

High Ordered Thinking Skills

Electricity

1. What is the difference between a conductor and an insulator?
2. What is the difference between open and closed circuits? Draw diagrams for both.
3. Define parallel connection and series connection.
4. What are the disadvantages of heating effect of current?
5. What are the advantages of heating effect of current?
6. What is electric current?
7. What is potential difference? Give its unit with definition.
8. Find the expression for calculating heat.
9. A wire is 1m long, 0.2mm in diameter and has resistance of 10Ω . Calculate its resistivity.
10. Calculate the area of cross section of a wire of length 2m, its resistance is 25Ω and the resistivity of material of wire is $1.84 \times 10^{-6} \Omega\text{m}$.
11. Calculate the energy consumed by 120W toaster in 20 minutes.
12. What is resistance of conductors? Name two metals which are highly resistant.
13. Why is tungsten metal used in bulbs but not in fuse wires?
14. Define the terms Watt and Volt.

Electricity

Two Mark Questions

1. Name the unit of (a) electrical resistance (b) resistivity
2. Define One Ohm
3. Define Resistivity
4. Determine the direction of conventional current?
5. What is electrical power? Write its unit.

Three Mark Questions

6. You take two resistors of resistance $2R$ and $3R$ and connect them in parallel in an electric circuit. Calculate the ratio of the electrical power consumed by $2R$ and $3R$?
7. A small bulb has a resistance of 2Ω when cold. It takes up a current of 0.4 A from a source of 4V and then starts glowing. Calculate (i) the resistance of the bulb when it is glowing and
(ii) Elaborate on the reason for the difference in resistance?
8. Define resistance and resistivity and also give the relation between them. Explain the dependence of resistance on temperature.
9. A bulb is rated at $330\text{V}-110\text{W}$. What do you think is its resistance? Three such bulbs burn for 5hrs at a stretch. What is the energy consumed? Calculate the cost in rupees if the rate is 70 paise per unit?
10. Calculate the resistance of 2 km long copper wire of radius 2 mm. (Resistivity of copper = 1.72×10^{-8})
11. What connection is used in domestic appliances and why?
12. A 250 watt electric bulb is lighted for 5 hours daily and four 6 watt bulbs are lighted for 4.5 hours daily. Calculate the energy consumed (in kWh) in the month of February.
13. A torch bulb is rated at 3V and 600mA . Calculate its
(a) Power (b) Resistance (c) Energy consumed if it is lighted for 4 Hrs.
14. State and derive joule's law. An electric iron consumes energy at rate of 420w when heating is at maximum rate and 180 w when heating is at minimum. The voltage is 220V . What is the current and resistance in each case?
15. A piece of wire having a resistance R is cut into five equal parts.
(i) How will the resistance of each part of the wire compare with the original resistance?
(ii) If the five parts of the wire are placed in parallel, how will the resistance of the combination compare with the resistance of the original wire? What will be ratio of resistance in series to that of parallel?

Test

Electricity

Time: 60 Minutes

MM- 35

1. What are the two types of electric charges? 1
2. What do you understand by potential difference? 1
3. The direction of current is the same as that of the flow of electrons. Explain with a circuit diagram. Is this statement true or false?

4. State Ohm's law. 2
- 5.a) Calculate the energy transferred when 2 A current flows through a 10 Ω resistor for 30 minutes. 2
 b) Calculate the amount of charge that would flow in one hour through the element of an electric iron drawing a current of 0.4 amps. 2
6. Draw a circuit diagram showing a cell, a bulb and a closed switch. 2
7. a) How much work is done in moving a charge of 3 coulomb from a point at the volts 115 to a point at 125 volts? 2
 b) Ammeter burns out when connected in parallel. Give reasons. 2
8. Given n resistors each of resistors R Ω . How will you combine them to get the (i) maximum and (ii) minimum effective resistance? What is the ratio of the maximum to minimum resistance? 3
9. a) A wire of length L and resistance R is stretched so that its length it's doubled. How will the (a) Resistance change (b) Resistivity change? 3
 b) In an experiment the current flowing through a resistor and potential difference across it are measured. The values are given below. Show that these values confirm Ohm's Law
 I (ampere) 1.0 1.0 2 1.5 2.0 2.0 2.5 2.5 3.0 3.0
 V (volt) 4.0 4.0 6.0 6.0 8.0 8.0 10.0 10.0 12.0 12.0 3
10. a) A tube light draws 0.1 A current from a 220 V supply. What current will this tube light draw when it is connected to a 110 V supply? 3
 b) An electric wire is stretched to increase its length by 25%.By what % will the resistance be increased and what will be increase in its resistivity? 3
11. a) Two resistances of 4 Ω and 8 Ω are connected in parallel. What would be the combined resistance of the system? 3
 b) Two identical resistors each of resistance 2 Ohm are connected in turn (1) in series (2) in parallel to a battery of 12 V. Calculate the ratio of power consumed in two cases. 3
12. a) A household uses the following electric appliances:
 (i) Refrigerator of rating 400 W for ten hours each day.
 (ii) Two electric fans of rating 80 W each for twelve hours each day.
 (iii) Six electric tubes of rating 18 W each for 6 hours each day
 Calculate the electricity bill of the household for the month of June if the cost per unit of electric energy is Rs.3.00. 3
 b) An electric iron of resistance 20 Ω takes a current of 5 A. Calculate the heat developed in 30sec. 3
13. a) Derive the expression for Joules law of heating. 5
 b) Derive a formula for four equivalent resistances connected in series. 5
- 14.(a) The electric power consumed by a device may be calculated by using either of the two expressions $P = I^2R$ or $P = V^2/R$. The first expression indicates that it is directly proportional to R whereas the second expression indicates inverse proportionality. How can the seemingly different dependence of P on R in these expressions be explained? 5
 (b) (i) A 100 W electric bulb is connected to 220 V mains power supply. Calculate the strength of the electric current passing through the bulb. (ii) If the same bulb is taken to U.S.A where the main power supply is 110 V, how much electric current will pass through the bulb when connected to mains? 5

HUMAN EYE AND COLORFUL WORLD

HOTS

1. What is a diameter of human eye?
2. What is the function of crystalline lens of human eye?
3. In which type of eye defect far point of the eye gets reduced?
4. Why do birds fly back to their nest in the evening?
5. Why do you take time to find object when you enter in dim lighted room from outside in the sun?
6. Why does ray of light splits when passed from prism?
7. Why doesn't planet appear to be twinkling?
8. Why we can't see things very close to our eyes?
9. When we see any object through the hot air over the fire, it appears to be wavy, moving slightly. Explain.
10. Why does sky appear blue on a clear day?

HUMAN EYE AND COLORFUL WORLD

PREVIOUS YEAR QUESTIONS

1. What eye defect is hypermetropia? Describe with a ray diagram how this defect of vision can be corrected by using an appropriate lens. (CBSE 2011)
2. A star sometimes appears brighter and some other times fainter. What is this effect called? State the reason for this effect. (CBSE 2012)
3. A student cannot see a chart hanging on a wall placed at a distance of 3 m from him. Name the defect of vision he is suffering from. How can it be corrected? (CBSE 2012)
Draw ray diagrams for the (i) defect of vision and also (ii) for its correction
4. Why is red color selected for danger signal lights? (CBSE 2008)
5. (a) A person cannot read newspaper placed nearer than 50 cm from his eyes. Name the defect of vision he is suffering from. Draw a ray diagram to illustrate this defect. List its two possible causes. Draw a ray diagram to show how this defect may be corrected using a lens of appropriate focal length.
(b) We see advertisements for eye donation on television or in newspapers. Write the importance of such advertisement. (CBSE 2013)
6. Explain giving reason why the sky appears blue to an observer from the surface of the earth? What will the color of the sky be for an astronaut staying in the international space station orbiting the earth? Justify your answer giving reason. (CBSE 2013)
7. (a) List three common refractive defects of vision. Suggest the way of correcting these defects.
(b) About 45 lac people in the developing countries are suffering from corneal blindness. About 30 lac children below the age of 12 years suffering from this defect can be cured by replacing the defective cornea with the cornea of a donated eye. How and why can students of your age involve themselves to create awareness about this fact among people? (CBSE 2014)
8. With the help of a labeled diagram, explain why the sun appears reddish at the sun-rise and the sunset. (CBSE 2015)
9. (a) What is dispersion of white light? What is the cause of this dispersion? Draw a diagram to show the dispersion of white light by a glass prism.
(b) a glass prism is able to produce a spectrum when white light passes through it but a glass slab does not produce any spectrum. Explain why? (AI CBSE 2008)

HUMAN EYE AND COLORFUL WORLD

Maximum time: 40 minutes

Maximum marks: 23 marks

1. Name the transparent membrane through which light enters the first in the eyes. (1)
2. What is the function of iris? (1)
3. What is persistence of vision? (1)
4. What is Tyndall effect? (1)
5. The image formed on retina is inverted but we can see the objects erect. Why? (1)
6. What is night blindness and color blindness? (2)
7. Distinguish between presbyopia and hypermyopia (3)
8. Draw a well labeled diagram of eye. (4)
9. Draw a labeled diagram of rainbow formation. Also explain the phenomena. (4)
10. Name three refractive defects of vision with help of diagram. Explain its reasons and correction of these defects.5

LIGHT

HIGH ORDER THINKING QUESTIONS

1. What is the magnification of a plane mirror?
2. What is the radius of curvature of plane mirror?
3. Why paper catches fire when a convex lens is used to focus sunlight?
4. What is silvering of mirror?
5. What is refractive mirror?
6. State the formula, lens formula and power of lens
7. The refractive index of water is 1.33 and kerosene is 1.44. Calculate refractive index of the kerosene with respect to water.
8. What kind of mirrors are used in big shopping stores to watch activities of customers?
9. Give mirror image of word AMBULANCE.
10. The magnification produced by a plane mirror is +1. What does it mean?

LIGHT
PREVIOUS YEAR QUESTIONS

1. List four characteristics of the images formed by plane mirrors. (CBSE 2015)
2. Draw a ray diagram to show the path of the reflected ray corresponding to an incident ray which is directed parallel to the principal axis of a convex mirror. Mark on it the angle of incident and the angle of reflection (CBSE 2014)
3. A spherical mirror produces an image of magnification -1 on a screen placed at a distance of 50 cm from the mirror.
 - (a) Write the type of mirror.
 - (b) Find the distance of the image from the object.
 - (c) What is the focal length of the mirror?
 - (d) Draw the ray diagram to show the image formation in this case. (CBSE 2014)
4. State the laws of refraction of light. If the speed of light in vacuum is 3×10^8 ms⁻¹, find the speed of light in a medium of absolute refractive index 1.5. (CBSE 2014)
5. Which phenomenon is responsible for making the path of light visible? (CBSE 2012)
6. When we place a glass prism in the path of a narrow beam of white light a spectrum is obtained.
7. What happens when a second identical prism is placed in an inverted position with respect to the first prism? Draw a labeled ray diagram to illustrate it. (CBSE 2012)
8. The power of the lens is -4.0D. What is the nature of this lens? (CBSE 2008)
9. Which type of mirror is used to give erect and enlarged image of an object? (CBSE 2008)
10. Draw the ray diagram and also state the position, the relative size and the nature of image formed by a concave mirror when the object is placed at the centre of curvature of the mirror. (CBSE 2011)

LIGHT

MAXIMUM TIME: 40 MINUTES

MAXIMUM MARKS: 25 MARKS

1. Name the type of mirror used in following situations (3)
 - a. Headlights of the car
 - b. Side/rear view mirror of a vehicle
 - c. Solar furnace
2. What are two types of reflexive index? (2)
3. Differentiate between concave and convex lens. (3)
4. Draw the diagram of path of light when it travels through a glass slab. (3)
5. What are the properties of the image formed by plane mirror? (2)
6. Write laws of reflection (2)
7. Draw and explain the ray diagram formed by a convex mirror when (5)
 - a. Object is at infinity
 - b. Object is at finite distance from the mirror
8. Name the mirror which can show the size of the object to be double of its original. (1)
9. If the speed of light in water is 2.25×10^8 m/s and the speed in vacuum is 3×10^8 m/s. Calculate the refractive index of water. (2)
10. Find the focal length of a lens of power -2.0 D. what type of lens is this? (2)

HOTS

MAGNETIC EFFECTS OF ELECTRIC CURRENT

1. The MCB of a Rupa's room is tripped and keeps on tripping again and again. If it is a domestic circuit, what could be the reason of this phenomenon?
2. State any three appliances that function on Fleming's left hand rule.
3. What is the need to convert Dynamo into alternating current?
4. Find the applications of solenoid.
5. Difference between short circuiting and overloading.
6. Show an activity to demonstrate the direction of the magnetic field generated around a current carrying conductor.
7. What is a fuse? What material is used for make fuse wire?
8. State the properties of magnetic lines of force.
9. Name two safety measures commonly used in electric circuits and appliances.
10. What is the direction of magnetic field in bar magnet?

MAGNETIC EFFECTS OF ELECTRIC CURRENT

1. Name the type of current. (a) used in household supply (b) given in cell (CBSE (CCE) 2011)
2. Name the physical quantities of electromagnetic induction. (CBSE (CCE) 2012)
3. Give one application of electromagnetic induction. (CBSE (CCE) 2012)
4. Name any two appliances which are based on the application of heating effect of electric current. (AI 2009C)
5. What constitutes the field of a magnet? (DELHI 2006)
6. A compass needle is placed near a current carrying wire. State your observation for the following cases, and give reason for the same in each case.
 - a. Magnitude of electric current in the wire is increased
 - b. The compass needle is displayed away from the wire. (CBSE (CCE) 2012)
7. Explain the role of fuse in series with any electrical appliance in an electric circuit. Why should a fuse with defined rating for an electric circuit not be replaced by one with a larger rating? (CBSE (CCE) 2011)
8. What is meant by the term frequency of an alternating current? What is the value in India? Why is an alternating current considered to be advantageous over direct current for long range transmission of electric energy? (CBSE 2009)
9. What is an electromagnet? Draw a circuit diagram to show how a soft iron piece can be transformed into electromagnet. (DELHI 2008)
10. With the help of neat diagram describe how you can generate induced current in the circuit. (DELHI 2006C)
11.
 - a. Mention effect of electric current on which the working of an electrical fuse is based.
 - b. Draw a schematic labeled diagram of a domestic circuit which has a provision of a main base, meter, one light bulb and a socket.
 - c. Explain the term overloading of an electric circuit. (CBSE (CCE) 2012)
12.
 - a. Describe an activity to demonstrate the pattern of magnetic field lines around a straight conductor carrying current.
 - b. State the rule to find the direction of magnetic field associated with a current carrying conductor?
 - c. What is the shape of a current carrying conductor whose magnetic field pattern

MAGNETIC EFFECTS OF ELECTRIC CURRENT

Time: 45 minutes

MM: 20

1. What does an electric current carrying wire behaves like? (1)
2. How to define field lines? (1)
3. What do you meant by solenoid? (1)
4. What do you understand by electromagnet? (1)
5. Draw the magnetic field lines due to current through circular loop. (1)
6. State the properties of magnetic field lines? (1)
7. State the similarity between solenoid and bar magnet. Also a difference between solenoid and coil? (2)
8. Explain Fleming's left hand rule. (2)
9. What is electric fuse? What material is used for fuse wire? (2)
10. There are some differences between electric motor and generator. State them. (2)
11. Give any two features of magnetic field due to current carrying solenoid coil. (2)
12. Describe an activity to show that a magnetic field is produced by an electric current flowing a circular coil of wire. (4)

SOURCES OF ENERGY

HOTS

1. The cost of production of electricity in thermal power station in Bihar is lesser than in Gujarat. Prove this statement by giving reasons.
2. Out of two solar cookers, one was covered and the other one was left open. Which one of the two will be more efficient and why?
3. The surface area of concentrator type solar heater is 5m^2 . It can reflect 80% of solar radiation incident while it absorbs the rest. Calculate energy concentrated by heaters as it focus in 2 hours if solar energy was delivered to it at the rate of $0.4\text{ kJ/m}^2\text{s}$
4. List three energy sources that are considered to be inexhaustible. State three reasons in support of your answer.
5. Why is there so much emphasis on changing over from petrol/diesel driven automobiles to CNG driven vehicles.
6. The increase in demand for energy is affecting our environment adversely. List two effects

7. What happens to waste of a nuclear plant system? How waste produced in nuclear power plants are different from those produced in thermal power plants?
8. What is acid rain? What are its harmful effects?
9. What is the use of black painted surface in a solar cooker?
10. Name the energy which is used in treatment of cancer.
11. What is the full form of CNG?
12. How much energy does earth's upper atmosphere receive per square metre per second?

SOURCES OF ENERGY

PREVIOUS YEAR QUESTIONS

1. Which force is responsible for stability of our universe?
1. Name one fuel used in nuclear reactor. (CBSE CCE 2012)
2. Name the reaction responsible for large energy production in the sun. (CBSE CCE 2012)
3. How has the traditional use of wind energy been modified for our convenience? (AI 2008C)
4. Biogas is considered to be a boon to the farmers. Give reasons. (CBSE CCE 2011)
5. What is a solar cell panel? Mention any three of its applications? (CBSE CCE 2012)
6. Why are many thermal plants set up near coal or oil fields? (AI 2008C)
7. Distinguish between renewable and non-renewable resources of energy. Also give examples (CBSE CCE 2011)
8. What is geothermal energy? What are the advantages of wind energy? (CBSE CCE 2011)
9. Name the device used to convert
 - a. Solar energy into heat
 - b. Solar energy into electricity (DELHI 2006C)
10. Write the principle of generation of electric power by a boiling water type nuclear reactor. Name the coolant used in such a reactor. (DELHI 2005C)
11. a. name four gases which are mainly present in biogas.
b. List two advantages of using biogas over fossil fuels. (AI 2006C)
12. List any three hazards of nuclear waste. How does the disposal of nuclear waste pose a problem for the plant and animal life? (CBSE CCE 2012)

SOURCES OF ENERGY

Time: 1 hour

Maximum Marks: 30

1. What is the nuclear fission process? [1]
2. Name any two gases, which are major constituents of biogas. [1]
3. What is a solar cell panel? [1]
4. Give the names of any two devices that utilize solar energy. [1]
5. Outline the energy conversion that takes place in a hydro power plant. [1]
6. Why can CNG be considered as an environment friendly fuel? [1]
7. Define anaerobic degradation. [1]
8. What is the typical range of voltage and power of a solar cell, when exposed to the sun? [1]
9. What is the condition under which ocean thermal energy can be trapped and used? [1]
10. What is the cause of geothermal energy? [1]
11. Define bio mass. Give two examples. [2]
12. What are the limitations of using wind energy?[2]
13. Why is it difficult to use hydrogen as a source of energy? [2]
14. What is acid rain? What are its harmful effects? [3]
15. What characteristics should an ideal fuel possess? [3]
16. Give the advantages and disadvantages of solar cell panels. [3]
17. (i) What is the use of black painted surface in a solar cooker? [5]
(ii) What is the unit in which nuclear energy is expressed? How is it related to joule?
(iii) Give the disadvantage of generating hydro electricity.

OR

Discuss the working of a hydro power plant using a labeled diagram