Name of the Student:_____

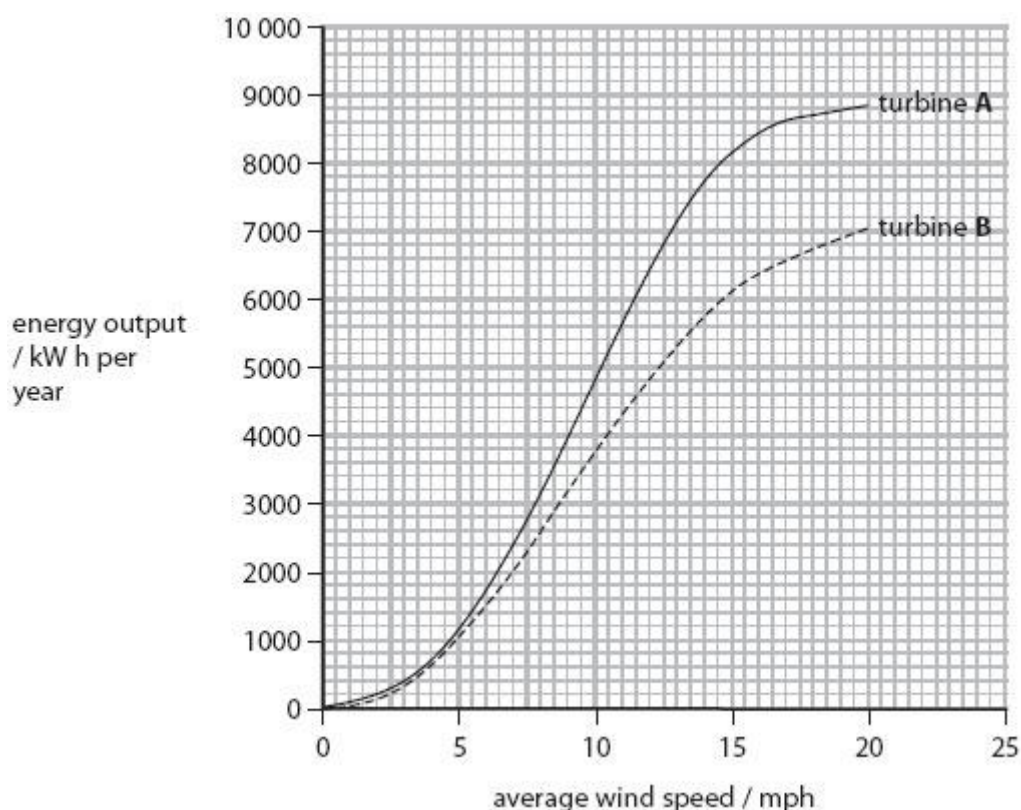**Max**. **Marks : 18 Marks**   **Time : 18 Minutes**

Q1.

Eric owns a small farm where chicks are hatched from eggs.

He is considering generating his own electricity to heat and light a barn rather than using electricity from the National Grid.

This graph shows how the energy output varies with wind speed for two different wind turbines, **A** and **B**.

The average wind speed at Eric's farm is 13 mph.
 The total heating and lighting in the barn requires 6000 kW h of electrical energy each year.

(i) Use the data in the graph to recommend the best turbine for Eric's barn.

(1)

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(ii) Eric pays 14p per kW h for electrical energy supplied by the National Grid.
     Calculate how much he could expect to save each year by using the energy from this wind turbine to heat and
     light the barn.

(2)

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(iii) Eric looks at the cost of installing the turbine.

State how he should work out the payback time.

(1)

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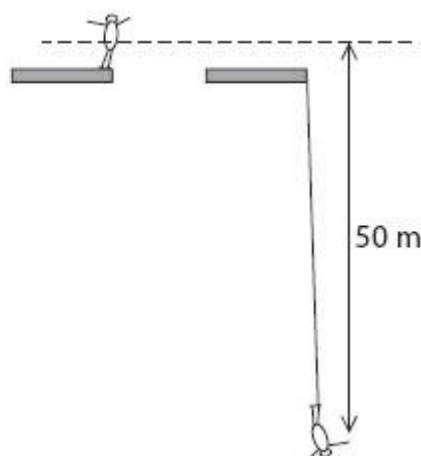
(iv) The chicks need to be kept warm at all times.
Eric uses halogen lamps to provide heat and light for most of the day.
Eric thinks about changing his halogen lamps for energy saving lamps.
Suggest why this might not actually be a benefit.

(2)

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Q2.

A 60 kg student weighs 600 N.
He does a bungee jump.

The bungee cord becomes straight and starts to stretch when he has fallen 50 m.
(i) Calculate the change in gravitational potential energy as the student falls 50 m.
Give the unit.

(3)

....

(ii) State at what point in the bungee jump the student has maximum kinetic energy.

(1)

....

....

(iii) Explain why his maximum kinetic energy is likely to be less than your answer to (c)(i).

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Q3.

A 60 kg student weighs 600 N.
He does a bungee jump.

The bungee cord becomes straight and starts to stretch when he has fallen 50 m.
(i) Calculate the change in gravitational potential energy as the student falls 50 m.
Give the unit.

(3)

....

(ii) State at what point in the bungee jump the student has maximum kinetic energy.

(1)

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....

(iii) Explain why his maximum kinetic energy is likely to be less than your answer to (c)(i).

(2)

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