

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE –**  
**RAIGAD -402 103**  
**Mid Semester Examination – Summer - 2018**

**Branch:EXTC/Comp/IT/Elect.**

**Sem.:- I**

**Subject with Subject Code:- Energy and Environmental Engineering (CHE206)**

**Marks: 20**

**Date:-**

**Time:- 1 Hr.**

**Instructions:- 1.** Figures to the right indicate full marks

**2.** Clearly mention the main question number along with the sub questions.

**(Marks)**

**Q.No.1 Choose the correct choice from the given options.**

**(6 X 1=6)**

1. The fuel that is generally used in a gas turbines are -----

- |                 |                 |
|-----------------|-----------------|
| a) Furnace oil  | b) Residual oil |
| c) Producer gas | d) Natural gas  |

Ans- d

2. The diesel plants are mainly used -----

- |                            |  |
|----------------------------|--|
| a) as peak load plants     | b) as base load plants                     |
| c) as standby power plants | d) Both standby and peak load power plants |

Ans- d

3. Reflecting mirrors used for exploiting solar energy are called -----

- |               |           |
|---------------|-----------|
| a) diffusers  | b) ponds  |
| c) heliostats | d) mantle |

Ans- c

4. What is the biggest source of biogas in rural India?

- |                  |                     |
|------------------|---------------------|
| a) kitchen waste | b) leaves           |
| c) cow dung      | d) industrial waste |

Ans- c

5. What kind of energy does MHD power generator use?

- |                    |                     |
|--------------------|---------------------|
| a) Kinetic Energy  | b) Potential energy |
| c) Chemical energy | d) Thermal energy   |

Ans- d

6. Which one is normally not an energy conservation measure?

- |                                       |  |
|---------------------------------------|--|
| a) to reduce excess air of combustion | b) to replace 60 watt incandescent light bulb by a 12 watt CFL |
|---------------------------------------|--|

c) to convert an oil fired boiler to wood fired

d) to increase air conditioned room temperature by 2oC

Ans- c

**Q.No. 2 Attempt any one of the following:**

**(1 X 6=6)**

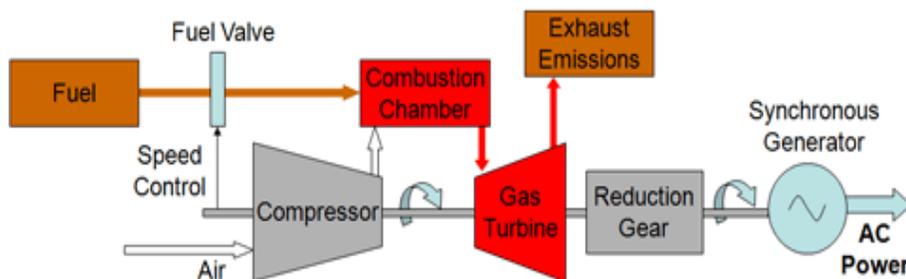
**a.) What are the fossil fuels used for generation of conventional power? Explain the working of gas based power plant.**

Ans: Fossil fuels used are -

Coal, Crude oil, Natural Gas, Uranium, etc

Working of Gas Based Power Plant

Gas turbine power plant works on the turbines that runs on the gaseous fuel. In this plant the fuel in the gaseous form is burnt in the combustion chamber. The resultant high velocity combustion gases drive a turbine similar to that of high pressure steam drives a steam turbine.



Gas turbine power plants may operate on either an open or closed type. The open cycle type is most common which is shown in Fig.2.8. In the case of open cycle gas turbine system, the air is not reused hence the next step of cooling the working fluid is omitted. In gas turbine power plant the atmospheric air is continuously drawn into the compressor, where it is compressed to a high pressure. The air then enters a combustion chamber, or combustor, where it is mixed with fuel and combustion occurs, resulting in combustion products at an elevated temperature. The combustion products expand through the turbine and are subsequently discharged to the surroundings. Part of the turbine work developed is used to drive the compressor; and the remaining work is utilized to generate electricity, to propel a vehicle, or for other purposes.

**b.) What is energy conservation? How do you reduce the energy consumption in household air conditioner? Write any four measures.**

Ans: Energy conservation refers to adapting ones activities to cut energy use entirely. Efficient energy use means using less energy for everyday's task. It is nothing but

a strategic use of energy in order to reduce the energy requirements per unit output.

**Q.No 3. Attempt any two of the following**

**(2 X 4 = 8)**

**a) Differentiate between the conventional and Non-conventional energy sources. Write any four differences.**

Ans:

<b>Conventional Energy Sources</b>	<b>Non- Conventional Energy Sources</b>
Generates more pollution	No pollution or sometimes very less pollution
Non renewable in nature as depleting after few years	Renewable in nature and available in nature
Easy for conversion as the technology is well set and conversant	Need sophisticated technology for conversion
The use of fossil fuel degrade the environment	No degradation of environment

**b) List the types of fuel cells. What are the main components of fuel cell? List some applications of fuel cells.**

Ans: The classification is according to the electrolyte which is employed:

1. Alkaline Fuel Cell
2. Phosphoric acid Fuel Cell
3. Solid Oxide Fuel Cell
4. Molten Carbonate Fuel Cell
5. Proton Exchange Membrane PEM Fuel Cell
6. Direct Methanol DMFC Fuel Cell

Main Components of Fuel Cell are -

Fuel cell basically consists of three major components - a cathode, an anode, and an electrolyte sandwiched between the two.

Applications of Fuel Cell

- The fuel cell can be used in the gas turbine in city's power plant, the gasoline engine of a car and the battery of laptop.
- Fuel cell batteries converted chemical energy back into electrical energy as and when needed.

- A fuel cell provides a DC (direct current) voltage that can be used to power motors, lights or any number of electrical appliances.

**c) What is the principle of solar photo-voltaic power generation? What are the main elements of a PV system?**

Ans: Principle of working

The sunlight causes the semiconductors to give off electrons which generate an electric current. These free electrons flow through the cells bottom layer as direct current to a connecting wire. The electrical output from a single cell is small, so multiple cells are connected together and encapsulated (usually behind glass) to form a module (panel).

Main elements of P-V system

The PV cell consists of two or more thin layers of semi-conducting material, most commonly silicon. The PV module is the principle building block of a PV system and any number of modules can be connected together to give the desired electrical output. The PV array consists of a number of individual photovoltaic modules connected together to give the required power with a suitable current and voltage output. It also consists of DC isolation switch, Inverter, AC isolation switch, Meter, etc.

\*\*\*\*\*