

REVISION QUESTIONS (NEWTON'S LAWS)

1. State Newton's first law of motion

(1mk)

2. A car of mass 2 metric tonnes is travelling at a velocity of 36 km/h. Calculate the momentum of the vehicle.

(3mks)

3. A trolley of mass 2.0 kg is pulled along by an elastic cord. Given acceleration of  $4 \text{ m/s}^2$ , find the frictional force acting on the trolley if the tension in the cord is 10 N.

(3mks)

4. Derive the relation  $F=ma$

(3mks)

5. What is impulse? state its units

(2mks)

6. Determine the change in momentum produced  
a) when a force of  $4.5 \times 10^3 \text{ N}$  acts on a body which is at rest for 0.04 seconds.

(3mks)

(b) what velocity will be given to the body if it has a mass of 40kg? (3mks)

7. A gas cylinder containing 20kg of compressed gas empties in 40 minutes when the valve is opened. If the gas comes out from the exit nozzle with an average velocity of 60m/s, find the force exerted on the cylinder. (3mks)

8) Two blocks of masses  $m_1 = 6.0\text{kg}$  and  $m_2 = 4\text{kg}$  are in contact on a frictionless table.



If a force  $F$  of 12N acts on  $m_1$ , determine  
a) the acceleration of the two blocks (3mks)

b) the force exerted by  $m_1$  on  $m_2$  (3mks)

+ body of mass 6 kg is attached to the hook of a spring balance hanging from the rod at a lift, what is the reading on the spring balance when the lift is:

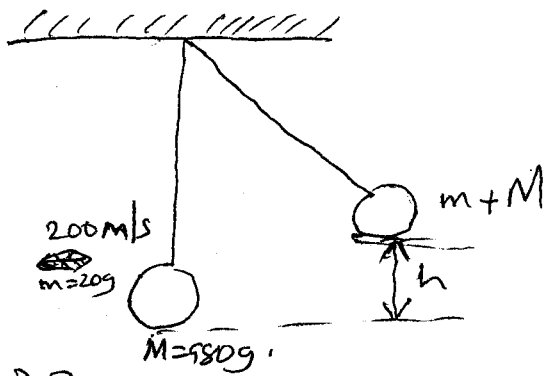
a) Ascending at an acceleration of  $0.4 \text{ m/s}^2$   
(3 mks)

b) Descending at an acceleration of  $0.4 \text{ m/s}^2$   
(3 mks)

(c) Ascending at a constant velocity ( $g = 10 \text{ m/s}^2$ )  
(2 mks)

(10) A bullet of mass  $0.01 \text{ kg}$  is fired from a gun of mass  $1.0 \text{ kg}$ . If the velocity of the bullet is  $500 \text{ m/s}$ , determine the RECOIL velocity of the gun.  
(2 mks)

11 A bullet of mass  $20 \text{ g}$  travelling horizontally at a speed of  $200 \text{ m/s}$  embeds itself in a block of wood of mass  $980 \text{ g}$  suspended from a light inextensible string so that it can swing freely. Find



a) The velocity of the bullet and block immediately after collision (3 m/s)

b) The height through which the block rises (3 m/s)

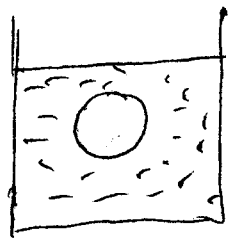
12. A wooden box of mass  $60\text{ kg}$  rests on a rough floor. The co-efficient of friction between the floor and the box is  $0.8$ .

a) Calculate the force required to just move the box.

b) If a force of  $600\text{ N}$  is applied to the box, with what acceleration will it move. Take  $g = 10\text{ m/s}^2$ .

Block of metal with a mass of 80 kg required a horizontal force of 100 N to pull it with uniform velocity along a horizontal surface. Calculate the coefficient of friction between the surface and the block (Take  $g = 10 \text{ m/s}^2$ ).  
(3 marks)

4. The figure below shows a ball falling in a liquid, state and show the forces acting on the ball.  
(3 marks)



(3 marks)

5. Sketch a velocity-time graph of the ball in Q14 above as it falls through the liquid.  
(2 marks)

balloon is observed to rise up  
when the air inside it is  
suddenly let free to escape  
(2MKS)

17. which of the two liquids A and B  
shown in the figure below is  
more viscous? Give a reason.

