energy from food are dependent on solar energy.

**28. When sulphuric acid is added to 1g solid sodium chloride taken in a test tube, which gas is released? What changes do you observe when you test the gas with dry and wet litmus paper? What conclusion**

do you draw by this experiment?

When concentrated sulphuric acid is added to solid sodium chloride, Sodium bisulphate and HCl gas are produced.



The gas when passed through moist blue litmus paper will change to red. It shows acidic properties because  $\text{H}^+$  ions are produced when HCl dissolves in water.

OR

The pH values of four solutions A, B, C and D are 5, 12, 8 and 9 respectively. Arrange them in the increasing order of their hydroxyl ion concentration. Which solution among them has strong acidic property? Explain what happens if our mouth contains the pH of solution A how we can prevent it.

Increasing order of hydroxyl ion concentration is  $5 > 8 > 9 > 12$

A is more acidic.

If our mouth contains acid than it will break the upper layer of our teeth. We can decrease acidity by using basic compounds.

29. Write the functions of Forebrain, Medulla and Cerebellum in human brain.

The fore-brain is the main thinking part of the brain. Separate areas of the fore-brain are specialised for hearing, smell, sight etc.

All the involuntary actions including blood pressure, salivation and vomiting are controlled by the medulla in the hind-brain.

Cerebellum is responsible for precision of voluntary actions and maintaining the posture and balance of the body.

30. The molecular formula of three fatty acids A, B and C present in oil or fat is  $\text{C}_{12}\text{H}_{29}\text{COOH}$ ,  $\text{C}_{15}\text{H}_{29}\text{COOH}$  and  $\text{C}_{16}\text{H}_{29}\text{COOH}$ . Which of these is derived from i) Alkane ii) Alkene and iii) Alkyne? Which of them becomes rancid earlier? How can we increase its shelf life?

$\text{C}_{12}\text{H}_{29}\text{COOH}$  is alkane,  $\text{C}_{15}\text{H}_{29}\text{COOH}$  is alkene,  $\text{C}_{16}\text{H}_{29}\text{COOH}$  is alkyne

Fatty acid A becomes rancid fastest as it is saturated.

Shelf life of alkene and alkynes can be increased by storing in refrigerator, using antioxidants, flushing inert gas like nitrogen and storing in air-tight bag.

31. A tall plant with red flowers (TtRr) is self-pollinated. Represent the plants obtained in F2 generation with the help of a checker board (Punnet square). The traits which are not found in the parental plants are expressed in the offspring. Why?

	RT	Rt	rT	rt
RT	RRTT	RRTt	RrTT	RrTt
Rt	RRTt	RRtt	RrTt	Rrtt
rT	RrTT	RrTt	rrTT	rrTt
rt	RrTt	Rrtt	rrTt	rrtt

Parents represented only tall and red plants. But other combinations observed due to the law of independent assortment.

32. Observe the following figure. AB is light ray travelling from liquid to air. BC and BD are refracted rays.



- i) Which is the refracted ray if the liquid taken is benzene?

If the liquid taken is benzene the refracted ray is BC.

- ii) Which is the refracted ray if the liquid taken is water?

If the liquid taken is water, the refracted ray is BD.

Justify your answer. (The absolute refractive index of water and benzene are 1.33 and 1.5 respectively)

When light gets into rarer medium from denser medium, the speed of light increase so it will be away from the normal. Higher the refractive index, the ray will be farther away from the normal when light travels from denser to rarer medium.

OR

An object 2cm tall is kept on the principal axis of a converging lens of focal length 8 cm. Find the position, nature and size of the image formed if the object is at 12cm from the lens. Also find the magnification produced by the lens.

$$f = +8\text{cm}$$

$$h = +2\text{cm}$$

$$u = -12\text{cm}$$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{1}{8} = \frac{1}{v} - \frac{1}{-12}$$

$$\frac{1}{8} = \frac{1}{v} + \frac{1}{12}$$

$$\frac{1}{v} = \frac{1}{8} - \frac{1}{12}$$

$$\frac{1}{v} = \frac{3 - 2}{24}$$

$$\frac{1}{v} = \frac{1}{24}$$

$$v = 24\text{ cm}$$

Magnification is  $v / u = 24 / -12 = -2$

33. Explain the three types of decomposition reaction with the help of balanced chemical equation for each.

1) Thermal decomposition- Decomposition reaction caused by heating is called Thermal decomposition.



2) Photodecomposition - Decomposition reaction caused by light is called Photodecomposition.



3) Electrolytic Decomposition- Decomposition reaction caused by electricity is called Electrolytic Decomposition



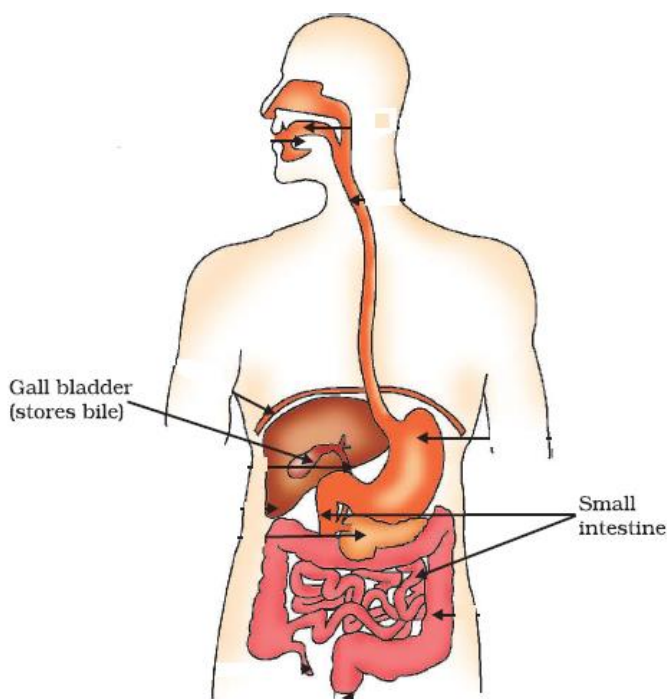
V. Answer the following questions.

4x4=16

34. Draw the diagram showing the structure of human alimentary canal and label the following parts.

a) The part which stores bile juice

b) The longest part of the alimentary canal



35. How did Mendeleev arrange the elements? He left empty places in his periodic table. Why? Explain the limitations of Mendeleev classification.

Mendeleev arranged 63 elements known at that time on the basis of the similarities in their properties; on the basis of similarities of their oxides, hydrides etc. He observed that most of the elements were placed in the increasing order of their atomic masses. Mendeleev left some empty spaces for undiscovered elements. He predicted the properties of those element and were found similar when discovered later.

Limitations of Mendeleev's classification:

- 1) Certain elements of highest atomic mass precede those with lower atomic mass.
- 2) Elements with dissimilar properties were placed in same group as sub-group A and sub-group B. For example, alkali metal like Li, Na, K etc., of IA group have little resemblance with coinage metals like Cu, Ag and Au of IB group.
- 3) Some similar elements like 'copper and mercury' and 'silicon and thalium' are placed in different groups of the periodic table.
- 4) Isotopes of elements are placed in the same position in the table.

36. There are two metallic wires of the same thickness made from iron and silver. If the length of iron wire is 12cm what should be the length of silver wire which is equal to the resistance of iron wire?

Data Resistivity of iron =  $10 \times 10^{-8} \Omega\text{m}$  Resistivity of silver =  $16 \times 10^{-8} \Omega\text{m}$

Resistance of silver wire =



$$\frac{\rho l}{A} = \frac{10 \times 10^{-8} \times 12 \times 10^{-2}}{A} = \frac{16 \times 10^{-8} \times l}{A}$$

$$R_t = R$$

$$\frac{10 \times 10^{-8} \times 12 \times 10^{-2}}{A} = \frac{16 \times 10^{-8} \times l}{A}$$

$$l = \frac{10 \times 12 \times 10^{-2}}{16} = 7.5 \times 10^{-2} \text{ m} = 7.5 \text{ cm}$$

37. a) Explain why variations are observed in the offsprings formed by sexual reproduction?  
b) What are the advantages of vegetative propagation?

a) In sexual reproduction two gametes fuse to form zygote. Before gamete formation recombination of genes of parental chromosomes take place. As the DNA molecule have variations in their structure, offsprings formed by sexual reproduction show variation from their parents.

b)

- i) Plants raised by vegetative propagation can bear flowers and fruits earlier than those produced from seeds.  
ii) It makes possible the propagation of plants such as banana, orange, rose and jasmine that have lost the capacity to produce seeds.  
iii) All plants produced are genetically similar enough to the parent plant to have all its characteristics.

OR

- a) Write the structure and functions of placenta.  
b) What are the changes that occur in a flower after fertilization?

a) Structure: It is a disc embedded in the uterine wall of the mother. It contains villi on the embryo's side of the tissue and blood spaces from mother's side.

Function: It provides oxygen and nutrients to the growing baby and removes waste products from the baby's blood.

b) The ovules develop a tough coat and converts into seeds. The ovary grows rapidly and ripens to form a fruit.

VI. Answer the following question.

1x5=5

38. Stars appear to be twinkling but planets do not twinkle. Why? Explain why the colour of the clear sky during day appears blue and during sunset appears red.

The twinkling of a star is due to atmospheric refraction of starlight. Since the stars are very distant, they are point-sized sources of light. As the path of rays of light coming from the star goes on varying slightly, the apparent position of the star fluctuates and the amount of starlight entering the eye flickers – the star sometimes appears brighter, and at some other time, fainter, which is the twinkling effect.

The planets are much closer to the earth, and are thus seen as extended sources. If we consider a planet as a collection of a large number of point-sized sources of light, the total variation in the amount of light entering our eye from all the individual point-sized sources will average out to zero, thereby nullifying the twinkling effect.

Particles that are small compared with the light wavelength scatter blue light more strongly than red light. Because of this, the tiny gas molecules that make up our Earth's atmosphere (mostly oxygen and nitrogen) scatter the blue portion of sunlight in all directions, creating an effect that we see as a blue sky.