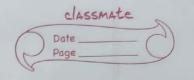
CHAPTER -I Introduction to energy source & its conversion. Energy: "The ability / capicity to do work. * SI Unit: Joule (J) or kilojoule (KJ) Notation : E Power: "Rate of doing work or rate at which energy is converted from one form to other. SI Unit: Watt or J/sec. Notation : P. * Various types of energy: +1. Electrical Energy: It is the energy carried by moving election in an electric conductor. Ex: Lightning, (Power plant convert chemical energy into electricity) 2. Chemical Energy: It results from chemical reactions between atoms. Ex: Electrochemical cell or battery. 93. Mechanical Energy: It is energy that results from movement of an object. Mechanical energy is sum of K.E and P.E. An object possesing mechanical energy has both K.E & P.E. Ex. carmoving up a mountain has both K. E & P.E. 4. Thermal Energy: Heat energy reflets temp. difference between two systems. Ex. Cup of not Tea has thermal energy. 5. Nuclear Energy: It is energy resulting from changes in atomic nuclei or nuclear reaction. Ex. Nuclear fusion, Nuclear fission. 6. Gravitational Energy: Energy associated with gravity involves attraction between two



Objects based on their mass.

Ex. Gravitational energy holds atmosphere to

from light or electromagnetic waves.

Ex. X-rays, aamma, Radio etc.

Grades of energy:

*

1. High - Grade energy:

Electrical and chemical are high grade energy because energy is concentrated in a small space. Even a small amount of electrical and chemical energy can do great amount of work.

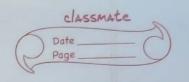
molecules that stores these forms of energy are highly ordered & compact, thus Consider as high grade energy.

High-grade energy like electricity is better used for high grade applications like melting metals rather than simply heating of water.

2. Low-Grade Energy:

Heat is low grade energy. Heat can still be used to do work, but it rapidly dissipates. The molecules, in which kind of energy is stored (air ewater) are more randomly distributed than molecules of carbon in acoal. This disordered state of dissipated energy are classified as low-grade energy. Its efficiency ranges from 28% - 40% depending on system.

*	Thermal Energy power plant:
IC	(1) Thermal energy I heat energy is produced
	when rise in temperature causes atoms to move
	faster and collide with each other.
	(2) Energy that comes from temperature of
	heated substance is called thermal energy.
	(3) Heat energy is other name for thermal
	energy.
→	Principle & working:-
正	Diagram: Refer ppt.
~	11. The Court of t
	(1) In this power plant, heat is evolved by burning
	of fuel in combuction chamber, where steam is
	given generated from water in boiler. This high
	pressure steam is passed through steam turbing
	which impinges on turbine blade eausing
	expansion and reduces pressure.
~	(2) Thus it rotates turbine shaft which is
	coupled with generator & generates electric
	power. Then this steam is passed through
	condenser where it is condenced by changing
	phase from vapour to liquid.
	(3) This condensates are pumped back to boiler
	and water is taken from dam/ niver and the
	cycle is repeated.
1111	lict of company of
411-	List of components and function:
	(1) feed pump: The function of feed pump is
	to increase pressure of condensate water up to
	boiler pressure on expense of work done on pump



- (2) Combuction chamber: Burning of (coal or oil) fuel.

 (3) Boiler: Boller is closed metallic vessel in water is heated beyond its boiling point temperature in order to convert water into steom.

 (4) Turbine: Expansion of steam and generate electric power with help of generator.

 (5) Condenser: condenser is bosically heat
 - exchanger in which heat is transferred (rejected)
 from exhaust steam from turbine to cooling
 water due to which exhaust steam will be
 condensed into liquid called condensate.

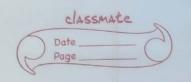
 (6) Cooling Tower: Due to heat transfer from
 - exhaust steam from turbine to cooling water, cold water becomes hot, This hot water will be sent to cooling tower where hot water will be cooled, in order to recirculate it to condenser.
 - (7) Generator: Mechanical work (WT) which is produced by turbine will be converted into electrical work by generator.

IV Advantages, Refer ppt

Disadvantages

Application

	Page
in	
*	Hydro power energy:
ーフェ	Hydropower or hydroelectric power is a
Lei hoz	renewable source of energy that generates
	power by using dom or diversion structure
200	to alter natural flow of a river or other body
	of water.
Plays	Hydropower relies on endless, constantly
	recharging system of water cycle to produce
Lan	electricity, using fuel water that is not reduc-
ودادها	ed or eliminated in process.
- pon	There are many types of hydropower facilities
- 9	though they are powered by kinetic energy
~	of flowing water as it moves downs heam.
aca	Hydro power utilizes turbines and generators to
TALAC	convert that kinetic energy into electricity,
	which is then fed into electrical grid to power
75,000	homes, businesses and industries.
-	stolustrister of the stole ad mis
	Classification =
2000	High head ! (Water head above 300 m)
9	redium head . (water head from
	Low head : (Water head from 3-30m)
712	
	Diagram: Refer ppt.
I	Principle & Marking!
	The working.
	The Cific.
	U)-Hydro electric is often considered as a
	renewable energy source.
UNR.	



- (2) A renewable energy source is one that is not depleted (used up) in production of energy. Through hydropower, energy is felling water is converted into electricity without "using up" water.
- (3) An impoundment is simply a dom that holds water in reservoir. water is released when needed through penstock, to drive the turbine.
- (4) Flowing water causes turbine to rotate, converting waters kinetic energy into mechanical energy produced by turbine is converted into electric energy using turbine power.

components:

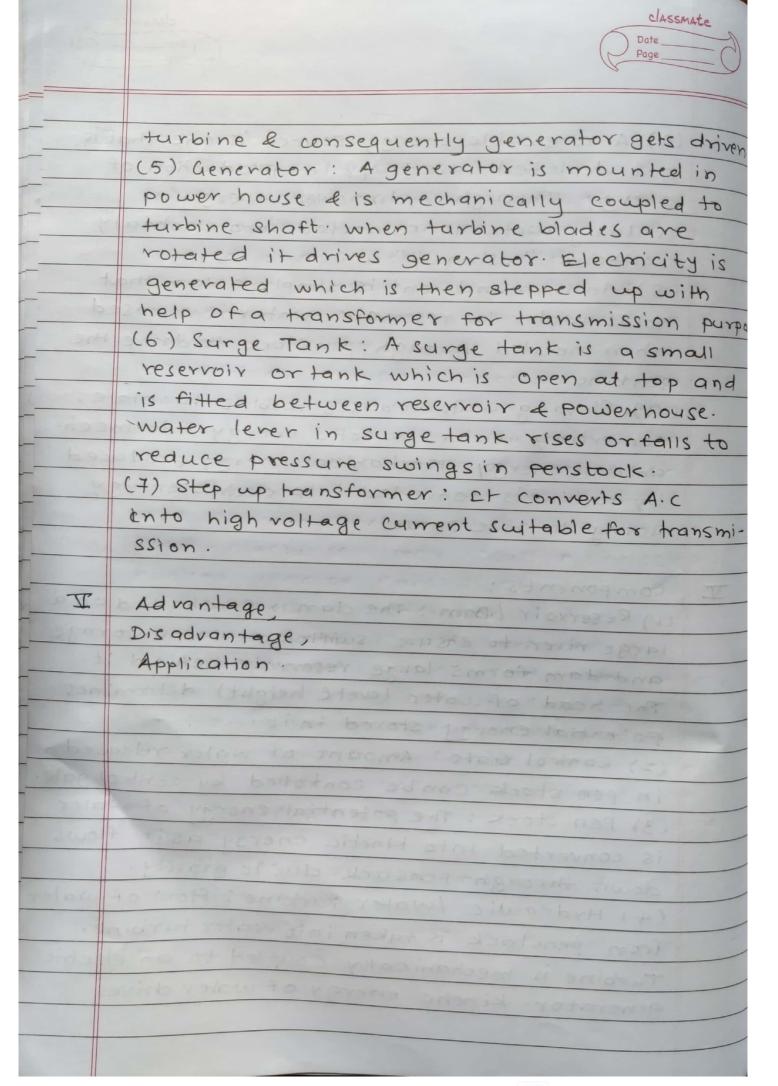
V

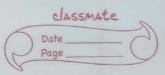
- (1) Reservoir I Dam: The dam is constructed on a large river to ensure sufficient water storage and dam forms large reservoir behind it.

 The head of water level (height) determines potential energy stored in it.
- (2) control Gate: Amount of water released in pen stock can be controlled by control gate.

 (3) Pen stock: The potential energy of water is converted into kinetic energy as it flows down through penstock due to gravity.
- (4) Hydrawic / water turbine: How of water from penstack is taken into water turbine.

 Turbine is mechanically coupled to an electric generator. Kinetic energy of water drives





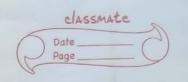
*	Nuclear Energy:
	Nuclear energy is energy in nucleus or core
2 grib	of an atom. Atoms are tiny units that make
-	up all matter in universe, & energy is what
9418	holds nucleus together. There is a huge amount
	of energy in atom's dense nucleus.
	is Favorina topical dointes prierrib doissit
I	Nuclear energy can be used to create electricity
. 000	but it must first be released from atom. In
The state of the s	process of nuclear fission, atoms are split to
29	release energy.
watraij	A nuclear reactor or power plant is a series
3:00	of machine that can control nuclear fission
-odno	to produce electricity
A - 10	The fuel that nuclear reactors use (U-235)
	to produce nuclear fission is pellets of
	element uranium.
	In a nuclear reactor, atoms of uranium are
d	force to break aport. As they split atoms
	release tiny particles called fission products.
It rings	Assion product cause other uranium atoms
ra b	to split, starting a chain reaction. Energy
	released from this chain reaction creates heat.
·bo	characterist production of the second
III	Diagram: Refer ppt.
10	Draw both, nuclear P.P. Reactor dia.
	i announce of the board of the second
3:191	- restain blad aborreser : box laul (63 -1)

I Components:

(1) Nuclear reactor:

- used to perform nuclear fission and is
 covered by a protective shield. Splitting up
 of nuclei of heavy atoms is called nuclear
 fission, during which huge amount of
 energy is released.

 (2) Nuclear fission is done by bombording
- slow moving neutrons on nuclei of heavy element. As the nuclei break up it releases energy as well as more neutrons which further cause fission of neighboring atoms. Hence it is a chain reaction and it must be contro-Hed, otherwise it may result in explosion. A nuclear reactor consists of fuel rods. control rods, & moderator. A fuel rod contains small round fuel pallets. (3) Control rods are of codmium which absorbs neutrons. They are inserted into reactor & can be moved in or out to control reaction. Moderator conbe graphite red or coolont itself moderator slows down neutrons before they bombard on fuel rod. (Althornood:
- (a) Nuclear fuel: Normally used nuclear fuel is uranium.
 - (b) fuel rod: fuel rods hold nuclear fuel in



- (c) Neutron source: A source of neutron is required to initiate fission for first time.

 A mixture of beryllium with plutonium is commonly used as source of neutron.
 - chain reaction they are absorders of neutrons commonly used control rods are made up of cadmium or boron.
 - (e) Moderator: This are used to Slow down fast neutrons. It reduces 2 Mev to an average velocity of 0.015 eV. Ordinary or heavy water are used as moderator.
 - (f) Neutron reflector: To prevent leakage of neutron to large extent. In pressurized heavy water reactor (PHWR), moderator itself acts as replector.
 - (9) shielding: To protect from harmful radiations, reactor is somounded by a concrete wall of thickness about 2-2.5 m
 - (2) Heat Exchanger:
 - (1) In heat exchanger primary coolant transfers heat to secondary coolant (water) thus water from secondary loop is converted to steam.
 - (2) The primary and secondary systems are closed loop, and they are never allowed to mixup with each other. Thus heat exchanger helps in keeping secondary system free from radioactive stuff.

	classmate Date
200	(3) Steam Turbine:
- 20	(1) Generated steam is passed through a
1 24	steam turbine, which runs due to presence
	of steam. As steam is passed through
land	turbine blades, pressure of steam gradually
ZNOW NO	decreases & it expands in volume.
909	(2) Stem turbine is coupled with alternator
	through rotating shaft.
aa	ob woll otherwise are side for (3)
SERVING	(4) Alternator:
Valer	(1) Steam turbine rotates shaft of alternate
	thus generating electrical energy.
	(2) Electrical output of alternator is
	delivered to step up transformer to transfer
2400	it over distances.
	1 Os verlector
	(5) Condenser:
	(1) Steam coming out of turbine, after it
(1)	has done its work is converted back into
	water in condenser.
	(2) steam is cooled by passing it through
	third cold water loop.
	and danies vachanss of send many
I	Advantage & Refer ppt.
	Disadvantage
3/19	Application)
9	Names of nuclear P.Pin India.
	mixup with earth otherwinnus heat exchang
mag	herbein seebing secondary system here
-	Sodio active stuff.