كلية الهندسة – جامعة مصراته

القسم/هندسة النفط | فصل الربيع 2014/2013

الزمن: 3 ساعات | الامتحان النهائي | المقرر/ ميكانيكا الموائع

أستاذ المادة: د. احمد إبراهيم سيداحمد | التاريخ/2014/6/26

اجب عن جميع الأسئلة

Q1

1. **A certain object weighs 150 N at the earth's surface. Determine the mass of the object in kilograms and its weight in Newton when located on a planet with an acceleration of gravity equal to 8 ft/s^2 .**

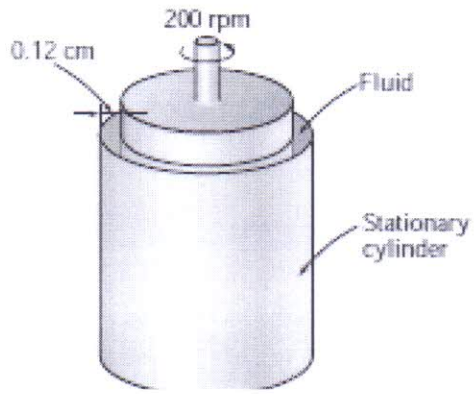
   (7 marks)

2. **Calculate the density and specific weight of carbon dioxide at absolute pressure of 300 kN/m^2 and 60°C.(6 marks)**
3. **A certain gas whose specific weight is 16 N/m^3 and at certain temperature and pressure. What are the values of its density, specific gravity relative to air weighing 12 N/m^3. (7 marks)**

Q2

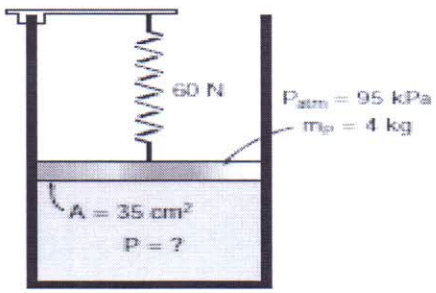
1. **The velocity distribution in a flow through a tube is given by u = (– 10/μ) (0.01 – r2). If the pipe radius R = 0.1 m. calculate the shear stress at the wall in N/m2.**
   (10 marks)

2. **The viscosity of a fluid is to be measured by a viscometer constructed of two 75-cm-long concentric cylinders. The outer diameter of the inner cylinder is 15 cm, and the gap between the two cylinders is 0.12 cm. The inner cylinder is rotated at 200 rpm, and the torque is measured to be 0.8 N m. Determine the viscosity of the fluid.**
   (10 marks)



Q3

1. **A gas is contained in a vertical, frictionless piston– cylinder device. The piston has a mass of 4 kg and a cross sectional area of 35 cm2. A compressed spring above the piston exerts a force of 60 N on the piston. If the atmospheric pressure is 95 kPa, determine the pressure inside the cylinder. (10 marks)**



2. **Both a gage and a manometer are attached to a gas tank to measure its pressure. If the reading on the pressure gage is 80 kPa, determine the distance between the two fluid levels of the manometer if the fluid is:**
   (a) mercury (ρ_{Hg}= 13,600 kg/m3). (5 marks)
   (b) water (ρ_{H2O}= 1000 kg/m3). (5 marks)