# Topical test evolution

1. (a) Distinguish between hybrid and hybrid vigour. (02 marks)

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(b) Explain how each of the following may alter the gene frequency

(i) Closeness of population. (03 marks)

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(ii) Small population size. (03 marks)

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2. In human, albinism is caused by an autosomal recessive allele. On average 1 in 10,000 is an albino.

(a) Give two characteristics of an albino. (02 marks)

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(b) Using Hardy Weinberg formula p2 +2pq + q2 = 1, determine

(i) the frequency of the albino allele in human population. (02 marks)

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(ii) Frequency of heterozygous genotype in the population. (02 marks)

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(c) Explain why it is difficult to eliminate recessive alleles from a population. (04 marks)

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3. When extensive lakes that existed in Bunyoro were reduced to isolated pools many years ago, four species of fish evolved as a result

(a) Suggest how the drying up of the lake system to isolated pools have resulted in evolution of the four new fish species. (04 marks)

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(b) Describe how environmental factors act as stabilizing forces to natural selection in an isolated pool after the evolution of a new species. (03 marks)

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(c) Suggest what would happen to the fish species if water levels rose and the isolated pools once again formed an extensive lake system. (03marks)

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4. (a) Explain the meaning of the Hardy- Weinberg equilibrium principle. (01 mark)

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(b) State four conditions that must be fulfilled in order for the principle to hold true (02 marks)

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(c) Brown eyes in a human population is caused by a dominant allele. If in a population, 84% of the people have brown eyes, using Hardy-Weinberg formula, determine the percentage of the population who are

(i) Heterozygous for eye color. Show your working. (04 marks)

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(ii) Homozygous dominant for eye color. Show your working. (03 marks)

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5. (a) Outline the causes of gene reshuffling. (03 marks)

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(b) In what way may variation resulting from gene reshuffling differ from that caused by mutation? (02 marks)

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(c) What is the importance of variation in a population? (02 marks)

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(d) Explain how constancy of species may be maintained through natural selection. (03 marks)

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6. (a) State three ecological problem which arise from the accumulation of domestic waste in urban communities

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(b) Give two ways of reducing domestic waste.

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(c) Figure 8 show lichen species growing along a 20km transect from urban Centre.

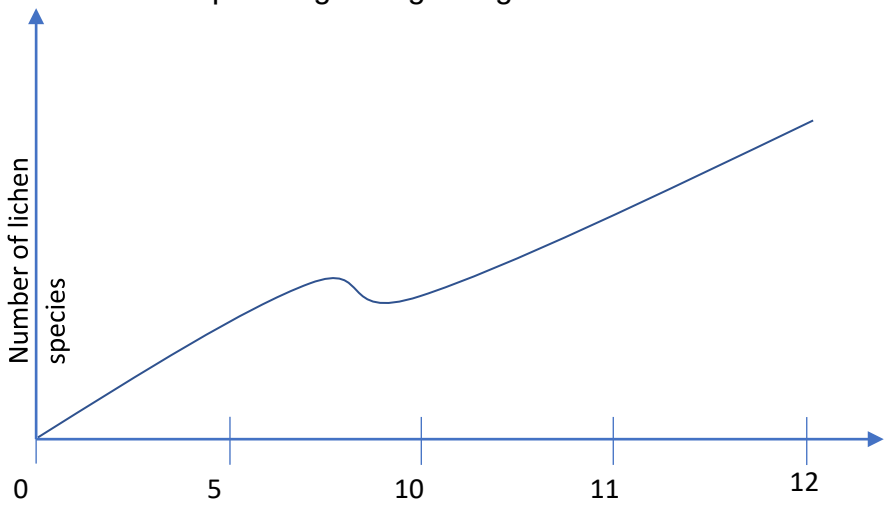


Fig. 8. Distance from urban centre (km)

(i) Explain the trend in the lichen species with distance.

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(ii) Suggest an explanation for the observed number of lichen species at a distance of 10km from the urban Centre.

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7. (a) How does resistance of malarial parasite to antimalarial drugs occur?

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(b) How may each of the following lead to speciation

(i) genetic drift

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(ii) Non-random mating

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8. (a) Using examples. Give the meaning of adaptive radiation of species? (2marks)

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(b) State the ecological importance of adaptive radiation. (2marks)

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(c) How do adaptive radiation and homologous structures give evidence of evolution?

(i) Adaptive radiation. (3marks)

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(ii) Homologous structures. (3marks)

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9. (i) What is meant by natural selection? (2marks)

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(ii) How does it occur? (6marks)

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(iii) What is the importance of natural selection? (2marks)

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10. (a) What do you understand by gene pool? (2marks)

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(b) What may cause a gene pool of a population to be static? (2marks)

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(c) (i) state three factors that may contribute to change in frequency of dominant and recessive alleles in a population. (3marks)

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(ii) Explain how each factor stated in c(i) above may cause change in the frequency of dominant and recessive alleles in a population. (3marks)

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11. (a) State Darwin's theory natural selection.

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(b) State three observations and two deductions from which Darwin derived this theory.

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(c) How does the modern view on evolution differ from Darwin's View?

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12. (a)(i) What is mutation?

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(ii) State the possible causes of mutation

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(b) What is the role of mutation in evolution of new species?

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13. Explain what is meant by each of the following concepts:

(a) Continental drift

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(b) Divergent evolution

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(c) Industrial melanism

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(d) Vestigial organs

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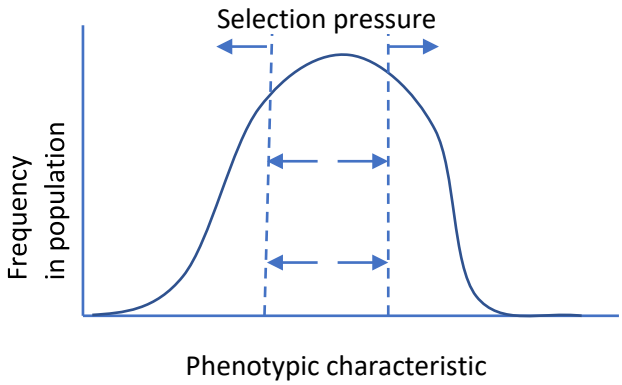
14. The figure below illustrates selection pressure acting on a population of butterfly




(a) State the type of selection being exhibited in the figure. (1mark)

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(b) Explain how this type of natural selection affect the phenotypic characteristics of the population.

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(c) (i) In the space below sketch the distribution curve that would result after many generations of this type of natural selection shown in (a)

(ii) What ecological effect does the above type of selection have on the population? (3marks)

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(d) State the importance of genetic variation in natural selection? (2marks)

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