

Series : LN4MK



SET ~ 1



रोल नं.

Roll No.

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प्रश्न-पत्र कोड
Q.P. Code

31/4/1



विज्ञान SCIENCE

निर्धारित समय : 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक : 80

Maximum Marks : 80

नोट / NOTE :

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(I) कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 31 हैं।

Please check that this question paper contains 31 printed pages.

(II) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।

Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.

(III) कृपया जाँच कर लें कि इस प्रश्न-पत्र में 39 प्रश्न हैं।

Please check that this question paper contains 39 questions.

(IV) कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में यथा स्थान पर प्रश्न का क्रमांक अवश्य लिखें।

Please write down the serial number of the question in the answer-book at the given place before attempting it.

(V) इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक परीक्षार्थी केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।

15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the candidates will read the question paper only and will not write any answer on the answer-book during this period.



General Instructions :

Read the following instructions carefully and follow them :

- (i) *This question paper contains **39** questions. **All** questions are compulsory.*
- (ii) *Question paper is divided into **THREE** sections – **A, B** and **C**.*

SECTION A : Biology (30 Marks)

SECTION B : Chemistry (25 Marks)

SECTION C : Physics (25 Marks)

- (iii) *The question paper has MCQs, VSAs, SAs, LAs and CBQs. Marks are given against each question.*
- (iv) *There are Case Based Questions (CBQs) with three sub-questions and are of 4 marks each.*
- (v) *Divide your answer sheet into three sections as per question paper – **SECTION A** (Biology), **SECTION B** (Chemistry) and **SECTION C** (Physics). It is compulsory to answer each question in its respective section.
*Do not mix answers of one section into the other section.**
- (vi) *Instructions are given with each section and question, wherever necessary.*
- (vii) *Kindly note that a separate question paper has been provided for visually impaired candidates.*
- (viii) *There is no overall choice in the question paper. However, an internal choice has been provided in few questions. Only one of the choices in such questions must be attempted.*

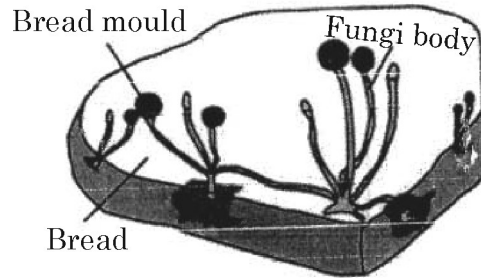


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SECTION – A
(Biology)

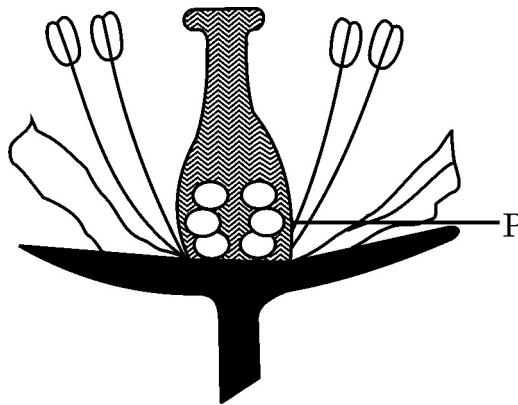
1. Observe the given figure and select the statement that correctly states how these fungi obtain nutrition.

1



- (A) By eating the bread on which it is growing.
- (B) By using nutrients from the bread to prepare their own food.
- (C) By breaking down the nutrients of bread outside the body and then absorbing them.
- (D) By allowing other organisms to grow on the bread and then consuming them.
2. If the part 'P' of the flower is removed, which of the following processes will not take place ?

1



- (A) Formation of pollens (B) Formation of flower
- (C) Formation of fruit (D) Formation of seed



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3. Given below are some of the statements regarding our environment : 1

- (i) Change in our life-styles have resulted in greater amounts of waste material generation.
- (ii) Changes in attitude have resulted in use of more disposable things.
- (iii) Changes in packaging has resulted in much of our waste becoming non-biodegradable.
- (iv) Organic farming.

Which amongst these is not leading to any damage of environment ?

- (A) (i), (ii), (iii) (B) (iv)
- (C) (i) and (iii) (D) (ii) and (iv)

4. Identify the traits that cannot be transmitted from parents to the off-springs : 1

- (i) Swimming technique (ii) Blood group
- (iii) Eye colour (iv) Dancing skills

Options :

- (A) (i) and (ii) (B) (i) and (iv)
- (C) (iii) and (iv) (D) (ii) and (iii)

5. Following are the statements about the different parts of the brain. Select the correct statements. 1

- (i) The thinking part of the brain is the forebrain.
- (ii) Centres for smell, hearing, memory, sight are located in forebrain.
- (iii) Salivation, vomiting, blood pressure are controlled by medulla in the hind brain.
- (iv) Cerebellum does not control the posture and balance of the body.

- (A) (i), (ii) and (iii) (B) (ii), (iii) and (iv)
- (C) (i), (ii) and (iv) (D) (i), (iii) and (iv)



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6. Two pea plants, one with round green seeds (RRyy) and another with wrinkled yellow (rrYY) seeds were crossed with each other which produced F_1 progeny that have only round yellow (RrYy) seeds. When F_1 plants are self-pollinated, the F_2 progeny will have which new combination of characters, as compared to the parents : 1

- (i) Round, yellow (ii) Round, green
(iii) Wrinkled, yellow (iv) Wrinkled, green

Correct options are :

- (A) (i) and (ii) (B) (i) and (iv)
(C) (ii) and (iv) (D) (i) and (iii)

7. In human beings the oxygen rich blood is pumped out to the body by : 1
(A) contraction of right atrium (B) relaxation of left ventricle
(C) contraction of right ventricle (D) contraction of left ventricle

Question Nos. 8 & 9 consists of **two** statements : Assertion (A) and Reason (R). Answer these questions selecting the appropriate option from (A), (B), (C) and (D) given below :

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

8. **Assertion (A)** : Variations are not often seen in off-springs produced by asexual reproduction. 1

Reason (R) : DNA molecule generated by replication is not similar to the original DNA.



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9. **Assertion (A)** : Highest percentage of pesticides is found in tertiary consumers in a food chain. 1

Reason (R) : Chemicals / pesticides get accumulated progressively at each trophic level.

10. “Transpiration in plants is a necessary evil.”

Comment on the statement giving two reasons. 2

11. Explain why food chains generally consist of three or four steps. 2

12. (A) Varun is diabetic. His latest ultrasound reports showed a blockage in his pancreatic duct. How will this affect the dual functioning of the pancreas ? 2

OR

- (B) Sunil unconsciously touched the hot iron rod and immediately withdrew his hand. Which type of action is involved ? Also define this action. Draw a flow chart to show the path followed for this action. 2

13. Give reasons for the following : 3

- (a) Adrenal gland is known as the stress gland of the body.
- (b) Prenatal sex determination is banned in India.
- (c) Vegetative propagation is advantageous in some plants.



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14. Study the given table and answer the following questions :

3

Parents	F ₁	F ₂
A pea plant with red flowers was crossed with a pea plant with white flowers.	30 seeds were sown and all bore plants with red flowers.	44 seeds were sown, 33 plants bore red flowers and 11 plants bore white flowers.

- (a) Depict the information given in the table in the form of a cross.
(b) Deduce the F₂ phenotypic ratio/F₂ ratio showing external look as well as genotypic /genetic makeup, ratio.

15. Plants exhibit movements in response to various environmental stimuli to adopt and survive in their surroundings. These movements, influenced by external factors such as light, gravity, water and chemicals are regulated by specific plant hormones. For example, the differential growth of plant parts allows them to bend, grow or orient themselves in particular directions. Roots and shoots often show contrasting response to the same stimulus, highlighting the complex mechanisms involved in plant growth and development.

4

- (a) Why is hydrotropism essential for plants ?
(b) What role does auxin play in the growth of plants ?
(c) Differentiate between movement shown by the sensitive plant and tropic movement by plants (Two points).

OR

- (c) How does movement of roots differ from that of shoots in response to gravity and light ?

16. (A) (a) Draw a labelled diagram showing open and closed stomatal pore.
(b) List the main events that occur during the process of photo-synthesis.
(c) Write a balanced chemical equation showing photo-synthesis in plants.

5

OR

- (B) (a) Draw a well-labelled diagram of nephron and label atleast 4 of its parts.
(b) Write the role of capillary cluster inside Bowman's capsule.
(c) What is meant by selective reabsorption ?



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SECTION – B**(Chemistry)**

17. The volume ratio of hydrogen and oxygen gases liberated during electrolysis of water is 1
- (A) 1 : 1 (B) 2 : 1
(C) 4 : 1 (D) 1 : 2
18. $\text{C}_6\text{H}_{12}\text{O}_{6(\text{aq})} + 6\text{O}_{2(\text{g})} \longrightarrow 6\text{CO}_{2(\text{g})} + 6\text{H}_2\text{O}_{(\text{l})}$. 1
- The above reaction is an example of -
- (A) Displacement Reaction (B) Endothermic Reaction
(C) Exothermic Reaction (D) Neutralisation Reaction
19. An aqueous solution turns red litmus blue. Excess addition of which of the following solution would reverse the change ? 1
- (A) Sodium hydroxide (B) Hydrochloric acid
(C) Baking soda (D) Slaked lime
20. While washing dirty clothes by soap, micelles are formed. Select the correct statement about micelles. 1
- (A) The hydrophobic tail of the soap molecule is in the interior of the cluster, whereas hydrophilic end is on the surface of the cluster.
(B) The hydrophobic tail is on the surface of the cluster, whereas hydrophilic end is in the interior of cluster.
(C) Both hydrophobic tail and hydrophilic end are in the interior of the cluster.
(D) Both hydrophobic tail and hydrophilic end are on the surface of the cluster.



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21. Which one of the following metals does not react with cold water ?

1

- (A) Sodium
- (B) Potassium
- (C) Calcium
- (D) Magnesium

22. Alloys are homogeneous mixture of metal with a metal or non-metal.

Which among the following alloys contain non-metal as one of its constituents ?

1

- (A) Brass
- (B) Bronze
- (C) Amalgam
- (D) Steel

23. How will you protect yourself from the heat generated while diluting a concentrated acid ?

1

- (A) By adding acid to water with constant stirring.
- (B) By adding water to acid with constant stirring.
- (C) By adding water to acid followed by base.
- (D) By adding base to acid with constant stirring.



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24. In the question, two statements are given – One labelled as Assertion (A) and other labelled as Reason (R). Write the correct answer selecting the appropriate option from (A), (B), (C) & (D) given below : 1

Assertion (A) : Pure ethanoic acid is also known as glacial acetic acid.

Reason (R) : Pure ethanoic acid often freezes during winter due to its low melting point of 290 K.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
- (C) Assertion (A) is true, but Reason (R) is false.
- (D) Assertion (A) is false, but Reason (R) is true.
25. (a) A compound 'A' is used in soda-lime fire-extinguisher and decomposes on heating to form compound 'B'. Compound 'B' is used for removing permanent hardness of water. Identify 'A' and 'B'. 1
- (b) Write chemical formula of Plaster of Paris. At what temperature gypsum is heated to obtain Plaster of Paris ? 1
26. Account for the following : 3
- (a) White silver chloride turns grey when exposed to sunlight.
- (b) Lead (II) nitrate on heating releases brown fumes.
- (c) Bags of oil and fat containing food items are flushed with nitrogen gas.

27. Attempt **either** option (A) or (B).

(A) (i) Which method will be used to convert each of them to their respective metal oxides ?

(a) Carbonate ore (b) Sulphide ore



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- (ii) Write a chemical reaction to illustrate the use of aluminium for joining cracked railway tracks.
- (iii) During extraction of metals, electrolytic refining is used to obtain pure metals. Which material will be used as anode and cathode for the refining of copper metal by this process ?

3

OR

- (B) (i) Write all the reactions involved in the extraction of Zn from ZnS.
- (ii) Hydrogen gas is not evolved when most of the metals react with nitric acid. Give reason.

2+1

28. The pH plays an important role in our daily life. Strength of acids and bases depends on the number of H^+ ions and OH^- ions produced by these respectively. pH scale helps in predicting the strength of acids and bases by measuring hydrogen ion concentration in a solution.

Answer the following :

- (a) What type of indicator is used to predict how strong an acid or base is ?
- (b) Three solutions A, B and C showed pH as 3, 5 and 7. Which solution has the highest concentration of H^+ ions ?
- (c) What are strong acids and weak acids ?

OR

- (c) (i) Under what condition is rainwater called acid rain ?
- (ii) In the following acids, identify weak acids :

Nitric acid, hydrochloric acid, acetic acid, sulphuric acid, formic acid.

1+1+2



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29. Attempt **either** option (A) or (B) :

- (A) (i) Carbon cannot form C^{4+} cation and C^{4-} anion. Explain.
- (ii) Define homologous series of carbon compounds. Why are the melting and boiling points of C_4H_{10} higher than C_3H_8 or C_2H_6 ?
- (iii) What happens when ethanol is heated with acidified potassium dichromate ?

2+2+1

OR

- (B) (i) How would you name the following :
- I. $CH_3 - CH_2 - \underset{\substack{| \\ H}}{C} = O$
- II. $CH_3 - C \equiv CH$
- (ii) When ethanol reacts with ethanoic acid in the presence of conc. H_2SO_4 , a substance with sweet smell is produced. Answer the following :
- I. State the class of compounds to which the sweet smelling compounds belong.
- II. Write the chemical equation for the reaction.
- (iii) Why soaps do not produce foam with hard water ?

2+2+1



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SECTION – C**(Physics)**

30. The pair of eye parts responsible for admitting different amount of light in to the eyes is 1
- (A) Iris and pupil (B) Ciliary muscles and pupil
(C) Retina and Iris (D) Ciliary muscles and cornea

31. The vision defect which arises due to gradual weakening of the ciliary muscles and diminishing flexibility of eye lens is : 1
- (A) Myopia (B) Hypermetropia
(C) Presbyopia (D) Myopia and hypermetropia both

Direction : For question number 32, two statements are given – one labelled as Assertion (A) and other labelled as Reason (R). Select the correct answer to this question from the codes (A), (B), (C) & (D) as given below : 1

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.
32. **Assertion (A) :** With the help of compass, magnetic field lines can be traced outside the bar magnet.
Reason (R) : The north pole of a compass needle always points towards the south pole of the magnet when brought close to it.

33. (A) A fuse in electric circuit is rated 4 A. Can it be used with an electric heater of rating 2 kW, 200 V ? Explain your answer. 2

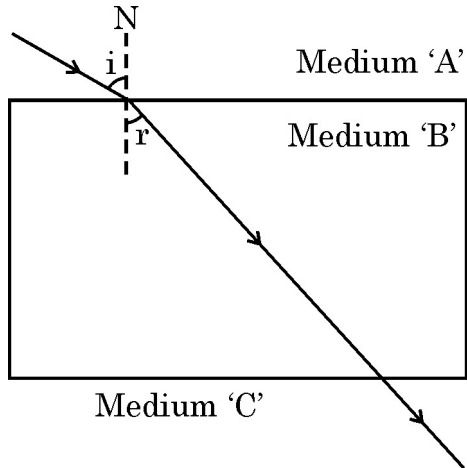
OR

- (B) How is an electromagnet made ? Write any two ways by which the strength of electromagnet can be increased. 2
34. (a) Define volt, the unit of potential difference. 2
(b) Calculate the work done required to move an electron between two points A and B located at a potential difference of 100 V in an electric field.



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35.

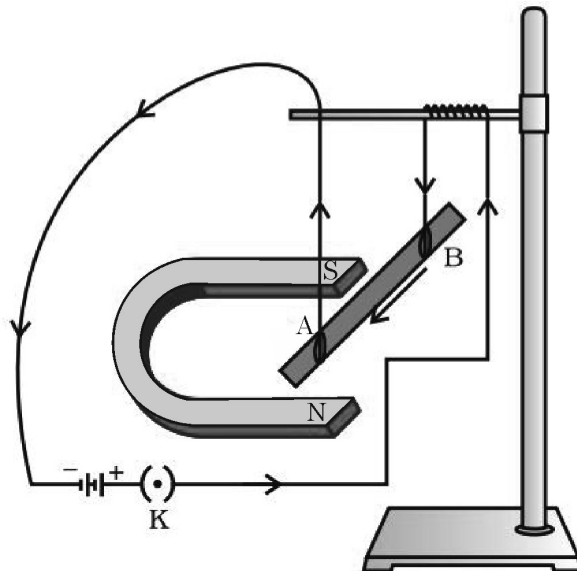


- (a) Observe the given ray diagram and compare : 3
- (i) the speed of light in medium A and the speed of light in medium B.
 - (ii) the optical densities of medium B and medium C.
- (b) Draw a ray diagram for refraction where the optical density of medium 'A' becomes equal to the optical density of medium 'C' and optical density of medium 'B' is greater than the optical density of medium 'A' and medium 'C'.

36. Explain the phenomenon of rainbow formation in the sky. Draw the labelled ray diagram in support of your explanation. 3

37.

3

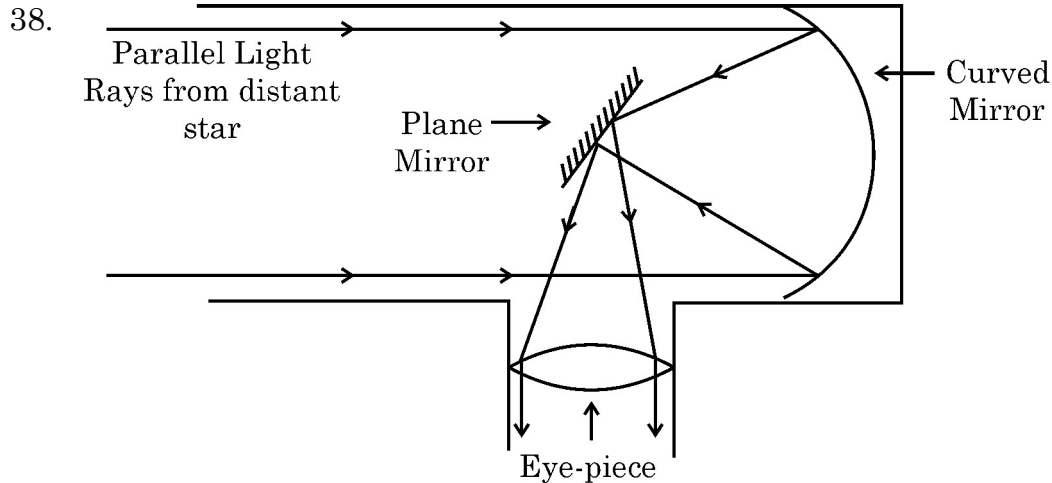




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On the basis of the given circuit arrangement, answer the following questions :

- (a) What happens to the rod AB when the key K is closed and why ?
- (b) Name and state the rule that determines this behaviour of the rod AB in the above situation.



The above ray diagram is to show image formation by a reflecting telescope. Reflecting telescope revolutionized our way of looking into the sky. Reflecting telescopes employ large mirrors to gather and focus light rather than relying solely on lenses as we do in the refracting telescopes. These telescopes utilize precisely shaped and polished mirrors to capture incoming light and reflect it to a focal point, where the telescope forms an image for observation.

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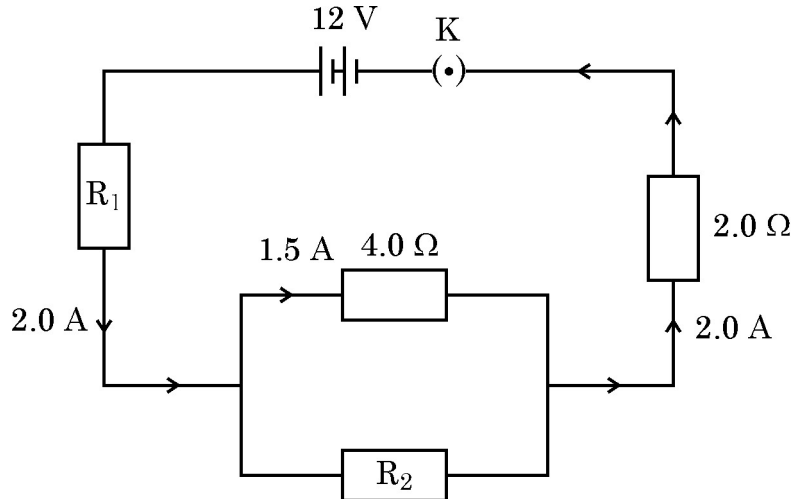
- (a) What kind of image of a star is seen by the observer in the eye-piece ?
- (b) What kind of mirror is used in this reflecting telescope ?
- (c) Explain with the reason, what kind of optical device (type of lens or mirror) is used at the eye-piece.

OR

- (c) What is the role of plane mirror in image formation by this telescope ?



39. (A)



5

- (i) The given electric circuit is a part of an electrical device. Use the information given in the electric circuit diagram to calculate :
- (I) Potential difference across the ends of resistor R_2 .
 - (II) Value of resistor R_2 .
 - (III) Value of resistor R_1 .
- (ii) Write the factors on which resistance of a conductor depends and derive the formula for resistance of a given conductor.

OR

- (B) (i) How much electric current will an electric iron draw from 220 V source if the resistance of its heating element when hot, is 55Ω ? Calculate the power consumed by the electric iron when it is operated at 220 V.
- (ii) In a house, 3 bulbs of 100 watt each, are lit for 5 hours daily and an electric heater of 1.0 kW is used for half an hour daily. Calculate the total energy consumed in a month of 30 days and its cost at the rate of ₹ 3.60 per kWh.
- (iii) With reason explain, why are alloys commonly used to make elements of electrical heating devices.



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