

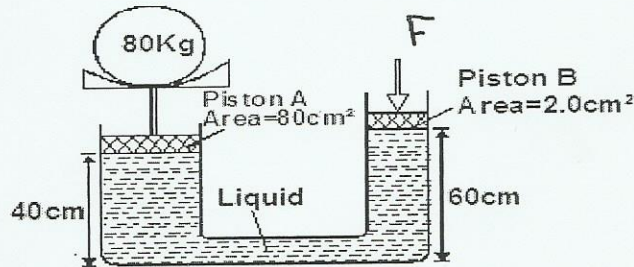
SECTION B (55 MARKS)

Answer ALL questions in this section.

13 a) State the principle of transmission of pressure in liquids. (1 mark)

Pressure exerted at one point in an enclosed container is transmitted equally to all parts.

b) A mass of 80kg is being lifted by a force F applied on the other piston of the machine as shown in figure below



Determine the value of F needed to just lift the 80kg mass given the density of the liquid is 1.2g/cm³. (4 marks)

$$\frac{F_1}{A_1} = \frac{F_2}{A_2}$$

$$\frac{800}{80} = \frac{F_2}{2.0}$$

$$F_2 = 20N$$

Mass of liquid = $(2.0 \times 60) \times 1.2$
 $= 48g = 0.048kg$
 WT of liq. = 0.48N
 $F = 20 - 0.48$
 $= 19.52N$

c) Give one reason why a lift pump raises water to heights less than 10m. (1 mark)

low air density

d) In an experiment, it was observed that soapy water placed on a wet smooth surface displaced the particles of non-soapy water. State and explain this observation. (2 marks)

Soapy water lowers the surface tension of non-soapy water drawing the non-soapy water towards itself.

14 a) A block of metal of mass 250g at 100°C is dropped into a lagged calorimeter of heat capacity 40JK⁻¹ containing 100g of water at 25°C. The temperature of the resulting mixture was found to be 40°C. Determine; (C_w = 4200J/kgk)

i) Heat gained by calorimeter. (2 marks)

$$Q = mc\Delta\theta$$

$$= 40 \times 15$$

$$= 600J$$