MODUL EMaS JPNTrg

MODULE 5
BIOLOGY FORM 4

Chapter 8 : Dynamic Ecosystem

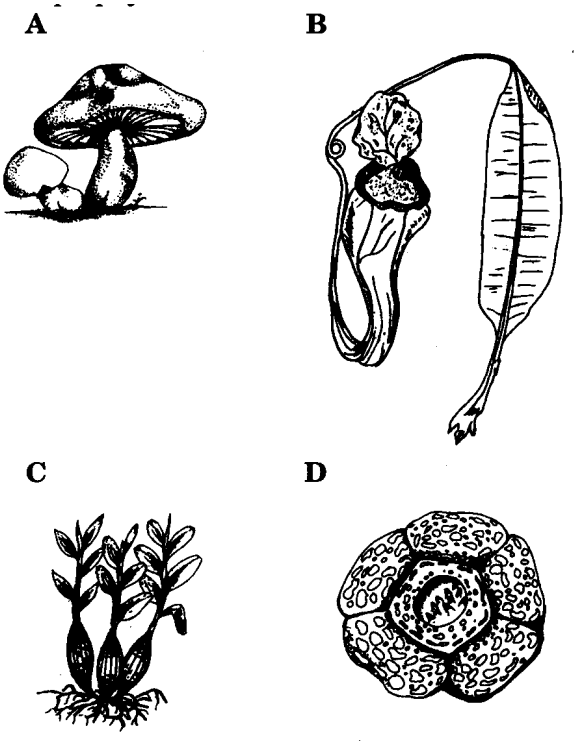
Chapter 9 : Endangered Ecosystem

Module Panels:
1. **Tn. Haji Meli bin Hussin**
   SM Sains K. Terengganu
2. **En. Mohd Nor bin Ismail**
   SMK Tun Telanai, Marang
3. **En. Zulkifli bin Awang**
   SMK Ibrahim Fikri, K. Terengganu
4. **Pn.Hjh Muslimah Bt Mahmood**
   SM Sains Sultan Mahmud , K. Terengganu
5. **Pn. Hjh Rohayah Bt Md Nor**
   SMK Sultan Mansor, K. Terengganu

CHAPTEBR 8 : DYNAMIC ECOSYSTEM
CHAPTER 9 : ENDARGERED ECOSYSTEM

SECTION A
Instruction: *Each question is followed by four options* A, B, C *and* D. *Choose one correct answer for each question.*

1. Which of the following organisms is a saprophyte?



2. What is the correct sequence of ecological change that occurs to a barren land over a long period of time?

   A Colonization, climax community, succession
   B Succession, colonization, climax community
   C Colonization, succession, climax community
   D Succession, climax community, colonization

3. Figure 1 shows a pyramid of numbers

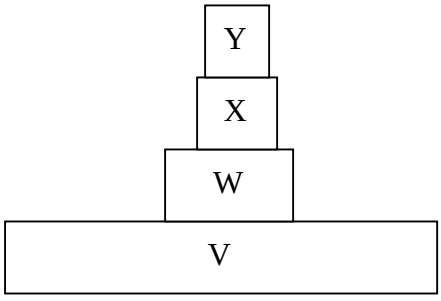
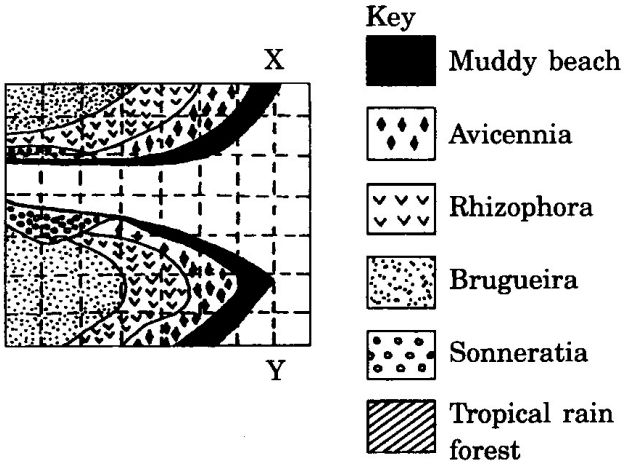


Figure 1

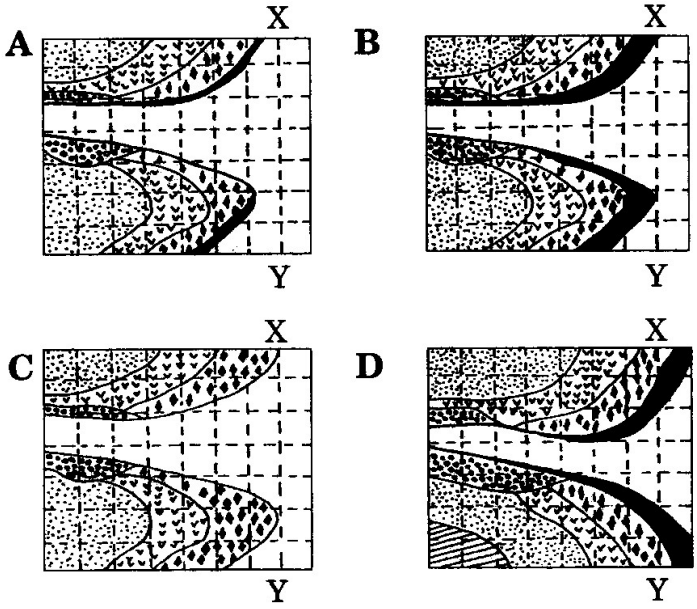
Which of the following is not true about the organisms in the pyramid in Figure 1?

	V	W	X	Y
A	Holophytic	Holozoic	Holozoic	Holozoic
B	Autotrophic	Autotrophic	Heterotrophic	Heterotrophic
C	First trophic level	Second trophic level	Third trophic level	Fourth trophic level
D	Producer	Primary consumer	Secondary consumer	Tertiary consumer

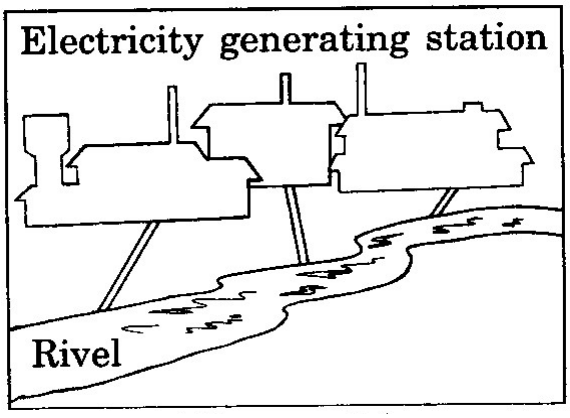
4. Figure 2 shows a mangrove swamp at the month of a river in the year 1970



Which of the following would represent the possible zonal shift at the river mouth in the year 2010?



5. Figure 3 shows an area of human activity?



What is the effect on the river ecosystem based on the main activity shown in Figure 3?

A Number of trophic levels in a food chain
B Algae growth in the river increases
C BOD of the water decreases
D Temperature of the water increase

6. Table 1 shows the results of an experiment to study the population of garden snails in a vegetable farm

Capture	Number of garden snails captured	
First	200 were marked	
Second	50 marked	80 unmarked

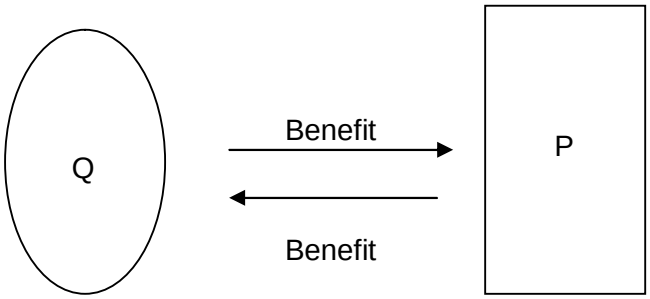
What is the approximate population of the snails in the farm?
A 125
B 320
C 330
D 520

7. The picture shows the root structure of a mangrove tree.

What is structure Q?

A Knee root
B Buttrees root
C Fibrous root
D Stilt root

8. The figure shows the effect of interaction between two organisms, P and Q.



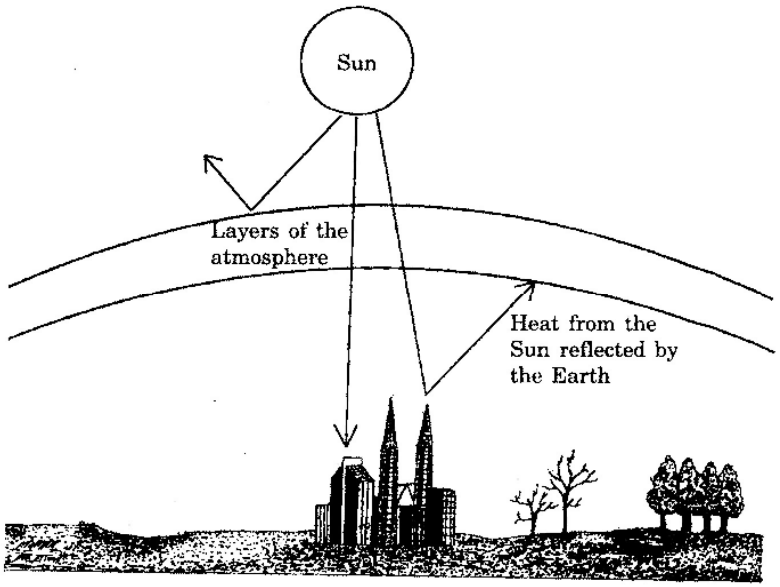
What type of interaction is this?

A Parasitism
B Mutualism
C Saprophytism
D Commensalism

9. Which of the following does not cause water pollution?

A Carbon monoxide
B Excess fetilizers
C Sewage
D Industrial waste

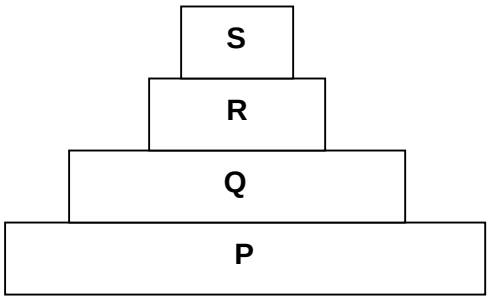
10. The figure shows an environment phenomenon.



What is the phenomenon?

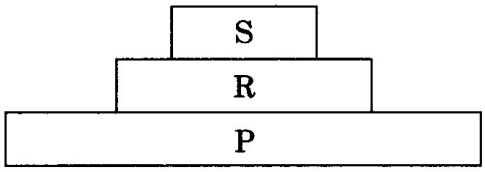
A Green house effect
B Air pollution
C Ozone depletion
D Radiation effect

11. The figure represents a pyramid of numbers of a vegetable farm. P, Q, R and S represent the different organisms in the pyramid of numbers.

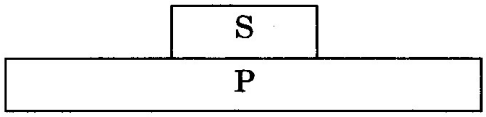


An insecticide was used to eliminate the population of Q.
Which of the following represents the pyramid of numbers after the insecticide was used?

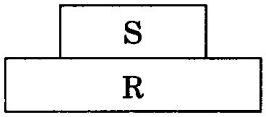
A



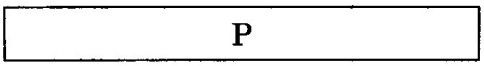
B



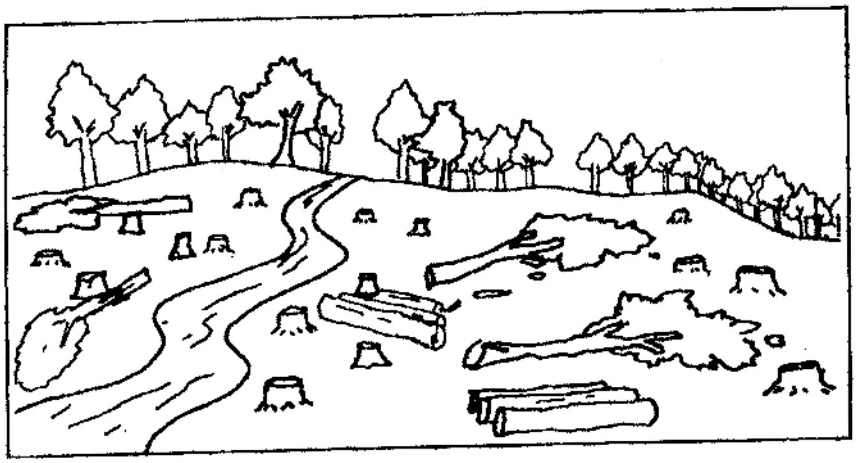
C



D



12. The picture shows an activity.

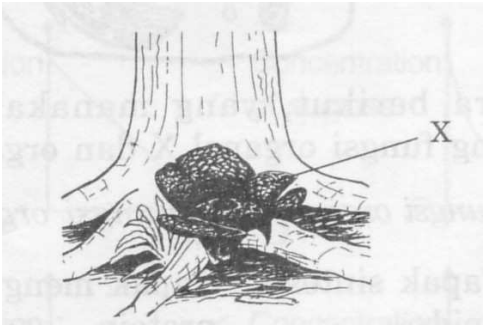


Which of the following are the effects of the activity?

I Flash flood
II Landslide
III Global warming
IV Training of the ozone layer

A I, II and III only
B I, II and IV only
C II, III and IV only
D I, II, III and IV

13. The diagram shows the feeding method of organism X



What is the feeding method of organism X

A Holozoic
B Parasitic
C Saprohytic
D Autotrophic

14. A former mining ground can form a primary forest.
Which of the following sequence is correct in the formation of the primary forest?

A Successor, climax community, pioneer
B Pioneer, climax community, successor
C Successor, pioneer, climax community
D Pioneer, successor, climax community

15. What is “biochemical oxygen demand” (BOD)?

A The quantity of oxygen produced by an aquatic organism
B The quantify of oxygen used by an aquatic organism
C Indicator to measure the level of water pollution
D Indicator of the amount of a water pollutant

16. The following information is about eutrophication.

P – Algae grow and cover the surface of the lake Q – The rate of bacteria reproduction increases R – BOD value increases S – Organic fertilizer flows into the lake

Which of the following sequences is correct about the eutrophication process?

A S, P, Q, R
B P, S, R, Q
C S, Q, R, P
D Q, S, P, R

17. The increase in global temperature due to deforestation causes

I soil erosion
II climatic change
III air pollution
IV rise in sea level

A I and II only
B II and IV only
C I, II and IV only
D II, III and IV only

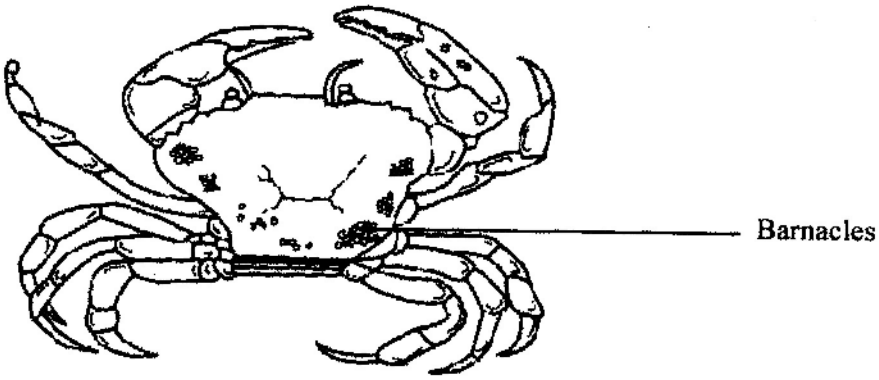
18. The following information shows steps in reactions during the destruction of the ozon layer.

P – Chlorine atom reacts with ozone to produce chlorine monoxide and oxygen molecules Q – Free oxygen atom will break the chlorine monoxide bond R – Ultra violet ray breaks the chlorine chemical bond in CFC to produce free chlorine atom S – Free chlorine atom repeats the chain reaction

Which of the following sequences of steps is correct during ozone destruction?

A P, R, Q, S
B Q, P, R, S
C R, P, Q, S
D R, Q, P, S

19. Diagram below show a crab with barnacles on its shell



What is the interaction between the crab and the barnacles?

A Parasitism
B Mutualism
C Saprophytism
D Commensalism

20. The following information is related to a process occurring in an ecosystem

- The pioneer species is replaced by a new species which is more adapted to the habitat
- The process occurs gradually over a long period of time
- The process ends with a climax community

The process is

A colonisation
B competition
C succession
D evolution

SECTION B

Answer **all** questions in this section.

Water source	Type of fauna				Biochemical oxygen demand (BOD)
	Insect nymphs	**Insect larvae**	**Fish**	**Worm (Tubifex sp)**	
J	5	3	4	None	0-3
K	3	2	2	None	3-10
L	1	1	None	None	10-15
M	None	1	None	Present	15-30
N	None	None	None	Present	>30

0,1,2,3,4, …… 48,49,50
BOD value Low BOD value high

Table 1

1. A study was carried out to compare the effects of pollution on several types of fauna in five types of water sources J, K, L, M and N. biochemical oxygen demand (BOD) was used as an indicator of the quality of water. Table 1 shows the results of the study.

   a) State the meaning of biochemical oxygen demand (BOD).

   ……..

   ……..

   ……..

   [2 marks]

   b) (i) State the relationship between the level of pollution and the fauna species in this study

   ……..

   ……..

   ……..

   [1 mark]

   (ii) Describe how the relationship in (b)(i) is formed.

   ……..

   ……..

   ……..

   ……..

   ……..

   [3 marks]

(iii) State one waste substance that cause the high BOD value in N.

……

[1 mark]

c) (i) What is the other indicator that can be used to gauge the level of pollution in the five sources of water in Table 2, if BOD is not used?

……..

……..

[1 mark]

(ii) What conclusion can you make about the worm *Tubifex* sp. in Table 2?

……

……

……

……

[2 marks]

d) Suggest two ways to increase the number of fauna species in N.

……..

……..

……..

……..

……..

[2 marks]

2. Figure 2 (i) shows a food web found in a field ecosystem.

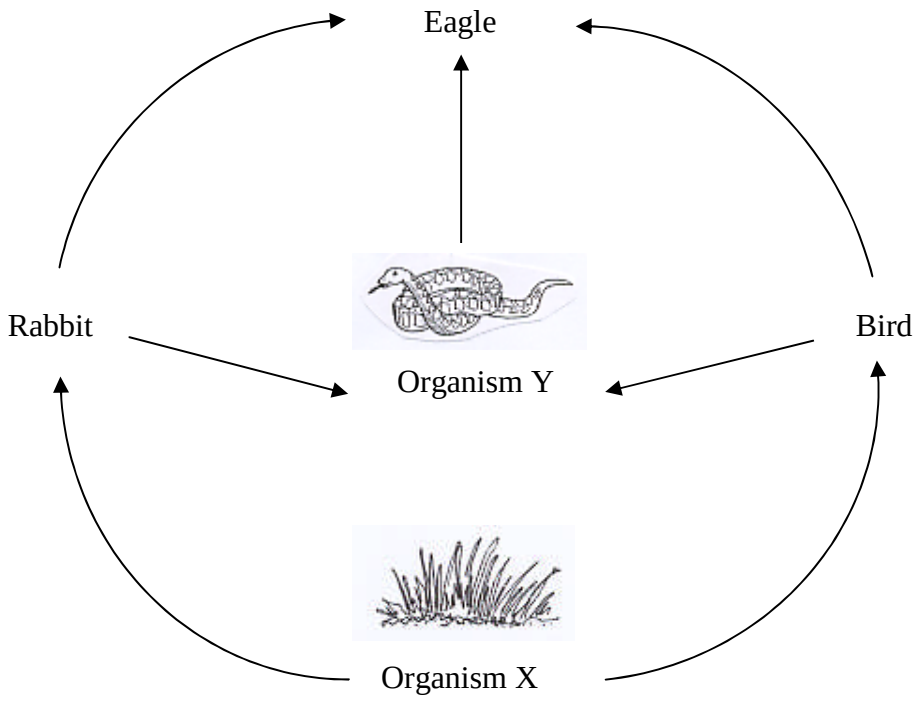


Figure 1 (i)

(a) (i) State the role of organism X and Y in the food web in Figure 2(i)

X: ……

Y:……..

[2 *marks*]

(ii) If grasshopper and wolf brought into the ecosystem, mark on the figure 2 (i) the position of both organisms to show their roles in the food web above.

[2 *marks*]

(b) Explain the importance of organism X in the food web

……

……

……

……

……

……

[3 *marks*]

(c) Based on figure Rajah 2 (i), draw and label a pyramid of numbers to show all trophic levels in the food web on figure 2 (ii) below.

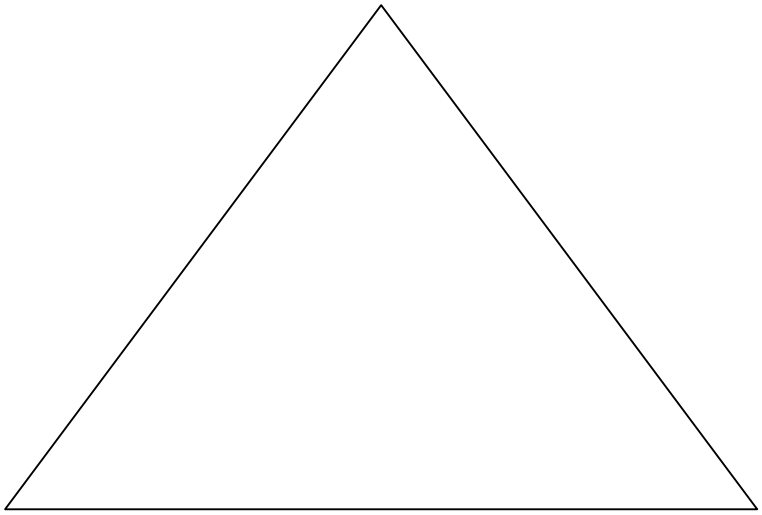


Figure 1 (ii)

[3 *marks*]

(c) In a season of draught, all the grass in the field died in a fire. Explain the effect of this fire to the eagle population in the ecosystem.

……

……

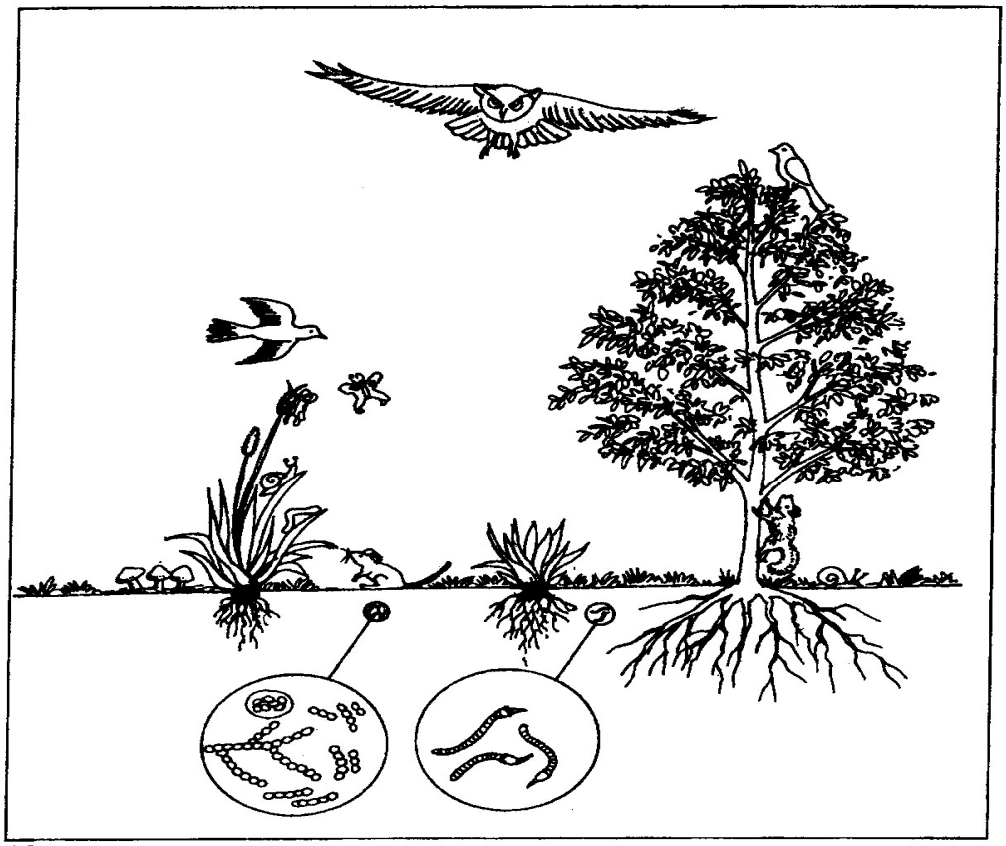
……

……

……

[2 *marks*]

3. Figure 2 show a terrestrial ecosystem



Abiotic components:	**Temperature**		
Biotic components:	**Decomposer**		

Figure 2

a) Abiotic and biotic components influents the lives of organisms. Fill in the boxes in Figure 2 to show two more abiotic and two more biotic components

[2 marks]

b) On Figure 2, mark and label **one** example of the following organism
   (i) Producer
   (ii) Consumer
   (iii) Decomposer

[3 marks]

c) Based on Figure 2, constructs one food chain consisting of four trophic level.

1st trophic level	→	2nd trophic level	→	3rd trophic level	→	4th trophic level
……..		……..		……..		……..

[2 marks]

d) An organism in the 3rd trophic level in Figure 2 has decrease in number.

(i) Base on the food chain you have constructed in (c), suggest a way to increase the number of this organism again.

……..

……..

[1 mark]

(ii) Explain your suggestion in (d)(i).

……..

……..

……..

[2 marks]

e) The organism in the trophic level in Figure 2 absorbs 15 000 kJ solar energy. Energy loss at each trophic level is 90%.

Calculate the total every transferred to the organism in the 3rd trophic level.

= …….kJ

[2 marks]

SECTION C

1. Figure 6a shows the profile of a mangrove swamp and distribution of plant species.

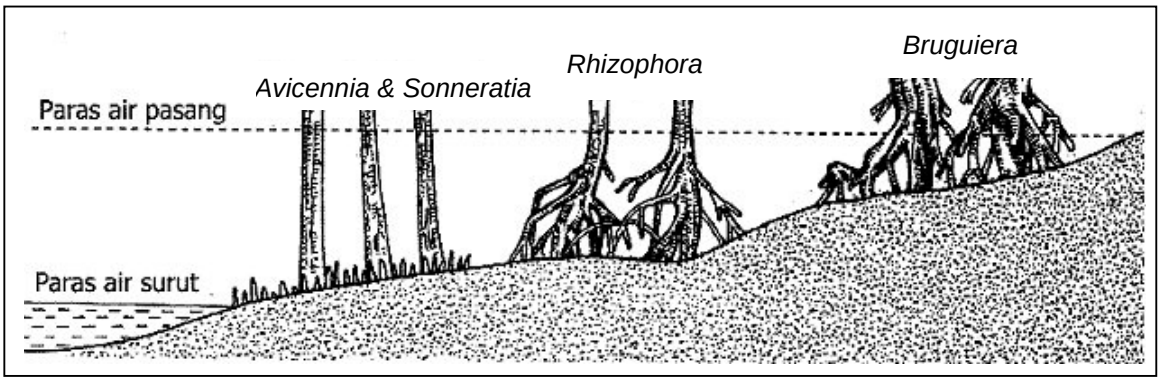


Figure 6a

(a)(i) This mangrove swamp has been polluted by oil spill from a tank ship. Explain how this event can affect the ecosystem of the mangrove swamp.

[*4 marks*]

(ii) Explain the role of plants in figure 6a in increasing the ground level of mangrove swamp.

[*6 marks*]

(c) Figure 6b shows the condition of three cities.

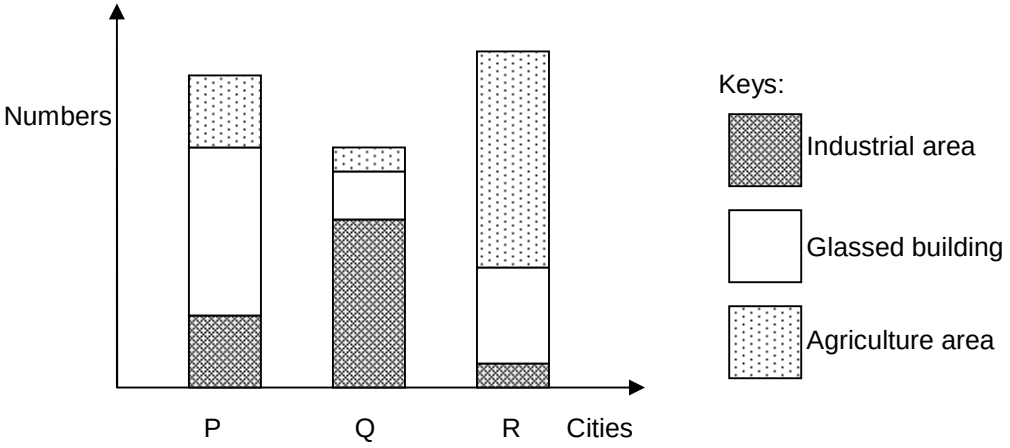


Figure 6b

Discuss about the pollution in P, Q, and R city.

[*10 marks*]

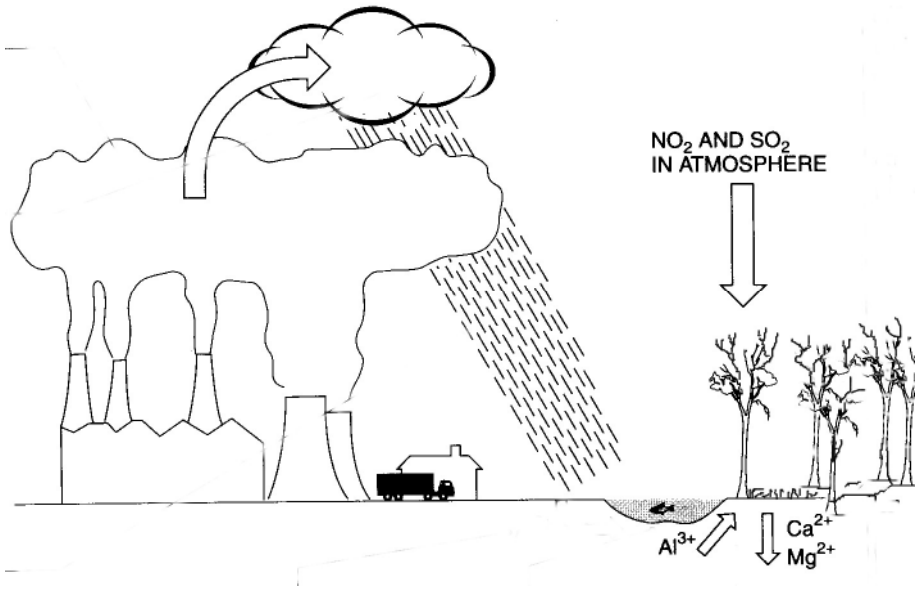


FIGURE 2

2. Figure 2 above shows an industrial area that release smoke resulting from burning fossil fuel to environment.

a) (i) Name the event shown in figure 2 above and explain how it happen.

[4 marks]

(ii) Elaborate the effect of the event you mentioned in (a) to living things and ecosystem.

[6 marks]

b)

A real estate company wants to open an area of forested hill for the purpose of building a new housing area. The hill area situated near to a water reservoir centre for the nearby villages and a river flowing from the hill area through a few nearby villages.

You are assigned to do an initial study at the area mentioned above. Using your knowledge in biology, justify why the company's proposal must not be approve.

[10 Marks]