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| NATURAL SCIENCES DEPARTAMENT | Unit 7 practice examPhysics and Chemistry 10º  |
| Name and surname  |
| Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Mark. A\_\_\_\_\_. B\_\_\_\_\_. MYP\_\_\_\_\_. VC\_\_\_\_\_.\_\_\_\_\_.  |

1. **State** Newton´s 1st law. **0.3 for each**: an object will remain at rest; or with a constant velocity; unless acted on by a force.
2. **Show** which of the following produces the greatest pressure: 8 N on 2 m2, 200 N on 20000 cm2 and 50 N on 0.5 m2. **0.3 for each**: 8/2=4 Pa; 200/2=100 Pa; 50/0.5=100 Pa
3. **Label** the following forces acting on the diagram below – gravity, normal, centripetal and friction. Gravity down, normal up, friction right and centripetal from edge of a wheel to centre. **0.3 for 2 correct; 0.6 for 3 correct; 1 for 4 correct.**



1. **State** the equation for the law of universal gravitation and **describe** how it relates mass and distance to force. F=(G·m1·m2)/d2; F directly proportional to m; F inversely proportional to d2.
2. The hydraulic system below is set up to lift a car with a mass of 500 kg on piston 2. **Calculate** the minimum force required at F1 to lift the car if A1 = 0.5 m2 and A2 = 4 m2.

F1/A1=F2/A2;

Weight of car=500·9,8=4900 N;

F1=(4900·0.5)/4=612.5 N

1. A standard mercury barometer at sea level supports 760 mm Hg in a column with a cross sectional area of 1 cm2. **Explain** what would happen if the barometer was taken to the edge of the Dead Sea (no tinto the water) which has an altitude of 400 m below sea level. Height of Hg would increase; greater atmospheric pressure; would be able to support a greater weight of mercury.
2. **Calculate** the **difference** in hydrostatic pressure felt by a submarine at a depth of 200 and 400 m respectively. *Data: dsea water=1030 kg/m3* p1=h·d·g=200·1030·9,8=2018800 Pa; p2=400·1030·9,8=4037600 Pa; 4037600-2018800=2018800 Pa (**must** have units for final answer)
3. A 600 kg car accelerates uniformly from rest for 30 seconds and reaches a speed of 120 m/s. It then collides with a tree. **Calculate** the force applied by the car hitting the tree. F=m·a; a=(120-0)/30=4m/s2; F=600·4=2400 N
4. The graph below shows data collected from a Hooke´s law invesitgation. **State** the equation for Hooke´s law and use it to **calculate** the extension constant, k.

F=k·x

Gradient=k=10/0.2=50

Units = N/m

1. **Explain** why liquids are more suitable in their use in hydraulic systems than gases and solids. Gases can be easily compressed; solids particles in fixed positions so cannot move freely; liquids are closely packedbut can still move freely.
2. A cube of material X is placed in a container of distilled water. Half of the cube remains above the surface of the water as it floats. **Calculate** the mass of the cube. *Data: ddistilled water=1 g/cm3; cube side length = 2 m.Vobject displacing water=1/2 ·(2·2·2)=4 m3; Fobject=Fthrust=4·1000·9,8=39200 N; m=F/a=4000 kg*
3. The table below gives data about “*ratios compared with Earth*”. **Compare** and **explain** the similar values seen for force due to gravity on Venus and Saturn. Very similar values; although Saturn has a very high mass BUT diameter of venus is much smaller; density of venus much smaller.



**Formulation**

1. Potassium permanganate 🡪
2. Sodium hydroxide 🡪
3. Calcium phosphate 🡪
4. Lead(II) iodide 🡪
5. Sulfuric acid 🡪
6. Beryllium oxide 🡪
7. Sodium nitrite 🡪
8. Zinc(II) arsenate 🡪
9. Iron(III) sulfite 🡪
10. Ammonia 🡪
11. LiCN 🡪
12. Mg(IO4)2 🡪
13. Fe(NO3)2 🡪
14. Zn(SCN)2 🡪
15. CH4 🡪
16. HBr 🡪
17. Mn(OH)2 🡪
18. Na3BO3 🡪
19. PdS 🡪
20. Au2O 🡪