

S.B. Roll No.....

HYDRAULICS AND PNEUMATICS
4th Exam/Mech./RAC/Prod/T&DM/5304/0953/Nov'17

Duration: 3Hrs.

M.Marks:75

SECTION-A

Q1. a) Fill in the blanks.

1x15=15

- i. An ideal fluid is defined as a fluid which is _____ and _____.
- ii. _____ is the property of fluid by virtue of which it resists shear.
- iii. The difference between absolute pressure and local atmospheric pressure is called _____.
- iv. Minor losses in pipe have _____ magnitude.
- v. Two pipes are called equivalent when they have same _____ and _____.
- vi. Differential manometers are used to measure _____ two points.
- vii. FRL unit means _____.
- viii. Kaplan turbine is a _____ turbine.
- ix. The hydraulic motor which receives force and power by means of fluid pressure is known as _____.
- x. The ratio of inertia force to viscous force is known as _____.

b) State True or False

- xi. Surface tension in liquids is due to adhesion.
- xii. When fluid is at rest. The shear stress is zero.
- xiii. The sum of static and dynamic pressure is called stagnation pressure.
- xiv. For a centrifugal pump, the discharge varies inversely as the speed.
- xv. Pressure required in a hydraulic motor depends on torque and displacement.

SECTION-B

Q2. Attempt any six questions.

6x5=30

- a. What is viscosity? State Newton's law of Viscosity.
- b. State Archimedes principle with suitable example.
- c. State and prove Pascal's law. Give some example.
- d. State Bernoulli's theorem. Explain different types of heads.
- e. A 2m long pipe is inclined at 30 degrees has diameter 20 cm and 10 cm with smaller diameter at lower end has pressure of 200kpa and 230kpa respectively at lower and upper end. Find flow rate in the pipe.
- f. Derive the head loss due to sudden enlargement.
- g. Explain with neat sketch working of hydraulic ram.
- h. Distinguish between centrifugal pump and reciprocating pump.
- i. Explain single acting double acting air cylinder.

SECTION-C

Attempt any two questions.

15x2=30

Q3. A pipeline 2000 m long is used for power transmission. 110kW is to be transmitted through the pipe in which water having pressure of 5000kN/m² at the inlet is flowing. If the pressure drop over the length of pipe is 1000kN/m² and coefficient of friction is 0.0065 Find

- a. The diameter of the pipe
- b. Efficiency of transmission

Q4. a) What are Reynolds number and its effect on pipe friction?

- b) An inverted tube manometer containing oil of specific gravity 0.7 as manometric fluid at the top is used to measure pressure difference between two points x and y. The centre of pipe X containing liquid of specific gravity 1.1 connected to left limb is 100mm higher than the centre of pipe Y, containing water, connected to right limb is 350mm above the centre of pipe X. Calculate the pressure difference between the two points.

Q5. a) Explain the construction and working of Francis turbine with neat sketch.

- b) Explain the working of Roots Blower compressor.