



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education

Centre Number

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Candidate Number

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Environmental Technology

Assessment Unit AS 1

assessing

The Earth's Capacity to Support
Human Activity



SET11

[SET11]

Assessment

TIME

1 hour 30 minutes.

Assessment Level of Control:

Tick the relevant box (✓)

Controlled Conditions	
Other	

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 75.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question 7.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	

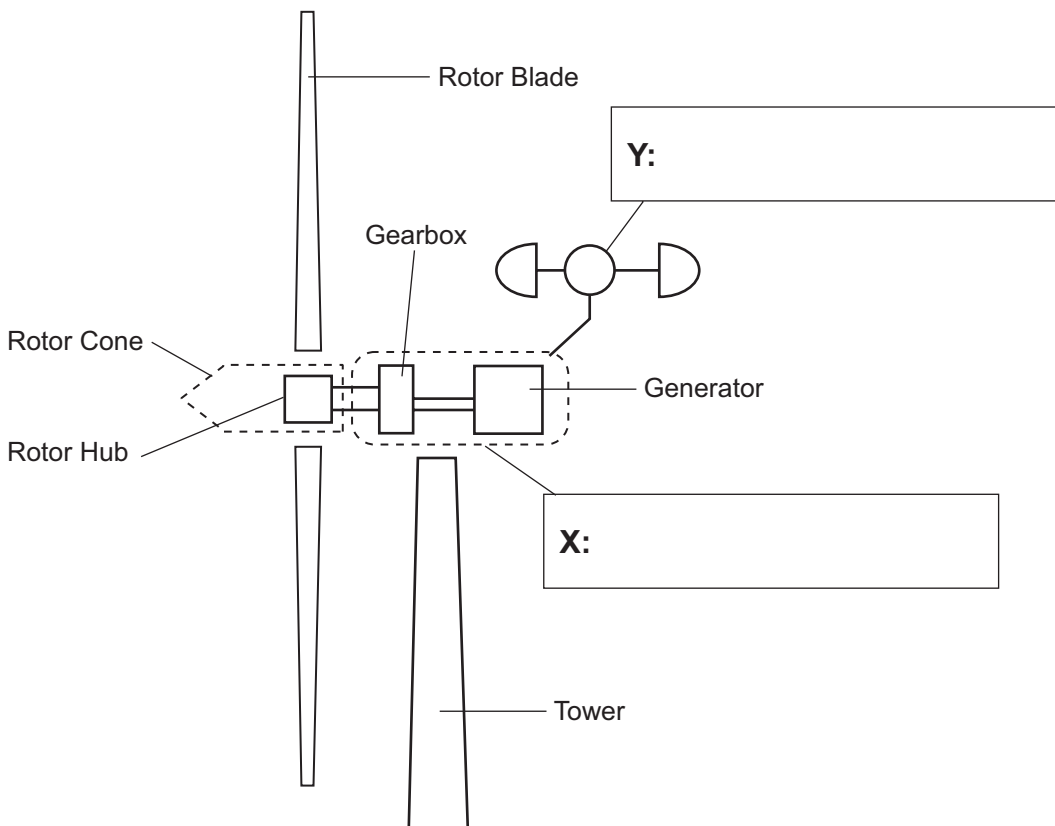
Total Marks	
--------------------	--

1 (a) Describe **two** differences, other than the axis orientation, between Vertical Axis Wind Turbines (VAWT) and Horizontal Axis Wind Turbines (HAWT).

1. _____ [2]

2. _____ [2]

(b) Fig. 1 below shows a typical horizontal axis wind turbine. Complete Fig. 1 by labelling X and Y.



Source: © Principal Examiner [2]

Fig. 1

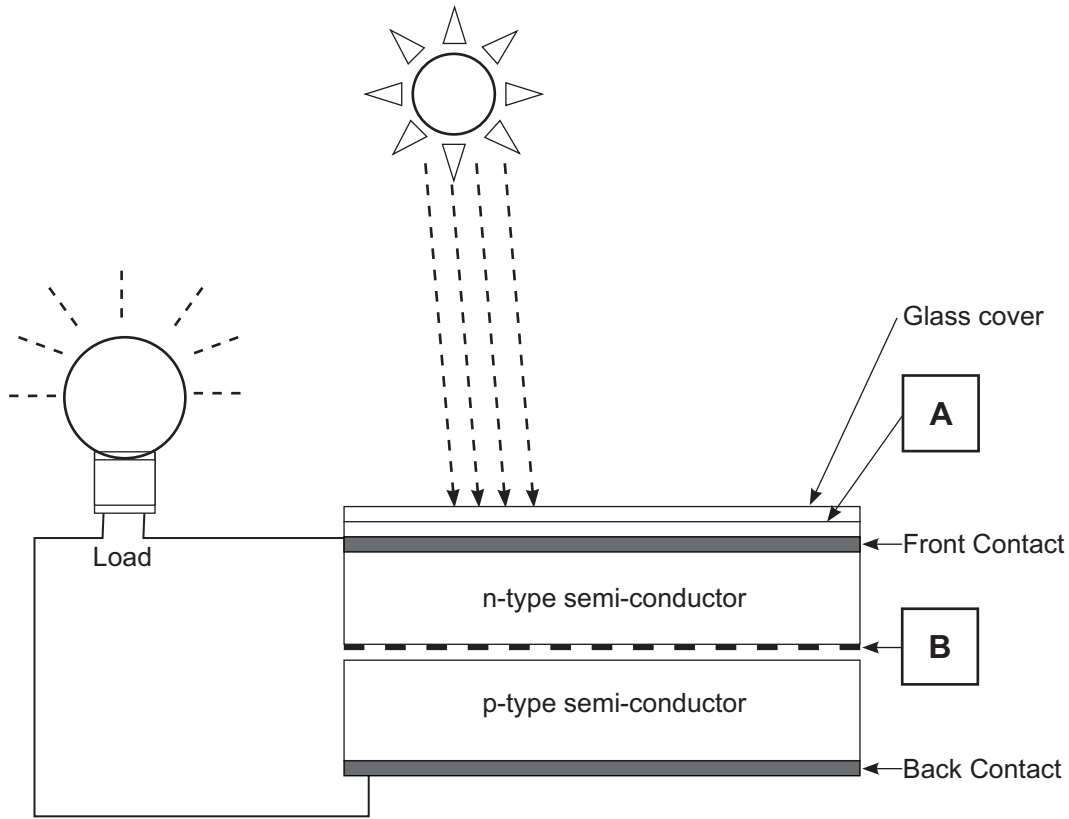
Examiner Only	
Marks	Remark

3 (a) Fig. 3 below shows a typical Solar PV cell installation.

Name **A** and **B** in Fig. 3 below.

A: _____ [1]

B: _____ [1]



Source: © Principal Examiner

Fig. 3

(b) Explain the operation of the Solar PV cell in Fig. 3.

[4]

Examiner Only	
Marks	Remark

(c) Name **two** of the main material types of PV module.

1. _____ [1]

2. _____ [1]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

5 (a) (i) State the Brundtland Commission definition of sustainable development.

[2]

The Brundtland Commission led to several significant global agreements on energy conservation and climate change. The findings have influenced many laws including targets which have been set for Northern Ireland.

(ii) State the Northern Ireland targets for 2020 aimed at reducing greenhouse gas emissions and improving energy efficiency.

[1]

(b) Explain the term Energy Density.

[2]

Examiner Only	
Marks	Remark

(c) **Table 1** shows the energy density of different fuel types.

Table 1

Category	Fuel Type	Energy Density (MJ/ kg)
Renewable	Wood	16
Non-renewable	Coal	24
Non-renewable	Oil	44
Non-renewable	Natural Gas	55
Nuclear	Uranium-235	3 900 000

Source: Adapted from © J.M.K.C. Donev et al. (2021). Energy Education - Energy density https://energyeducation.ca/encyclopedia/Energy_density.

With reference to **Table 1**:

- (i) Discuss the use of renewable fuel as a viable alternative to non-renewable fuels.

[2]

- (ii) Discuss the use of nuclear fuel as a viable alternative to non-renewable fuels.

[2]

Examiner Only	
Marks	Remark

6 (a) A local school is considering the installation of a ground source heat pump.

Identify **two** economic benefits and **two** environmental benefits for the school if they choose to install a ground source heat pump.

Economic benefits

1. _____

_____ [1]

2. _____

_____ [1]

Environmental benefits

1. _____

_____ [1]

2. _____

_____ [1]

(b) Explain the role of the following parts of a ground source heat pump:

(i) Evaporator

_____ [2]

Examiner Only	
Marks	Remark

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