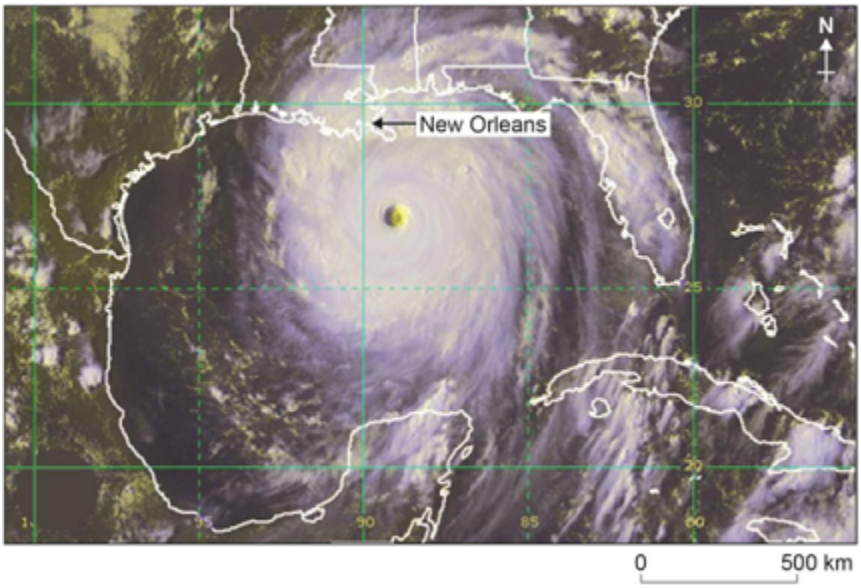
1. Study the figure, a satellite image of Hurricane Katrina shortly before it crossed New Orleans in the USA.



Using the image only, forecast the weather conditions in New Orleans over the next 24 hours.

(Total 4 marks)

2. Study The **Figures 1** and **2** below, photographs taken after the Philippines were hit by Typhoon Haiyan (a tropical revolving storm) on 8 November 2013.

Figure 1

Figure 2

Figure 1 shows Tacloban Airport.
Figure 2 shows the Tacloban coast near the airport.

Describe the effects of Typhoon Haiyan shown in **Figures 1** and **2**.

(Total 4 marks)

3. (a) Study the image below, a variety of newspaper headlines about weather in the UK.

Explain how the newspaper headlines show that the UK experiences extreme weather.

(2)

(b) Describe the benefits that extreme weather can bring.

(4)

(Total 6 marks)

4. (i) In 2002 the Ganges Delta was hit by several tropical storms (cyclones).

The table below gives some of the characteristics of the Ganges Delta.

Characteristics of the Ganges Delta	
Relief	Low-lying area: 90% is less than 10 metres above sea level
Transport network	Poorly developed with few main roads and railways
Population density	High – over 200 people per square kilometre

Using the table above, explain why so many people die as a result of tropical storms in the Ganges Delta.

(4)

(ii) Give **two** ways of reducing the damage caused by tropical storms, either in the long term or in the short term.

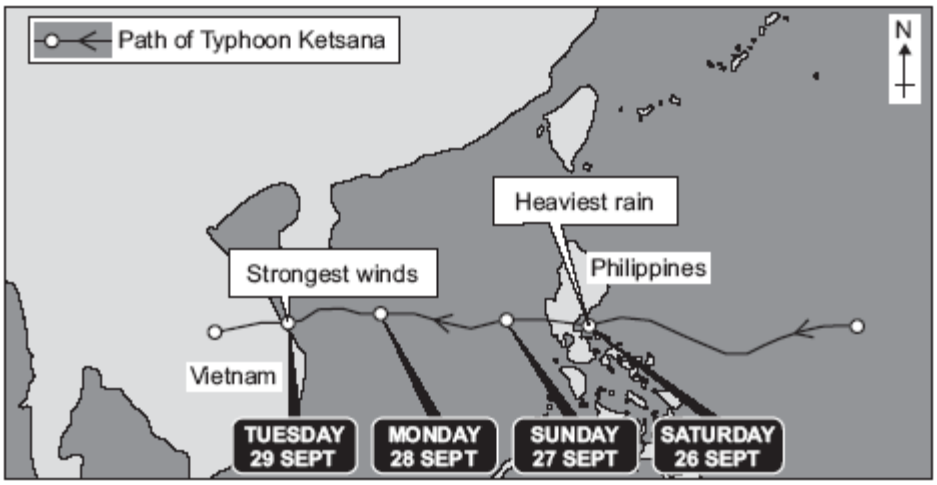
(2)

(Total 6 marks)

5. Explain how a tropical storm forms. You may use a diagram.

(Total 4 marks)

6. The figure below shows the path of a tropical storm (Typhoon Ketsana), 23 to 30 September 2009.



With the help of the figure above, describe the effects of a tropical storm.

(Total 4 marks)

7. Describe the possible effects of climate change on the UK.

(Total 4 marks)

8.

Study the photograph above of an information board describing flood management in Boscastle, Cornwall.

(a) Give **one** example of hard engineering and **one** example of soft engineering shown in the photograph.

(2)

(b) With the help of the photograph, explain how different responses have reduced the risk of flooding in areas such as Boscastle.

(6)

(Total 8 marks)

1.

Level	Marks	Description
2 (Clear)	3–4	AO3 Demonstrates accurate interpretation of weather conditions through the application of relevant knowledge and understanding to the resource. AO4 Makes clear and effective use of the satellite image to support the forecast of weather conditions.
1 (Basic)	1–2	AO3 Demonstrates some interpretation of weather conditions through the application of limited relevant knowledge and understanding to the resource. AO4 Makes limited and piecemeal use of the satellite image to support the forecast of weather conditions.

Indicative content

- The weather forecast should relate to the satellite image, so expect reference to the typical sequence of weather conditions associated with the passage of a tropical storm.
- Credit any aspects of weather that might realistically occur in the next 24 hours, e.g. cloud cover, precipitation, wind speed and direction, air pressure, humidity, general weather conditions.
- Cloud cover will increase over the next few hours and wind speed will pick up dramatically as the outer part of the vortex approaches. Winds, which will be blowing from the east, may be damaging and there will be torrential downpours of rainfall from dark cumulonimbus clouds. There is a possibility of tornadoes and thunderstorms with lightning. A storm surge combined with the heavy rain may cause dangerous flooding in low-lying coastal areas. Air pressure will drop rapidly.
- This will be followed by the centre of the storm or ‘eye’, which will only last for a short time. The weather is likely to be fairly calm with only light winds and fair weather.
- The winds will again increase suddenly as the second part of the vortex approaches. This will be accompanied by powerful winds blowing from the west, with further heavy rain. Air pressure will rise as the storm continues northwards, and cloud cover will then become thinner, with more moderate winds. Eventually the rain will cease, although further belts of showers will occur as the storm moves away.

The focus is on weather conditions. No credit for describing the structure of the storm, its causes or responses.

As the forecast is for 24-hours, allow differing interpretations about how far the tropical storm may move. Credit partial sequence to the top of Level 2 if clear and valid forecast is produced.

No credit for descriptions unrelated to the image.

Answers must apply understanding of the features of tropical storms to interpret the resource.

AO3 = 2
AO4 = 2

[4]

2. *This mark scheme is from a question paper that assessed a previous specification and has not been edited.*

Click [here] to access a document explaining the differences that might apply to it.

Figure 1 shows what seems to be a car park with vehicles off the road and overturned. There are the remains of trees – often only the main trunk and some branches. Some seem to be diagonal rather than vertical. There is debris on the car park area – some of it from the roof of the buildings – where sections have been removed from the building in the foreground. People are having to wait beyond the main airport area and there are only one or two planes indicating that the airport may not be fully functional.

Figure 2 shows the scale of the devastation in this area. The runway of the airport can be seen in the distance. There are many bare areas with occasional tree trunks dotted about. Vehicles can be seen randomly on the area off the roads. Many buildings that remain are damaged and there is a lot of debris in many areas – yet some buildings remain in clusters in the central part of the photograph for example.

AO2 = 2
AO3 = 2

Level	Marks	Description
2 (Clear)	3 – 4	There is clear reference to the photographs. Statements are developed and linked. *Figure 1 shows clear damage to the terminal building at the airport; debris from it is found strewn across the car park. Here, some vehicles have been pushed to the side or even overturned. People are kept back – a sign that the buildings are dangerous. The second photo shows that a very large area was affected – there is a lot of land that is empty, but littered with rubble and vehicles. Trees are dotted around the area. The road is clear but there is very little traffic on it.*
1 (Basic)	1 – 2	Describes effects – some reference to one or both photographs – rings true. Statements are general and separate in a random order. *Buildings are damaged. Trees are bent. Everything is destroyed. Buildings have no roofs.*
	0	No relevant content.

[4]

3. *This mark scheme is from a question paper that assessed a previous specification and has not been edited.*

Click [here] to access a document explaining the differences that might apply to it.

(a) The headlines refer to weather that does not normally occur, it is severe enough or unexpected enough to make news; there is reference to severe impacts; there are unusual occurrences for the time of year. Three events within 1 year – from September 2011 to August 2012.
Information must be used to be creditworthy.
2 × 1 for basic statements; 1 + 1 for a statement that is elaborated.

AO2 – 1
AO3 – 1
2

(b) Actual benefits will depend on the type(s) of extreme weather being referred to. Likely benefits will refer to feel good factor resulting from heat waves, lots of sunshine – especially when unexpected; spending time outside – barbeques with friends; increase in leisure time as schools / businesses close due to snow and leisure pursuits that are not every day - sledging; increased sales of specific items – wellies and umbrellas in very wet conditions; ice-creams in a heat wave so that businesses benefit. If a heat wave is predicted to last, people are more likely to holiday in the UK than go abroad, benefitting UK resorts.

Level 1 (Basic) (1 – 2 marks)
Simple statements, perhaps list-like at lower end.
Separate ideas – may be only one benefit.
General points – may refer just to extreme weather.
Sales of certain goods will go up – ice-cream and drink sales will increase. People will feel more relaxed.

Level 2 (Clear) (3 – 4 marks)
Develops statements and makes links. Will refer to more than one benefit.
Will refer to UK and specific weather type(s).
A heat wave in early spring will get people having barbeques early and being more sociable – meeting up with friends and family. This will boost sales of barbeques, charcoal and meat as well as drinks and probably ice-cream, benefiting businesses.

AO1 – 4
4

[6]

4. *This mark scheme is from a question paper that assessed a previous specification and has not been edited.*

Click [here] to access a document explaining the differences that might apply to it.

(i) **Level 1 Basic (1-2 marks)**
Simple statements and any detail which is a straight lift from **Figure 1** without elaboration – flat/low lying, few roads/railways, high population density.

Level 2 Clear (3-4 marks)
Linked statements needed.
Dense population / high density – many killed,
low-lying area / near sea level – easy to flood / no flood protection/large area covered,
poor infrastructure – lack of roads to escape / get aid into area.

4

(ii) Voluntary aid/bilaterial aid (= 1 only), vaccinations/antibiotics, stronger buildings/on stilts, storm shelters, build banks on rivers/levees, radios for fishermen at sea, improved roads/transport raised mounds, sea walls, warning systems.

2

[6]

5. *This mark scheme is from a question paper that assessed a previous specification and has not been edited.*

Click [here] to access a document explaining the differences that might apply to it.

Levels of response

L1 (1-2 marks) basic statements, e.g. the air rises and forms heavy rain. They form over the sea. The air spins round.

L2 (3-4 marks) clear statements, e.g. the air picks up moisture over the sea which is warm. The air spirals round the calm eye. The air rises and cools and heavy rain falls. Clear statement of process.

[4]

6. *This mark scheme is from a question paper that assessed a previous specification and has not been edited.*

Click [here] to access a document explaining the differences that might apply to it.

Level 1 Basic (1–2 marks)
Simple statements without development of ideas.
E.g. storm surges, flooding, death, injury, lose money, roads destroyed etc.

Level 2 Clear (3–4 marks)
Clear description of effect.
E.g. storm surges which inundate the land and destroy houses and *crops.*

[4]

7. *This mark scheme is from a question paper that assessed a previous specification and has not been edited.*

Click [here] to access a document explaining the differences that might apply to it.

Economic effects – likely to include loss of earnings, loss of businesses / livelihoods, e.g. as ice melts and skiing cannot occur; impact on farming – different crops grown as climate changes, e.g. parts of southern England growing more crops linked to Mediterranean areas such as vines, olives. Health could be affected as a social impact of diseases such as malaria may become common; people may be affected by the heat. Environmental effects – likely to refer to impact on climate – such as southern Britain getting warmer; the UK experiencing more gales, floods, drought. Impact on things that will grow – deciduous trees may struggle in drier conditions, crops grown may change – oranges and vines in southern areas will become more common. Coastal flooding is likely to feature with vulnerable areas being along The Wash, and the Humber and the Thames estuaries.

Level 1 (Basic) (1–2 marks)
Simple statements, perhaps list-like at lower end.
Separate ideas – may be only one effect.
General points.
It will get warmer. There will be more rain. Some plants may die and others, like oranges and grapes, will be able to grow. The coast will flood.

Level 2 (Clear) (3–4 marks)
Develops statements and makes links.
Will refer to more than one effect.
Response is targeted to question – reference to the UK is clear.
Low lying coastal areas will flood. Some areas will be really likely to flood such as areas around The Wash and the Thames estuary. Weather may be more extreme. There will be more gales and rain and flooding of rivers will be more likely to occur.

AO1 – 3
AO2 – 1

[4]

8. *This mark scheme is from a question paper that assessed a previous specification and has not been edited.*

Click [here] to access a document explaining the differences that might apply to it.

(a) Any valid example of **hard engineering** such as river bank widened, river wall, exisiting car park raised, River Jordan flood relief culvert, River Valency widened and lowered and **soft engineering** such as tree management, the positioning of the car park next to the river (flood plain zoning), car park with permeable surface, gauging station to measure speed and flow if linking to preparation area for river to deposit sediment.
2 × 1

AO1 – 1
AO2 – 1
2

(b) There is a need to explain how the strategies identified on the photograph lead to a reduction in the flood risk. There should be reference to more than one response. E.g widening the river means that the capacity is increased as more water can be held within the banks and so there is less of a risk of flooding. The river wall and raising the car park level will again mean that more water can be held in the channel as the height of the banks is being increased. Tree management – planting of trees will increase interception and reduce runoff and allow infiltration to occur. Chopping down dead trees will mean that they are not swept away in the river to create a dam.

Level 1 (Basic) (1 – 4 marks)
Simple, separate statements – descriptive emphasis. Will begin to explain at the top end.
There is a river wall on the left bank of the river Valency and the car park there has been raised. The river bank has been widened and the river itself lower down. This increases the capacity in the river.

Level 2 (Clear) (5 – 6 marks)
Develops and links statements. Refers to more than one response.
Clear purposeful explanation – links response to reducing flood risk.
Widening and lowering the river means that the river itself can hold more water and so flooding is less likely. The car park has been raised and so this is a barrier against the flood water while the car park at the top has been built with a permeable surface meaning that water can soak into the ground and not run straight into the river and so reduces the risk of flooding.

AO1 – 2
AO2 – 2
AO3 – 2
6

[8]