Sources of Energy

Multiple Choice Questions

1. At which of the following locations is geothermal energy feasible?
(a) Those that are nearer to the sea
(b) Those that have thermal plants
(c) Those that have coal mines
(d) Those that are above the hot spots in the crust

2. What does biogas mainly consist of?
(a) $CH_4 + CO_2$ (b) $C_2H_6 + CO_2$
(c) $CH_4 + NO_2$ (d) $C_2H_2 + CO_2$

3. Which of the following does NOT allow harmful ultraviolet radiations from the sun to reach the earth?
(a) O_2 (b) NO_2
(c) CO_2 (d) O_3

4. Identify the fuel that can replace petrol in racing ears.
(a) Ethanol (b) Hydrogen
(c) Nitrogen (d) Methanol

5. What is needed to produce biogas in a biogas plant?
(a) Only oxygen
(b) Only water
(c) Both oxygen and water
(d) Neither oxygen nor water

6. What is the least speed of wind needed to generate electricity?
(a) $1.5\,km\,h^{-1}$ (b) $15\,km\,h^{-1}$
(c) $150\,km\,h^{-1}$ (d) $1500\ km\ h^{-1}$

7. Which of the following produces heat the most on burning?
(a) Dung cake (b) Bjomass
(c) Biogas (d) A fuel

8. Which of the following causes the least pollution when burnt?
(a) Petrol (b) Diesel
(c) Coal (d) Natural gas

9. The main constituent of natural gas is
(a) CH_4 (b) C_2H_6
(c) C_3H_8 (d) C_4H_{10}

10. What is the percentage of carbon in coke?
(a) 60% (b) 80%
(c) 90% (d) 98%

11. In a nuclear reactor, the material used for making control rods is
(a) uranium. (b) graphite.
(c) mercury. (d) cadmium.

12. A good moderator in a nuclear reactor should
(a) be a gas.
(b) slow down the speed of neutrons.
(c) be light in mass number.
(d) All of the above

13. Atom bomb is based on the principle of
(a) fission. (b) fusion.
(c) ionisation. (d) electrolysis.

14. A fusion reaction is initiated
(a) with the bombardment of any particle.
(b) with the bombardment of neutrons.
(c) at low temperature.
(d) at high temperature.

15. Which process is used to produce electric power in the atomic power station?
(a) Nuclear fusion (b) Nuclear fission
(c) Electrolysis (d) Both (a) and (b)

16. Identify the forms of energy obtained from the oceans.

(i) Tidal energy
(ii) Ocean waves energy
(iii) Ocean thermal energy

(a) Only (i) and (ii) (b) Only (ii) and (iii)
(c) Only (i) and (iii) (d) (i), (ii) and (iii)

17. The end product formed after biogas is used as
(a) manure. (b) poultry feed.
(c) food for mushrooms. (d) dog feed.

18. Which of the following, when used in a solar cooker can increase its efficiency?
(a) Plane mirror (b) Convex mirror
(c) Convex lens (d) Concave lens

19. A solar cell is made up of
(a) silicon. (b) titanium.
(c) magnesium. (d) Teflon.

20. Which metal is used to connect solar cells in a solar panel?
(a) Gold (b) Copper
(c) Silver (d) Nickel

21. Which of the following is a cleaner fuel?
(a) Hydrogen (b) Wood
(c) CNG (d) Coal

22. Which of the given problems is associated with the burning of coal?
(a) It causes acid rain.
(b) Carbon dioxide is released.
(c) Ash with toxic metal impurities are produced.
(d) All of the above

23. What is the time taken for the formation of anthracite coal?
(a) Tens of years (b) Hundreds of years
(c) Thousands of years (d) Millions of years

24. The below given devices are needed to generate electricity in a nuclear power station.

P Boiler
Q Dynamo
R Reactor
S Turbine

Identify the correct sequence of the given devices.
(a) S, Q, R, P (b) R, S, P, Q
(c) R, P, S, Q (d) P, S, Q, R

25. A solar cell converts
(a) heat energy into electrical energy.
(b) solar energy into electrical energy.
(c) heat energy into light energy.
(d) solar energy into light energy.

26. Which of the following are the characteristics of a good fuel?

(i) Easily accessible and economical
(ii) Easy to store and transport
(iii) Has a high calorific value

(a) Only (i) and (ii) (b) Only (ii) and (iii)
(c) Only (i) and (iii) (d) (i), (ii) and (iii)

27. Which fuel is taken in the atomic pile?
(a) Thorium (b) Uranium
(c) Potassium (d) Sodium

28. Why is biogas a better fuel than animal dung cakes?
(a) Animal dung cakes have higher calorific value than biogas
(b) Biogas has alower calorific value.
(c) Biogas is a smokeless fuel and it does not leave any residue
(d) Biogas is easily accessible than animal dung

29. Identify a non-conventional source of energy from the following.
(a) Coal (b) Wind
(c) Natural gas (d) LPG

30. Classify the following fuels in ascending order of their calorific values.

(i) Coal
(ii) Dung cake
(iii) Kerosene oil
(iv) Hydrogen gas

(a) (ii),(i),(iii).(iv) (b) (ii), (iv), (iii), (i)
(c) (iv),(iii),(i),(ii) (d) (iii), (ii), (i), (iv)

Previous Contest Questions

1. Identify the disadvantage of using coal as a fuel.
(a) It produces a lot of noise.
(b) It is free of impurities
(c) It produces a lot of soot.
(d) It does not produce a hot flame.

2. Which of the given statements is incorrect?
(a) Biomass is a plant residue.
(b) Biomass is used to produce biogas.
(c) Biomass is a renewable source of energy.
(d) Biomass is used to produce liquid petroleum gas.

3. A solar panel is made by combining a large number of
(a) solar cookers. (b) solar cells.
(c) solar concentrators. (d) solar water heaters.

4. Which type of coal is of the best quality?
(a) Lignite (b) Bituminous
(c) Anthracite (d) Peat

5. Source rocks are the rocks where
(a) rivers originate. (b) CNG is formed.
(c) petroleum is formed. (d) coal is formed.

6. The fission of a nucleus is achieved by bombarding it with
(a) protons. (b) neutrons.
(c) electrons. (d) X-rays.

7. Solar constant is the amount of solar energy received
(a) per second by one square metre area.
(b) per hour by one square kilometer area.
(c) per minute by one square metre area.
(d) per second by one square kilometer area.

8. Why is charcoal a better fuel than wood?
(a) It is a volatile fuel with low calorific value.
(b) It is a low calorie, smokeless fuel.
(c) It is a compact, smokeless fuel with high calorific value.
(d) It contains carbon, nitrogen, sulphur and phosphorus which enhances its calorific value.

9. The main source of energy in the sun is due to
(a) nuclear fission.
(b) nuclear fusion.
(c) gravitational contraction.
(d) combustion.

10. Which of the following is NOT used as a nuclear fuel?
(a) Uranium (b) Thorium
(c) Plutonium (d) Titanium

Answers with Solutions

Multiple Choice Questions

1. (d) Geothermal energy is feasible in the regions that are over hot spots in the crust.

2. (a) Biogas is a mixture of methane, carbon dioxide, hydrogen and hydrogen sulphide. The major constituents of biogas are methane which is about 65% and carbon dioxide is 20%.

3. (d) The ozone layer protects us from the harmful ultraviolet radiations from the sun.

4. (a) Many racing cars use ethanol as a fuel in the place of petrol.

5. (b) Biogas is produced from biomass, by the anaerobic degradation of animal wastes like animal dung or plant wastes in the presence of water.

6. (b) The minimum wind speed necessary for satisfactory working of a wind generator is about $15\ kmh^{-1}$.

7. (d) A fuel is a substance that can produce a lot of heat on burning. Examples of fuels are coal, petrol, wood, natural gas, etc.

8. (a) Natural gas causes the least pollution when it is burnt.

9. (a) The main composition of natural gas is methane.

10. (d) Coke has 98% of carbon.

11. (d) The elements used to make control rods are cadmium and boron.

12. (b) To slow down the neutrons, they are made to collide with the material of the moderator.

13. (a) Atom bomb is based on the principle of nuclear fission.

14. (d) Nuclear fusion reaction is initiated at high temperature.

15. (b) In atomic power station, nuclear fission reaction is used to produce electric power.

16. (d) Tidal energy. Ocean or sea waves energy, Ocean thermal energy are obtained from the oceans.

17. (a) After biogas is produced, the end product is used as manure to enhance plant growth.

18. (a) A plane mirror is used as a reflector in a solar cooker to increase the area over which the solar energy is focussed.

19. (a) A solar cell is made up of silicon.

20. (c) Solar cells in a solar cell panel are joined together with connecting wires made up of silver.

21. (a) Hydrogen is a cleaner fuel than CNG because it produces water on burning which is totally harmless.

22. (d) On burning coal, carbon dioxide is released. Coal also releases acidic oxides like SO_2, P_2O_3 ,etc. which combine with water vapour to form acid rain. Ash with toxic metal impurities are also produced.

23. (d) The time taken for the formation of anthracite is 300 millions of years.

24. (c) The correct sequence of the given devices is R, P, S, Q.

25. (b) A solar cell converts solar energy directly into electrical energy.

26. (d) All the given characteristics are necessary for a good fuel.

27. (b) The fuel taken in the atomic pile is uranium.

28. (c) Biogas burns completely without giving smoke and any residue. So, it is a better fuel than animal dung cakes.

29. (b) Wind is a non-conventional source of energy.

30. (a) The calorific value of fuels is
Dung cake - 6 - 8000 kJ/kg,
Coal - 25 - 33000 kJ/kg,
Kerosene oil - 45000 kJ/kg
Hydrogen gas -150000 kJ/kg
Hence, ascending order of the calorific value of fuels is dung cake, coal, kerosene oil and hydrogen gas.

Previous Contest Questions

1. (c) When coal is used as a fuel, it produces a lot of soot.

2. (d) The postharvest remains of crop plants is called biomass. It is used to produce biogas. It cannot produce liquid petroleum gas.

3. (b) A solar panel is made by combining a large number of solar cells.

4. (c) The best quality of coal is anthracite as it contains highest percentage of carbon.

5. (c) "Petra" means rock and "Oleum" means oil. So, petroleum is found under rocks and such rocks are called source rocks.

6. (b) Nuclear fission is carried out by bombarding the heavy nucleus with neutrons.

7. (a)Solar constant is the amount of solar energy received per second per square metre area of the near earth space perpendicular to the rays of the sun.

8. (c) Charcoal is a better fuel than wood because it mainly consists of carbon without volatile impurities.

9. (b) The main source of energy in the sun is due to nuclear fusion reactions.

10. (d) A nuclear fuel should have fissionable nucleus but titanium is not a fissionable element. It is a stable element,