

MODULE 2
ADVANCES IN ENERGY SYSTEM
AND NATURAL RESOURCE
MANAGEMENT

1. Which of the following supplies maximum amount of hydrogen gas?

- a) Natural gas
- b) Anaerobic Digestion
- c) Wastewater treatment
- d) Electrolysis

Answer: a

2. In terms of greenhouse gas emissions, how good or bad is hydrogen fuel?

- a) Major contributor of greenhouse gas emissions
- b) Zero-emission fuel
- c) Lowest contributor of greenhouse gas emissions
- d) Hydrogen cannot be used as fuel

Answer: b

3. Which of the following use hydrogen as fuel?

- a) Fossil fuels
- b) Anaerobic digestion
- c) Fuel cells
- d) Cooking

Answer: c

4. Which of the following is the most popular application of hydrogen fuel cell?

- a) Fuel cell vehicles
- b) Fuel cell energy power plants
- c) Fuel cells stand-alone power supplies
- d) Fuel cells spacecraft

Answer: d

5. How is hydrogen gas produced from fossil fuels?

- a) Partial oxidation of methane
- b) Electrolysis
- c) Evaporation
- d) Biomass gasification

Answer: a

6. What is the major drawback of steam-methane reforming technique to produce hydrogen?

- a) Capital intensive

- b) Releases greenhouse gases into atmosphere
- c) A niche technology
- d) Poor efficiency

Answer: b

7. How does electrolysis produce hydrogen?

- a) By running electricity to combine hydrogen and water
- b) By separating water into hydrogen and oxygen and generating electricity
- c) By passing electricity into water to separate it into hydrogen and oxygen
- d) By passing electricity into water to evaporate it into hydrogen

Answer: c

8. Why is hydrogen hazardous as fuel?

- a) Because of high ignition and low combustion energy
- b) Because of high ignition and high combustion energy
- c) Because low ignition and low combustion energy
- d) Because of low ignition and high combustion energy

Answer: d

9. Traditionally, why is steam methane reforming preferred over electrolysis?

- a) Because electrolysis requires electricity
- b) Because electrolysis has lower production efficiency
- c) Because steam methane reforming produces greenhouse gases
- d) Because electrolysis produces greenhouse gases

Answer: a

10. What is the main problem in using hydrogen as fuel for vehicles?

- a) Capital intensive
- b) Storage
- c) Fuel cell technology is not well established
- d) Cars will become heavy

Answer: b

11. What is a fuel cell?

- a) Converts heat energy to chemical energy
- b) Converts heat energy to electrical energy
- c) Converts chemical energy to electrical energy
- d) Converts kinetic energy to heat energy .

Answer: c

12. How does hydrogen fuel cell work?

- a) Membrane → hydrogen ions → electric current and recombination with oxygen
- b) Electric current and recombination with oxygen → hydrogen ions → membrane
- c) Hydrogen ions → membrane → electric current and recombination with oxygen
- d) Recombination with oxygen → electric current → membrane → hydrogen ions

Answer: d

13. What does hydrogen fuel cell emit?

- a) Water
- b) Steam
- c) Greenhouse gas
- d) Methane

Answer: a

14. Fuel cell vehicle is sourced by a battery.

- a) True
- b) False

Answer: b

15. High pressure containers are used to store hydrogen.

- a) True
- b) False

Answer: a

16. Which of the following energy has the greatest potential among all the sources of renewable energy?

- a) Solar energy
- b) Wind Energy
- c) Thermal energy
- d) Hydro-electrical energy

Answer: a

17. What is the rate of solar energy reaching the earth surface?

- a) 1016W
- b) 865W
- c) 2854W
- d) 1912W

Answer: a

18. What is total amount of solar energy received by earth and atmosphere?

- a) 3.8×10^{24} J/year
- b) 9.2×10^{24} J/year
- c) 5.4×10^{24} J/year
- d) 2.1×10^{24} J/year

Answer: a

19. Which is most common source of energy from which electricity is produced?

- a) Hydroelectricity
- b) Wind energy
- c) Coal

d) Solar energy

Answer: c

20. Oil is estimated to last for _____ more.

a) 100 years

b) 500 years

c) A decade

d) 800 years

Answer: a

21. Complete the following reaction.

$\text{H}_2\text{O} + \text{CO}_2 \rightarrow \underline{\hspace{2cm}}$

a) $\text{CH}_2\text{O} + \text{O}_2$

b) $\text{CO}_2 + \text{O}_2$

c) $\text{H} + \text{CO}_2 + \text{O}_2$

d) $\text{CH}_2\text{O} + \text{H}_2\text{O} + \text{O}_2$

Answer: a

22. In what form is solar energy is radiated from the sun?

a) Ultraviolet Radiation

b) Infrared radiation

c) Electromagnetic waves

d) Transverse waves

Answer: c

23. What does MHD stands for in the energy field?

a) Magneto Hydro Dynamic

b) Metal Hydrogen Detox

c) Micro Hybrid Drive

d) Metering Head Differential

Answer: a

24. Solar radiation which reaches the surface without scattering or absorbed is called

a) Beam Radiation

b) Infrared radiation

c) Ultraviolet radiation

d) Diffuse radiation

Answer: a

25. The scattered solar radiation is called _____

- a) Direct Radiation
- b) Beam Radiation
- c) Diffuse radiation
- d) Infrared Radiation

Answer: c

26. Solar radiation received at any point of earth is called _____

- a) Insolation
- b) Beam Radiation
- c) Diffuse Radiation
- d) Infrared rays

Answer: a

27. Insolation is less _____

- a) When the sun is low
- b) When the sun right above head
- c) At night
- d) At sun rise

Answer: a

28. HW stands for _____

- a) High and Low water
- b) High Level Waste
- c) Heated Low Level water
- d) High and Low Waste

Answer: b

28. What is unit of nuclear radiation?

- a) Reaumur
- b) Roentgen
- c) Rankine
- d) Pascal

Answer: b

29. Which type of fuel is removed from the reactor core after reaching end of core life service?

- a) Burnt Fuel
- b) Spent fuel
- c) Engine oil

d) Radioactive fuel

Answer: b

30. The ocean thermal energy conversion (OTEC) is uses _____

- a) Energy difference
- b) Potential difference
- c) Temperature difference
- d) Kinetic difference

Answer: c

31. OTEC is developed in _____ a) 1880

- b) 1926
- c) 1890
- d) 1930

Answer: a

32. The OTEC is constructed in _____ a) 1920

- b) 1924
- c) 1922
- d) 1926

Answer: d

33. The by-product of the ocean thermal energy conversion is _____

- a) Hot water
- b) Desalinated water
- c) Chemicals
- d) Gases

Answer: b

34. In ocean thermal energy conversion, the plant pumps the deep cold sea water and do not pump the surface sea water.

- a) True
- b) False

Answer: b

35. How many types of OTEC plants are there?

- a) 1
- b) 2
- c) 3
- d) 4

Answer: c

36. Closed cycle systems use the fluid having _____

- a) High boiling points
- b) Low boiling points
- c) High viscosity

d) Low viscosity

Answer: b

37. Warm surface sea water is pumped through a _____ to vaporize the fluid.

a) Heat exchanger

b) Generator

c) Evaporator

d) Condenser

Answer: a

38. The heat exchanger _____ the vapour into a liquid which is recycled.

a) Condenses

b) Heats

c) Cools

d) Evaporates

Answer: a

39. Open cycle OTEC uses _____ surface water directly to make electricity.

a) Hot

b) Warm

c) Cool

d) Icy

Answer: b

40. In some cases, the steam drives the low pressure turbine attached to the electrical generator.

a) True

b) False

Answer: a

41. The steam leaves the _____

a) Salts

b) Aluminium

c) Copper

d) Silver

Answer: a

42. The open cycle system produces _____ water.

a) Desalinated

b) Impure

c) Contaminated

d) Chlorinated

Answer: a

43. In _____ method the sea water enters a vacuum chamber and flash evaporated.

a) Closed cycle system

- b) Open cycle system
- c) Hybrid OTEC
- d) Neither closed nor open system

Answer: c

44. How is OTEC caused?

- a) By wind energy
- b) By geothermal energy
- c) By solar energy
- d) By gravitational force

Answer: c

45. What does OTEC stand for?

- a) Ocean thermal energy cultivation
- b) Ocean thermal energy conversion
- c) Ocean techno energy conservation
- d) Ocean thermal energy consumption

Answer: b

46. Which country has world's largest tidal power plant?

- a) Netherlands
- b) South Korea
- c) Laos
- d) Bolivia

Answer: b

47. Which type of turbine is commonly used in tidal energy?

- a) Francis turbine
- b) Kaplan turbine
- c) Pelton wheel
- d) Gorlov turbine

Answer: b

48. How is water trapped from coastal waters?

- a) By building canals
- b) By building dams
- c) By digging wells
- d) By storing in tanks

Answer: b

49. Water to the turbine is allowed through the _____

- a) Pipes
- b) Sluice gates
- c) Canals

d) Pumps

Answer: b

50. The tides are rhythmic and constant.

a) True

b) False

Answer: b

51. For exactly how much time does it take for one tidal cycle?

a) 22h, 20min

b) 24h, 50min

c) 20h, 10min

d) 22h, 50min

Answer: b

52. What type of tide is it if the difference between high and low tide is greatest?

a) Diurnal tide

b) Neap tide

c) Spring tide

d) Ebb tide

Answer: c

53. A tide whose difference between high and low tides is least is called as _____

a) Diurnal tide

b) Neap tide

c) Spring tide

d) Ebb tide

Answer: b

54. Which of the turbine can be mounted vertically and horizontally?

a) Pelton wheel

b) Kaplan turbine

c) Gorlov turbine

d) Francis turbine

Answer: c

55. What types of tides occur when there is so much interference with continents?

a) Diurnal tide

b) Neap tide

c) Spring tide

d) Ebb tide

Answer: a

56. What does Heating and cooling of the atmosphere generates?

- a) Thermo line circulation
- b) Radiation currents
- c) Convection currents
- d) Conduction currents

Answer: c

57. How much is the energy available in the winds over the earth surface is estimated to be? a) 2.9×10^{12} MW

- b) 1.6×10^7 MW
- c) 1 MW
- d) 5MW

Answer: b

58. How much wind power does India hold? a) 20,000 MW

- b) 12,000 MW
- c) 140,000 MW
- d) 5000 MW

Answer: a

59. What is the main source for the formation of wind?

- a) Uneven land
- b) Sun
- c) Vegetation
- d) Seasons

Answer: b

60. Which country created wind mills?

- a) Egypt
- b) Mongolia
- c) Iran
- d) Japan

Answer: c

61. “During the day, the air above the land heats up more quickly than the air over water”.

- a) True
- b) False

Answer: a

62. What happens when the land near the earth’s equator is heated?

- a) All the oceans gets heated up

- b) Small wind currents are formed
- c) Rise in tides
- d) Large atmospheric winds are created

Answer: d

63. What type of energy is wind energy?

- a) Renewable energy
- b) Non-renewable energy
- c) Conventional energy
- d) Commercial energy

Answer: a

64. What are used to turn wind energy into electrical energy?

- a) Turbine
- b) Generators
- c) Yaw motor
- d) Blades

Answer: a

65. What is the diameter of wind turbine blades?

- a) 320 feet
- b) 220 feet
- c) 80 feet
- d) 500 feet

Answer: b

66. At what range of speed is the electricity from the wind turbine is generated? a) 100 – 125 mph

- b) 450 – 650 mph
- c) 250 – 450 mph
- d) 30-35 mph

Answer: d

67. When did the development of wind power in India begin? a) 1965

- b) 1954
- c) 1990
- d) 1985

Answer: c

68. Disasters can be broadly termed as _____ types.

- a) 2
- b) 4
- c) 5
- d) 3

Answer: a

69. The annual flood peaks in India are recorded in months of:

- a) June, July
- b) July, August
- c) July, September
- d) August, September

Answer: d

70. Uttarakhand lies in zone _____ of Earthquake prone areas.

- a) 5
- b) 3
- c) 4
- d) 2

Answer: c

71. To measure flood variability, _____ is used widely.

- a) FFMI
- b) FI
- c) FMI
- d) FFI

Answer: a

72. Disaster management deals with situation that occurs after the disaster.

- a) True
- b) False

Answer: b

73. How many elements of disaster management are there?

- a) 8
- b) 7
- c) 4
- d) 6

Answer: d

74. Which of the below is an example of slow-onset disaster?

- a) Earthquake
- b) Tsunami

- c) Cyclone
 - d) Draught
- Answer: d**

- 75.** How many phases of disaster response are there?
- a) 5
 - b) 4
 - c) 3
 - d) 2
- Answer: a**

- 76.** The first step in preparedness planning is:
- a) Analysis of data collected
 - b) Determination of objectives
 - c) Development of implementing device
 - d) Determination of strategy
- Answer: b**

- 77.** Tsunami detectors are placed in sea at _____ kms from shore.
- a) 25
 - b) 100
 - c) 50
 - d) 85
- Answer: c**

- 78.** Carbon footprint can be measured by:
- a) Carbon dating
 - b) Instruments
 - c) Carbon accounting
 - d) Formula

Answer: c

- 79.** A legally binding agreement between 2 or more nation states relating to environment is:
- a) BEA
 - b) BA
 - c) MA
 - d) MEA
- Answer: d**

80. _____ is a programme run by UN related to sustainable development.

- a) GHG indicator
- b) Agenda 21
- c) IPCC
- d) UNEP

Answer: b

81. For a gold LEED certification, how many points are required? a) 40-49

- b) 60-79
- c) 50-59
- d) 80-110

Answer: b

82. Which of the below green building in India has received a platinum LEED certification?

- a) Dabur India, Chandigarh
- b) Logix Cyber Park, UP
- c) Unitech Commercial Tower, Chandigarh
- d) Suzlon One Earth, Pune

Answer: d

83. _____ is the conventional source for hydel power.

- a) Tidal wave
- b) Currents
- c) Water
- d) Ripples

Answer: c

84. The first academic publication about ecological footprints was in: a) 1992

- b) 1990
- c) 1993
- d) 1994

Answer: a

85. Which of the below is a global scale environmental issue?

- a) Eutrophication
- b) Regional ozone
- c) Climate change
- d) Pollution

Answer: c

86. Carbon can be stored in organic matter in the form of:

- a) Biomass

- b) Biofuel
- c) Bioenergy
- d) Bio carbon

Answer: a

87. The 'Miracle Material' that can turn CO₂ into liquid fuel is:

- a) Propene
- b) moCopper
- c) Graphene
- d) Potassium

Answer: c

88. Acid rains are produced by

- (a) Excess NO₂ and SO₂ from burning fossil fuels
- (b) Excess production of NH₃ by industry and coal gas
- (c) Excess release of carbon monoxide by incomplete combustion
- (d) Excess formation of CO₂ by combustion and animal respiration. (1988, 89)

Answer (a)

89. Green house effect is warming due to

- (a) Infra-red rays reaching earth
- (b) Moisture layer in atmosphere
- (c) Increase in temperature due to increase in carbon dioxide concentration of atmosphere
- (d) Ozone layer of atmosphere.

Answer (c)