Date

Section-A
Unit-I (Introduction)

✱ Source Of Energy :-

(a) Conventional Source of Energy

These are the sources of energy which are used on large scale are called conventional source energy. Such as (i) Thermal Power (ii) Hydropower
(iii) Thermo-nuclear power

(b) Unconventional source of energy

Other source of energy through valuable but in comparison with quantum power produced by main sources, their contribution is limited and hence have been classified as unconventional sources of energy like -

(i) Tidal Power (ii) Solar Power
(iii) Geothermal Power (iv) Wind Power
(v) Wave Power (vi) Depression (Solar) power

✱ Advantages and Disadvantages Of Hydropower :-

(i) Hydropower has a 'perpetual' source of energy, while thermal power has a depletable fossil fuel source. Besides hydropower doesn't consume the water.

(ii) Running cost of hydropower plant is very low compared to thermal and nuclear plant.

(iii) Hydropower plants can be brough in to operation in few minutes while thermal and nuclear power plants lack this capability.

(iv) Efficiency of hydropower system is very high (90-95%), while thermal power plants has low efficiency,

as low as 40%.

(v) Hydropower development also provides secondary benefit such as recreation, fishing, flood control etc. where storage is contemplate.

→) Developing Countries need affordable energy to:
(a) increase agricultural productivity
(b) deliver basic educational and medical services
(c) establish adequate water supply and sanitation facilities, and
(d) build and power new job-creating industries.

✱ Energy Use :-
(i) Domestic Sector (ii) Agricultural Use
(iii) Industry Sector (iv) Transportation Sector
(v) Use in Offices (vi) Use in Colleges and Schools

✱ Classification Of Energy Sources :-
The Energy has been classified in the following ways:
(a) Based on Traditional Use :
(i) Conventional Source of Energy
(ii) Non-Conventional Source Of Energy
(i) These are the sources of energy which are used tradinally for many years around the world are called as Conventional Sources of energy.
Eg.- Thermal, Nuclear and Hydropower
(ii) These are the sources of energy which are used on small scale are called non-Conventional energy sources. Eg.- Solar, Wind biomass etc.

(b) Based on long Term Availability :-

(i) Renewable Resources : These are the sources of energy which are used again and again and they are not consumed, are called renewable sources of energy, i.e. hydropower, solar wind etc.

(ii) Non-Renewable Source of Energy : These sources are non-renewable and non-replenishable after their use. Such sources of energy are called as non-renewable source of energy.
Eg.- Fossil Fuels, Uranium etc.

(c) Based on Usability of Energy :-

(i) Primary Source of Energy : These are the sources of energy which are available in nature without any conversion, in raw form. These are coal, crude oil, sunlight, wind, running rivers, etc. These are exploited, processed and are converted to a form as required by the user.

$$\text{Energy yield ratio} = \frac{\text{Energy received from raw energy}}{\text{Energy spent to obtain raw energy source}}$$

Only such sources of energy are exploited which have high energy yield ratio.

(ii) Secondary Resources : The form of energy which is finally supplied to a consumer for utilization is known as secondary or usable energy like electrical energy, thermal energy, chemical energy in the form of hydrogen or fossile fuels.

(iii) Based on Origin:-

(a) Nuclear Energy (b) Hydro Energy
(c) Solar Energy (d) Wind Energy
(e) Biomass Energy (f) Tidal Energy
(g) Fossil Fuel Energy (h) Ocean Thermal Energy
(i) Ocean Wave Energy (j) Geothermal Energy

Common Forms Of Energy:-

(i) Thermal Energy:

Thermal energy is that form of energy which is used to raise the temperature of an object during industrial process. It can also be transferred into mechanical energy with the help of a engine. There are following types of thermal energy:

(a) Low Grade (80°-150°C): The temperature of this grade can be raised from 80°-150°C. It is mostly used for heating purposes.

(b) Medium Grade of Thermal Energy: In this case, temperature of the object can be increased from 150°C to 500°C. It can be converted into mechanical energy with difficulties.

(c) High grade Thermal Energy: The temperature can be raised from 500°C - 1000°C. It can be converted conventially and efficientially into mechanical energy.

(ii) Electrical Energy:

It is considered to be the top grade form of energy. It is used universally as a vehicle of energy. At present about 30-40% energy distribution in the world is met through electrical supply system. It can be easily converted into other form of energy.

(iii) Mechanical Energy :-
It is used in transportation, agriculture, handling processing and other industrial processes. Mechanical energy is required for movement of objects, changing the shape of the object etc.

(iv) Chemical Energy :-
Fuel and organic matter contain chemical energy. Exothermic chemical reaction release heat energy. Also chemical energy directly converted into electrical energy in fuels cells, Storage batteries etc. It is converted into thermal energy by combustion.

* Advantages and Disadvantages Of Conventional Sources Of Energy :-
Thermal energy, Nuclear energy and Hydro energy sources are termed as conventional sources of energy.
Advantages :-
i) These are cheaper than non-conventional sources of energy.
ii) Storing certain quality of energy is easy
iii) These sources are very easy to use as technology for their convention and their use is available.

Disadvantages :-
i) Fossil fuel (thermal) generate pollution. Main pollutions are CO_2, CO, NO_2, and SO_2 particulate matter and heat.
ii) Coal is also a valuable petrochemicals and it is

as raw material for chemical, pharmaceutical for industries and stock is limited.

iii) Safety of nuclear power is a debatable issue.

The major problems with nuclear power are:

(a) The material generated after generation of Nuclear power has radioactivity and is health hazardous.

(b) There is possibility of accidental leakage of radio-active material from reactor.

(c) Uranium source for which technology exists, has a limited source.

(d) Only few countries posses technology required to use nuclear power.

Availability:-

Oil	—	38.3%
Coal	—	32.5%
Gas	—	19.0%
Wood	—	6.5%
Hydro	—	2%
Dung	—	1.2%
Waste	—	0.3%
Uranium	—	0.13%

These are commonly known as commercial or conventional sources of energy.