
COMBINED SCIENCE

5129/22

Paper 2 Theory

October/November 2017

MARK SCHEME

Maximum Mark: 100

Published

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Question	Answer	Marks
1(a)	$F = ma$ or $15 = 70 \times a$; 0.21 ;	2
1(b)	continuous line touching the flag to diver ; arrow in direction from flag to the diver ; correct refraction at surface of sea ;	3

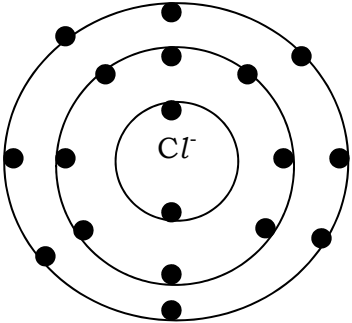
Question	Answer	Marks
2	narrower ; thicker ; away from ; oxygen ; lower ;	5

Question	Answer	Marks
3(a)	(average) mass of one <u>atom</u> of an element ; relative to one <u>atom</u> of carbon-12 ;	2
3(b)(i)	74 ;	1
3(b)(ii)	36 ; 2 ; 1.8 ;	3
3(c)	Universal Indicator ; blue ; or litmus ; blue ;	2

Question	Answer	Marks
4(a)(i)	ball changes direction ;	1
4(a)(ii)	it accelerates / its speed increases ; at a decreasing rate ;	2
4(a)(iii)	from >3.1 to < 3.4 ;	1
4(b)	slows down ; friction / air resistance ;	2

Question	Answer	Marks
5(a)	A = iris ; B = pupil ;	2
5(b)(i)	the pupil / B will become smaller ;	1
5(b)(ii)	reduces light entering the eye ; protects / prevents damage to the <u>retina</u> or <u>rods and cones</u> ;	2

Question	Answer	Marks
6(a)	giant lattice ; particles vibrating ;	2
6(b)	any two from <ul style="list-style-type: none"> • (copper) conducts electricity when solid ; • (copper is) malleable ; • copper is insoluble in water ; 	2

Question	Answer	Marks
6(c)(i)		1
6(c)(ii)	it is stable ; because outer / valence shell (of electrons) is full / complete ;	2

Question	Answer	Marks
7(a)(i)	$w = F \times d$ or 300×8 ; 2400 ;	2
7(a)(ii)	$E = ItV$ or $E = 10 \times 25 \times 12$; 3000 ;	2
7(a)(iii)	600 ;	1
7(b)	risk of fire / melting (of cables / insulation) ;	1

Question	Answer	Marks
8(a)(i)	16 27.7–28 ;	1
8(a)(ii)	57 or 58 ;	1
8(a)(iii)	upper mesophyll cell / palisade cell ;	1

Question	Answer	Marks
	any two from <ul style="list-style-type: none"> • as it has <u>most</u> or <u>more</u> chloroplasts / chlorophyll ; • can capture / absorb / trap <u>more</u> light / energy ; • <u>more</u> photosynthesis occurs ; 	2
8(b)	any one from <ul style="list-style-type: none"> • waterproofs the leaf ; • protects (the other leaf cells) / protection ; • reduce transpiration ; • prevent water loss ; 	1

Question	Answer	Marks
9(a)	yeast ; 25–40°C ; oxidation ; fractional distillation ;	4
9(b)	2 2 ;	1
9(c)	$ \begin{array}{ccccccc} & & \text{H} & & \text{H} & & \\ & & & & & & \\ \text{H} & - & \text{C} & - & \text{C} & - & \text{O} - \text{H} ; \\ & & & & & & \\ & & \text{H} & & \text{H} & & \end{array} $	1

Question	Answer	Marks
10(a)	15 mm ;	1
10(b)	$M = f \times d$ or 25×5 ; 125 ; Ncm ;	3
10(c)	$V = m / d$ or $120 = V \times 7.9$; 15.2 ;	2

Question	Answer	Marks
11		5

Question	Answer	Marks
12(a)	V = potassium oxide ; W = carbon ;	2
12(b)	oxidised reduced ;	1
12(c)	filtration ;	1
12(d)(i)	11–14 ;	1
12(d)(ii)	decreases ;	1

Question	Answer	Marks
13(a)	any one from <ul style="list-style-type: none"> • x-ray ; • gamma ; 	1
13(b)(i)	$c = 3 \times 10^8$; any three from	1
13(b)(ii)	$v = f\lambda$ or $v = f \times 1.0 \times 10^{-7}$; 3×10^{15} ;	2

Question	Answer	Marks
14(a)	any one from <ul style="list-style-type: none"> • protein ; • (biological) catalyst ; • has an optimum temperature ; • has an optimum pH ; • substrate specific ; 	1

Question	Answer	Marks
14(b)	C = liver ; D = ileum ; E = colon ;	3
14(c)	stomach ; liver ; pancreas / salivary gland ;	3
14(d)	any two from <ul style="list-style-type: none"> • glucose converted to glycogen ; • glycogen stored in liver cells ; • glucose respired / broken down to release energy ; • glucose metabolised by liver ; 	2

Question	Answer	Marks
15(a)	any two from <ul style="list-style-type: none"> • use oxygen ; • produce carbon dioxide ; • produce energy ; • produce water ; 	2
15(b)(i)	petroleum ;	1
15(b)(ii)	contain carbon to carbon single bonds ;	1

Question	Answer	Marks
16(a)(i)	tongs ;	1
16(a)(ii)	point source away from people ;	1
16(a)(iii)	alpha (particle) ;	1
16(b)	place absorber between source and detector ; measure the count rate ; use of different absorbers / named absorbers ;	3

Question	Answer	Marks
17	any three from <ul style="list-style-type: none"> • vitamins ; • minerals ; • water ; • fibre ; 	3

Question	Answer	Marks
18(a)	silver ; copper nitrate ;	2
18(b)	aluminium zinc copper silver ;	1