

Oxford Revise | Geography | Answers

Chapter 34 The biosphere: a vital life-support system

All exemplar answers given are worth full marks.

1.

- a) The global increase in population
- b) Trees absorb water through their roots and intercept precipitation which slows or prevents surface runoff. This regulates river flow and so reduces the risk of flooding. They return water to the atmosphere by evaporation and transpiration from their leaves forming clouds and rain. This completes the hydrological cycle.
- c)
 - i) Tropical rainforest
 - ii) This method of farming is sustainable because it allows people to produce food without destroying the rainforest. Trees are burnt down to clear an area for cultivation, and the ash that is produced is added to the soil to add nutrients. The clearing is as small as possible so that it is protected from soil erosion by the surrounding trees. After 5–6 years the farmers move on to make a new clearing. This allows the forest to regenerate and is therefore sustainable.
 - iii) The population is increasing which means there is a shorter time before the farmers must return to an area used in the past. This does not give enough time for the forest to fully recover. Timber and minerals found in the rainforest is in great demand. Their exploitation leads to deforestation so indigenous people cannot carry on their traditional way of farming.
Accept suitable alternative answers.
- d) An advantage to a developing or emerging country is that the country can make money by selling timber, iron ore or other resources found in the tropical rainforest.
A disadvantage is that deforestation of the tropical rainforest reduces the amount of carbon dioxide that is removed from the atmosphere by photosynthesis. This means they can no longer contribute to reducing the atmosphere's carbon layer and global warming.
Accept suitable alternative answers.
- e) The theory put forward by Malthus was that the world would eventually run out of food, because while population growth was rising geometrically, the output of food was only rising arithmetically. Disasters like war, diseases, and famine were necessary to slow down the growth of population. The neo-Malthusian theory put forward by the Club of Rome was basically the same thing.
- f) Boserup's theory is more optimistic. This theory argues that agricultural and other inventions along with improved technology will mean that the output of food will be able to keep up with the global growth of population.

2.

- a) The biosphere and biomes are important sources of raw materials. They are vital for maintaining the hydrological cycle.
Accept suitable alternative answers.
- b) Indigenous people have limited impact on natural ecosystems. They use the natural vegetation of the biomes sustainably to obtain food and building materials. They leave sufficient time for the vegetation to recover from the effects of their actions.
- c) Hardwoods are used to make high quality furniture. Softwoods are used in paper making.
Accept suitable alternative answers.
- d) Biomes, especially forests, take carbon dioxide from the atmosphere and give out oxygen. This helps counter the effects of burning of fossil fuels, the consequence of which is an increase in carbon emissions, leading to global warming and climate change.
- e) The world's population is increasing so there is an increased demand for natural resources. Increased wealth and improved technology create an increase in the use of energy based on natural resources.
Accept suitable alternative answers.
- f) The increase in the world's population puts an increasing demand for food. This means that forests are cleared to produce farmland that can be used to cultivate food crops. There is also an increasing demand for timber, so deforestation is taking place to supply the wood used in building. The increasing demand for energy means new sources of power must be found. Tropical rainforests, with their high rainfall are favoured locations for the construction of dams to supply HEP. The mineral wealth found in many forest areas means the trees must be removed to exploit resources like gold, copper, and iron ore. These minerals are vital as more of the world industrialises. All these factors mean that continued forest clearance is inevitable.
- g) Forest clearance destroys one of the world's unique ecosystems. It destroys the way of life of the indigenous people who rely on the forests for their day-to-day existence. Forest clearance plays a significant part in changing the world's climate. Human actions have resulted in an enhanced greenhouse effect with more carbon dioxide emissions. The loss of forest cover means there are fewer opportunities for this extra carbon to be stored, reducing the amount being released into the atmosphere. Trees remove carbon dioxide from the atmosphere by photosynthesis, which produces more clouds and so reduces solar insolation. Trees act as a natural way of reducing flood risk. They intercept rainfall and reduce surface run-off so excess water gets into rivers more slowly. This means there is not a sudden increase in river discharge and hence less likelihood of the river overflowing its banks.

Questions referring to previous content

3.

- a) The biomes' characteristic feature is the natural vegetation. The temperature and precipitation regimes are the main influences on the type of vegetation. Temperatures tend drop with distance from the Equator because of the changes in the angle of the Sun's rays reaching the Earth's surface. At low

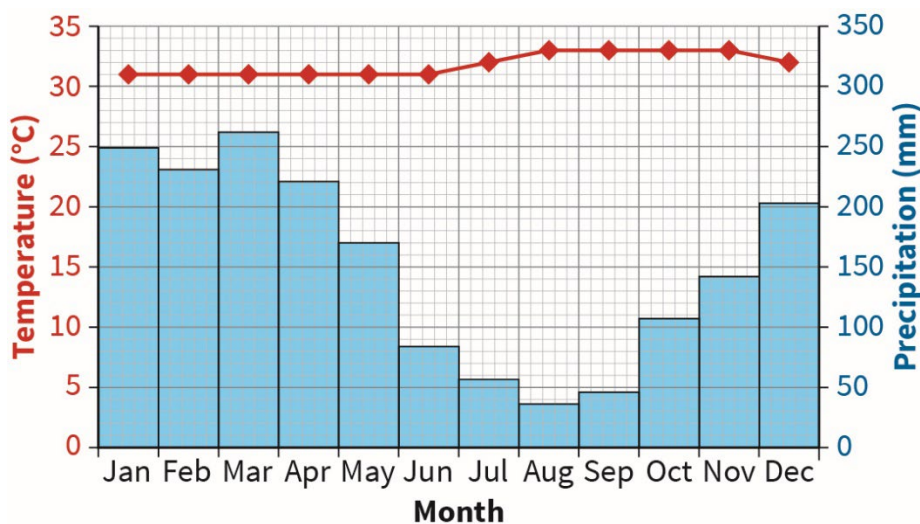
latitudes the low angle of the Sun's rays means the Sun's energy is spread over a larger area. Near the Equator the high angle means that there is powerful heating of the Earth's surface. Rainfall patterns reflect the atmospheric circulation creating zones of high and low rainfall so the relationship with latitude is not as close.

b) In the nutrient cycle, there are stores, water, and energy. Nutrients are stored in the soil, the biomass, which is the mass of living material and in litter of decomposing leaves on the ground. The nutrients flow from one store to another.

c)

i) Tropical rainforest

ii) The graph should be completed as below:



iii) 1811 mm

iv) 31.8°C

v) The climate of Manaus is very hot and wet. The mean temperature is 31.8°C with a very small range of 2°C. The hottest months are from August to November. The total precipitation of 1811 mm is very high, with only the months of June to September showing a total below 100 mm. The lowest total is in August with 38 mm.