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**COMBINED SCIENCE**

**0653/33**

Paper 3 Core Theory

**October/November 2017**

MARK SCHEME

Maximum Mark: 80

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**Published**

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This document consists of **10** printed pages.

Question	Answer	Marks
1(a)	xylem ; mesophyll cells ; stomata ;	<b>3</b>
1(b)	any two from photosynthesis ; transport of ions ; support / turgor ; AVP ;	<b>max 2</b>
1(c)	ions / named ion ; soluble nutrients / named soluble nutrient ; hormones / named hormone ; carbon dioxide ; AVP ;	<b>max 2</b>
1(d)(i)	transport of oxygen ;	<b>1</b>
1(d)(ii)	to replace iron lost during menstruation / period ;	<b>1</b>
1(d)(iii)	feeling tired / dizzy ;	<b>1</b>

Question	Answer	Marks
2(a)(i)	Any two from electrical conductor ; thermal / heat conductor ; malleable ; ductile ; sonorous ;	<b>max 2</b>
2(a)(ii)	high density / high melting point / coloured compounds ;	<b>1</b>
2(b)(i)	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; padding: 5px; margin: 0 10px;">(iron)</div> <div style="margin: 0 10px;">+</div> <div style="border: 1px solid black; padding: 5px; margin: 0 10px;">sulfuric acid</div> <div style="margin: 0 10px;">→</div> <div style="border: 1px solid black; padding: 5px; margin: 0 10px;">iron sulfate</div> <div style="margin: 0 10px;">+</div> <div style="border: 1px solid black; padding: 5px; margin: 0 10px;">hydrogen</div> </div> ;	<b>1</b>
2(b)(ii)	(anion) chloride ; (acid) hydrochloric (acid) ;	<b>2</b>
2(c)	number of protons in an atom / nucleus ;	<b>1</b>

Question	Answer	Marks							
3(a)	(Q =) friction / (water) resistance ; (R =) gravitational force / weight ;	<b>2</b>							
3(b)	(forces P and R) equal / balanced ;	<b>1</b>							
3(c)(i)	P / uplift ;	<b>1</b>							
3(c)(ii)	<table border="1"> <tr> <td>gamma</td> <td></td> <td></td> <td>visible light</td> <td></td> <td>micro- waves</td> <td>radio waves ;</td> </tr> </table>	gamma			visible light		micro- waves	radio waves ;	<b>1</b>
gamma			visible light		micro- waves	radio waves ;			
3(c)(iii)	sound ;	<b>1</b>							
3(d)	nuclear / batteries ;	<b>1</b>							
3(e)	either $30 \text{ km} = 30\,000 \text{ m}$ or $1 \text{ hour} = 3600 \text{ s}$ ; $(30\,000 / 3600) = 8.3 \text{ m/s}$ ;	<b>2</b>							

Question	Answer	Marks
4(a)	<b>A</b> oesophagus ; <b>B</b> colon / large intestine ;	<b>2</b>
4(b)(i)	stomach ; <b>any two</b> from stomach has acidic conditions ; pH 2 is acidic ; enzyme only worked in tube 1 / tube 1 was acidic / at the optimum pH ;	<b>max 3</b>
4(b)(ii)	enzyme will become inactive / destroyed at this temperature ;	<b>1</b>
4(b)(iii)	large / protein molecules are broken down ; by the action of an enzyme / acid ;	<b>2</b>
4(b)(iv)	chewing food (in mouth) ;	<b>1</b>

Question	Answer	Marks
5(a)(i)	distillation ;	1
5(a)(ii)	decrease ;	1
5(b)	(filtration) remove (named) solids ; (chlorination) kill microbes / bacteria / sterilizes ;	2
5(c)(i)	(refinery gas) bottled gas / heating / cooking ; (gas oil) diesel fuel / diesel engines / diesel vehicles ;	2
5(c)(ii)	compound / molecule containing hydrogen and carbon ; only (C and H);	2
5(d)(i)	<b>A F</b> ;	1
5(d)(ii)	<b>B</b> ;	1

Question	Answer	Marks
6(a)	temperature at which a solid changes to a liquid <i>owtte</i>	<b>1</b>
6(b)(i)	conduction <b>and</b> convection ;	<b>1</b>
6(b)(ii)	(reduces convection) as no (gas) circulation (possible) <i>owtte</i> ; (reduces conduction) as foam is a bad conductor <i>owtte</i> ;	<b>2</b>
6(c)	infra-red	<b>1</b>
6(d)	$d = m/V = (1900/2000)$ ; $= 0.95 \text{ (g/cm}^3\text{)}$ ;	<b>2</b>

Question	Answer	Marks
7(a)	transpiration ;	1
7(b)(i)	<u>carbon dioxide</u> from the air ; is used in photosynthesis / reacts with water ;	2
7(b)(ii)	by respiration ; carbon dioxide released ;	2
7(c)	<i>rainfall reduced (no mark)</i> less water being transpired / evaporated from trees ;	1
7(d)	soil easily eroded ; due to lack of tree roots ;	2

Question	Answer	Marks
8(a)(i)	(left) cathode ; (right) anode ;	<b>2</b>
8(a)(ii)	orange / brown gas ;	<b>1</b>
8(b)	(reduced) oxygen is removed ;	<b>1</b>
8(c)	K Ca Mg Cu ; ;	<b>2</b>
8(d)(i)	any two from heat / increase temperature ; increase surface area of magnesium ; increase concentration of acid ; use / add a catalyst ;	<b>2</b>
8(d)(ii)	magnesium chloride ;	<b>1</b>
8(d)(iii)	filter / filtration ;	<b>1</b>

Question	Answer	Marks
9(a)	<div> </div> <p>           motor in parallel with headlamps ;            variable resistor in motor branch, correct symbol ;            switch for headlamps after motor branch, before first headlamp branch ;            all wires required for complete circuit ;         </p>	<b>4</b>
9(b)	(decreasing resistance) increases current (so faster motor) ;	<b>1</b>
9(c)	in parallel ; the same as ; less than ;	<b>3</b>
9(d)	rain / water / damaged insulation / AVP ; protect from rain or water / use of protective cover / sensible suggestion related to hazard identified ;	<b>2</b>