

## **PHYSICS ASSIGNMENT**

**Note : 1. Every chapter has 3 and 5 marks questions only.**  
**2. All the questions are strictly according to the CBSE board pattern.**

### **C-10 LIGHT REFLECTION AND REFRACTION**

#### **3 Marks** **Questions**

- 1. An object is placed at a distance of 12 cm in front of a concave mirror. It forms a real image four times larger than the object. Calculate the distance of the image from the mirror**
- 2. Draw a ray diagram to represent the nature, position and size of the image formed by a convex lens for the object placed at**
  - (a) infinity**
  - (b) Between and optical centre (O)**
- 3. A convex mirror used on a bus has a focal length of 200 cm. If a scooter is located at 100 cm. from this mirror find the position, nature and magnification of the image formed in the mirror.**
- 4. A concave lens has focal length of 20 cm. At what distance from the lens a 5cm tall object be placed so that it forms an image at 15 cm from the lens? Also calculate the size of the image formed?**
- 5. An object is kept at a distance of 15 cm from a**
  - (a) convex mirror**
  - (b) concave lens**
  - (c) Plane mirror.****The focal length of the convex mirror and the concave lens are 10 cm each. Draw the appropriate ray diagrams, showing the formation of image, in each of the three cases.**
- 6. State the mirror formula for determining the focal length of spherical mirrors write the meanings of the symbols used An object is placed at a distance of 25 cm. from a concave mirror of focal length 15 cm. Calculate the distance of the image from the mirror.**
- 7. Find the position, nature and size of the image formed by a convex lens of focal length 12 cm of an object 5 cm high placed at a distance 20 cm from it.**

**8. An object is kept at a distance of**

**1.  $a/2$**

**2.  $3a/2$**

**from a convex lens having focal length of magnitude 'a' Draw ray diagrams showing the formation of images formed in the two cases.**

**9. A concave mirror is used to form an erect and enlarged image of a given object. Where is the image located with respect to the mirror? Draw the corresponding ray diagram.**

**10. How can you show that if a ray enters a rectangular glass slab obliquely and emerges from the opposite face, the emergent ray is parallel to the incident ray?**

**11. Light enters from air to glass having refractive index 1.50. What is the speed of light in glass? The speed of light in vacuum is  $3 \times 10^8 \text{ m/s}$ .**

**12. We wish to obtain an erect image of an object, using a concave mirror of focal length 15 cm. What should be the range of distance of the object from mirror? What is the nature of image? Is the image larger or smaller than the object? Draw a ray diagram to show the image formation in this case.**

**13. Name the type of mirror used in the following situations:**

**(a) Headlights of a car**

**(b) Side/rear-view mirror of a vehicle.**

**(c) Solar furnace.**

**Support your answer with reason.**

**14. An object is placed at a distance of 10 cm from a convex mirror of focal length 15 cm. Find the position and nature of image.**

**15. The magnification produced by a plane mirror is +1. What does this means?**

**16. An object 5.0 cm in length is placed at a distance of 20 cm in front of a convex mirror of radius of curvature 30 cm. Find the position of the image, its nature and size.**

**17. An object of size 7.0 cm is placed at 27 cm in front of a concave mirror of focal length 18 cm. At what distance from the mirror should a screen be placed, so that a sharp focused image can be obtained? Find the size and the nature of the image.**

**18. Find the focal length of a lens of power -2.0 D. What type of lens is this?**

**19. A doctor has prescribed a corrective lens of power +1.5 D. Find the focal length of the lens. Is the prescribed lens diverging or converging?**

**20. You are given three lenses.**

**i) a concave lens of focal length 25 cm.**

**ii) a convex lens of focal length  $\frac{1}{4}$  m and**

**iii) a convex lens of focal length 100 cm.**

**Which combination out of these three lenses will form a lens of zero power?**

**21. A rod of length 10 cm lies along the principal axis of a concave mirror of 10 cm in such a way that the end closer to the pole is 20 cm away from it. Find the length of image?**

### **5 Marks Questions**

**1. A convex lens has a focal length of 10 cm. At what distance from the lens should the object be placed so that it forms a real and inverted image 20 cm. away from the lens? What would be the size of the image formed if the object is 2 cm high? With the help of a ray diagram show the formation of the image by the lens in this case?**

**2. Draw a ray diagram to show the use of a convex lens for the formation of images having the following characteristics.**

**(a) Real & inverted and diminished**

**(b) Virtual, erect & magnified.**

**3. A convex lens forms a real and inverted image of a needle at distance of 50 cm. from it. Where is the needle placed in front of the convex lens if the image is equal to the size of objects? Also, find the power of lens.**

**4. One-half of a convex lens is covered with a black paper. Will this lens produce a complete image of the object? Verify your answers experimentally. Explain your observations.**

**5. An object 5 cm in length is held 25 cm away from a converging lens of focal length 10 cm. Draw the ray diagram and find the position, size and the nature of the image formed.**

**6. A convex lens of focal length 15 cm forms an image 10 cm from the lens. How far is the object placed from the lens? Draw the ray diagram.**

## **C-11 HUMAN EYE AND COLOURFUL WORLD**

### **3 Marks Questions**

1. (a) What is hypermetropia?  
(b) What are the two causes of this defect of vision?
  
2. (a) What is scattering of light?  
  
(b) Astronauts observe the sky as dark instead of blue why?  
A person is known to use a lens of power  
(i)  $-5.5\text{ D}$  for his distant vision  
  
(ii)  $+1.5\text{ D}$  for his near vision  
Calculate the focal length of the lens used for correcting his  
(a) Distant vision and (b) Near vision problems.
  
3. What is presbyopia? State the causes of this defect? How is presbyopia of a person corrected?
  
4. The rainbow is a natural spectrum appearing in the sky after a rain shower  
  
(a) Is it correct to say that a rainbow is always formed in a direction opposite to sun?  
  
(b) Can it be seen on a sunny day?  
  
(c) Arrange the sequence in correct sequential order Refraction, Internal Reflection, Refraction & Dispersion
  
5. (a) Write two causes of hypermetropia?  
  
(b) Show diagram to show the correctness of hypermetropia?
6. A reporter records the following observations of an astronaut from his space ship.  
  
(a) The length of the day is same as observed on the earth.  
  
(b) Sky appears black in colour.

**(c) The star appears to twinkle while the planets do not do so as they do on the earth. Justify each statement**

**7. A person needs a lens of power  $-5.5$  dioptre for correcting his distinct vision. For correcting his near vision he needs a lens  $+1.5$  dioptre. What is the focal length of the lens required for correcting (i) distinct vision, and (ii) near vision?**

**8. Why do stars twinkle?**

**9. Explain why the planets do not twinkle.**

**10. Why does the sky appear dark instead of blue to astronaut?**

**11. A certain person has minimum distance of distinct vision of  $150\text{cm}$ . He wishes to read at a distance of  $25\text{cm}$ . What focal length glass should he use? What is the nature of eye defect?**

### **5 Marks Questions**

**1. A 14 year old student is not able to see clearly the questions written of the black board placed at a distance of  $5\text{ m}$  from him.**

**(a) Name the defect of vision he is suffering from?**

**(b) Draw the diagram to show this defect?**

**(c) Name the type of lens used to correct this defect?**

**(d) Name two possible cause of this defect.**

**(e) Draw the diagram to show how this defect can be corrected.**

**2. Make a diagram to show how hypermetropia is corrected. The near point of a hypermetropic eye is  $1\text{ m}$ . What is the power of the lens required to correct this defect? Assume that near point of the normal eye is  $25\text{ cm}$ .**

## **C-12 Electricity**

### **3 Marks Questions**

**1. Two metallic wires A and B are connected in series. Wire A has length  $l$  and radius  $r$ , while wire B has length  $2l$  and radius  $2r$ . Find the ratio of total resistance of series combination and the resistance of wire A, if both the wires are of same material?**

**2. Should the heating element of an electric iron be made of iron, silver or nichrome wire? Justify giving three reasons?**

**3. (a) Define electric resistance of a conductor?**

**(b) A wire of length  $L$  and resistance  $R$  is stretched so that its length is double and the area of cross section is halved. How will its**

**(i) Resistance change**

**(ii) Resistivity change?**

**4. Two resistors of resistance  $R$  and  $2R$  are connected in parallel in an electric circuit. Calculate the ratio of the electric power consumed by  $R$  and  $2R$ ?**

**5. The length of different metallic wires but of same area of cross section and made of the same material are given below**

Wire	Length
A	1 m
B	1.5 m
C	2.0 m

**(i) Out of these two wires which wire has higher resistance.**

**(ii) Which wire has higher electrical Resistivity? Justify your answer.**

**6. Two resistors of resistances  $R$  and  $2R$  are connected in series in an electrical circuit? Calculate the ratio of the electric power consumed by  $R$  and  $2R$ ?**

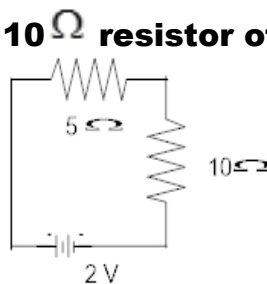
**7. A copper wire has diameter 0.5 mm and resistivity of  $1.6 \times 10^{-8} \text{ m}$ . what will be the length of this wire to make its resistance 10? How much does the resistance change if the diameter is doubled?**

**8. Calculate**

(i) effective resistance

(ii) current

(iii) Potential difference across  $10\ \Omega$  resistor of a circuit shown in the figure.



9. A piece of wire of resistance  $20\ \Omega$  is drawn out so that its length is increased to twice

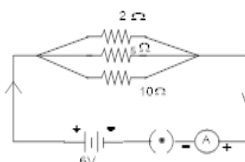
its original length calculate the resistance of the wire in the new situation?

10. In the circuit diagram given here

Calculate- (a) The total effective resistance

(b) The total current

(c) The current through each resistor.



11. You have two circuits (i) a 6V battery in series with 1ohm, 2 ohm resistors.

(ii) A 4V battery in parallel with 1ohm, 2 ohm resistors Compare the power used in 2 ohm resistor in each case.

12. How much energy is given to each coulomb of charge passing through a 6 volt battery?

13. Why does the cord of an electric heater not glow while the heating element does?

14. On what factor does the resistance of a Conductor depend?

15. Will current flow more easily through a thick wire or a thin wire of the same material, when connected to the same source? Why?

16. Let the resistance of an electric component remains constant while the potential difference across the two ends of the component decreases to half of its former value. What change will occur in the current through it?

**17. Why are coils of electric toasters and electric irons made of an alloy rather than a pure metal?**

**18. Draw a schematic diagram of a circuit consisting of a battery of three cells of 2 V, each, a 5  $\Omega$  resistor, 8  $\Omega$  resistors and a 12  $\Omega$  and a plug key, all connected in series.**

**19. An electric lamp of 100  $\Omega$ , a toaster of resistance 50  $\Omega$  and a water filter of resistance 500  $\Omega$  are connected in parallel to a 220 V source. What is the resistance of an electric iron connected to the same source that takes as much current as all three appliances, and what is the current through it?**

**20. What is (a) the highest, (b) the lowest total resistance that can be secured by combination of four resistance of 4  $\Omega$ , 8  $\Omega$ , 12  $\Omega$  and 24  $\Omega$ ?**

### **5 Marks Questions**

**1. Two wires A and B are of equal length, different cross sectional areas and made of same metal.**

**(a) (i) Name the property which is same for both the wires,**

**(ii) Name the property which is different for both the wires.**

**(b) If the resistance of wire A is four times the resistance of wire B, calculate**

**(i) the ratio of the cross sectional areas of the wires and**

**(ii) The ratio of the radii of the wire.**

**2. (a) State ohm's law?**

**(b) The value of (I) current following through a conductor for the corresponding values of (V) potential difference are given below**

I (Ampere)	0.5	1.0	1.5	2.5	3
V (Volt)	1	2	3	4.5	5

**Plot a graph between V and I and also calculate the resistance.**

**3. (a) Define electrical energy with S.I. unit?**

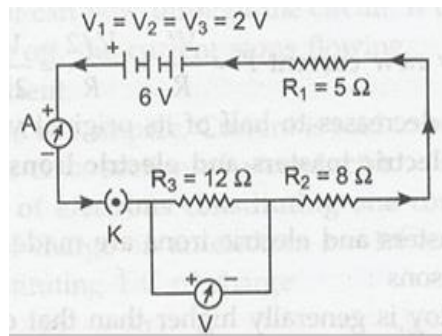
**(b) A house hold uses the following electric appliance;**

**(i) refrigerator of rating 400w for ten hour each day.**



- (ii) Two electric fans of rating 80w each for twelve hours each day.  
 (iii) Six electric tubes of rating 18w each for 6hours 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.

4. Redraw the circuit of question 1, putting in an ammeter to measure the current through the resistors and a voltmeter to measure the potential difference across the 12 Ω resistors. What would be the reading in the ammeter and voltmeter?



5. What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?
6. How can three resistors of resistance 2Ω, 3Ω and 6Ω be connected to give a total resistance of (a) 4 Ω (b) 9 Ω?
7. The value of current I flowing in a given resistor for the corresponding values of Potential difference V across the resistor are given below:

I (amperes)	0.5	1.0	2.0	3.0	4.0
V (volts)	1.6	3.4	6.7	10.2	13.2

Plot a graph between V and I and calculate the resistance of that resistor.

8. Explain the following:

- (a) Why is the tungsten used almost exclusively for filament of electric lamps?
- (b) Why are the conductors of electric heating devices, such as bread-toasters Electric irons, made of an alloy rather than a pure metal?
- (c) Why is the series arrangement not used for domestic circuits?
- (d) How does the resistance of wire vary with its area of cross-section?
- (e) Why are copper and aluminum wires usually employed for electric transmission?

9. A battery of 9 V is connected in series with resistance of 0.2  $\Omega$ , 0.3  $\Omega$ , 0.4  $\Omega$ , 0.5  $\Omega$  and 12  $\Omega$  respectively. How much current would flow through the 12  $\Omega$  resistor?

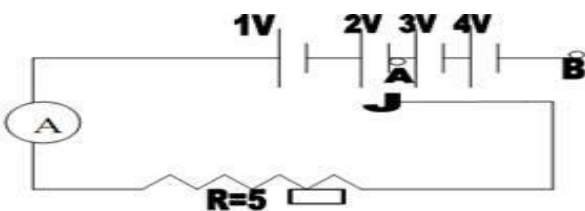
10. How many 176  $\Omega$  resistors (in parallel) are required to carry 5 A on a 220 V line?

11. Show how you would connect three resistors, each of resistance 6  $\Omega$  so that the combination has resistance of (i) 9 $\Omega$  (ii) 4 $\Omega$ .

26. A hot plate of an electric oven connected to a 220 V line has two resistance coils A and B. Each of 24  $\Omega$  resistances, which may be used separately, in series or in parallel. What are the currents in the three cases?

27. Compare the power used in the 2  $\Omega$  resistor in each of the following circuits: (i) a 6 volt battery in series with 1  $\Omega$  and 2  $\Omega$  resistors and,  
(ii) a 4 V battery in parallel with 12 $\Omega$  and  $\Omega$  resistors.

28. In the given figure what is ratio of ammeter reading when J is connected to A and then to B



29. Given a resistor each of resistors R. 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?

30. A wire of length L and resistance R is stretched so that its length its doubled. How will its (a) Resistance change (b) Resistively change?

31. Two students perform the experiments on series and parallel combinations of two given resistors (R) and R2 and plot the following V-I graphs.

32. A household uses the following electric appliances

(i) Refrigerator of rating 4 for ten hours each day.

(ii) Two electric fans of rating 8 each for twelve hours

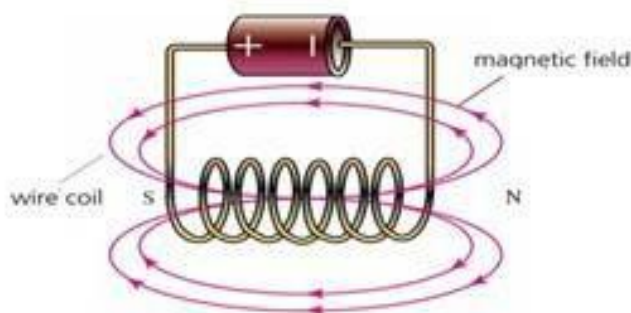
each day. (iii) Six electric tubes of rating 18 W each for 6 hours each day.

Calculate the electricity bill of the household for the month of June if the cost per unit of electric energy is Rs. 3.00.

## **C-13 MAGNETIC EFFECT OF CURRENT**

### **3Marks Questions**

- 1. What is the function of an earth wire? Why is it necessary to earth metallic casing of electric appliance?**
- 2. We know a current carrying conductor placed in a magnetic field experiences a force due to which the conductor moves. How do we think the rod displaces if-**
  - (a) current in rod is increased?**
  - (b) a stronger horse shoe is inserted**
  - (c) length of the rod is increased.**
- 3. What is the principle of electric motor? State the function of**
  - (i) split ring**
  - (ii) field magnet used in electric motor.**
- 4. State three factors on which magnetic field produced by a current carrying solenoid depends.**
- 5. What is a solenoid? Draw magnetic field lines showing the magnetic field inside and outside the current carrying solenoid?**



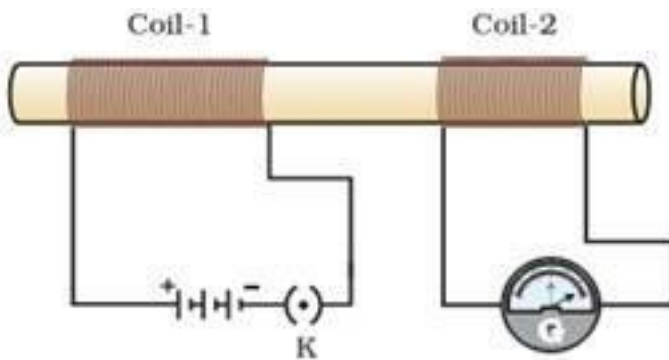
- 6. (a) Name four appliances wherein an electric motor is used as an important component. In what respect it is different from generator?**
  - (b) Define the terms used in the generator**
    - (i) armature**
    - (ii) slip rings**
    - (iii) brushes**
- 7. (a) What is the standard colour code followed for**
  - (i) live**
  - (ii) neutral and**
  - (iii) earth wires used in electric circuits?**

**(c) Which part of an electric appliance is earthed and why?**

8. (a) What is short circuiting?

(c) What is overloading? How can you avoid overloading?

9. Define electromagnetic induction? Two circular coils A and B are placed close to each other. If the current in the coil A is changed, will some current be induced in the coil B? Explain.



10. Why does a current carrying conductor kept in a magnetic field experience force? What is the direction of force acting on the conductor?

11. List the properties of magnetic lines of force.

12. In activity 13.7, how do we think the displacement of rod AB will be affected if

(i) current in rod AB is increased,

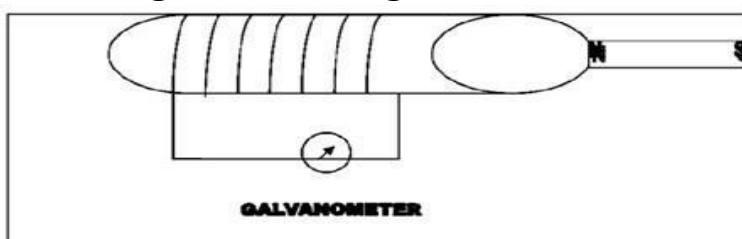
(ii) a stronger horse shoe magnet is used, and

(iii) length of the rod AB is increased?

13. State Fleming's left-hand rule.

14. If we place a compass needle near straight conductor carrying current (a) What happens to the deflection of the compass needle if the direction of current reversed. Is (b) What change will you notice in the compass needle if it is moved away from conductor but the current through the conductor remains the same?

15. A magnet is moving towards a coil as shown in figure.



(1) Which phenomenon is shown in figure.

**(2) Which physical quantity is between magnet and coil? set up in the coil when there is a relative motion**

**(3) What may be the cause of production of that physical quantity?**

**16. Suppose your science teacher asks you to demonstrate the phenomena of EMI with following material**

**(a) Two different coils and 2 of copper wire having large no. of turns 50 and 100 respectively.**

**(b) A non conducting cylinder.**

**(c) A battery**

**(d) A plug key**

**(e) A galvanometer**

**(i) Draw a labeled diagram of your demonstration setup.**

**(ii) How will you prove the phenomena of EMI.**

**17. What is the principle of an electric motor?**

**18. Explain different ways to induce current in a coil.**

**19. An electric oven of 2 kW power rating is operated in a domestic electric circuit (220V) that has a current rating of 5.A. What result do you expect? Explain.**

**20. What precaution should be taken to avoid the overloading of domestic electric circuit?**

**21. List three methods of producing magnetic field.**

**22. How does a solenoid behave like a magnet? Can you determine the north and south poles of a current carrying solenoid with the help of a bar magnet? Explain.**

**23. Imagine that you are sitting in a chamber with your back to one wall. An electron beam, moving horizontally from back wall towards the front wall, is deflected by a strong magnetic field to your right side. What is the direction of magnetic field?**

**24. A coil of insulated copper wire is connected to a galvanometer. What will happen if a bar magnet is**

**(i) pushed into the coil.**

**(ii) withdrawn from inside the coil**

**(iii) held stationary inside the coil?**

25. Two circular coils A and B are placed close to each other. If the current in the coil A is changed, will some current be induced in the coil B? Give reason.

26. State the rule to determine the direction of a

- (i) magnetic field produced around a straight current carrying conductor
- (ii) force experienced by a current carrying straight conductor
- (iii) current induced in a coil due to its rotation in a magnetic field.

27. What is the function of an earth wire? Why is it necessary to earth metallic appliances?

28. A coil of insulated copper wire is connected to a galvanometer. What would happen if a bar magnet is.

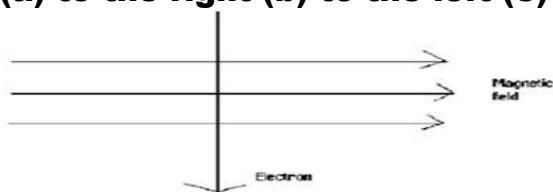
(i) Pushed into the coil?

(ii) Withdrawn from Side the coil?

(iii) (iii) Held stationary inside the coil?

29. An electron enters a magnetic field at right angles to it as shown in fig. The direction of the force acting on the electron will be:

(a) to the right (b) to the left (c) out of the page (d) into the page



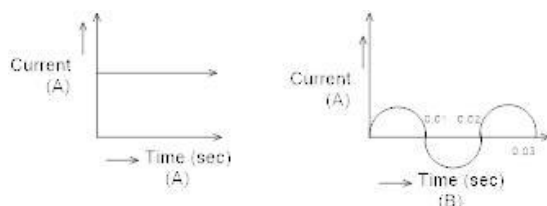
30. Consider a circular wire lying in the plane of the table and the direction current in it is antilock wise.

(i) Draw the magnetic field lines produced around it.

(ii) Why does magnetic field at the center of current carrying circular loop appear straight? Explain with diagram.

### 5 Marks Questions

1. Current- time graph from two different sources are shown in the figure.



(i) Name the type of current shown by graph (A) and (B)?

**(ii) Name any one source of shown by (A) and (B)?**

**(iii) What is frequency of current in case (B)?**

**(iv) Write two differences between current shown by (A) and (B)?**

**2. Explain the principle, construction and working of an electric motor with a help of labeled diagram?**

**3. Draw a labelled diagram of an electric motor. Explain its principle and working. What is the function of split ring in an electric motor?**

**4. Explain the underlying principle and working of an electric generator by drawing a labeled diagram. What is the function of brushes?**

### **C-14 SOURCE OF ENERGY**

#### **3 MARKS QUESTION**

**1. Distinguish between renewable and non- renewable sources of energy?**

**2. Why is biogas a better fuel than animal dung-cakes.**

**3. How difference in temperature helps to harness energy from ocean?**

**4. What are the limitations of extracting energy from**

**(a) the wind**

**(b) waves**

**(c) tides**

- 5. Name three forms in which energy from ocean is made available for use. What are OTEC power plants? How do they operate?**
- 6. List three forms of energy we use when we wake up from morning till we reach the school. Also from where do we get these different forms of energy?**
- 7. Compare and contrast bio- mass and hydro-electricity as source of energy. The production cost of hydroelectricity is cheaper than the electricity produced in a thermal power station. Explain why?**
- 8. What kind of mirror concave, convex or plane would be best suited for the use in a solar cooker. Why? What is the role of glass sheet used in a solar cooker? Also write two disadvantages of using a solar cooker?**
- 9. What is a good source of energy?**
- 10. What are the disadvantages of fossil fuels?**
- 11. Why are we looking at alternate sources of energy?**
- 12. How has the traditional use of wind and water energy been modified for our convenience?**
- 13. What are limitations of the energy that can be obtained from the oceans?**
- 14. What is geothermal energy?**
- 15. What are the advantages of nuclear energy?**
- 16. Name two energy sources that you would consider to be renewable. Give reasons for your choices.**
- 17. Give the names of two energy sources that you would consider to be exhaustible. Give reasons for your choices.**
- 18. Compare and contrast fossil fuels and the Sun as direct sources of energy.**
- 19. Compare and contrast bio-mass and hydroelectricity as sources of energy.**
- 20. What are the qualities of an ideal source of energy?**
- 21.  $H_2$  has been used as a rocket fuel. Would you consider it as a cleaner fuel than CNG? Why or why not?**
- 24. Write three reasons why construction of Tehri Dam on river Ganga and Sardar Sarovar project on river Narmada is opposed by local people and environmentalist?**



**25. Write three environmental consequences of the various source of energy we used?**

### **5 Marks Questions**

**1. A student constructed a box type solar cooker. He found that it did not work efficiently. What could this be due to? Give any four possible mistakes in the construction and operation of the solar cooker. What maximum temperature can ordinarily be reached inside a solar cooker?**

**2. (i) What is biogas? Name two main combustible components of biogas? (ii) What is the use of spent slurry in a biogas plant?**

**3. Name the microorganisms responsible for the fermentation of slurry in the digester?**

**4. What are the limitations of extracting energy from:**

**(i) the wind? (ii) waves? (iii) tides?**

**5. On what basis would you classify energy sources as**

**(a) renewable and non-renewable?**

**(b) exhaustible and inexhaustible?**

**6. What are the advantages and disadvantages of using a solar cooker? Are there places where solar cookers would have limited utility?**

**7. What are the environmental consequences of the increasing demand for energy? What steps would you suggest to reduce energy consumption?**