

1. The commercial sources of energy are :-
 1. Fossil fuels, water and radioactive substance
2. What is the total power installed capacity (approximate) in India :-
 1. 125,000 MW
3. The power development programmes that are possible in Tamil Nadu are largely based on :-
 1. Nuclear power plants.
4. The power output from a hydroelectric power plant depends on :-
 1. head, discharge and efficiency of the system.
5. $\frac{0.736}{75} WQH\eta$ is the expression for the electrical power developed by a hydroelectric plant in kW.
6. Taking the density of water to be 1000 kg/m^3 , how much power would be developed by a hydroelectric generator unit, assuming 100% efficiency, with 1.0 m head and $1.0 \text{ m}^3/\text{s}$ discharge

(a) 2.90 kW	(b) 4.45 kW
(c) 9.80 kW	(d) 19.60 kW
7. If power P available from a hydro-scheme is given by the formula $P = 9.81 QH$, where Q is the flow rate through the turbine in L/s and H is head in metres, then P will be in units of :- W

8. If the discharge is $1 \text{ m}^3/\text{s}$ and head of the water is 1 m . Then the power generated by the alternator in one hour (assume 100% efficiency of generator and turbine) will be

$$A:- \frac{736}{75} \text{ KW}$$

9. The utilizable water from a catchment is $60 \times 10^6 \text{ cu m}$ annually and the hydro-station has head of 40 m . Assuming ideal generator and turbine, the power that can be theoretically generated is

$$A:- 750 \text{ KW}$$

10. A hydroelectric power station is supplied from a reservoir of capacity $3 \times 10^7 \text{ m}^3$ at a head of 150 m . The overall efficiency of the power plant is 70%. Energy available from the plant will be

$$A:- 8.58375 \times 10^6 \text{ kWh}$$

11. A hydroelectric power station is commonly found in hilly areas.

12. In hydroelectric power plants \rightarrow operating cost is low and initial cost is high.

13. The advantages of hydroelectric power station over thermal power station is \rightarrow
 \rightarrow The operating cost of hydroelectric power station is low.

14. The largest size of hydroelectric unit in india is 165 MW.

15. Gross head of any hydroelectric power station is the difference of water level b/w the level in the above storage and tail race.

16. With reference to hydropower station, the graphical representation of the discharge as a function of time is known as Hydrograph.

Advantages of hydrograph in india:-

17. Hydrograph is similar to chronological load curve.

18. The area under a flow duration curve represents:- total quantity of run-off during that period.

19. A mass curve can be plotted from chronological load curve.

20. Storage requirement can be determined from either by hydrograph or by mass curve

21. In hydropower stations what is an enlarged body of water just above the intake and used as a regulating reservoir is called Forebay.

22. A surge tank is used as a control buff in the dam and the turbine in a hydrostation.
23. In high head hydroelectric power plant, the velocity of water flow in surge tank is around 3 m/s.
24. The term "surge tank" associated with high head hydro type of power plant.
25. Location of a surge tank, in any hydroelectric power station is near turbine.
26. The function of a surge tank is to relieve water hammer pressures in the penstock pipe.
27. Water hammer occurs in penstock.
28. In a medium or high head hydroelectric power station, a surge tank is provided to control the pressure variations in the penstock pipes due to sudden load changes.
29. In buff the runner exhaust and the draft tube is the draft tube of a hydro-power station that is an airtight pipe located.
30. The draft tube is provided to increase the acting head on the water wheel.

31. For variable heads of near about but less than 30 meters, Kaplan types of turbines is used in hydropower stations.

32. For harnessing lower variable water heads the suitable hydraulic turbine with high percentages of reaction and runner adjustable vane is Kaplan.

33. For high head and low discharge the water turbine used is Pelton wheel.

34. For harnessing low variable water heads the suitable hydraulic turbine with reaction and adjustable vane is Kaplan.

35. The "specific speed" of a water turbine is the speed at. exit horse power at exit head.

36. The specific speed (N_s) of a turbine is equation is

$$N_s = \frac{N \sqrt{P}}{H^{1.25}}$$

37. The specific speeds of Kaplan, Francis and Pelton turbines are the decreasing order.

38. In water turbines, the runaway speed of Pelton wheel is 1.8 times rated speed.

89. Load frequency control uses both proportional and integral controllers.

90. Load control frequency controls are carried out with PID controllers.

91. The permissible variation of frequency in power system is $\pm 3\%$.

92. The voltage of a bus can be controlled by controlling the reactive power of the bus.

93. The area under the load curve represents energy consumed.

94. The area under daily load curve divided by 24 gives average load of the day.

95. Load curve of a power generating station is of always negative slope and positive slope.

96. Load duration curves give the number of hours for which a particular load lasts during the day.

97. Diversity factor is the ratio of sum of max demands of consumers / system max demand.

48. Diversity factor has direct effect on fixed cost per unit generated.

49. The knowledge of diversity factor helps in completing plant capacity.

50. Load shedding is done for reducing peak demand on the system.