

Candidate Name

Candidate Number

Centre Name

Centre Number

Paper 2: Statistics and Mechanics

Sample Paper

(1 hour 15 minutes)

It is necessary to respond on this question paper. You must have a soft pencil (preferably of type B or HB), a clean eraser and a dark blue or black pen.

INSTRUCTIONS:

- You must write your name, candidate number, centre name and centre number in the designated spaces.
- Attempt all the questions using a dark blue or black pen.
- You may use a soft pencil for graphs.
- If working is needed for any question it must be shown below that question.
- Do not use correction fluid.
- Avoid writing on any bar codes.
- You are allowed to use a calculator if needed.

INFORMATION:

- This paper has a total of 50 marks.
- The number of marks assigned for every question or its parts is indicated within brackets [].
- Rough work must be completed on this question paper; no marks will be given for unsupported answers from a calculator.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question

(a) Calculate the value of a . [4]

[illegible]

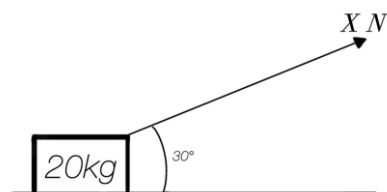
(b) When the truck is travelling at 11 ms^{-1} , the engine is switched off and without braking, the truck comes to rest in a distance of x metres. Assuming that the resistance is still 2200N.

Use the work-energy principle to calculate the distance x metres.

[3]

[illegible]

2.



A parcel of mass 20kg rests on a rough horizontal plane. A force of magnitude X newtons is applied to the parcel at 30° to the horizontal, as shown in the diagram above. The coefficient of friction between the parcel and the plane is 0.8 . The parcel is on the point of sliding along the plane.

Find the value of X , giving your answer to 3 significant figures.

[8]

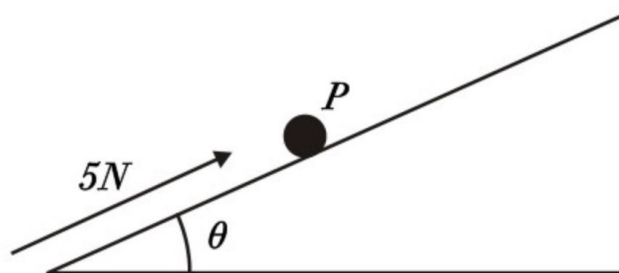
(a) The value of m [4]

[illegible]

[3]

[illegible]

4.



A particle P of mass 0.8 kg is on a rough plane inclined at an angle θ to the horizontal, where $\tan\theta = \frac{5}{12}$. The particle is held at rest on the plane by the action of a force of magnitude 5 N acting up the plane in a direction parallel to a line of greatest slope of the plane, as shown in the figure above. The particle is on the point of slipping up the plane.

(a) Find the coefficient of friction between P and the plane. [7]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

The force of magnitude 5N is removed.

(b) Find the acceleration of P down the plane.

[4]

[illegible]

Find

- [illegible]

- [illegible]

(c) The average speed of the car during the journey from town *A* to town *B*. [2]

6. At a skate park, skaters skate down a straight ramp into a holding area. The ramp is rough and is inclined at an angle of 60° to the horizontal. The distance travelled down the ramp by each skater is 20m. Skaters are modelled as particles and a skater of mass 50kg is released from rest at the top ramp. When the skater reaches the bottom of the ramp, his speed is 5.36ms^{-1} .

(a) Find the potential energy lost by the skater in moving down the ramp. [3]

[illegible]