SATHYABAMA UNIVERSITY
(Established under section 3 of UGC Act, 1956)

Course & Branch: B.E – AERO/M&P/MECH
Title of the paper: Fluid Mechanics & Machinery
Semester: III   Max.Marks: 80
Sub.Code: 6C0066(2006-2007)   Time: 3 Hours
Date: 28-04-2009   Session: AN

PART – A   (10 x 2 = 20)
Answer All the Questions

1. What is the difference between an ideal fluid and a real fluid?

2. What is center of buoyancy?

3. What are the limitations of Bernoulli's equation?

4. What is the difference between a notch and a weir?

5. What is the difference between laminar flow and turbulent flow?

6. How is turbulent motion classified?

7. How are centrifugal pumps classified?

8. What is negative slip in reciprocating pump?

9. Give the comparison between impulse and reaction turbine.

10. What are the uses of dimensional analysis?

PART – B   (5 x 12 = 60)
Answer All the Questions

11. Find the density of metallic body which floats at the inter face of mercury of specific gravity 13.6 and water such that 35 percent of its volume is submerged in mercury and 65 percent in water.

(or)

12. Write short notes on
    (a) Viscosity
    (b) Surface tension
    (c) Compressibility

(d) Metacentric height.

13. State and prove Bernoulli's equation.

(or)

14. A submarine fitted with a Pitot tube moves horizontally in sea. Its axis is 12 m below the surface of water. The Pitot tube fixed in front of the submarine and along its axis is connected to the two limbs of a U tube containing mercury, the readings of which is found to be 200 mm. Find the speed of the submarine. Assume the specific gravity of sea water as 1.025 times fresh water.

15. Derive an expression for the discharge over a rectangular notch in terms of head of water over the crest of notch.

(or)

16. A crude oil of viscosity 0.9 poise and relative density 0.9 is flowing through a horizontal circular pipe of diameter 10mm and length 12m. Calculate the difference of pressure at the two ends of the pipe, if 785 N of the oil is collected in a tank in 25 seconds.

17. A centrifugal pump is to discharge $0.11 m^3$/s at a speed of 1500 rpm against a head of 25m. The impeller diameter is 250mm, its with outlet is 50mm and manometric efficiency is 75%. Determine the vane angle at the outlet periphery of the impeller.

(or)

18. Explain with neat sketches the function of air vessels in a reciprocating pump.

19. A Kaplan turbine develops 22000kW at an average head of 35m. Assuming a speed ratio of 2, flow ratio of 0.6, diameter of the boss equal to 0.35 times the diameter of the runner and an overall efficiency of 90 percent, calculate the diameter, speed and specific speed of the runner.

(or)

20. Write short notes on:
    (a) Geometric similarity
    (b) Kinematic similarity
    (c) Dynamic similarity.