

**Indian Institute of Information Technology Sricity**  
**Energy and Environment**  
**Mid-term Exam**  
**Exam conducted through Classmarker on 05/Feb/2022**

Wind power plants operate with a typical plant capacity factor of -----  
(approximately) as a result of the great variability of wind velocity

- A. 2%
- B. 65%
- C. 90%
- CorrectD. 30%

Which one of the following renewable energy source is also termed as 'carbon neutral source?'

- A. Wind
- B. Tidal
- Correct C. Biomass
- D. Solar

Which one of the following material is not a structural component of a biomass?

- Correct A. Cellulase
- B. Lignin
- C. Starch
- D. Hemicellulose

Oils and sugars extracted from food crops is e.g. of \_\_\_\_ generation of bio-energy feedstocks

- A. second
- B. Fourth
- Correct C. First
- D. Third

Which one of the following is not a thermo-chemical biomass conversion process?

- A. Gasification
- Correct B. Esterification
- C. Carbonization
- D. Liquefaction

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Biomass gasification is process of producing combustible gases by means of \_\_\_\_ carried out in gasifier

- Correct      A.      Partial oxidation
- B.      Complete oxidation
- C.      Inert heating
- D.      Anaerobic digestion

Which one of the following is not a characteristic of a geothermal site

- A.      Sedimentary basins
- B.      Aquifer
- C.      Cap-rock
- Correct      D.      Lava

\_\_\_\_\_ is regarded as the main product of biomass pyrolysis

- A.      Pyroligneous liquid
- Correct      B.      Charcoal
- C.      Coke
- D.      Syn-gas

One of the main dis-advantages associated with the alkali pre-treatment of biomass is production of \_\_\_\_\_

- A.      Furfurals
- Correct      B.      Salts
- C.      Hetero cyclic components
- D.      Inhibitors

Which state in India has the least wind energy potential

- A.      Gujarat
- B.      Tamilnadu**
- C.      Karnataka
- D.      Andhrapradesh

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The largest wind-farm in our country is located at -----

- A. Brahmanvel
- B. Okha
- C. Ratnagiri

Correct D. Muppandal

Heating value of fuel is

- A. a measure of how much heat can be generated in a fuel cell
- B. a measure of how much electricity can be generated in a fuel cell

Correct C. a measure of how much heat can be generated if the fuel is combusted (not necessarily in a fuel cell)

- D. None of the other options given here

Coal has about  $30 \times 10^6$  J of energy per kg, but a power plant can only use 30% of this energy to make electricity (i.e., it is 30% efficient). How many kilograms of coal have to be burned to light a 100 W light bulb for one day?

- A. 0.92
- B. 0.98

Correct C. 0.96

- D. 0.91

which of the below listed is/are greenhouse gas?

- A. water vapor
- B. carbon dioxide
- C. methane

Correct D. all of above

Which of the following is not a primary source of energy?

- A. Natural Gas
- B. Coal
- C. Biomass

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Correct      D.      Electricity

Which of the following is not a major inhibiting the growth of nuclear power?

A.      Permitting process

Correct      B.      CO2 emissions

C.      Fear of incidents affecting public health and safety

D.      Waste disposal

Which three countries account for 60% of world uranium production?

Correct      A.      Australia, Canada, and Kazakhstan

B.      Australia, Canada, and South Africa

C.      South Africa, Canada, and Kazakhstan

D.      Australia, Canada, and United states

\_\_\_\_\_ is used as a moderator in nuclear reactors

A.      Beryllium oxide

B.      Lithium

C.      Zirconium

D.      None of the above

Thorium consists of \_\_\_\_\_ naturally occurring ones and among them the most stable isotope is

\_\_\_\_\_

A.      7; Thorium-227

B.      7; **Thorium-232**

C.      6; Thorium-227

D.      6; Thorium-232

Wind energy is the \_\_\_\_\_ energy associated with the movement of air

A.      **Kinetic**

B.      Potential

C.      Both a & b

D.      None of the above

In India the largest wind farm cluster is located in

A.      **Tamil Nadu**

B.      Maharashtra

C.      Gujarat

D.      Kerala

The thermal efficiency and overall efficiency of thermal power plant is comparatively less than other power plant like nuclear power plant but still it is very popular, the reason behind this is the high cost of coal

A.      True

B.      **False**

**Match the options below:**

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**Condensing Type Thermal Power Plant**

**Correct answer**

**plant extracts more energy from per kg of steam**

**Non-Condensing Type Thermal Power Plant**

**Correct answer**

**a continuous supply of fresh feed water is required**

In Hydroelectric power plant water fall into water turbine and the \_\_\_\_\_ energy of water is converted into \_\_\_\_\_ energy.

- A. **potential;kinetic**
- B. kinetic;potential
- C. None of the above

**Match the options below:**

Low head hydro electric power plant

**Correct answer**

**water head height is below 30 meters**

Medium head hydro electric power plant

**Correct answer**

**water head height is above 30 meters to 300 meters**

Fuel cost of nuclear power plant is generally \_\_\_\_\_ cheaper than a conventional steam power station

- A. 70%
- B. 60%
- C. 50%
- D. **40%**

In India, about one-fourth of the total electricity generation capacity installed is contributed by -----resources

- A. **Renewable**
- B. Coal

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- C. Oil
- D. Hydel

Biomass

- a. contains organic elements and performs photosynthesis using CO as carbon source
- b. is a biogenic material derived from plants and is used as non-renewable source
- c. is a biogenic material from living organisms and renewable source of energy**
- d. none of the above

Select the first generation feedstocks from the following

- a. Soybean, corn, jatropha
- b. Soybean, corn, sugar beet**
- c. Soybean, corn, fat from animals
- d. Soybean, corn, lignocelluloses

Select the third generation biomass feedstocks from the following

- a. waste cooking oil and animal fats
- b. *Spirulina* and sugar cane
- c. *Chlorella* and green algae**
- d. high lipid containing *Scenedesmus* species, ground nut and Pongamia seeds

Which one cannot be considered a fossil fuel?

Coal

Natural gas

Oil

**Hydrogen**

Most energy in the world is consumed by the -----sector

**Industrial**

Commercial

Residential

Transportation

Which renewable energy source should not be considered to be the manifestation of solar energy in different form?

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Wind

Hydro

**Geothermal**

Biomass

Electricity is mostly produced from -----burning power plants in the world

**Coal**

Natural gas

Oil

Biomass

Which fuel is the most polluting fuel and the largest contributor to global CO<sub>2</sub> emissions?

Natural gas

**Coal**

Oil

Nuclear

Which is not an application of geothermal energy

Heating

Cooling

Electricity generation

**None of the above**

The coal power plant availability is higher than the geothermal power plant. True or false?

True

**False**

Which system is not used in geothermal power plants

**Brayton**

Binary

Direct steam

double flash

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A site contains geothermal water available at a rate of 200 kg/s at a temperature of 190°C with a vapour fraction of 30%. The ambient is at 30°C at atmospheric pressure. What is the maximum thermal efficiency (%) of this power plant?

**34.6**

84.2

20.1

42.3

Which biomass product usually consists of 55 to 78% of the gas which is a dominant component in natural gas and 22 to 45% of the gas species that is generated in large quantities as pollutant from coal-based power plant that leads to global warming

Synthesis gas

Ethanol

Producer gas

**Biogas**

Biomass is exposed to high temperatures without the presence of air, causing it to decompose by a process called

Hydrolysis

**Pyrolysis**

Gasification

Combustion

Which is not a technology used to convert biomass energy into heat and electricity

**Methane recovery**

Anaerobic digestion

Direct combustion

Co-firing