Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Q1.

A teacher sets up two experiments for her students to complete.

The outcome of each experiment can be explained using Newton's laws.

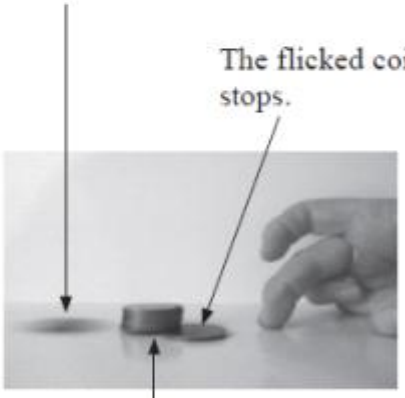
(a) Use Newton's first law of motion to explain the behaviour of the dominoes in experiment 1.

(2)

Experiment 1	Explanation
Falling dominoes The first domino is given a gentle push.  **Observation** The domino falls, knocking the next domino; one by one the dominoes fall. 	

*(b) Apply Newton's laws of motion to explain the three observations in experiment 2.

(6)

Experiment 2	Explanation
Stacked coins A coin is flicked towards a stack of coins.  **Observations** The bottom coin is knocked out from under the stack. 	

(c) Whilst carrying out the stacked coins experiment, the student sometimes observed that the flicked coin did not stop but changed its direction of travel.

Suggest a reason for this observation.

(2)

Observation	Reason
 The coin that was flicked changes its direction.	.....

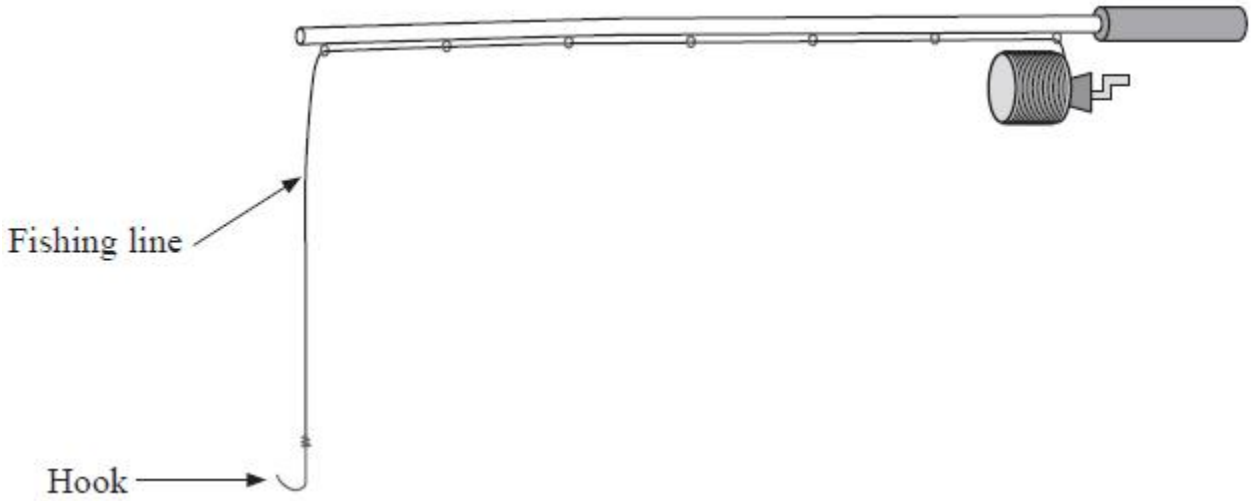
(Total for question = 10 marks)

Q2.

The following three properties can be used to describe copper.

Ductile Malleable Tough

(a) Both nylon and copper can be used to make fishing lines. Copper fishing lines sink faster than those made of nylon. This makes copper fishing lines more suitable for deep water fishing.



(i) By considering the forces acting on the submerged line, explain why nylon is less suitable than copper for deep water fishing. Include a suitable calculation in your answer.

Both lines have the same cross-sectional area.
cross-sectional area of lines = 1.30×10^{-7} m^2
density of saltwater = 1030 kg m^{-3}
weight of 20.0 m of copper line = 0.220 N
weight of 20.0 m of nylon line = 0.0280 N

(4)

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(ii) A fish becomes caught on the hook and the copper line extends. Calculate the extension produced.

cross-sectional area of copper line = 1.30×10^{-7} m^3
load on line = 65.0 N
original length of line = 20.0 m
Young modulus of copper = 129 GPa

(3)

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Extension = ...

(b) Some people use fishing lines that have been pre-stretched by loading and unloading.

(i) Sketch the force-extension graph for a copper line during the process of pre-stretching.

(3)

(ii) Suggest a reason why some people prefer to use this type of line.

(1)

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(Total for question = 11 marks)