

Antibiotics

Mark Scheme 5

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Infectious disease
Sub Topic	Antibiotics
Booklet	Theory
Paper Type	Mark Scheme 5

Time Allowed : 24 minutes

Score : / 20

Percentage : /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

1 (a) one mark for each row

statement	hae	DNA	phospholipids	antibodies	
contains iron	✓	x		x	;
contains phosphate	x	✓	✓	x	
able to self-replicate	x	✓	x	x	;
hydrogen bonds stabilise the molecule	✓	✓	x	✓	;
contains nitrogen	✓	✓	✓	✓	;

[5]

(b) AVP answers must be in context to a watery external environment

ref to molecules held together / strong attraction / AW ;

A cohesion between water molecules

detail of hydrogen bonding, e.g. slight -ve charge on O, slight +ve charge on H ;

A water molecules are polar

high boiling point / boils at 100°C ;

high latent heat of vaporisation ;

so water is liquid over wide range of temperatures ;

(liquid so) provides, support / buoyancy ;

high (specific) heat capacity ;

stable temperature / temperature of water does not change quickly ;

large amount of energy needed to be transferred from water for it to freeze / high latent heat of fusion ;

maximum density at 4°C / less dense at 0°C ;

provides surface tension ;

ref solvent ;

AVP ;

AVP ;

e.g. ref to surface dwellers, less need for support tissue

stable habitat qualified, ref upwelling currents

ice floats / insulates

[5 max]

[Total: 10]

2 (a) (i) $700\,000/5\,400\,000 \times 100$; AW e.g. $6,100,000/5,400,000 = 112.96\% - 100 (= 12.96\%)$

13; **R** 12.96

1 mark for working, 1 mark for correct answer

[2]

(ii) (more red cells =) more haemoglobin;
more oxygen can be carried (per unit volume of blood);
at altitude the partial pressure of oxygen is, low/lower than at sea level;
A less oxygen at altitude **R** ref to lower Hb saturation
more red cells/more haemoglobin, compensates for lower saturation, of
haemoglobin; **A** affinity

[max 2]

(b) *phagocytes*

ingest/engulf/digest, bacteria; **R** destroy/kill/phagocytosis unqualified act as APC
(Antigen Presenting Cell) to stimulate B/T cell response;

[max 1]

T helper cells

secrete/release, cytokines/lymphokines;
to activate/stimulate B lymphocytes to produce plasma cells/antibodies/memory
cells, or stimulate/activate phagocytosis;

[max 1]

[2]

(c) resistance; **R** bacteria become immune
ref to selection of resistant bacteria;
antibiotic, can then not be used/are ineffective/no longer kill bacteria;
ref to multiple resistance;

R answers that suggest people become resistant

[max 2]

[Total: 8]

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