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CBSE Objective Questions Exam 2019-2020
CLASS : 10th
SUB : Science
For 15 Years Exams Chapter-wise Question Bank

CHAPTER 14

Source of Energy

1. OBJECTIVE QUESTIONS

1. Which of the following is a non-renewable source of energy?
(a) Wood (b) Sun
(c) Fossil fuels (d) Wind

Ans : (c) Fossil fuels

2. Which environmental hazard is not contribnted by the combustion of fossil fuels?
(a) Acid rain
(b) Greenhonse effect
(c) Destruction of wildlife habitat
(d) Air pollution

Ans : (c) Destruction of wildlife habitat

Combustion of fossil fuels does not lead to the destruction of wildlife habitat. However, hydroelectric power projects lead to devastation of wildlife habitat, soil erosion, man-made floods, etc.

3. Choose the incorrect statement regarding wind power
(a) its temperature increases
(b) larger amount of potential energy is converted into kinetic energy
(c) the electricity content of water increases with height
(d) more water molecules dissociate into ions.

Ans : (b) larger amount of potential energy is converted into kinetic energy

4. Which of the following is employed for harnessing the potential energy of surface water stored in a reservoir?
(a) Thermal power plant
(b) Nuclear power plant
(c) Tidal power plant
(d) Hydroelectric power plant

Ans : (d) Hydroelectric power plant

In a hydroelectric power plant, the kinetic energy of following river water is first converted into potential energy, when it is stored in a reservoir (dam) and finally when the stored dam water flows downhill, the stored potential energy of water harnessed in the form of electrical energy with the help of turbine.

5. Solar energy is the universal source of energy. It is converted into chemical energy by
(a) photovoltaic cells (b) solar cooker
(c) solar concentrators (d) green plants

Ans : (d) green plants

Solar energy is the universal source of energy that is nsed by all living organisms for their survival on Earth. The green plants convert solar energy into chemical energy - food or biomass of plant, by the process of photosynthesis.

6. 100 W/m^2 of solar energy is received by the Earth. If all the energy was to be absorbed by a bucket of water (mass 30 kg) in 30 minutes, then the rise in temperature of water will be
(a) 18° C (b) 15° C
(c) 14.3° C (d) 12.3° C

Ans : (c) 14.3° C

Given, mass of water, $m = 30\text{ kg} = 30000\text{ g}$
Specific heat of water, $s = 4.2\text{ J g}^{-1^\circ}\text{C}^{-1}$
and time, $t = 30$ minutes
$= 30 \times 60\text{ s}$

As heat absorbed by water is given by

$$Q_A = ms\Delta\theta$$
$$= (30000 \times 4.2 \times \Delta\theta)$$

where, $\Delta\theta$ is the rise in temperature of water.

Now, heat given out by the sun $= 100\text{ J W}$
$= 100\text{ Js}^{-1}$

Heat given out by the sun in (30×60)s is

$$Q_L = 100 \times 30 \times 60$$
$$= 1.8 \times 10^5\text{ J}$$

Let the heat gained by water = the heat lost by the sun

i.e. $Q_A = Q_L$

or $3000 \times 4.2 \times \Delta\theta = 1.8 \times 10^5$

$\Delta\theta = 14.3^\circ\text{C}$

7. While filling LPG in cylinders, a substance X is

added to make the detection of leakage of LPG from the cylinder easy. The substance X is

(a) ethanol (b) ethanethiol

(c) methanethiol (d) methanol

Ans : (b) ethanethiol

Ethanethiol or ethyl mercaptan is added while filling LPG in cylinders because it has a foul smell which can be detected easily during any leakage of LPG.

8. For a nuclear reactor, 48 kJ of energy is produced per minute. If the energy released per fission is 3.2×10^{-11} J, then the number of fission which would be taking place in a reactor per second is

(a) 5×10^{14} (b) 2×10^{14}

(c) 52×10^{13} (d) 2.5×10^{13}

Ans : (d) 2.5×10^{13}

Energy produced in 60 seconds = 48 kJ

Then, energy produced in 1 second $= \frac{48}{60} = 0.8$ kJ

$= 800$ J

If 3.2×10^{-11} J of energy is released by 1 fission, then 800 J of energy is released by $\frac{1 \times 800}{3.2 \times 10^{-11}}$ fission $= 2.5 \times 10^{13}$ fission

9. What sector of the Indian economy consumes most of the nation's petroleum?

(a) residential (b) commercial

(c) industrial (d) transportation

Ans : (d) transportation

10. Global warming focuses on an increase in the level of which gas in the atmosphere?

(a) ozone (b) sulfur dioxide

(c) carbon dioxide (d) nitrous oxide

Ans : (c) carbon dioxide

11. Choose the incorrect statement regarding wind power

(a) It is expected to harness wind power to minimum in open space

(b) The potential energy content of wind blowing at high altitudes is the source of wind power

(c) Wind hitting at the blades of a windmill causes them to rotate The rotation thus achieved can be utilised further

(d) One possible method of utilising the energy of rotational motion of the blades of a windmill is to run the turbine of an electric generator

Ans : (b) The potential energy content of wind blowing at high altitudes is the source of wind power

12. Ocean thermal energy is due to

(a) energy stored by waves in the ocean

(b) temperature difference at different levels in the ocean

(c) pressure difference at different levels in the ocean

(d) tides arising out in the ocean

13. (b) temperatSolar, biomass, geothermal, wind, and hydro-power energy are all renewable sources of energy. They are called renewable because they

(a) are clean and free to use

(b) can be converted directly into heat and electricity

(c) can be replenished by nature in a short period of time

(d) do not produce air pollution

Ans : (c) can be replenished by nature in a short period of time

14. Most of the energy we use originally came from

(a) the sun (b) the air

(c) the soil (d) the oceans

Ans : (a) the sun

15. Propane is used instead of natural gas on many farms and in rural areas. Why is propane often used instead of natural gas?

(a) it's safer (b) it's portable

(c) it's cleaner (d) it's cheaper

Ans : (b) it's portable

16. Which part of the solar cooker is responsible for green house effect?

(a) Coating with black colour inside the box

(b) Mirror

(c) Glass sheet

(d) Outer cover of the solar cooker

Ans : (c) Glass sheet

17. Which is the ultimate source of energy?

(a) Water (b) Sun

(c) Uranium (d) Fossil fuels

Ans : (b) Sun

Ans : ure difference at different levels in the ocean

18. The main constituent of bio-gas is

(a) methane (b) carbon dioxide

(c) hydrogen (d) hydrogen sulphide

Ans : (a) methane

19. When the material P mined from the earth is heated strongly in an insufficient supply of air, it produces a solid fuel Q which mainly consist of carbon. When another material R obtained from trees is heated in an insufficient supply of air, it produces another solid fuel S which also consists mainly of carbon. Then, which of the following is true?

(a) P-coke (b) Q-coal

(c) R-charcoal (d) None of these

Ans : (d) None of these

As per the question, P is coal, Q is coke, R is wood and S is charcoal.

20. The mass number of four different elements A, B, C and D are 2, 35, 135 and 239, respectively. Which of them would provide the most suitable for nuclear fission?

(a) A (b) C

(c) C (d) D

Ans : (a) A

In the process of nuclear fusion, a very small atom is used as a fuel. Here, out of the four elements A, B, C and D the atom of element A is the smallest, having a mass number of 2. So, element A would provide the most suitable fuel for nuclear fusion.

21. Acid rain happens because
(a) sun leads to heating of upper layer of atmosphere
(b) burning of fossil fuels release oxides of carbon, nitrogen and sulphur in the atmosphere
(c) electrical charges are produced dne to friction amongst clouds
(d) earth atmosphere contains acids

Ans : (b) burning of fossil fuels release oxides of carbon, nitrogen and sulphur in the atmosphere

22. Electrical energy can be produced from
(a) mechanical energy (b) chemical energy
(c) rndiant energy (d) All of the above

Ans : (d) All of the above

23. Coal, petroleum, natural gas, and propane are fossil fuels. They are called fossil fuels because:
(a) they are burned to release energy and they cause air pollution
(b) they were formed from the buried remains of plants and tiny animals that lived hundred of millions of years ago
(c) they are non-renewable and will run out
(d) they are mixed with fossils to provide energy

Ans : (b) they were formed from the buried remains of plants and tiny animals that lived hundred of millions of years ago

24. In a hydro-power plant
(a) Potential energy possessed by stored water is converted into electricity
(b) Kinetic energy possessed by stored water is converted into potential energy
(c) Electricity is extracted from water
(d) Water is converted into steam to produce electricity.

Ans : (a) Potential energy possessed by stored water is converted into electricity

25. The power generated in a windmill
(a) is more in rainy season since damp air would mean more air mass hitting the blades
(b) depends on the height of the tower
(c) depends on wind velocity
(d) can be increased by planting tall trees close to the tower Choose the correct statement

Ans : (c) depends on wind velocity

26. Choose the correct statement
(a) Sun can be taken as an inexhaustible source of energy
(b) There is infinite storage of fossil fuel inside the earth
(c) Hydro and wind energy plants are non polluting sources of energy
(d) Waste from a nnclear power plant can be easily disposed off

Ans : (a) Sun can be taken as an inexhaustible source of energy

27. Natural gas is transported mainly by
(a) pipelines (b) trucks
(c) barges (d) al three equally

Ans : (a) pipelines

28. Gasoline is produced by refining which fossil fuel?
(a) natural gas (b) coal
(c) petroleum (d) propane

Ans : (c) petroleum

2. FILL IN THE BLANK

DIRECTION : Complete the following statements with an appropriate word/term to be filled in the blank space(s).

1. A device that utilises solar energy for cooking purposes is called a .....

Ans : Solar cooker

2. Hydro power plants convert ..... energy of falling water into electricity.

Ans : Potential

3. A solar cell is a device which converts solar energy directly into .....

Ans : Electricity

4. When wood is burnt in a limited supply of oxygen ..... is left behind as residue.

Ans : Charcoal

5. The energy possesses by wind is called .....

Ans : Wind energy

6. The flowing water possesses ..... energy.

Ans : Kinetic

7. Bio-gas contains ..... % methane.

Ans : 75

8. Electricity generated from sea waves is .....

Ans : Tidal energy

9. The internal heat of an earth is known as ..... energy.

Ans : Geothermal

10. Many of the sources ultimately derive their energy

from the .....
Ans : Sun

11. ..... and ..... countries have number of power plants based on geothermal energy.
Ans : New Zealand, United States of America

12. The material obtained from the bodies of plants and animals is called .....
Ans : Biomass

13. To establish 1 MW generator, the wind energy farm needs about ..... hectares of land.
Ans : 2

14. Coal gas is mixture of ....., ... and .....
Ans : H_2, CH_4 and CO

15. Coal, petroleum and ..... are the three important source of modern fuels.
Ans : Natural gas

16. Ocean Thermal Energy plants can operate if the temperature difference between the water at the surface and water at depths up to ..... km is ..... or more.
Ans : 2, 293 k (or 20° C)

17. Bio-gas is a mixture of ....., carbon dioxide, ... and .....
Ans : Methane, hydrogen, hydrogen sulphide

18. To maintain the required speed of the turbine, wind speed should be higher than .....
Ans : 15 km/h

19. When a complex material is heated strongly in the absence of air, then id decomposes to the simplest substance. This process is called .....
Ans : Destructive distillation

3. TRUE/FALSE

DIRECTION : Read the following statements and write your answer as true of false.

1. The low kinetic energy (slow moving) neutrons which can produce nuclear fission are called thermal neutrons.
Ans : True

2. Sun is the source of heat contained in geothermal energy.
Ans : False

3. Gobar gas is a non-renewable source of energy.
Ans : False

4. The main constituent of bio-gas is not methane.
Ans : False

5. Black colour is a very good absorber of heat and good reflector.
Ans : False

6. The use of geothermal energy cause pollution.
Ans : False

7. Deep drilling in the earth to obtain geothermal energy is very difficult.
Ans : True

8. Natural gas is renewable source of energy.
Ans : False

9. Wood is better fuel than charcoal.
Ans : False

10. Nuclear fission reactions have been used to generate electricity.
Ans : True

11. On an average, the 5.5 neutrons per fission is released.
Ans : True

12. Solar cookers make use of solar energy.
Ans : True

13. The sun is the ultimate source of energy.
Ans : True

14. Sun is the ultimate source of energy.
Ans : True

15. Charcoal is a better fuel than wood and coal.
Ans : True

16. Bio-gas is a better fuel than animal dung-cakes.
Ans : True

17. Our energy requirements increase with our standard of living.
Ans : True

18. Biogas is produced by the aerobic degradation of animal wastes like cow-dung in the presence of water.
Ans : True

19. In order to fulfil our energy requirements, we try to improve the efficiency of energy requirements, we try to improve the efficiency of energy usage and also try and exploit new sources of energy.
Ans : True

20. The calorific value of methane is less than that or butane.
Ans : False

21. Producer gas is obtained as one of the products of dry distillation of coal.
Ans : False

22. The sun is an ultimate source of fossil fuel.
Ans : True

23. Coal gas is an is an example of primary fuel.
Ans : False

24. Biomass is the oldest source of heat energy for domestic purposes.
Ans : True

4. MATCHING QUESTIONS

DIRECTION : Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in column-I have to be matched with statements (p, q, r, s) in column II.

1.

Column I		Column II	
(A)	Peat	(p)	liquid fuel
(B)	Alcohol	(q)	27% of carbon
(C)	Decay of biomass	(r)	Difference in temperature between warm surface waters and colder waters.
(D)	Rise and fall of water levels in oceans	(s)	biogas
(E)	OTEC	(t)	tidal energy
(F)	Ultimate source of energy	(u)	sun
(G)	Stored in food grains	(v)	wind
(H)	Moving air	(w)	bio-energy

Ans : A-q, B-p, C-s, D-t, E-r, F-u, G-w, H-v

2.

Column I		Column II	
(A)	Ramagudam thermal plant is in	(p)	Andhra Pradesh
(B)	Raichur thermal plant is in	(q)	Karanatak
(C)	Korba thermal plant is in	(r)	Madya Pradesh
(D)	Farraka thermal plant is in	(s)	West Bengal

	A	B	C	D
(a)	r	s	p	q
(b)	p	r	s	q
(c)	q	p	r	s
(d)	p	q	r	s

Ans : (d) A-p, B-q, C-r, D-s

3. Match the following

Column I		Column II	
(A)	Hydrogen bomb	(p)	Fission
(B)	Atom bomb	(q)	Fusion
(C)	Stellar energy	(r)	Critical mass
(D)	Nuclear reactor	(s)	Controlled chain reaction

	A	B	C	D
(a)	r	p	s	q
(b)	s	q	r	p
(c)	q	p	r	s
(d)	p	q	s	r

Ans : (c) A-q, B-p, C-r, -D-s

5. ASSERTION AND REASON

DIRECTION : In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.
(e) Both Assertion and Reason are false.

1. **Assertion :** Dam is a barrier that is built across a river or a stream.
Reason : Large dam can ensure the storage of adequate water for irrigation and also for generating electricity.
Ans : (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

Dam is a barrier that stops or restricts the flow of water or underground streams. A dam is built to control water through placement of a blockage of earth, rock across a stream or river. They usually store water in a reservoir, which is then used for a variety of applications such as irrigation and municipal water supplies.

2. **Assertion :** Bio-gas is a boon to the farmers.
Reason : Spent slurry is used as manure and can be

used to generate electricity.

Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Bio-gas is considered to be a boon to the farmers as the slurry left in bio-gas plant is a good manure for fields.

3. **Assertion :** Certain gases like carbon-dioxide, water vapour, methane are called greenhouse gases.
Reason : These gases are responsible for heating up of the atmosphere.
Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Sun is very hot, so it emits infrared radiations of very short wavelength. The Earth absorbs the radiation and then re-emits. But the Earth being cooler emits radiations of longer wavelength. These are absorbed by certain gases like carbon-dioxide, water vapour, methane etc. This effect is called greenhouse effect and the gases are called greenhouse gases. This is responsible for heating up of the atmosphere.

4. **Assertion :** Solar heating devices are painted black.
Reason : Black bodies are good absorbers of heat, so temperature rises quickly.
Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Solar heating devices are painted black as black bodies are good absorbers of heat.

5. **Assertion :** Charcoal is a better fuel than wood.
Reason : It has a lower heat generation efficiency.
Ans : (c) Assertion (A) is true but reason (R) is false.

Charcoal is a better fuel than wood because it burns without flames and is comparatively smokeless. It also has higher heat generation efficiency.

6. **Assertion :** Burning of coal or petroleum products lead to air pollution.
Reason : Coal and petroleum are non renewable source of energy.
Ans : (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

Coal and petroleum are non-renewable source of energy as they take millions of years to form and are available in very limited amount. Burning of fuels releases gases like CO_2, SO_2, NO_2. These gases air pollution. With rain, these pollutants fall as acid rain and cause soil pollution.

7. **Assertion :** Nuclear fusion is used to generate electricity.
Reason : Nuclear power is used because it cannot be controlled.
Ans : (c) Assertion (A) is true but reason (R) is false.

8. **Assertion :** Bio-gas is also known as Gobar gas.
Reason : The animal dung is the common material used in the bio-gas plant.
Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

9. **Assertion :** Solar cooker is painted white from inside.
Reason : The black surface to the solar cooker is a better heat absorber than a white surface.
Ans : (d) Assertion (A) is false but reason (R) is true.

10. **Assertion :** Charcoal is a better fuel then wood for domestic purposes.
Reason : Charcoal burns without flames and does not produce smoke during burning.
Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

11. **Assertion :** U^{238} nucleus, by absorbing a slow neutron undergoes unclear fission with the evolution of a significant quantity of heat.
Reason : During nuclear fission a part of the original mass of U^{235} is lost gets converted into heat.
Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

12. **Assertion :** The slurry left behind in a bio-gas plant is used as a manure.
Reason : Slurry contains methane and phosphorus as two main nutrients in it.
Ans : (c) Assertion (A) is true but reason (R) is false.

13. **Assertion :** Thermal power plants are set up near coal or gas fields.
Reason : Transmission of electric power is more efficient, convenient and economical then transportation of fossil fuels like coal or natural gas.
Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

14. **Assertion :** Solar cell is a device which converts solar energy i.e., light energy directly into electricity.
Reason : They are made up of semi-conductors like-silicon, germanium and selenium.
Ans : (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

Solar cell panel absorb sunlight as a source of energy to generate electricity. It comprises of a large number of photo voltaic solar cells and can provide much higher power for many uses.

15. **Assertion :** Solar cooker covered with a plane glass plate is more effective then the one which is left open.
Reason : Covered glass plate allows solar radiations of smaller wavelength to pass through it but does not allow heat radiation of longer wavelengths emitted by heated container to pass through it. thus, heat remains inside the cooker itself and food item is cooked easily.
Ans : (a) Both assertion (A) and reason (R) are true

and reason (R) is the correct explanation of assertion (A).

16. **Assertion :** In street light circuits, photo-cells are used to switch on and off the lights automatically at dusk and dawn.
Reason : A photocell can convert a change in intensity of illumination into a change in photo-current that can be used to control lighting system.
Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

17. **Assertion :** Construction of big dams has lots of problems associated with them.
Reason : Large ecosystems are destroyed when submerged under the water in dams.
Ans : (a) Both A and R are true and R is the correct explanation of A.

18. **Assertion :** Charcoal is better fuel than wood.
Reason : Wood is smokeless and leaves no residue.
Ans : (c) Assertion (A) is true but reason (R) is false.
Charcoal is better fuel than wood because it is smokeless and leaves no residue. It has higher heat of combustion.

19. **Assertion :** Solar energy, wind energy and hydro energy are considered to be exhaustible source of energy.
Reason : The rate of depletion of these energy sources, because of extraction of usable energy, is practically negligible.
Ans : (d) Assertion (A) is false but reason (R) is true.

20. **Assertion :** Wind energy is an environment friendly and efficient of energy.
Reason : Wind energy farms can be established everywhere.
Ans : (c) Assertion (A) is true but reason (R) is false.
Wind energy is an environment friendly and efficient of energy. Wind energy farms cannot be established everywhere because it needs back-up facilities of large area and high cost of maintenance.

21. **Assertion :** Silver metal is used for joining various solar cells in a solar cell panel.
Reason : Silver is a shiny metal.
Ans : (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

22. **Assertion :** Nuclear forces are independent of charges.
Reason : Nuclear force is not a central force.
Ans : (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

23. **Assertion :** Solar cooker is a device used to cook food by utilising the energy radiated by the Sun.
Reason : Solar cooker can be used to cook food on cloudy days and during night.
Ans : (c) Assertion (A) is true but reason (R) is false.
Solar cooker cannot be used to cook food on cloudy days and during night.