EXERCISE 4

1. What is a parallel flow turbine ?

2. Describe with sketches a propeller turbine.

3. What is the difference between a propeller and a Kaplan turbine ?

4. What is the advantage of the Kaplan turbine over the propeller turbine ?

5. Why is a Kaplan turbine referred to as a variable pitch propeller turbine ?

6. How is a Kaplan turbine different from a Francis turbine ?

7. What is speed ratio of a Kaplan turbine ?

8. What is flow ratio of a Kaplan turbine ?

9. Why are hydraulic losses less in a Kaplan turbine than in a Francis turbine ?

10. Under what conditions is a Kaplan turbine suited ?

11. What is the range of specific speed of Kaplan turbines ?

12. The velocity of flow for a Kaplan turbine is 8·25 *metres per second*. If the diameters of the runner and boss are respectively 4·5 *metres* and 1·5 *metres*, calculate the discharge of the turbine.

(116·63 cumec)

10. The overall efficiency of a propeller turbine is 82%. The outer diameter of the runner is 4 *metres* and the hub diameter is 1·20 *metre*. If the velocity of flow is 9·10 *metres* per second find the BHP of the turbine if the head on the turbine is 18 *metres*.

(24974·4 hp)

14. A Kaplan turbine working under a head of 18 *metres* develops 25000 *hp* at an overall efficiency of 85%. The bose diameter is 0·3 times the runner diameter. If the velocity of flow is 9·05 *metres* per second, calculate the discharge and the diameters of the runner and the boss.

(122·55 cumec ; D_o=4·35 metres ; D_b=1·305 metres)

15. A Kaplan turbine develops 58000 *hp* at an overall efficiency of 88% under a head of 24 *metres*. If the speed ratio is 1·62 and the flow ratio is 0·5 and the boss diameter is 0·35 times the runner diameter, find the diameter of the runner and the speed of the turbine.

(4·919 metres ; 136·5 rpm)