

REVISION (4)
GRADE 9
CHAPTER # 22
HUMANS & THE
ENVIRONMENT
PAPER (3)

0610/42 February/March 2017

Q1. (A)

) Water is one requirement for photosynthesis.

State two other requirements needed by the plant to carry out photosynthesis

ANS) carbon dioxide ,light energy , chlorophyll .

Table 4.1 shows the number of hectares of forested area in some countries in Africa in the years 1990, 2000 and 2005.

Table 4.1

country	hectares of forest per 1000 hectares of land		
	1990	2000	2005
Cameroon	25	22	21
Tanzania	41	37	35
Nigeria	17	13	11
Zambia	49	45	43
Zimbabwe	22	19	18

(b) Calculate the percentage loss of forested area in Nigeria between 2000 and 2005.

Show your working and give your answer to the nearest whole number.

$$2 \div 13 \times 100 = 15 \dots\dots\dots \%$$

[2]

(c) Some forested areas are cleared to provide land to grow crop plants. Deforestation reduces the local rainfall and the concentration of water vapour in the air.

(i) Describe and explain how a reduced concentration of water vapour in the air would increase the movement of water through crop plants.

ANS)

1) Increased rate of transpiration

2) Greater concentration of water vapour inside the leaf than outside.

3) More water vapour diffuses out of the leaf through stomata.

4) More water is drawn up through xylem/ transpiration pull.

(d) Describe the consequences of deforestation on the animals that live in forests.

ANS)

1) Loss of habitat .

2) Population decrease /migration.

3) Extinction /endangerment of species.

4) Loss of biodiversity .

5) Less food.

6) Disruption of food chains /food webs.

0610/41 May/June 2017

Q2.

The giant quiver tree, *Aloe pillansii*, shown in Fig. 5.1, is an endangered species.

These long-lived trees grow in harsh environments. Some populations of *A. pillansii* are found within the Richtersveld National Park, but one population is found just outside on a mountain called Cornell's Kop in southern Africa.



Fig. 5.1

(a) (i) State the genus of the giant quiver tree.

ANS) Aloe.

(ii) Explain why the *A. pillansii* trees on Cornell's Kop represent a population.

ANS) Isolated group of individual plants of the same species living in the same area at the same time.

(b) Suggest **three** reasons why the giant quiver tree is an endangered species.

ANS)

- 1) Deforestation .**
- 2) Climate change / global warming .**
- 3) Change in land use.**
- 4) Desertification .**
- 5) Pollution.**
- 6) Plant hunters .**
- 7) Increase in new grazers or predators.**
- 8) New disease and pests.**

(c) It was estimated in 2005 that the total number of giant quiver trees in the wild was less than 3000, which is considered to be very low compared with other tree species.

Explain the risks to a plant species of having very small numbers.

ANS)

- 1) High risk of extinction**
- 2) Less chance of reproduction and pollination.**
- 3) High risk of genetic diseases.**
- 4) Less genetic variation.**
- 5) Small population so more vulnerable to pests / disease / catastrophe.**
- 6) Less likely to adapt with change in environment**

- (d) The population of *A. pillansii* trees on Cornell's Kop was surveyed and photographed at four sites, **A** to **D**, from 1937 onwards. Researchers took photographs at all four sites in 2004 and compared them with the original photographs.

The results are shown in Table 5.1.

Table 5.1

site	date of the original photograph	number of living trees in the original photograph	number of living trees in 2004	number of dead tree stumps	average annual mortality rate /percentage of deaths per year
A	1937	12	4	8	1.0
B	1953	9	5	4	0.9
C	1985	5	3	2	2.1
D	2001	6	5	1	5.6

- (i) Calculate the percentage decrease in the number of living trees at site **B** from 1953 to 2004.

Show your working and give your answer to the nearest whole number.

ANS)

$$\begin{aligned}
 & 9 - 5 = 4 \\
 & 4 / 9 \times 100 \\
 & = 44.4 \% \qquad = \underline{44 \%}. \qquad (2)
 \end{aligned}$$

- (ii) Describe what the analysis of the photographs shows about the population of *A. pillansii* on Cornell's Kop.

ANS)

- 1) Decrease in population at all sites.**
- 2) D has highest mortality while B has the lowest mortality.**
- 3) Site A has lost the most number of trees where as site D has lost the lowest number of trees.**
- 4) Loss of trees in A 12 to 4 between 1937 to 2004.**
- 5) In whole population there is no net increase in number of trees.**
- 6) Difficult to compare changes over time as numbers are for different sites because site A has most trees in original photograph where as site C has the least trees in the original photo.**

February/March 2016

Q3).

- (a) Increasing human population is linked to a change in carbon dioxide concentration in the atmosphere. Fig. 4.1 shows the carbon dioxide concentration between 1958 and 2010 measured at Mauna Loa, Hawaii.

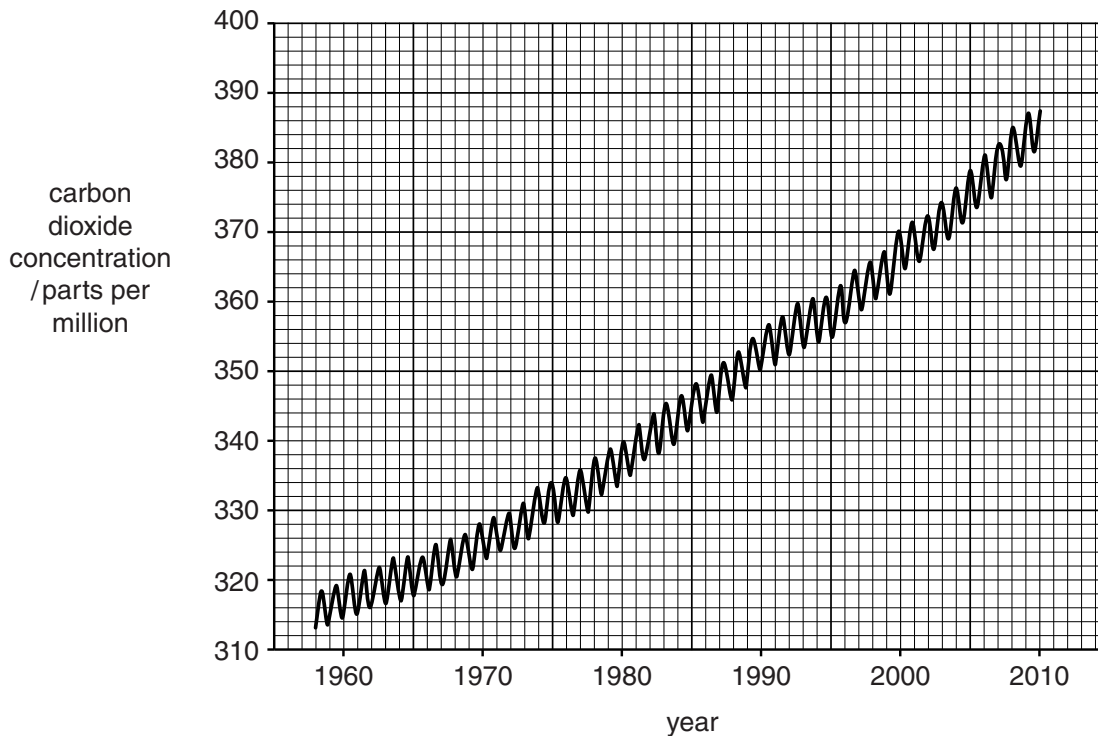


Fig. 4.1

Describe how the carbon dioxide concentration has changed between 1958 and 2010. You will gain credit for using data from Fig. 4.1.

ANS)

1) Overall carbon dioxide concentration increases.

2) At a steady rate there are minor fluctuations in carbon dioxide concentration.

3) The fluctuations occur regularly between 1980 to 2010.

4) In 1970 the carbon dioxide concentration was 340 parts per million and it increase to 370 parts per million in 2000.

- (b) (i) Carbon dioxide is a greenhouse gas.
Name **one other** greenhouse gas.

ANS) Methane.

(ii) Explain how carbon dioxide enhances the greenhouse effect.

ANS)

1) Radiation/ light from the Sun hits Earth/ atmosphere .

2) Short-wave radiation passes through carbon dioxide layer.

3) Reflected from the ground as long-wave radiation or infrared radiations.

4) Long-wave radiation/ infrared trapped prevented from escaping from atmosphere by carbon dioxide.

(d) Fertilisers can cause pollution to aquatic systems. Overuse of fertilisers may cause eutrophication. Lake Udai Sagar in India is an example of an aquatic system that shows high levels of eutrophication.

Explain what happens in aquatic environments, such as Lake Udai Sagar, when eutrophication occurs.

ANS)

1) Fertiliser leached into the rivers , streams & lakes.

2) Causing algal bloom or algae growth they block sunlight from entering water.

3) So rooted plants unable to photosynthesise & the plants die.

4) Bacteria decompose on dead plants & bacterial population increases.

5) bacteria respire aerobically & they use up the oxygen in the water.

6) Marine organisms (fish etc) die due to lack of oxygen.

(0610/41 May/June 2016)

Q4.

Fig. 5.1 shows the total mass of wild fish caught worldwide between 1950 and 2012 and the mass of farmed fish produced worldwide over the same period.

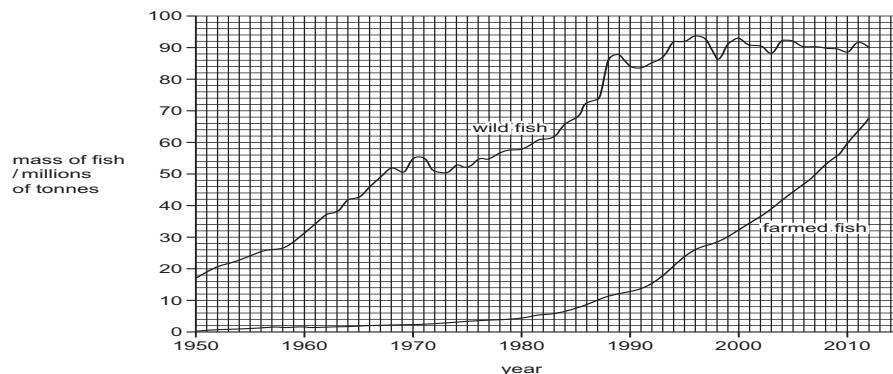


Fig. 5.1

(b) Describe the changes in the mass of **wild fish** caught between 1950 and 2012.

You will gain credit if you use data from Fig. 5.1.

ANS)

1) Between 1950 and 2012 mass of fish caught increased and levels off .

2) Fluctuation observe anytime after 1990 and around 1970.

3) Max catch 94 million tonnes n 1996 and steep increases between 1950 to 1970.

(c) It is predicted that wild fish stocks will decrease and become depleted because of overfishing.

Suggest ways in which governments can try to maintain the stocks of wild fish.

ANS)

1) Implement international agreements & quotas system.

2) Fines for overfishing & illegal fishing.

3) Restrictions on times when fishing can occur.

4) Total ban for some species.

5) Regulations on method of fishing e.g. mesh size of nets etc

6) Education & raise awareness among people.

7) Monitoring fish stocks through captive breeding & re-stocking of wild stocks.

(d) Like fish stocks, forests can be a sustainable resource.

Discuss what is meant by the term *sustainable resource*, using forests as an example.

ANS) Sustainable resource that does not run out or become exhausted.

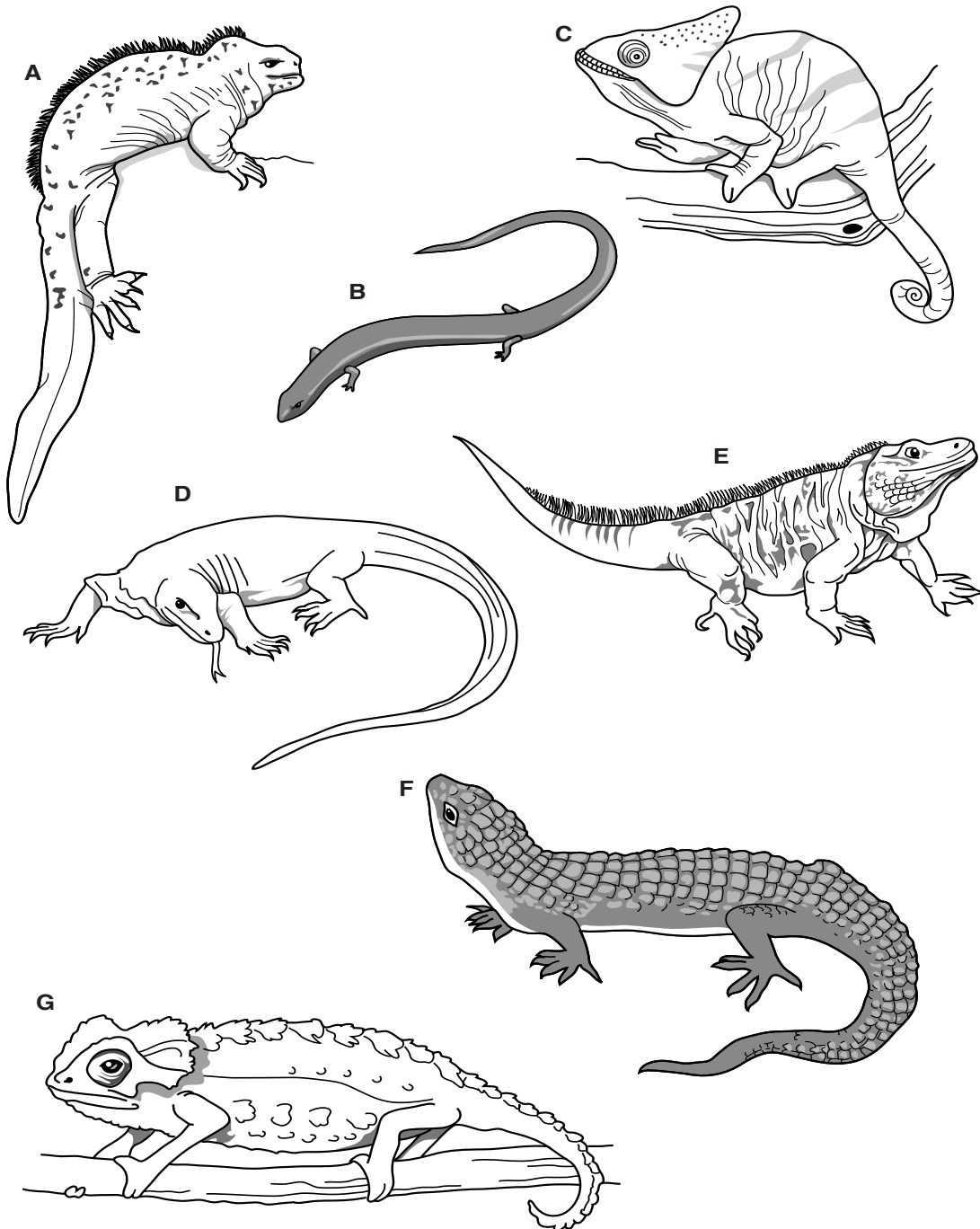
For e.g Replanting , coppicing & leaving mature trees in the forest.

0610/31 October/November 2015

Q5.

-

Fig. 1.1 shows seven lizards that are at risk of becoming extinct.



not to same scale

Fig. 1.1

- (b) The effect of humans on the environment has caused the populations of the lizard species in Fig. 1.1 to decrease.

Explain why conserving lizards is important.

ANS)

- 1) Encourages biodiversity & prevents extinction.**
- 2) Encourages genetic diversity (within each species) .**
- 3) Maintain food webs/chains (food for predators)**
- 4) Increasing source of medicine.**
- 5) Maintain habitats for other organisms.**

(ii) Explain the significance of meiosis to the survival of endangered species of lizards.

ANS)

- 1) For adaption to new changed environment.**
- 2) Causes (genetic) variation.**
- 3) Competition for survival.**
- 4) Best suited reproduce.**
- 5) It allows natural selection & evolution.**