

## ECOLOGY MARKING SCHEME

### 1. 1989 Q4 P1

May kill soil micro-organisms that decompose humus to release mineral salts. In this way they interfere with nutrient cycling

### 2. 1989 Q8 P1

<b>Disease</b>	<b>Causative agent</b>
Ringworm	Fungus
Tuberculosis	Bacteria
Yellow fever	Virus
Bilharzia	Schistosoma/fluke/platyhelminthes
Trypanosomiasis(sleeping sickness)	Trypanosoma

### 3. 1989 Q15 P1

- Drought or fire
- Emigration
- Food shortage/overgrazing

### 4. 1989 Q17 P1

- (a) - The fish were caught, their age determined and the two year old were obtained and their lengths measured and recorded.  
- This was done repeatedly until a large enough number (more than thirty) were measured. Calculation was done by dividing the total length of all fish by the total number of fish.
- (b) - Lake A has hard water/ more calcium while Lake D has soft water/ less calcium. Calcium is needed for bone formation. Thus the fish in Lake A will grow faster and have greater bone length and body length than fish in Lake D.
- (c) Lakes C and D have very little / no calcium which is necessary for the formation of shell in snails.
- (d) i) Light, temperature, carbon dioxide concentration, oxygen concentration, PH, and salinity.
- ii) - Light: Determine the rate of photosynthesis hence the primary production of the lake
- Temperature: rate of enzyme action in photosynthesis and other Metabolic reactions in plants and animals
- Carbon dioxide: determine the rate of photosynthesis / productivity (since it

is a raw material).it also determines the ph of water.

- Oxygen: affects respiration in plants and animals
- Salinity: some ions are needed for plants and animal nutrition.  
Osmoregulation in plants and animals is affected by salinity.
- Ph: Affects enzyme reactions in metabolism.

5. **1990 Q6 P1**

Measles, chickenpox, herpes simplex, poliomyelitis

6. **1990 Q14 P1**

(a) (i) 1968

(i) Hot water/ temperature, sewage and industrial waste

**(ii) Temperature:**

High temperature reduces the amount of dissolved oxygen in water. This cause the suffocation of fish.

**Sewage:**

- Decomposition of organic matter in sewage reduces oxygen concentration in the lake. Sewage provide food for bacteria (aerobic) increasing their population and demand for oxygen; leading to depriving fish for oxygen.
- The carbon dioxide and ammonia produced by decomposition of sewage changes PH of water in lake and hence interferes with photosynthesis.
- Pathogenic bacteria in sewage may kill fish.
- Sewage blocks light penetration into the the lake. This interferes with producers / photosynthesis thus decreasing available.

**Industrial waste:**

Toxic substances in industrial waste kill producers and fish substance in wastes may clog fish gills and may change PH of water and oxygen solubility is reduced; oil in surface may reduced oxygen availability to fish.

(b) (i) population of species A recovers at a faster rate than species D

(ii) - Reproductive rate/ fecundity higher in A and B

- Less competition for food in A in absence of C.
- C feeds on A: therefore A increased faster in absence of C.
- More predation of D than A
- Waste contained toxic substances with longer terms effect in D than A

(c) (i) Capture/ Recapture method

(ii) Marks may have disappear/death may interfere

**7. 1991 Q7 P1**

- Generate oxygen
- Remove carbon dioxide

**8. 1991 Q8 P1**

- Vaccination/ Immunization;
- Proper hygiene  
Acc. Any example of proper hygiene.

**9. 1991 Q10 P1**

- (a) - Reduced leaf surface/ needle like / spine / scales; thickened / waxy / shiny cuticles; Sunken stomata; reduced number of stomata; hairy leaves.
- Succulent / fleshy leaves to store water.
- (b) – Wave length / colour / quality of light.
- Duration / period of light
  - Light intensity

**10. 1992 Q3 P1**

Cholera/ dysentery/ typhoid/ hepatitis; clean sanitary conditions/ personal hygiene/ drinking boiled water / cook food well.

**11. 1993 Q3 P1**

Oil cuts the supply of air / suffocates / kills mosquito larvae: Thus breaking the life cycle / reducing population of mosquito

**12. 1993 Q8 P1**

- (a) Elephantiasis / Filariasis  
(b) Potato/ tomato blight

**13. 1993 Q15 P1**

**(a) X**

- (i) Thick / waxy (and impervious) to prevent water loss.
- (ii) Transparent to allow light; tough for protection against mechanical injury / infection; shiny to reflect heat / light preventing leaf from heating up.

**Y**

- (i) Cell closely packed/ vertically elongates to trap light
- (ii) Positioned on upper side trap light; has chloroplast for photosynthesis

- (c) Large air space/ closely packed mesophyll tissue/ aerenchyme stomata on upper epidermis/ no stomata on lower epidermis; reduced muscular bundles; presence of scheroids; reduced/ thin cuticle; chloroplast on epidermis  
 Acc. Stomata on top/upper side or surface but Rej. Upper part  
 Acc. poorly developed vascular bundles  
 Rej. Reduced number of vascular bundles

**14. 1993 Q19 P1**

- (a) A lot of food cause population to increase due high rate of reproduction an immigration hence competition for food, death, emigration thus reducing the population, little food leads to stiff competition, hence emigration, death reducing population.
- (b) Energy from the sun is trapped by green plants, in the process of photosynthesis when chemical energy/ starch/ food is produced; the green plants are the producer/ are the 1<sup>st</sup> trophic level ; the plants are eaten by herbivore, which are primary consumers/ occupy the 2<sup>nd</sup> trophic level; the herbivores are then eaten by carnivores which are the secondary consumers/ the 3<sup>rd</sup> trophic level when the plants and animqls / organism die; saprophytic organisms/fungi/bacteria feds them into simple substance/ mineral, the fungi/ bacteria are the decomposers / dentritivores/ dentritors as the energy flows to various trophic levels some energy is lost through respiration.

**15. 1994 Q5 P1**

Energy to sustain primary consumers is obtained from primary producers(who must also sustain themselves).Energy lost from one trophic level to the next

**16. 1994 Q19 P1**

- (a) Pollution in any process which leads to adverse/ harmful spoiling changes in the environment

**(b) (i) Air**

Air pollution is caused by pollutants such as dust, smoke, and fumes of engines, harmful gases / aerosols / sulphur dioxide / oxides of nitrogen / CO<sub>2</sub> / CO noise / loud explosion / bomb explosion

**Sources**

Factories/industries heavy traffic/ motor vehicles/ plains/ fire/ burning charcoal.

Volcanoes bomb explosion.

**Control of air pollution**

- Use of lead free petrol in motor vehicles
- Smokeless fuel/ electricity / solar energy
- Filtration of waste gases to remove harmful gases
- Factories to be elected away from residential area

- Reduced volume/ intensity of sound/ use ear miffs

**(ii)Water**

- Causes of water water pollution
- Agrochemical/silting/ dust/excessive fertilizers/ pesticides/ herbicides
- Industrial/ domestic waste/ effluent
- Untreated sewage/human feces
- Spillage of oils/ chemicals

**Control of water pollution**

- Treatment of industrial wastes before discharge in water
- Educating farmers on use of controlled amounts of insects/ pesticides/ herbicides/ weed killers/ fertilizers / organic farming controlled soil erosion
- Avoid spillage of oils/ chemicals

**17. 1995 Q13 P1**

- (a) - Green plants – Grasshoppers – Lizards – snakes
- Green plants – Grasshoppers – Lizards – Cats
- Green plants – Mice – Snakes – Hawks
- Green plants – Mice – Snakes – cats
- (b) – Mice
- (c) Lizards eat Hawk snakes, Rej. If any primary, tertiary consumer is given
- (d) (i) Most plants will die / dry
- (ii) (same) organisms may starve to death
- (iii) (same) organisms may migrate

**18. 1996 Q15 P1**

- (a)  $\frac{374 \times 400}{80}$
- (b) - There was even distribution of crabs
- No movement in and out of regions; no migration
- There was random distribution of errors after the first capture.
- (c) – Capture/ recapture; capture release recapture.

**19. 1996 Q20 P1**

- (a) 10 HRC and 31 HRC
- (b) (i) A and B
- The numbers of bacteria dividing are few: bacteria are adjusting conditions: few are dying therefore high increase in population
- (ii) B and C
- More cells are dividing due to suitable environment/ favorable

conditions; few are dying; therefore high increase in population

(iii) C and D

No population change; number produced is equal to number dying.

(c) Accumulation of toxic wastes; that kills bacteria; depletion of nutrients leading to competition of space.

(d) (i) The population will remain the same

(ii) Temperature not conclusive for division

(e) – Food to be sufficient for population

- Social amenities/ education; health services

**20. 1997 Q6 P1**

(a) Mosquito larvae/ Pupae are killed; Accept suffocation/ Breaking life cycle of mosquitoes

(b) Pollution of environment/ oil expensive, other aquatic are killed; accept Contamination.

**21. 1997 Q11 P1**

(a) Grass → Grasshoppers → Guinea fowls

Grass → Termites → Guinea fowls

(b) Lions would compete with leopards

Gazelle numbers would reduce

Grass would increase

(c) Grass; rej. Plants

**22. 1997 Q14 P1**

(a) E- Denitrifying bacteria; e.g. pseudomonas denitrifications

J- Nitrifying bacteria; Nitrobacteria reject nitrosamines

(b) H- Death decay/ decomposition; excretion/ Aminonification putrefaction egestion.

F- Nitrogen fixation

(c) Plants

**23. 1997 Q19 P1**

(a) An association between two organisms; where one benefits; and the other is adversely affected. Or an association where an organism lives in or on another living or organism: obtaining from it and causing harm without necessary killing it.

(b) Has hooks/suckers: for attachment to wall of intestines: long; to increase surface area for absorption of food: award increase in S.A for absorption once. Secretes enzymes/to neutralize digestive enzymes; (mucus inhibitor substance/anti enzymes)

Hermaphroditic: to ensure reproductive/ self fertilization.

Production of many eggs: to ensure survival

Segment for egg dispersal:

More than one host; for transmission: e.g T solium – pig (Intermediate host) T. Saginata. Long to fit in the intestine/ increase surface area for ( flatten)  
Absorption of food;  
Anaerobic survive in the gut with low O<sub>2</sub>.

**24. 1998 Q5 P1**

Symbiotic/ both benefit/ mutual benefit; correct description of mutual benefit

**25. 1998 Q10 P1**

- Light intensity decreases with depth light limiting
- Temperature decreases with depth

**26. 1998 Q15 P1**

(a) (i) Species A;

(ii) The rate of multiplication/ growth in A is faster than of species B

(b) (i) One year and three years

1-3 years shortage of resources more suitable environmental

Conditions/ such as food space e.t.c resource were not limiting hence the population increased exponentially rapidly; acc correctly named resource e.g food space.

(ii) Three years and seven years

3-7 years shortage of resources/ limiting/ birth rate equals death rate; hence the population had become stagnant/ constant; acc;

Environmental resistance has set in rej. Incorrect resources e.g PT and T.

(c) Species A would decrease (because of there is less competition with species A/  
More resources available.

**27. 1999 Q13 P1**

a) A community consists of all members of a given spaces in a particular habitat at a particular time.

b) Use the capture and recapture methods; Catch the grasshoppers count and mark using permanent ink; record and release; and allow time 1 to 2 hours; recapture

and count the marked and the unmarked; total population is equal to the number of marked and unmarked grasshoppers in the second sample multiplied by number marked grasshoppers in the first sample; divided by the number of grasshoppers marked in the second sample that were recaptured.

**28. 1999 Q17 P1**

Sulphur based chemicals e.g. sulphure dioxide gas  $H_2S$   $Cl_2$   $HCl_2$  produced by (food preventing) industries /sewages matter, Affect gaseous exchange/makes acid rain /damages plants leaves.

Acc. Pesticides, Herbicides, Insecticides, Acaricides, paint sprays, Aerosols

CFCs sprayed to control (plant) disease and pests, also affect respiratory organs of animals; the chemicals are residuals and persistent (not easily) broken down deplete.

Ozone layers; smoke/fumes produced in areas with (heavy) industries and (high density of motor vehicles / fire which burn fuel/oils wood coal; These visibility; fumes also settle on leaves and stop photosynthesis (excessive) production of carbon dioxide causes the green house effect/Temp. inversion as a result of heating in lower layers of atmosphere; sound /noise produced incessantly b machines/ heavy vehicles/aircraft; affects hearing in animals; Dust, industrial production of (cement) generates dust; which finally settles on plants leaves limiting photosynthesis; removal of vegetation/cutting of trees; interferes with.

The carbon cycle; radioactive emissions; from nuclear reactors/mines/ x-rays machines bombs cause mutation/cancer/death.

**29. 2000 Q2 P1**

Due to stiff competition of resources leading to elimination/ exclusion of one species; acc. currently named example food

**30. 2000 Q10 P1**

- Curved/ sharp/ hooked strong beaks for killing / tearing/ ripping off flesh from bones
- Curved/ strong/ sharp claws for grabbing/ holding prey

**31. 2000 Q14 P1**

(a) Crop

Potatoes / tomato

Disease

Tomato/potato bright/ Acc. Tomato rot

(b) Use of fungicides

Eradication of infected crop/ uprooting/ burning of infected plants  
Use biological control  
Use of disease resistant varieties  
Crop rotating

**32. 2000 Q17 P1**

- (a) (i) Goat
- (a) (ii) It is a grazer and a browser
- (b) Insufficient grass in bush/ aren't adapted to eating twigs/ not browsers/ are grazers
- (c) (i) Domestic animals - total counts  
Wild animals – total counts; aerial counts/ quadrant/ Belt transect/  
capture/ recapture
- (c) (ii) Analyzing gut counts, studying dentition/ breaks/ claws/ parts
- (d) Observation  
Examine droppings  
Dissecting a sample of animals/ study structure/ nature of digestive  
System/ size of caecum/ length of intestine/ chamber
- (e) Irrigation  
Competition; diseases  
Predation; human activity/ man accept any correct  
Parasitism
- (f) Poaching, cropping/ culling/ licensed spot hunting
- (g) Pollution; translocation  
Burning trees, charcoal- deforestation

**33. 2000 Q19 P1**

Broad/ wide/ flat lamina provides large surface area for absorption of (O) and sunlight, thin to ensure short distance of CO<sub>2</sub> reach photosynthesis/ palisade cells; presence of stomata guard cells for efficient diffusion of O<sub>2</sub> gaseous exchange / H<sub>2</sub>O vapour transpiration/ CO<sub>2</sub> into the leaf transparent cuticle epidermal cells; for light penetration into palisade cell which contains chloroplast next to upper epidermis; these receives maximum light for photosynthesis. Chloroplasts have chlorophyll, which traps light energy.

Leaves have vein, xylem and phloem to transport products of photosynthesis to other part of the plant.

Air spaces on spongy mesophyll, easily circulates gases/ CO<sub>2</sub> diffuse into palisade cells.

Mosaic arrangements of leaves; enable leaves to trap sunlight.

- 34. 2001 Q2 P1**  
Utilize energy from the sun to manufacture food/ photosynthesis; for subsequent  
tropic level/ consumers/ other organisms
- 35. 2001 Q13 P1**  
(a) A – Nitrogen fixation  
D – Absorption  
(b) Nitrate/ nitrates/  $\text{NO}_2$   
(c) Denitrifying bacteria/ Denitrifiers  
(d) (i) Leguminous plants, (acc. Legume/ acc examples e.g beans peas)  
(ii) Roots nodules; rej root or nodules alone; acc; root  
  
(e) – Killing / reducing of composers  
- Killing/reduction of nitrogen fixing bacteria/ nitrogen fixing microorganisms  
- Destruction of leguminous plants
- 36. 2002 Q2 P1**  
a) Rhizobium Nitrogen fixing bacteria  
b) Symbiosis / mutualism
- 37. 2002 Q7 P1**  
Cattle are mainly grazers while others are browser.
- 38. 2002 Q12 P1**  
a) A A photosynthesis  
B Decomposition / decay  
C Respiration  
  
b) X Bacterial  
Y Fungi  
c) Regulate the  $\text{CO}_2$  in the atmosphere.
- 39. 2002 Q15 P1**  
(a) Genus  
(b) Ileum/ colon/ duodenum/ intestines/ of humans or intestines of pig  
  
(c) Lack of elaborate elementary canal ( simple guts) can tolerate raw corn  
Thick cuticle pellicle, reject the outer covering lays many eggs  
Mouthparts for sucking partly digested food  
By pollen tube that grows through style
- 40. 2003 Q4 P1**  
a) Rhizobium

- b) Convert nitrogen into nitrates / convert nitrogen into proteins / convert N<sub>2</sub> into nitrogenous Compounds / fix N<sub>2</sub> into nitrates.

**41. 2003 Q10 P1**

- Numerous chloroplasts to absorb light / epidermis have chloroplasts to absorb light.
- Deeply divided / truncated leaves / branched leaves to increase surface area.
- Large air spaces for storage of air / buoyancy; acc parenchyma tissue for storage of air
- Have no cuticle to facilitate exchange of gases

**42. 2003 Q11 P1**

Salmonella typhi; Acc.Bacteria / salmonella alone

**43. 2003 Q16 P1**

- a) i) study of a single species within a community / ecosystem / habitat / environment.  
ii) Synecology?  
Study of natural communities within an ecosystem

b) **Leaf**

A

B

C

**Habitat**

aquatic / fresh water

Forest; Terrestrial

Arid / semi arid; desert.

c) **Sunken**

Hairy

Reserved rhythm

Small stomatal pore

**44. 2004 Q19 P1**

**Wind.**

In windy conditions the rate of transpiration increases; wind disperses fruits/ seeds; is an agent of pollination; acc. Spores for seed.

**Temperature**

Changes in temperatures affects the rate of photosynthesis and other biochemical reactions/ metabolic reactions/ enzymatic reactions/ enzymatic reactions, temperature increases rate of transpiration;

**Lights**

Plants need light for photosynthesis, some plants need light for flowering/ photoperiodism/ seeds like lettuce require light for germination.

## **Humidity**

When humidity is low, the rate of transpiration increases;

## **PH**

Each plant requires a specific pH to grow well/ acidic/ alkalinity/ neutral;

## **Salinity**

Plants with salt tolerant tissues grow in saline area, plants in estuaries adjust to salt fluctuations;

### **Topography**

North facing slopes in temperate lands have more plants than south facing slope

Plants on windward side have stunted/ distorted growth;

Acc. Comparisons of mountains and valleys

Acc. Description of other areas with other topographies e.g. River valley rainfall/ water

- Fewer plants in areas/ semi arid and
- Water is needed for germination/ is a raw material for photosynthesis/ dissolves/ minerals salts/ provides turgidity for support/ fruits/ seeds

## **Pressure;**

Variation in atmospheric pressure affect availability of CO<sub>2</sub> which affects photosynthesis and low pressure increase rate of transpiration; and affect amount of oxygen; for respiration

## **Mineral salts/ trace elements**

- Affects distribution of plants in the soils
- Plants thrive well where there are mineral salts in the soil  
Plants living in the soil deficient in particular mineral element have special methods obtaining it; for example legumes obtaining from nitrogen by fixation or carnivorous.

### **45. 2005 Q10 P1**

Entamoeba histolytica

### **46. 2005 Q16 P1**

- a) - Fungus  
-Bacteria

#### **b) Refrigeration**

-It inactivates disease causing organisms/micro-organisms.

**Irridation** –The radiation kills/destroys the micro-organism.

**Pasteurization** (for milk only)

**Canning-Kills** the micro – organisms.

**47. 2005 Q17 P1**

a) Photosynthesis

b) Heterotrophic – holozoic

c) Small fish pond / dam, rain forests.

d) Algae → Zoo plankton → smallfish → bird large bird.

e) -Snails would increase in number

-Bird M would increase in number.

-Green plants would decrease in number

f) The energy to be passed on from one trophic level to the next is contained in food materials. Most of the food taken in by consumers passed on from one trophic level to the next is consumers passes through the digestive track as undigested matter that is removed as faeces. The digested materials are absorbed in to the bloodstream and conveyed to various tissues of the body. Most of the absorbed food materials are used in respiration, to Produce is lost as heat during sweating, evaporation and transpiration in plants.

g) i) Scavengers e.g. vultures

Decomposers e.g. bacteria

ii) Scavengers feed on dead bodies of herbivores and carnivore // the consumers.

-Decomposers act upon the remains of the producers, consumers, &

Scavengers causing decay, to release inorganic materials, which are later re-used by producers to make new organic compounds.

h) i) -Deforestation

-Overgrazing

-Soil erosion

-Hunting, poaching

-Over fishing

-Poor waste disposal // Environmental pollution

ii) **Deforestation**

Lack of trees leads to reduced number producers in an ecosystem.

**Overgrazing**

Many animals eat away and trample the vegetation hence reducing / depleting the number of producers.

-Lead to gully erosion hence carrying away some of the underground and crawling animals (Consumers)

**48. 2006 Q16 P1**

- (a) Decomposer – recycling of nutrients
- (b) Predation – regulation of numbers/ population

**49. 2006 Q26 P1**

- X- Denitrifying bacteria/ denitrification
- Y- Animals/ Herbivores; accept primary consumers
- Z- Nitrogen fixing bacteria ( in soil) accept Azotobacter.

**50. 2006 Q3 P2**

- (a) Pyramid of numbers is a diagrammatic representation of the number of organism, at each trophic level in a food chain; While biomass is a diagrammatic representation of dry weight organism at each trophic level in a food chain.
  
- (b) Insufficient utilization of food resource/ wastage
  - Through respiration
  - Through excretion

**51. 2007 Q15 P1**

- (a) Population – It is all members of a given species in particular habitat at a particular time.  
Community- all organisms belonging to different species interact in the same habitat.
- (b)(i) Capture and recapture method
- (ii) Line transect

**52. 2007 Q16 P1**

- - Produce large number of eggs for increased survival
- Produce enzymes to digest human skin when penetrating
- Can withstand low oxygen concentration
- Have hooks – like structures to attach to the intestinal walls

**53. 2007 Q8 P2**

It is addition of substance into water that may cause harm to organisms and are disruptive to ecosystem.

The causes of water pollution include:

- Industrial effluents that may be toxic chemicals which may kill the aquatic organisms. It can be controlled by treating the effluents before discharging them.
- Hot water that reduces concentration of oxygen killing the animals. It is controlled by placing high penalties on factories discharging hot water.
- Oil spillage from oil tankers that reduces oxygen in water, penetration of light intensity and clog feathers of marine birds. It can be controlled by regular servicing of oil tankers.

**Domestic effluents that include:**

- Untreated sewerage that causes water borne diseases. It can be controlled by treating sewerage before being discharged.
- Detergents that cause eutrophication causing reduced oxygen concentration. It is controlled by banning phosphate based detergents.
- 

**Agricultural effluents that include:**

- Pesticides and herbicides that have heavy metals that they may cumulates along the food chain killing the higher animals. It is controlled by use of biological control of pests.
- Inorganic fertilizers that have nitrates and sulphates that cause eutrophication is controlled by use of organic fertilizers.

Silting due to soil erosion reduces penetration of light to the plants and clog respiratory surfaces of animals. It is controlled by proper methods of soil erosion and proper farming methods.

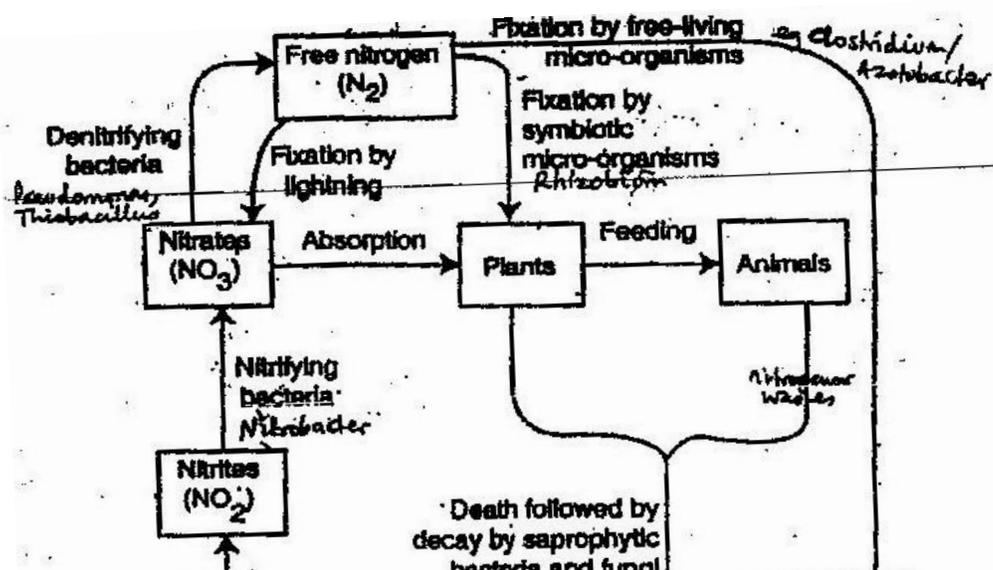
54. 2008 Q3 P1

- (a) Hepatitis (A- E lipids)
- (b) (i) *Vibria cholerae*
- (ii) *Canida/ candida albinism*

55. 2008 Q14 P1

- Growth – increase/ decrease in numbers/ change in numbers
- Dispersion – Spread/ distribution of organisms in a habitat
- Density – Number of individual per unit area

56. 2008 Q7 P2



During thunderstorm/ lightning; nitrogen gas combines with O<sub>2</sub> to form nitrogen oxides; nitrogen oxides dissolve in water to form nitric acid; acid is deposited in the soil by rain, nitric acid combines with chemical substance to form nitrates/ nitric acids dissolve to form nitrates which are absorbed by plants symbiotic bacteria/ such as rhizobium; which are found in root nodules of leguminous plants, fix free nitrogen to nitrates.

Free living bacteria/ clatridium/ azotobacteria fix nitrogen to all rates  
Nostoc algae/ chlorella/ anaemia/ ix nitrogen to nitrates.

Plants use Nitrates to form plant proteins

Animals feed on plants and convert plant proteins into animal proteins

Plants/ animals die and decomposed by bacteria/ saprophytes/ fungi decomposing plants/ animals/ release ammonia which is converted to nitrates/ by nitrosomonas nitrococcus bacteria

Nitrates are converted to nitrites; by nitrobacteria

Nitrates in the soil can be converted to free nitrogen/ denitrification by some fungi; pseudomonas/ hulo bacillus denitrifying bacteria.

**57. 2009 Q2 P1**

- Obtains food/nutrients

- Shelter

*Acc. Habitat*

*Ref: Protection*

**58. 2009 Q9 P1**

(a) (i) *Salmonella typhi*; *Ignore underlining but must be written correct.*

(ii) *Entamoeba histolytica*

(b) Malaria

**59. 2009 Q19 P1**

(a) – Leads to eutrophication; causes water borne disease

- Kills organisms in water; / reduce amount of oxygen in the water; / reduce the quality of water for consuming change water PH; / interferes with food chain / trophic levels

(b) Respiration / defecation / excretion;

**60. 2009 Q20 P1**

- Belt transect;/
- Line transect

**61. 2009 Q3 P2**

(a) (i) Using a living organism to regulate / control / reduce / check the population of another organism

- (ii) - Lady bird (Beetles) used to control Aphids in coffee
- Cats used to control rats in the store / snakes
- Wasps used to control coffee mealy bugs

(b) (i) Enrichment of water bodies with nitrates / phosphates / sulphate *accept*  $NO_3$  <sub>(aq)</sub> *NHT<sup>r</sup>* due to discharge of sewage / domestic effluent kitchen water containing water detergents / runoff water fertilizer; leading to rapid growth of aquatia plants / phytoplankton's ;

*Accept: nutrients for nitrates phosphates*

(ii) (Proliferation of plants) block light from reaching plants underneath which will not photosynthesize; the plants die and decompose leading to lack / depletion of O<sub>2</sub>; animals also die/suffocate

(c) nitrogen iv oxide /sulphur iv oxide; *accept nitrogen dioxide sulphur dioxide*

**62. 2010 Q13 P1**

- (a) Place / environment in which specified organisms live
- (b) A natural unit with abiotic and biotic factors

**63. 2010 Q25 P1**

- Overcrowding
- Accumulation of toxic wastes
- Limited resources such as nutrients.

**64. 2010 Q3 P2**

a) i) Primary consumer

ii) Primary consumer / Secondary consumers;

b) Green plants → Caterpillars → Small insects → lizard

Decaying leaves → Caterpillars → Small insects → lizard

- c) i) Hawks;  
 ii) At each trophic level energy is lost as heat / respiration; and during decomposition; or lost in defecation/ feces/ waste products of metabolism/ excretion; some parts of the organism are not eaten; (hence less biomass as one moves up the trophic levels).

65. 2011 Q5 P1

(a) Grass → Grasshopper → Lizards;  
 (1mark)

(b)(i) Chicken;

(ii) Grass

(2marks)

66. 2011 Q6 P1

- (a) This is the study of the inter-relationship between organisms and their environment;  
 (b) The maximum population of a species that a particular habitat can support.

67. 2011 Q3c P2

Grow into the air above mud / water; have lenticels for gaseous exchange;

68. 2012 Q5 P1

(a) plant C

(b) This cuticle reduces water loss;

Low number on upper surface reduces water loss;

Large root surface area enhances water absorption;

NB; (b) tied to (a)

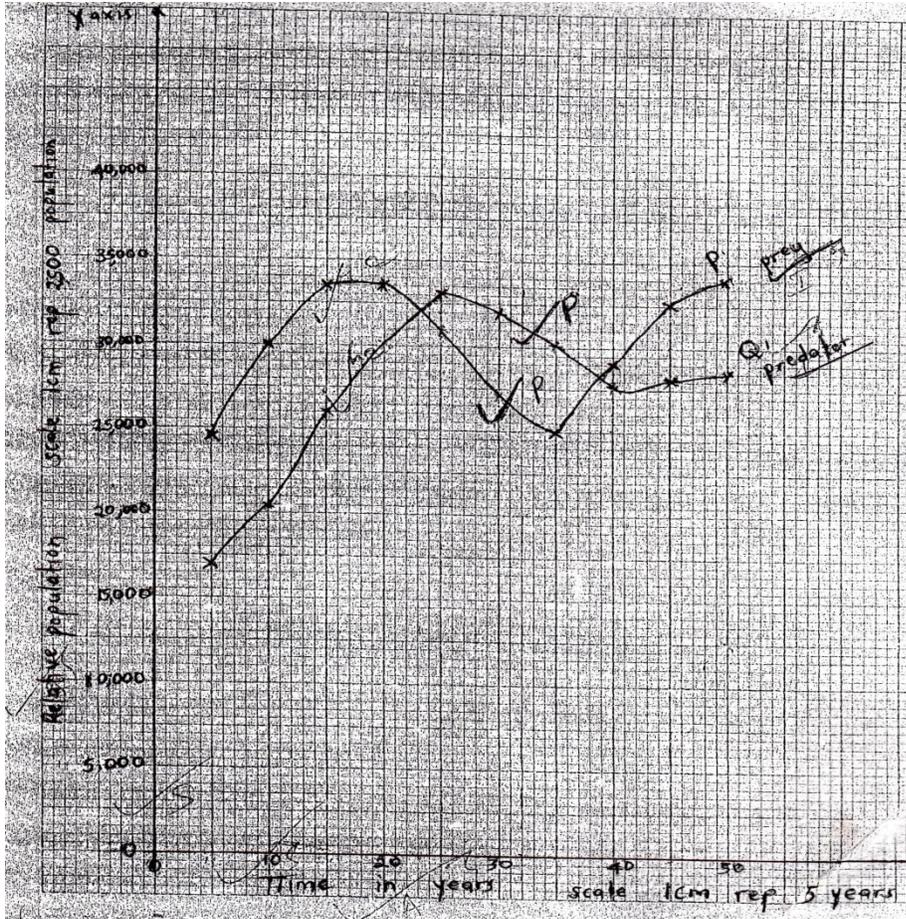
69. 2012 Q21 P1

Nitrogen fixation

70. 2012 Q6 P2

(a) (i) Scale = Y axis no scale

X axis no origin = deny



(ii) Curve P; Prey population is initially higher/prey population usually starts falling earlier.

(iii) Both populations decrease, because prey is not enough to sustain predator Population/environmental stress limit population of

(iv) At  $23 \pm 0.5$ ; 22.5, 23.5  
 $39 \pm 0.5$ ; 38.5, 39.5

(v) Human activities; Acc pollution/deforestation/translocation /culling/hunting/Poaching/afforestation.

Competition; for mates/space/water

Less food for prey/competition for food;

Diseases causing death of prey

Emigration of prey

Acc migration out of habitat.

Parasitism Acc parasite, pathogens

b) Sulphur IV oxide in the air causes respiratory diseases; in high concentration it can kill humans/damage plants. Acc aggravates asthma, causes bronchitis/pneumonia/emphysema  
 Forms acid rain; which decreases soil PH; corrodes metals/buildings/machines/stones/sculptures  
 acid rain poisons/damages/kills plants/kills animals;  
 acid rain causes leaching of magnesium  $Mg^{2+}$ /calcium  $Ca^{2+}$ /aluminum  $Al^{3+}$

