

# Hong Kong Diploma of Secondary Education

## *Public Examination of Biology and Combined Science (Biology)*

*HKEAA*

*November 2008*



香港考試及評核局  
Hong Kong  
Examinations and  
Assessment Authority

# HKDSE

- A total of 24+ subjects offered
- Maximum no. of subjects entered per candidate:
  - 4 core subjects
  - 3+1 elective subject
- Biology
  - Not to be taken together with Integrated Science, Combined Science (Bio + Phy / Chem)



# Public Assessment - Biology

	Paper 1	Paper 2	SBA
Duration	2 ½ hrs	1 hr	S5 & S6
Curriculum coverage	Compulsory part	Elective part	Whole
Type of assessment tasks	Section A: MCQs Section B: conventional Qs	Structured Qs (Answer 2 out of 4 Qs.)	Practical & non-practical related tasks*
Weighting	A: 18% B: 42%	20%	20%



\*Assessment of non-practical related tasks is applicable to 2014 exam and thereafter.

# Biology Paper 1

- All questions are compulsory
- Paper total = 120 marks
- Section A – 36 MCQs → 36 marks
- Section B
  - 5-7 short questions → 30 marks
  - 3-5 structured questions & 1 essay → 54 marks
- Question-Answer Book will be used



# Biology Paper 2

- Four sections; each section on one elective topic
- Attempt any 2 sections
- One question per section; divided into parts
- Attempt all parts within a section
- 20 marks per section
- Paper total = 40 marks
- Answer books will be used



# Combined Science

- 3 possible combinations:
  - Combined Science (Physics & Chemistry)
  - Combined Science (Chemistry & Biology)
  - Combined Science (Physics & Biology)
- Aims to complement a third science subject
- **NOT** to be taken together with Integrated Science



# Combined Science (Biology Part)

	Public Exam (one paper only)	SBA
Duration	1 hr 40 min	S5 & S6
Curriculum coverage	Whole Combined Sci (Bio part)	
Type of assessment tasks	Section A: MCQs Section B: conventional Qs	Practical & non-practical related tasks*
Weighting	A: 12% B: 28%	10%



\*Assessment of non-practical related tasks is applicable to 2014 exam and thereafter.

# Combined Science (Biology Part) Paper

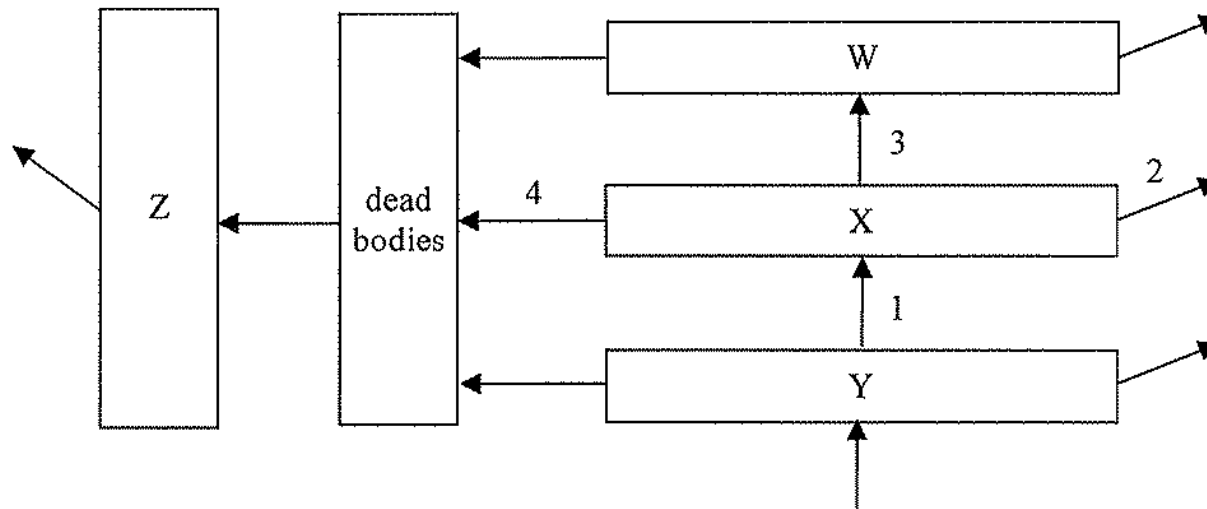
- All questions are compulsory
- Paper total = 80 marks
- Section A – 24 MCQs → 24 marks
- Section B
  - 4-6 short questions → 20 marks
  - 2-4 structured questions & 1 essay → 36 marks
- Question-Answer Book will be used
- Some questions common with Bio Paper 1
- CS (Bio) Exam held concurrently with Biology Paper 1





# Sample MC questions (1)

**Directions:** Questions 20 to 22 refer to the diagram below, which shows the flow of energy in an ecosystem. W, X and Y represent different trophic levels and Z represents another group of organisms in the ecosystem.



Key: direction of energy flow

25. Organisms Z are

- A. predators.
- B. pathogens.
- C. parasites.
- D. decomposers.

- questions on familiar topics

# Sample MC questions (2)

6. A certain weed-killer acts by blocking the flow of electrons along the electron transport chains in photophosphorylation. Which of the following processes would still occur in the plant sprayed with the weed-killer?
- A. formation of ATP
  - B. photolysis of water
  - C. formation of NADPH
  - D. photoactivation of chlorophyll

- questions on new topics



# Sample short questions (1)

1. For each of the biological processes listed in column 1, select *one* type of membrane transport mechanisms listed in column 2 that accounts for the process. Put the appropriate letter in the space provided. (2 marks)

## *Column 1*

Haemolysis of red blood cells when placed in 0.1% sodium chloride solution

.....

Uptake of oxygen into red blood cells

.....

## *Column 2*

- A. active transport
- B. diffusion
- C. osmosis
- D. phagocytosis

- Basic knowledge and understanding



# Sample short questions (2)

5. During the course of history, scientists have developed different systems for classifying the diverse range of living organisms based on different criteria. The table below lists some of the different classification systems developed in the past centuries:

Scientist	Linnaeus	Chatton	Copeland	Whittaker	Woese et al.	Woese et al.
Year of proposal	1735	1937	1956	1969	1977	1990
System	2 kingdoms	2 empires	4 kingdoms	5 kingdoms	6 kingdoms	3 domains
Group	(not treated)	Prokaryota	Prokaryota	Prokaryota	Eubacteria	Bacteria
					Archaeobacteria	Archaea
	Vegetabilia	Eukaryota	Plantae	Protocista	Protista	Eukarya
				Fungi	Fungi	
				Plantae	Plantae	
	Animalia		Animalia	Animalia	Animalia	

- (a) In 1937, Chatton classified all living organisms into two empires. List *two* major differences between these two empires. (2 marks)



(b) Complete the key below, which serves to classify eukaryotic organisms into four kingdoms as proposed by Whittaker: (3 marks)

1a Predominantly unicellular.....Protista

1b Multicellular.....2

2a .....

2b .....

3a .....

3b .....

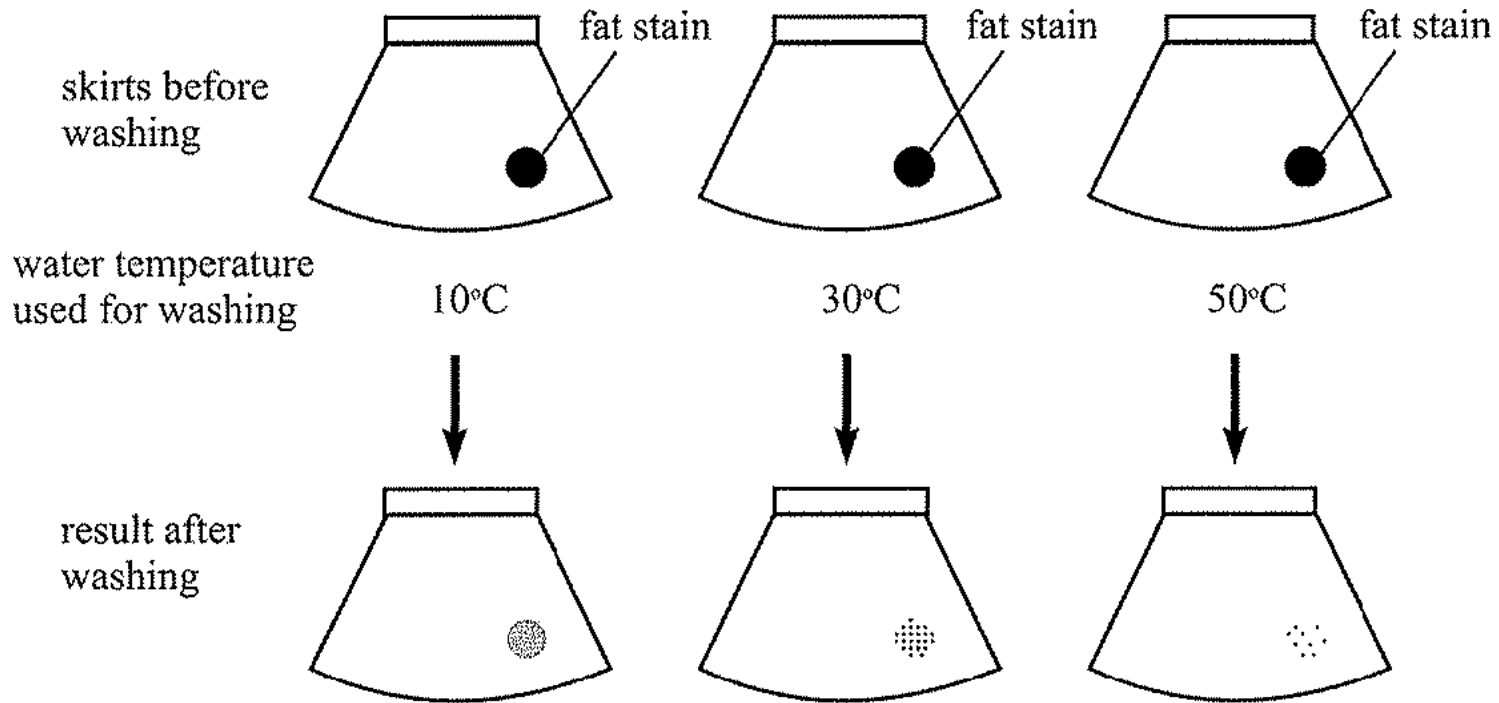
(c) Suggest *two* reasons why the classification system of organisms keeps changing over time. (2 marks)



- nature of science

# Sample structured question

9. One of the applications of enzymes in everyday life is found in biological washing powders. To study the effectiveness of a biological washing powder, three identical skirts with identical fat stains were washed with the washing powder solutions of the same concentration but at different water temperatures. The investigation and its results are outlined below:



(N.B. The investigation was repeated at the three temperatures, but no washing powder was used. The fat stains on all three skirts remained unchanged.)

(a) Suggest an explanation why the fat stain can be removed by using the biological washing powder. (3 marks)

(b) What conclusion can be drawn from the results of this investigation? (1 mark)

(c) A student queried whether or not biological washing powder is more effective than ordinary (non-biological) washing powder in removing fat stains. If you were the student, describe how you would carry out an investigation to find out which washing powder is more effective. (5 marks)

- STSE connections
- scientific inquiry



# Sample essay question

12. Hydrogen and nitrogen are essential components of proteins. Compare and contrast the processes by which non-leguminous plants acquire these two elements from the environment and describe how they can be incorporated together to form proteins in mesophyll cells. (11 marks)

- selection of relevant information
- integration of knowledge
- systematic organisation of ideas, logical and coherent presentation





# Sample Paper 2 questions

## 乙部 應用生態學

回答試題的**所有**部分。將你的答案寫在其中**一本**答題簿內。

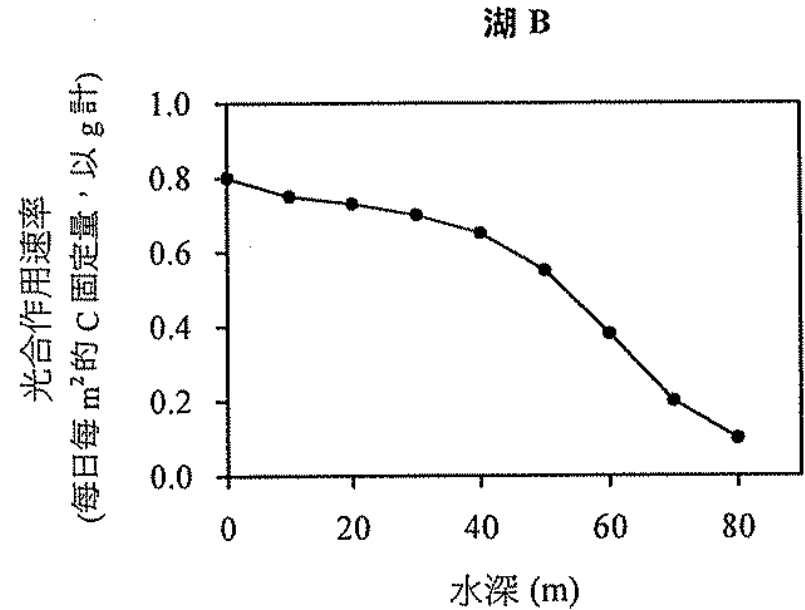
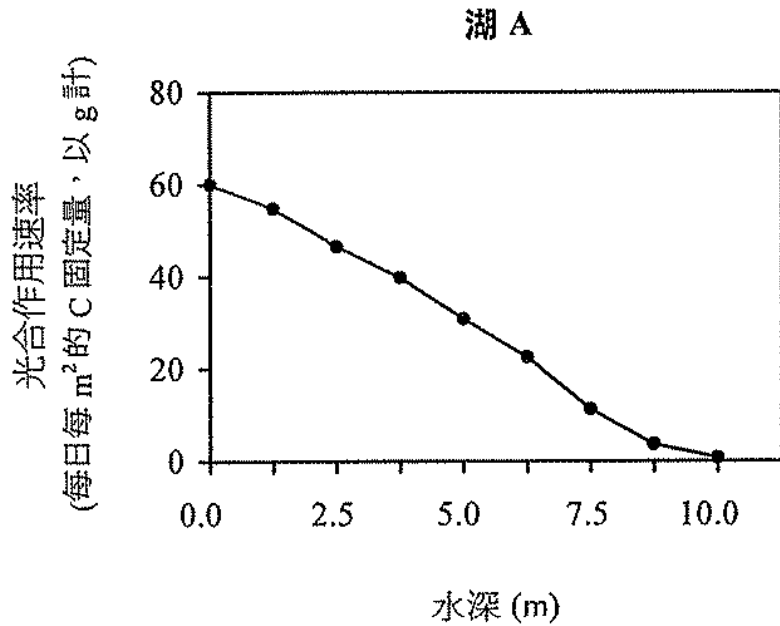
- 2.(a) 下表顯示於 1980 至 1987 年間，於大西洋的吞拿魚總漁穫和所有漁船用於捕捉吞拿魚的總日數，即捕撈力量。

年	總漁穫 ( $10^3$ 噸)	捕撈力量 ( $10^3$ 日數)	每日每單位捕撈力量 的漁穫 (噸)
1980	40	5	8.00
1981	45	8	5.63
1982	44	12	3.67
1983	60	20	3.00
1984	80	30	2.67
1985	85	35	2.43
1986	90	40	$x$
1987	100	60	$y$

- (i) 計算  $x$  和  $y$  的值，它們分別代表於 1986 和 1987 年的每單位捕撈力量的漁穫。 (1 分)
- (ii) 繪畫一幅曲線圖顯示 1980 至 1987 年間的每單位捕撈力量的漁穫。 (3 分)
- (iii) 參考你的曲線圖及以上數據，解釋由 1980 至 1987 年間每單位捕撈力量的漁穫的變化。 (3 分)
- (iv) 建議**兩項**捕魚的管制措施，並描述每項措施如何有助維持可持續的漁穫供應。 (4 分)



2.(b) 下圖顯示 A 和 B 兩個湖的光合作用速率隨着水深的變化。其中的一個湖受到從附近農地淋溶出來的化學肥料所污染。



- (i) 解釋湖 A 的光合作用速率隨着水深增加的變化。 (2 分)
- (ii) 哪個湖受到化學肥料污染？解釋你的答案。 (3 分)
- (iii) 哪個湖的溶解氧量較可能出現較大的晝夜變化？解釋你的答案。 (4 分)



# Features of exam papers

- Different question types
- Test understanding and application of knowledge, analysis, integration and evaluation
- Address 'scientific inquiry', 'STSE connections' and 'nature and history of biology'



# Sample papers

(now available on HKEAA website)

- [http://www.hkeaa.edu.hk/en/hkdse/Subject\\_Information/](http://www.hkeaa.edu.hk/en/hkdse/Subject_Information/)
- [http://www.hkeaa.edu.hk/tc/hkdse/Subject\\_Information/](http://www.hkeaa.edu.hk/tc/hkdse/Subject_Information/)



# External moderation of the sample papers

- By Cambridge International Examination (CIE)
- CIE's comments:
  - able to reflect the curriculum aims and assessment objectives adequately
  - of the right standard, with some easy questions allowing candidates to demonstrate their basic understanding and some challenging ones that offer opportunities for stretching the more able candidates
  - even balance between the demonstration of knowledge and understanding and higher order skills
  - some questions make similar cognitive demands as the UK A-level papers



# International recognition

- Sample papers sent to CIE for external moderation
- Benchmarking exercise with UCAS, NARIC and Australian Consulate is underway

