



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level



MARINE SCIENCE

9693/04

Data-Handling and Free-Response
SPECIMEN MARK SCHEME

For Examination from 2009

1 hour 15 minutes

MAXIMUM MARK: 50

This document consists of **5** printed pages and **1** blank page.



Section A

1 (a) CPUE values correctly filled in ;

0.73
1.71
1.32
1.08
3.36
3.47
2.58
4.08
2.32
1.42

[1]

(b) all points correctly plotted (ecf for wrong calculations in (a)) ;
points joined by line ;

[2]

(c) steady decline in the catch amount ;
steady decline in the CPUE ;
at the same time there is an increase in the amount of fishing effort ;

[2 max]

(d) decline in CPUE means less fish are being caught for the same amount of work ;
indicating that there are fewer fish to be caught ;

[2]

(e) ref. to illegal/unreported catch ;
size/sex of fish caught ;
location of catch ;

[3]

[Total: 10]

- 2 (a) lower concentration of dissolved salts ;
details ;;
- (b) to replace water lost ;
because body fluids less concentrated than sea water ;
ref. to osmosis ; [2 max]
- (c) respiration ;
ref. to mitochondria being site of respiration ;
ref. to more mitochondria more respiration occurs/more energy available for NKA pump ; [2 max]
- (d) with increase in salinity there is increase in number of chloride channels ;
straight line/directly proportional/quote figures ; [2]
- (e) idea that less water lost (by osmosis) ;
less sea water taken in/water taken in contains less salt ;
less active NKA pumps ;
less energy required to maintain concentration of body fluids ; [2 max]

[Total: 10]

- 3 (a) tourism involving travel to areas of natural/ecological interest ;
under the guidance of a naturalist ;
for the purpose of observing wildlife/learning about the environment ;
managed to be ecologically sustainable ; [2]
- (b) minimizes the adverse affects of hotels, trails, and other infrastructure ;
use of recycled materials/available local building materials/renewable sources of energy ;
recycling/safe disposal of waste and garbage ;
raise funds for environmental protection/research/education ;
park entrance fees/tour company, hotel, airline and airport taxes/voluntary contributions ;
builds environmental awareness ;
education, for both tourists and residents of nearby communities ;
local community receive income ;
other tangible benefits (potable water, roads, health clinics, etc.) from the conservation area/
tourist facilities ;
encourages rural development ;
shift economic and political control to the local community, village, cooperative ; [8 max]
- (c) air travel often not included in the “environmental impact calculation” ;
10,000 km flight consumes about 700 litres of fuel per person ;
destinations often extremely sensitive to environmental impact from human use ;
e.g. coral reefs/bird breeding colonies in Antarctica ;
damaged even by careful travellers. ;
involves travel to remote areas where small/isolated communities have had little experience
interacting with foreigners ;
ecotourism involves an unequal relationship of power between the visitor and the host/
commodification of the relationship through exchange of money ; [5 max]

[Total: 15]

- 4 (a) fusion of (haploid) gametes ;
details egg and sperm
producing diploid zygote ;
- (b) producing few young, typically one to eight ;
strategy of reproduction spawns few offspring ;
but provides each with a high rate of survival ;
devoting effort to protecting them while they grow to adulthood ;
ref K-selection strategy ;
large brain/need to learn requires parental care ;
parental care includes feeding ;
ref. mammary glands ;
maximize the chances that each individual calf will grow to maturity ;
successful in stable environments ;
few, large, well-developed young and protect through prolonged parental care ; [8 max]
- (c) large numbers of tiny young into the environment, providing little or no parental care afterwards ;
significant losses due to predation ;
populations are subject to wide fluctuations of relative abundance ;
makes them poor colonizers of stable environments ;
responsible for the phenomenon known as 'year class' among commercial fisheries ;
when environmental conditions are poor, very few or no young may survive to breed ; [5 max]

[Total: 15]

