

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD -402 103
Mid Semester Examination – October - 2017**

Branch: M.Tech (Electrical Power System)

Sem.: - I

Subject with Subject Code: - Renewable Energy Sources (MTEPS102) Marks: 20

Date: - 10/10/2017

Time: - 1 Hr.

Marking Scheme/ Model Answer

(Marks)

Q.No.1 Attempt any one of the following (08)

a.) Discuss the energy and its environmental impacts.

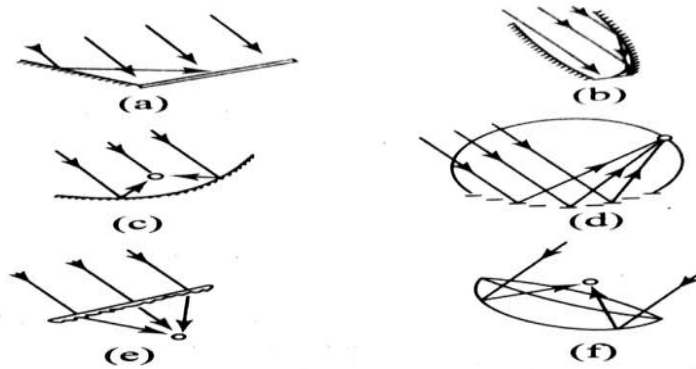
➤ **Explanation of following any eight points :-08**

- **Air Pollution: - Sulphur dioxide, Acidification from SO₂ and NO_x, Carbon monoxide (CO), Ground-level ozone (O₃), Hydrocarbons, TOMP's (Toxic Organic Micro pollutants), Heavy Metals and Lead,**
- **Climatic Change, Greenhouse Effect and the Carbon Cycle, Current Evidence of Climatic Change**
- **Future Effects, Severe Storms and Flooding, Food Shortages, Dwindling Freshwater supply, Acid Rain, Loss of Biodiversity, Increased Diseases, A World Under Stress**

b.) What are solar collectors? Compare different types of solar collectors on the basis of construction and application.

➤ **Define solar collectors and its types: -02**

- 1. Non concentrated (Flat Plate Collector)**
 - 2. Concentrated Collector**
- **schematic diagram of all types: -02**



Types of concentrating collectors: (a) Flat-plate collector with plane reflectors, (b) Compound parabolic collector, (c) Cylindrical parabolic collector, (d) Collector with fixed circular concentrator and moving receiver, (e) Fresnel lens concentrating collector, (f) Paraboloid dish collector

- explanation of all types:-3
- application depends up on the temperature range for all types:-01

Q.No. 2 Attempt any three of the following: (12)

a.) Write Shorts notes on Energy Security.

➤ **Details description of energy security:-04**

The basic aim of energy security for a nation is to reduce its dependency on the imported energy sources for its economic growth.

India will continue to experience an energy supply shortfall throughout the forecast period.

This gap has widened since 1985, when the country became a net importer of coal. India has been unable to raise its oil production substantially in the 1990s. Rising oil demand of close to 10 percent per year has led to sizable oil import bills. In addition, the government subsidizes refined oil product prices, thus compounding the overall monetary loss to the government. Imports of oil and coal have been increasing at rates of 7% and 16% per annum respectively during the period 1991-99. The dependence on energy imports is projected to increase in the future. Estimates indicate that oil imports will meet 75% of total oil consumption requirements and coal imports will meet 22% of total coal consumption As per requirements in 2006. The imports of gas and LNG (liquefied natural gas) are likely to increase in the coming years. This energy import dependence implies vulnerability to external price shocks and supply fluctuations, which threaten the energy security of the country.

Increasing dependence on oil imports means reliance on imports from the Middle East, a region susceptible to disturbances and consequent disruptions of oil supplies. This calls for diversification of sources of oil imports. The need to deal with oil price fluctuations also necessitates measures to be taken to reduce the oil dependence of the economy, possibly through fiscal measures to reduce demand, and by developing alternatives to oil, such as natural gas and renewable energy. Some of the strategies that can be used to meet future challenges to their energy security are

- Building stockpiles
- Diversification of energy supply sources
- Increased capacity of fuel switching
- Demand restraint,
- Development of renewable energy sources.
- Energy efficiency

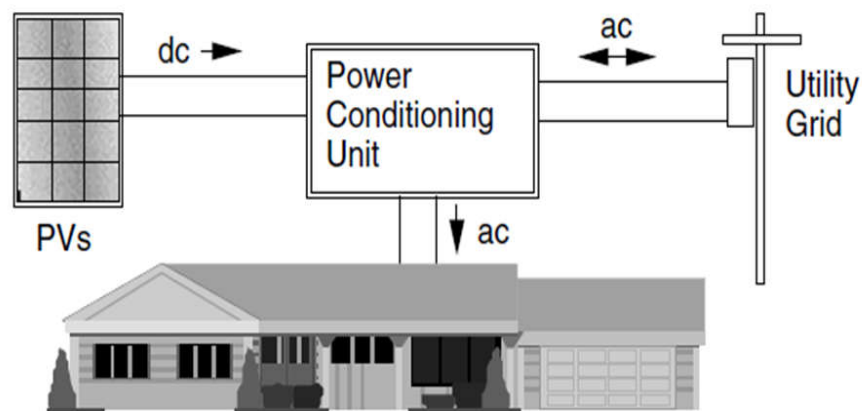
b.) Describe the building integrated PV (BIPV) system?



- **Define BIPV:-01**

Figure shows a simplified diagram of the first of these systems—a grid connected or utility interactive (UI) system in which PVs are supplying power to a building. The PV array may be pole-mounted, or attached externally to the roof, or it may become an integral part of the skin of the building itself. PV roofing shingles and thin-film PVs applied to glazing serve dual purposes, power, and building structure, and when that is the case the system is referred to as **building-integrated photovoltaics (BIPV)**.

- **Block diagram of BIPV:-01**



- **Explanation of BIPV block diagram:-02**

c.) What are the different factors affecting the performance of solar flat plate collector.

➤ **Explanation of all following points:-04**

- **Incident Solar Radiation**
- **Number of Cover Plate**
- **Spacing**
- **Collector Tilt**
- **Selective Surface**
- **Inlet Temperature**
- **Dust on cover Plate**

d.) List out the advantages and disadvantages of non-conventional energy sources.

➤

- **Advantages of non-conventional energy sources:-02**
- **Disadvantages of non- conventional energy sources:-02**