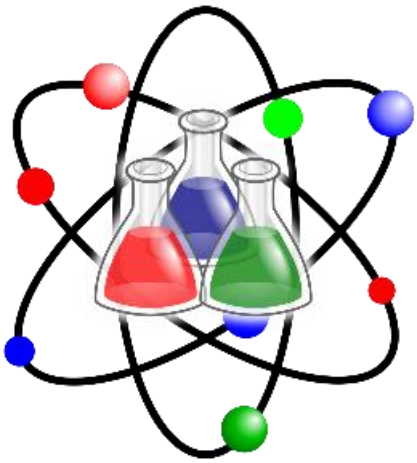
Edge Hill University

Standalone Test
Revision Support



Science GCSE
Equivalency Exam

Version: 8 September 2021 / Series B

Contents

Introduction

Edge Hill University

Thank you for choosing Edge Hill University for your equivalency test. As a leading university, we are dedicated to creating opportunity from knowledge – a philosophy that drives our teaching, our academic research, and our commitment to providing you with a great student experience leading to a rewarding career.

The University provides a package of targeted support to applicants and students, aimed at ensuring that individuals with the capacity to benefit from higher education can come to university, stay at university and take advantage of opportunities while they study.

We are continually recognised for our outstanding achievements in student support, graduate employment and innovation, as well as our significant role in transforming lives. Join us, and you will be studying on one of the best campuses in UK higher education, as part of a unique and welcoming academic community.

Standalone Equivalency Exams

This information pack is designed to support your revision in preparation for the exam. It is not designed to emulate the exams in any way.

The Edge Hill equivalency tests offer you the opportunity to demonstrate that you satisfy our entry requirements for GCSE English, GCSE Mathematics and GCSE Science at Grade C or Grade 4 or above for most of our programmes, excluding Medicine.

Standalone tests allow you to revise at home, before booking to sit your exam on selected dates throughout the year at either Edge Hill University or Holy Cross College in Bury.

Once you have booked and paid for the test, you can revise at your own pace. However, we do ask that you make at least one attempt at the chosen exam within one year of payment. Refunds can be requested either within 1 year of payment, or prior to attempting the exam (whichever of these is the earliest). This applies to standalone exams only.

Please be aware that Edge Hill University Equivalency Exams are designed to meet the GCSE requirements for Edge Hill University only. Other institutions or governing bodies may accept them, however, it is important that you check with your chosen training provider that this equivalent exam will be accepted. If any issues arise please pass your details and the provider's details to edgehilltests@edgehill.ac.uk and we can provide copies of our exam specification.

This specification is for the GCSE Science Equivalency Test.

Why choose Edge Hill University Equivalency Programmes?

Value for Money

- Past papers are posted to you free of charge.
- We provide high quality, professionally written, GCSE equivalency exams which are well supported and professionally administered.
- Exams are professionally assessed, and results are returned promptly, generally within two - four weeks.
- We offer our candidates a range of exam dates advertised in advance, both on campus at Edge Hill University, or at Holy Cross College in Bury, Greater Manchester.
- We also offer tutor-led revision courses to support candidates.
- Candidates have two further opportunities to resit their exam if they are unsuccessful in the first instance.
- Our charges cover our costs and are lower than most other providers.

Our expertise

- The Edge Hill Equivalency Tests team have been offering equivalency examinations to help students progress on to degree programmes for over 20 years. We are part of the Access Programmes Team, enabling access to university by offering equivalency tests and revision support. Plus, delivery of Edge Hill's highly successful 'Fastrack' access programme which provides a free entry route for people lacking the necessary qualifications, study skills and confidence to enter higher education directly.
- Our equivalency tests team is made up academic tutors, former teachers and university admissions staff; we know how to best assist applicants through this process.
- Academic professionals write and deliver our equivalency programmes, including professional examiners and trained exam invigilators.
- All examinees are ID checked by staff with compliance training.

Customer Service

- The Equivalency Tests team are available Monday-Friday, 9am-5pm, to support candidates with any queries.
  You can call 01695 657148
  Or email edgehilltests@edgehill.ac.uk.

Security and Accountability

- Banks of exams in each subject are regularly rotated to ensure examinees sit fresh exams.
- Completed exams, marking schemes, profiles of markers and evidence of specific learning difficulties (where relevant) are kept secure for five years before being disposed of in accordance with standard University procedure.

Purpose of study

The GCSE Science equivalency test will allow students to be awarded an equivalent qualification for entry onto most Edge Hill University degree programmes (excluding Social Work), where GCSE Science is included in the entry requirements.

Exam Specification at a glance

Candidates study at **Foundation Level** and could potentially achieve a Grade 5 equivalent as a maximum level of attainment. You must achieve at least 50% to pass the GCSE Science equivalency test with a Grade 4 equivalent.

The topics covered in the GCSE Science equivalency exam are as follows:

Biology

Cell Biology
Tissues, Organs and Organ system.
Infection and Response
Bioenergetics
Homeostasis
Inheritance, Variation and Evolution
Ecology

Chemistry

Atoms and the Periodic Table
Bonding, Structure and the properties of matter
Chemical Changes
Energy Changes
Rates of Reaction
Organic Chemistry
Chemical analysis

Physics

Energy
Electricity
The Particle Model
Atomic Structure
Waves
Electromagnetism

GCSE Science Equivalency Test

Assessment Format

- Written exam, 2 hours and 30 minutes in duration.
- The paper will have three sections related to the three science disciplines: Biology, Chemistry and Physics.
- 100 marks available.
- Candidates must achieve at least 50% to pass the exam.
- 50% = Grade 4 equivalent (previously Grade C, standard pass).
- 65% = Grade 5 equivalent (previously Grade B).

A range of question types will be used, including multiple choice, short answer and those that require extended responses. Extended responses may be prose, extended calculations, or a combination of both, as appropriate to the question.

There is no practical component to the Science equivalency test.

How the new numbered grades compare with the older lettered grades:

Old grades	New grades
A*	9
	8
A	7
B	6
	5
C	4 STANDARD PASS
D	3
E	2
F	1
G	
U	U

Scheme of Assessment

Candidates sit a standalone test, designed for the syllabus to be studied at home with a written examination taken within 12 months of registration. Candidates are sent a revision pack containing guidance and past papers to support their revision. GCSE equivalency exams are available 12 months per year on advertised dates: https://www.edgehill.ac.uk/tests

See “Resits and shelf life” in the General Administration section.

There is also the option to attend either a 12-week revision course (12 x 3 hour tutor-led sessions) or a 4 week revision course (4 x 3 hour tutor led sessions) followed by an exam on a pre-arranged date.

All materials are available in English only. See “Access Arrangements” for details of our provision for candidates with additional needs.

Aims

Scientific understanding is changing our lives and is vital to the world’s future prosperity. All candidates should have the knowledge to enable them to develop curiosity about the natural world, insight into working scientifically, and appreciation of the relevance of science to their everyday lives, so that they:

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.
- Develop and learn to apply observational, practical, modelling, enquiry and problem-solving skills, both in the laboratory, in the field and in other learning environments.
- Develop their ability to evaluate claims based on science through critical analysis of the methodology, evidence and conclusions, both qualitatively and quantitatively.

Assessment Objectives

We follow the assessment objectives set by The Office of Qualifications and Examinations Regulation (**Ofqual)** which are applied to all GCSE Science specifications and all exam boards. Therefore, the exam will measure how candidates have achieved the following assessment objectives:

AO1	Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures.
AO2	Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.
AO3	Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.

Working Scientifically: Skills Descriptors

Working scientifically is the sum of all the activities that scientists do. Candidates should be able to:

Development of scientific thinking	
WS 1.1	Understand how scientific methods and theories develop over time.
WS 1.2	Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts.
WS 1.3	Appreciate the power and limitations of science and consider any ethical issues which may arise.
WS 1.4	Explain everyday and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments.
WS 1.5	Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences.
WS 1.6	Recognise the importance of peer review of results and of communicating results to a range of audiences.
Experimental skills and strategies	
WS 2.1	Use scientific theories and explanations to develop hypotheses.
WS 2.2	Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena.
WS 2.3	Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment.
WS 2.4	Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations.
WS 2.5	Recognise when to apply a knowledge of sampling techniques to ensure any samples collected are representative.
WS 2.6	Make and record observations and measurements using a range of apparatus and methods.
WS 2.7	Evaluate methods and suggest possible improvements and further investigations.

Analysis and evaluation	
WS 3.1	Presenting observations and other data using appropriate methods.
WS 3.2	Translating data from one form to another.
WS 3.3	Carrying out and represent mathematical and statistical analysis.
WS 3.4	Representing distributions of results and make estimations of uncertainty.
WS 3.5	Interpreting observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions.
WS 3.6	Presenting reasoned explanations including relating data to hypotheses.
WS 3.7	Being objective, evaluating data in terms of accuracy, precision, repeatability and reproducibility and identifying potential sources of random and systematic error.
WS 3.8	Communicating the scientific rationale for investigations, methods used, findings and reasoned conclusions through paper-based and electronic reports and presentations using verbal, diagrammatic, graphical, numerical and symbolic forms.
Scientific vocabulary, quantities, units, symbols and nomenclature	
WS 4.1	Use scientific vocabulary, terminology and definitions.
WS 4.2	Recognise the importance of scientific quantities and understand how they are determined.
WS 4.3	Use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate.
WS 4.4	Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano).
WS 4.5	Interconvert units.
WS 4.6	Use an appropriate number of significant figures in calculation.

General Administration

Further information about our range of equivalency programmes can be found at www.edgehill.ac.uk/tests

Equivalency Tests

Edge Hill University Equivalency Exams are designed to meet the GCSE requirements for Edge Hill University only. Candidates are advised that other institutions or governing bodies may accept them, however, it is the candidates' responsibility to check that this equivalent exam will be accepted.

Awarding grades and reporting results

These tests are designed and delivered by the Access Programmes Team at Edge Hill University and are not validated through a national examination body.

Candidates who are successful in passing the exam receive a certificate from Edge Hill University. We will post your certificate to your registered address within 10 working days. You must notify us within 15 working days if you haven't received the certificate, otherwise, after this time there will be a charge.

It is the candidate's responsibility to inform Edge Hill Tests of a change of address. Please contact us if you have changed address since registering for your test so that we can send your certificate to the correct location.

Resits and shelf life

Candidates have two further opportunities to resit their exam if they are not successful in the first instance. We have three papers available for each subject and you must not sit the same paper twice or it will void your exam.

Candidates are informed that they must keep their certificate safe; after five years we cannot guarantee that we will be able to retrieve their results and confirm that they sat and passed an equivalency test at Edge Hill University. If candidates lose their certificate or require a replacement, the charge is £5.

Previous learning and prerequisites

The 12-week courses require some prior subject knowledge (i.e. they are not suitable for complete beginners). The 4-week courses are suitable if the candidate has a sufficiently advanced level of existing subject knowledge and understanding to not require the longer 12-week programme.

Standalone GCSE tests are for candidates who are not able to join one of our equivalency courses, or feel that, with some self-revision, their subject knowledge is already sufficient.

Access Arrangements

We make reasonable adjustments to the exam format to meet the requirements of our candidates with additional needs.

We ask candidates who have a disability or a specific learning difficulty to speak to us in advance so that we can discuss their requirements and make the arrangements. In certain circumstances, this may mean arranging a private exam. Candidates are asked to contact the Equivalency Tests Team to provide evidence of a specific learning requirements, such as an educational Psychology Report or Needs Assessment, **at least five working days prior to the exam date**. It is not possible to guarantee being able to meet requests made on the day of the test.

We are unable to approve extra time in exams for candidates on the basis that English is their second language. All candidates must be assessed according to the same marking criteria and following the same regulations, so that grades and certificates have the same validity.

Access Programmes Team

Janet Fairclough - Access Programmes Manager
Anne-Marie Kennedy – Pre-Entry Advice and Guidance Officer
Lindsey Tetlow – Senior Admissions Administrator (Access Programmes)
Joanne Williams – Admissions Assistant
Vicki Guttridge – Admissions Assistant

Contact Us

You can visit our website for information about all of our equivalency programmes: www.edgehill.ac.uk

The Equivalency Tests team are available Monday-Friday, 9am-5pm.

If you have any queries about equivalency tests, please get in touch:
T: 01695 657148
E: edgehilltests@edgehill.ac.uk

Your GCSE Science Equivalency Exam

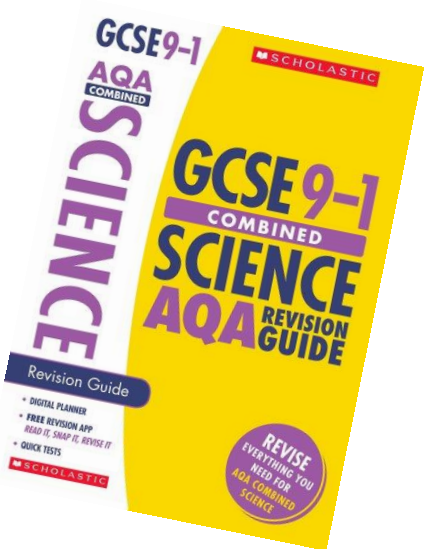
Revision Guidance

This information pack contains a list of the topics which you will need to revise for your exam, as well as exam preparation information and practise papers. The pack is designed to support your revision in preparation for your equivalency exam, but it is not designed to emulate the exams in any way.

You will need to use additional revision materials.

Text books:

The suggested text book for this programme is the GCSE 9-1 Combined Science Revision Guide for AQA produced by Scholastic.
You can search online for the book using the ISBN number: 9781407176819.



When using the book, avoid any content that is highlighted as “Higher tier”. You are studying at Foundation level.

Other GCSE level textbooks may be used, however, some of the topics may not be included, as many books are produced for specific exam specifications.

All subjects require basic mathematical skills, such as the ability to read graphs and calculate percentages.

Online:

The BBC GCSE Bitesize website is also a useful resource for many of the topics:
https://www.bbc.co.uk/bitesize/subjects/zp266yc

You should follow the advice given to AQA Trilogy candidates:

Biology:
https://www.bbc.co.uk/bitesize/topics/zthssrd

Chemistry:
https://www.bbc.co.uk/bitesize/topics/z88jjty

Physics:
https://www.bbc.co.uk/bitesize/topics/zqw77p3

Exam Preparation

Please take time before each exam to read the instructions on the front of the exam paper.

GCSE Science equivalency standalone test:

- 2 hours and 30 minutes in duration
- 1 paper with three sections: Biology, Chemistry and Physics

You much achieve at least 50% to pass the test.

50% = Grade 4 equivalent
65% and above = Grade 5 equivalent

What to bring with you:

You will need to bring photo ID to register for the exam.

Acceptable ID includes: passport, driving license, recognised age ID card, residential permit, student or NUS Card.

If you have recently changed your name you must bring additional evidence such as a change of name document or marriage certificate. If you feel your name has not been registered correctly please contact us prior to the exam.

GCSE Science:

- A blue/black pen.
- You can bring and use a scientific calculator.
- You will be given a copy of the periodic table.

Receiving Results

Please allow at least 4 weeks for your paper to be marked.

Unless otherwise requested, candidates will initially be informed of results by telephone. If you are successful in passing the exam, confirmation will also be made in writing and posted to your registered address.

Contact

The Equivalency Tests team are available Monday-Friday, 9am-5pm.

If you have any queries about equivalency tests, please get in touch by calling 01695 657148 or emailing edgehilltests@edgehill.ac.uk

On the Day of Your Exam

Please read the following information carefully, as it contains important information about the terms and conditions of Edge Hill University Standalone Equivalency Exams.

Arriving for your exam

You have been asked to arrive 30 minutes before the start of the exam for registration. This will allow us time to register everyone. Please wait outside the exam room until registration begins.

If you arrive 0-15 minutes after the start of the exam, you will be able to sit your test, but you will not be given any extra time.

If you arrive more than 15 minutes after the start of the exam, you will be refused entry and advised to re-book your test; this will not count as one of your attempts.

Please wait outside the exam room until registration begins.

Registration and Identification Checks

All examination candidates must bring a photo ID document to register for the exam. Acceptable ID includes: passport, driving licence, recognised age ID card, residential permit, student or NUS Card. The ID must contain a visible name and a photograph with a clear resemblance to the candidate sitting the examination. If you have recently changed your name you must bring additional evidence such as a change of name document or marriage certificate. If you feel your name has not been registered correctly please contact us prior to the exam.

The Invigilator in the examination venue will check each candidate's ID in advance of the exam. If an invigilator has any doubts over the validity of a candidate's ID, or if the candidate has not brought their ID or any other form of photographic identification with them to the examination, the candidate will still be allowed to sit the examination, however, they will be required to take a photograph of themselves on the day of the exam and email it to edgehilltests@edgehill.ac.uk along with a photograph of a valid ID document.

Edge Hill University acknowledges that some examination candidates will choose to wear religious dress, for example: turbans and hijabs/veils. It may be necessary, for the purposes of identification before an examination, to ask a student to remove any garment that obscures their identity. In the case of a female student who is asked to remove a veil in order for the Invigilator to confirm their identity, an appropriate female member of staff will accompany the student to a private area where they can remove their veil to enable identification to take place. This may also apply to face masks if it is difficult to match the photo ID document to the exam candidate.

Invigilators

The role of the invigilators is to supervise your exam and make sure your exams take place according to the rules and that the rules are applied fairly. You must follow any instructions given by an invigilator. It is your responsibility to listen to and follow these instructions.

If anything unexpected happens to you during an exam, such as feeling unwell, you should notify the invigilator immediately.

Additional Needs

We are happy to make reasonable adjustments to the exam format in order to meet the requirements of our candidates with additional needs.

All venues are accessible. However, if you have a disability or a specific learning difficulty, we do recommend that you speak to us in advance so that we can discuss your requirements and to allow us time to make the arrangements. In certain circumstances, this may mean you need to sit the exam on an alternative date.

Please contact the Equivalency Tests Team to let us know and provide evidence **at least five working days prior to the exam date**. It is not possible to guarantee being able to meet requests made on the day of the test.

Please contact edgehilltests@edgehill.ac.uk with evidence of your specific learning requirements such as an educational Psychology Report or Needs Assessment, or call 01695 657148 if you wish to discuss anything.

Your conduct

Improper conduct and actions that cause a disturbance during an exam are considered malpractice. They are unfair for other candidates and penalties often include losing marks or having your exam entry cancelled.

Examples of malpractice by candidates include:

- Pretending to be someone else or getting someone else to attempt to sit an exam for you.
- Disruptive behaviour in the exam room.
- Using rude, abusive, offensive or discriminatory language or images in your answer booklet.
- Copying from another candidate.
- Using any material or aids that would give you an unfair advantage in the exam.

Rules

It is important that you follow the test rules, to make sure that everyone has a fair and equal chance of doing their best work:

- When you enter the exam room you are under **exam conditions**; you must be silent, you must not communicate with anyone else in the room, or disturb other candidates.
- **All personal belongings** and any revision materials should be stored under your chair or table and out of your / your fellow candidates' line of vision.
- Mobile phones and web enabled devices must be switched OFF, put inside the **clear plastic bag** provided and placed on top of your desk for the duration of the exam. Phones cannot be used as calculators or timing devices.
- Any pencil cases should be clear plastic if they are on top of your desk.
- **Water** can be brought into the exam room in clear bottles.
- If you require any assistance during the exam, please raise your hand and wait for the invigilator to approach you.
- **You cannot eat food**, unless you have notified us of a medical condition.
- If you need to visit the bathroom during the exam, you cannot take any exam materials including stationery with you. Additional time is not allowed for such breaks (unless specified under an additional needs report).
- Dictionaries/ thesauruses are not permitted in any exam.

Question papers and answer booklets

It is important to read the instructions on the front of your exam paper. Make sure you follow them carefully and note the duration of your exam.

If you need extra paper, you should raise your hand and ask the invigilator.

You must complete your details legibly on the front of the question paper or answer booklet. If using extra paper, remember to write your name and the exam date on each sheet and put these inside your answer booklet.

Work through your question paper until you see the statement END OF EXAM. There will be nothing else you need to answer after this.

Writing your answers

You must use a pen with black or blue ink and it is important that you write legibly. Markers will do their best to read your work, but they might not be able to award marks if your writing is difficult to read.

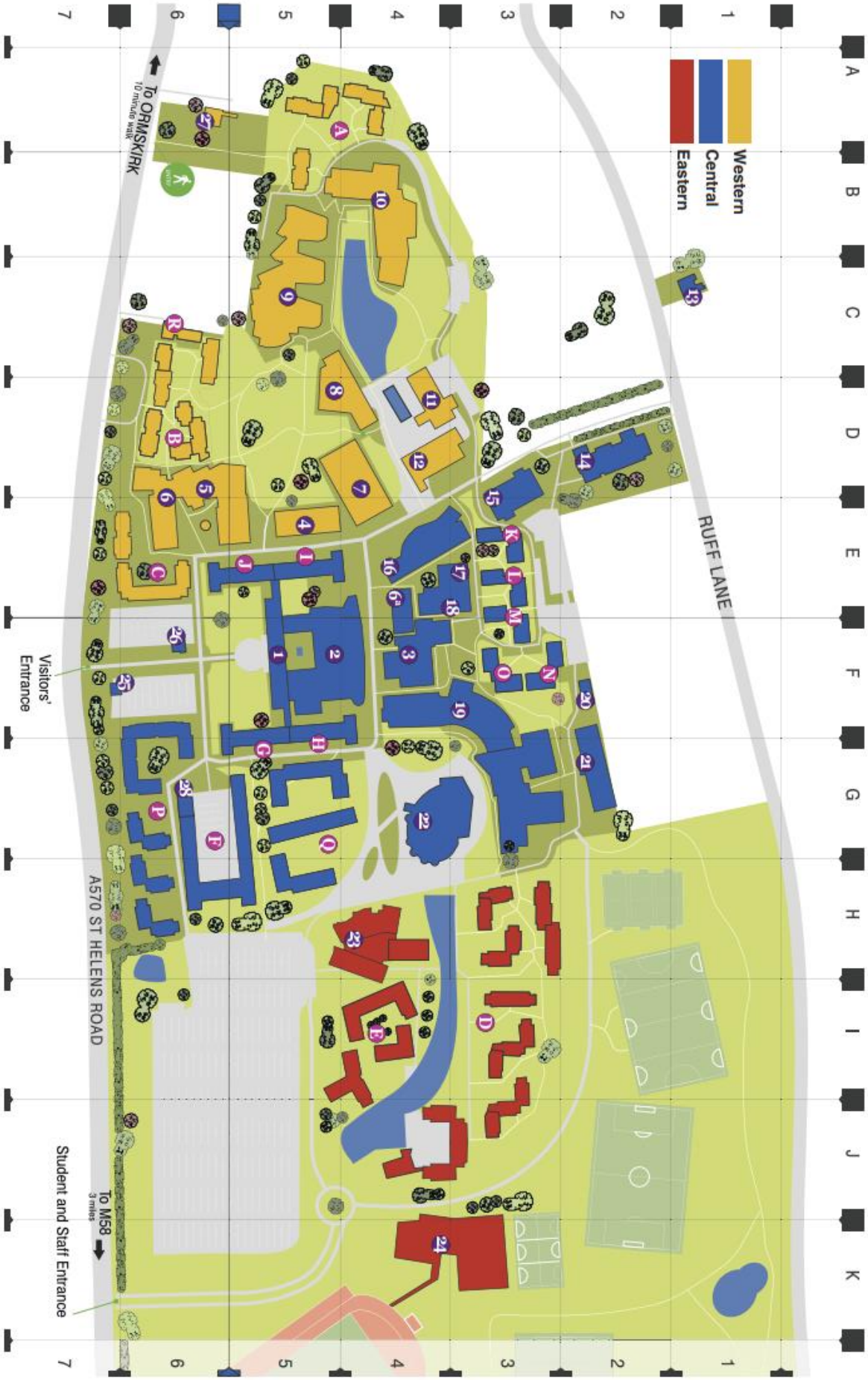
In some subjects, poor spelling and punctuation could also result in marks not being awarded. Remember to cross out any rough work or unwanted answers if you make more than one attempt at a question.

Leaving the exam room

You can leave the exam if you finish early, but please be considerate of other candidates who may still be working. Please be aware that talking outside of the exam room can be very distracting.

All exam papers, scrap paper and answer booklets must be handed in at the end of the exam. You could lose all marks for the paper concerned if you do not give your answer booklet to the invigilator before leaving the exam room, or when requested.

Edge Hill University, Ormskirk



BUILDING LOCATIONS

	Number	Grid
BioSciences	15	D3
Business School	16	E4
Catalyst	22	G4
Creative Edge	23	H4
Durning Centre	21	G2
Faculty of Education (Lakeside)	10	B4
Faculty of Education (Piazza)	11	D4
Faculty of Education (Professional Learning)	17	E3
Faculty of Health, Social Care and Medicine	9	C5
GeoSciences	12	D4
Health and Wellbeing Centre, Milton House	13	C1
Police Training and Simulation Facility	27	A6
Laurels	20	F2
Law and Psychology	7	E4
Lodge	25	F6
Magnolia	28	G6
Clinical Skills and Simulation Centre	8	D4
Old Gym	18	E3
Performing Arts	6	E6
Main Reception	1	F5
Security and Customer Information Centre	26	F6
Sport and Physical Activity Building (Wilson Centre)	19	F4
Student Administration Centre	4	E5
The Hub	2	F5
Students' Union	3	F4
Tech Hub	14	D2
The Arts Centre	5	E6
The Sports Centre	24	K4

Department	Building	Number	Grid
Academic Registry	Student Administration	4	E5
Academic Quality and Development Unit	Main Building (Clough)	1	F5
Accommodation Office (Student Services)	Catalyst	22	G4
Admissions	Student Administration	4	E5
Arts Centre	The Arts Centre	5	E6
Biology, Department of	BioSciences	15	D3
Business School	Business School Building	16	E4
Capital Projects	Durning Centre	21	G2
Careers Centre	Catalyst	22	G4
Chaplaincy Service	Students' Union	3	F4
Computer Science, Department of	Tech Hub	14	D2
Confucius Institute	The Lodge	25	F6
Corporate Communications	Main Building	1	F5
Course Enquiries	Student Administration	4	E5
Deliveries	Durning Centre	21	G2
Directorate	Main Building	1	F5
Education, Faculty of	Faculty of Education (Lakeside)	10	B4
Education: Early Years Children, Education and Communities	Faculty of Education (Lakeside)	10	B4
Education: Professional Learning	Faculty of Education (Professional Learning)	17	E3
Education: Secondary, Further Education Education programmes	Faculty of Education (Piazza)	11	D4
English, History and Creative Writing	Main Building (Clough)	G	G6
Facilities Management	Durning Centre	21	G2
Faith and Reflection Room	Magnolia	28	G6
Finance Office	Main Building (Lady Margaret)	J	E5
Geography, Department of	GeoSciences	12	D4
Graduate School	Main Building (Stanley)	H	G5
Hale Hall	Main Building (Hub)	1	F4
Health, Social Care and Medicine, Faculty of	Health, Social Care and Medicine	9	C5
Health and Wellbeing Centre	Milton House	13	C1
Human Resources	Main Building (Lady Margaret)	J	G6
International Office	Law and Psychology	7	E4
IT Services	Durning Centre	21	G2
Language Centre	Law and Psychology	7	E4
Law and Criminology, Department of	Law and Psychology	7	E4
Library	Catalyst	22	G4
Media, Department of	Creative Edge	23	H4

Department	Building	Number	Grid
Medical School	Clinical Skills and Simulation Centre	8	D4
Performing Arts, Department of	The Arts Centre	5	E6
Performing Arts, Department of	Performance Studio	6a	E4
Psychology, Department of	Law and Psychology	7	E4
Reception	Main Building	1	F5
Research Office	Business School	16	E4
Security	Security and Customer Information Centre	26	F6
Social Sciences, Department of	Creative Edge	23	H4
Sport and Physical Activity, Department of	Sport and Physical Activity	19	F3
Strategic Planning and Policy Unit	Student Administration	4	E5
Student Experience	Student Administration	4	E5
Student Financial Support	Catalyst	22	G4
Student Recruitment and Marketing	Student Administration	4	E5
Student Services	Catalyst	22	G4
Students' Union Bar	The Street	3	F4
Students' Union Office	The Hub	2	F4
Sports Centre	Sports Centre	24	K4
Teaching and Learning Development Unit	The Lodge	25	F6
Vice-Chancellor's Office	Main Building	1	F5
Food, Drink and Shopping			
Café Rewind	Health, Social Care and Medicine	9	C5
53.3° North	Catalyst	22	G4
Starbucks (We Proudly Brew)	Student Hub	2	E4
Grab and Go Snack Bar	Student Hub	2	F4
McColl's (Shop)	Student Hub	2	F4
Students' Union Bar	Students' Union	3	F4
Students' Union Shop	Students' Union	3	F4
Subway™	Students' Union	3	F4
The Red Bar	The Arts Centre	5	E6
Roots	Faculty of Education (Lakeside)	10	C4
Cashpoints (ATM)	The Hub	2	E4
	Security and Customer Information Centre	26	F6

Download the **Edge Hill Uni Virtual Tour App** to explore the campus yourself:

GET IT ON Google Play

Download on the App Store

HALLS OF RESIDENCE

A	Graduates Court A4, A5, B5	F	Forest Court G6	K	Eleanor Rathbone E3	P	Palatine Court G6
B	Founders West C6 - D6	G	Clough G5	L	Lady Openshaw E3	Q	Woodland Court G5 - H5
C	Founders East E6	H	Stanley G5	M	Katherine Fletcher F3	R	Hollies (Guest Accommodation) C6
D	Chancellors Court H3 - J3	I	John Dalton E5	N	EM Butterworth F3		
E	Chancellors South I4	J	Lady Margaret E5	O	Margaret Bain F3		

Edge Hill University

Holy Cross College & University Centre, Bury

For exam candidates who live closer to Manchester, we hold some of our exams at Holy Cross College on selected Tuesday evenings from 5:30pm.

PLEASE NOTE: There is NO onsite parking. A lot of streets in the areas surrounding Holy Cross are residential parking or two-hour parking only. Please carefully check signs when parking and allow time to travel from your parking space to the college. You must sign in at Main Reception on arrival and the invigilator will collect you and lead you to the exam room.

Syllabus: Revision Checklist

Your equivalency exam will cover the topics below.

You can use these pages as a revision checklist. Tick ✓ the topics as you revise them.

✓	**Biology**	
	Cell Biology	What are living things made of? Cells and the way cells differ in form and function. What are the life processes that cells engage with?
	Tissues, Organs and Organ system.	Digestive enzymes and how we digest and use our food? How is oxygen moved around the body? What makes a healthy/unhealthy lifestyle and what are the potential consequences for us as individuals.
	Infection and Response	Disease and the ways our bodies can defend against disease. How is medical science fighting disease?
	Bioenergetics	Photosynthesis and Respiration. Where do plants and animals get their energy? Why do living things require energy?
	Homeostasis	Ways in which we maintain a consistent internal environment and respond to external changes.
	Inheritance, Variation and Evolution	How organisms reproduce and evolve. How are some characteristics passed to the next generation? How scientists can engineer for certain characteristics.
	Ecology	How do different species interact to form communities? What are the grand cycles in nature? Feeding relationships and the dependency of all living things.

✓	Chemistry	
	Atoms and the Periodic Table	What are the smallest particles that make up matter – the structure of the atom? Elements as Building Blocks. How can we classify materials? Groups in the Periodic table.
	Bonding, Structure and the properties of matter	How do Elements join up to form new substances? Different types of chemical bonds. Simple and complex molecules.
	Chemical Changes	Acids and Alkalis. What do we mean by reactivity and the why is this important in the extraction of metals from their ores. Electrolysis – what is it?
	Energy Changes	Exothermic and Endothermic reactions.
	Rates of Reaction	Using chemical equations to represent chemical reactions. How can chemical reactions be made to go quickly or slowly? Using a particle model to explain reactions.
	Organic Chemistry	What is crude oil made of and how can we use it?
	Chemical analysis	Ways to separate substances.

✓	**Physics**	
	Energy	Energy stores and Energy changes. How can we calculate the efficiency of a system? How shall we generate electricity now and in the future – energy resources?
	Electricity	What is an electrical current and how do we make a current flow. What are the different types of circuits and how can we measure electricity?
	The Particle Model	Can we explain density and the three states of matter using a particle model?
	Atomic Structure	Following on from chemistry (atoms) and looking at what happens when atoms disintegrate. What do we mean when a substance is radioactive?
	Waves	What are the different types of wave? Properties of all waves. The electromagnetic family of waves
	Electromagnetism	What is the link between electricity and magnetism? How can we use this link to our advantage?

The Periodic Table of Elements – a copy of this page will be provided in your exam

Edge Hill University

Key

Relative atomic mass *Ar*
Atomic number (Proton number) *Z*

1	2											3	4	5	6	7	4
									1 **H** Hydrogen 1								**He** Helium 2
7 **Li** Lithium 3	9 **Be** Beryllium 4											11 **B** Boron 5	12 **C** Carbon 6	14 **N** Nitrogen 7	16 **O** Oxygen 8	19 **F** Fluorine 9	20 **Ne** Neon 10
23 **Na** Sodium 11	24 **Mg** Magnesium 12											27 **Al** Aluminium 13	28 **Si** Silicon 14	31 **P** Phosphorus 15	32 **S** Sulphur 16	35.5 **Cl** Chlorine 17	40 **Ar** Argon 18
39 **K** Potassium 19	40 **Ca** Calcium 20	45 **Sc** Scandium 21	48 **Ti** Titanium 22	51 **V** Vanadium 23	52 **Cr** Chromium 24	55 **Mn** Manganese 25	56 **Fe** Iron 26	59 **Co** Cobalt 27	59 **Ni** Nickel 28	64 **Cu** Copper 29	65 **Zn** Zinc 30	70 **Ga** Gallium 31	73 **Ge** Germanium 32	75 **As** Arsenic 33	79 **Se** Selinium 34	80 **Br** Bromine 35	84 **Kr** Krypton 36
85 **Rb** Rubidium 37	88 **Sr** Strontium 38	89 **Y** Yttrium 39	91 **Zr** Zirconium 40	93 **Nb** Niobium 41	96 **Mo** Molybdenum 42	99 **Tc** Technetium 43	101 **Ru** Ruthenium 44	103 **Rh** Rhodium 45	106 **Pd** Palladium 46	108 **Ag** Silver 47	112 **Cd** Cadmium 48	115 **In** Indium 49	119 **Sn** Tin 50	122 **Sb** Antimony 51	128 **Te** Tellurium 52	127 **I** Iodine 53	131 **Xe** Xenon 54
133 **Cs** Caesium 55	137 **Ba** Barium 56	139 **La** Lanthanum 57	178 **Hf** Hafnium 72	181 **Ta** Tantalum 73	184 **W** Tungsten 74	186 **Re** Rhenium 75	190 **Os** Osmium 76	192 **Ir** Iridium 77	195 **Pt** Platinum 78	197 **Au** Gold 79	201 **Hg** Mercury 80	204 **Tl** Thallium 81	207 **Pb** Lead 82	209 **Bi** Bismuth 83	**Po** Polonium 84	**At** Astatine 85	**Rn** Radon 86
Fr Francium 87	226 **Ra** Radium 88	227 **Ac** Actinium 89															

Elements 58-71 and 90-103 have been omitted.

– <u>a copy of this page will be provided in your exam</u>

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1 Reactivity Series of Metals

Most Reactive

Potassium
Sodium
Calcium
Magnesium
Aluminium
Carbon
Zinc
Iron
Tin
Lead
Hydrogen
Copper
Silver
Gold
Platinum

Least Reactive

(elements in italics, though non-metals, have been included for comparison).

---

2 Formulae of Some Common Ions

Positive ions		**Negative ions**	
Name	Formula	Name	Formula
Hydrogen	H^+	Chloride	Cl^-
Sodium	Na^+	Bromide	Br^-
Silver	Ag^+	Fluoride	F^-
Potassium	K^+	Iodide	I^-
Lithium	Li^+	Hydroxide	OH^-
Ammonium	NH_4^+	Nitrate	NO_3^-
Barium	Ba^{2+}	Oxide	O^{2-}
Calcium	Ca^{2+}	Sulphide	S^{2-}
Copper (II)	Cu^{2+}	Sulphate	SO_4^{2-}
Magnesium	Mg^{2+}	Carbonate	CO_3^{2-}
Zinc	Zn^{2+}		
Lead	Pb^{2+}		
Iron (I)	Fe^{2+}		
Iron (II)	Fe^{3+}		
Aluminium	Al^{3+}		

Edge Hill GCSE Science Equivalency Test

Practice Paper

2 Hours

This sample paper contains example questions to help you:

- **prepare for your exam**
- **test your knowledge**
- **identify topics for revision.**

The mark scheme for this paper can be found at the back of the revision pack.

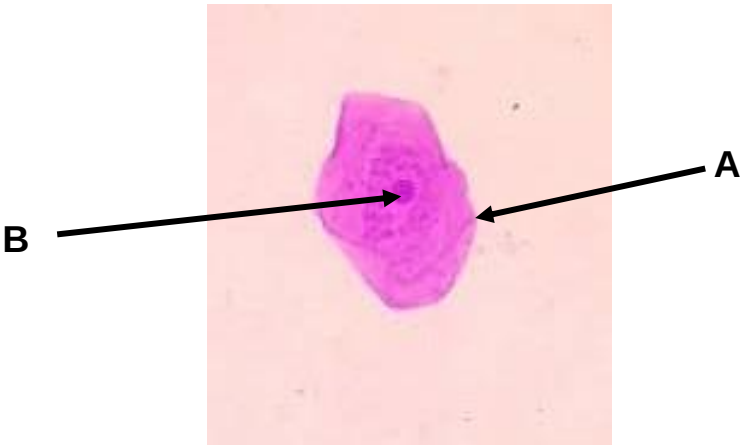
Biology

Animal Cells

Q1.

Figure 1 shows an animal cell.

Figure 1



(a) What is structure **A**?

Tick **one** box.

Cell membrane ☐

Cell wall ☐

Chromosome ☐

Cytoplasm ☐

(1)

(b) What is structure **B**?

Tick **one** box.

Chloroplast ☐

Mitochondria ☐

Nucleus ☐

Vacuole ☐

(1)

(c) **Figure 2** shows a sperm cell.

Figure 2

Describe how a sperm cell is adapted to carry out its function.

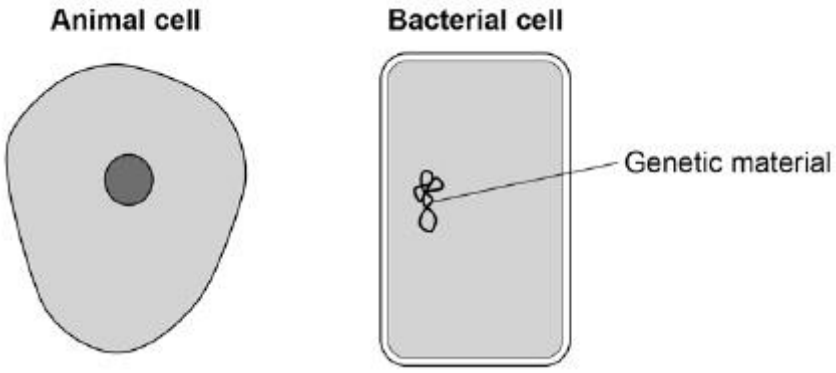
_____

_____

(1)

(d) **Figure 3** shows an animal cell and a bacterial cell.

Figure 3



Compare the structure of the cells in **Figure 3**.

Complete the sentences.

Choose the answers from the box.

cell membrane	**cell wall**	**chloroplast**
cytoplasm		**nucleus**

Only the animal cell contains a _____

Only the bacterial cell contains a _____

(2)

[5 marks]

Q2.

Malignant tumours are called cancers.

(a) What does the term malignant indicate in relation to a tumour?

_____

_____

_____

_____

(3)

(b) The table below shows data for people diagnosed with cancer in 1960 and 2000.

Type of Cancer	Diagnosed in 1960	Diagnosed in 2000
	% people alive 10 years after diagnosis	% people alive 10 years after diagnosis
Bowel	22	54
Breast	38	76
Prostate	22	82
Skin	46	85
Testicular	66	96

Look at the data in the figure above for testicular cancer.

Calculate the percentage increase in the survival rate of people diagnosed with testicular cancer in 1960 compared to 2000.

Give your answer to **three** significant figures.

_____

_____

Survival rate increase = _____ %

(2)

[5 marks]

Q3.

White blood cells protect the body against pathogens such as bacteria and viruses.

(a) (i) Pathogens make us feel ill.

Give **one** reason why.

_____

_____

(1)

(ii) White blood cells produce antibodies. This is one way white blood cells protect us against pathogens.

Give **two** other ways that white blood cells protect us against pathogens.

1. _____

_____

2. _____

_____

(2)

(b) Vaccination can protect us from the diseases pathogens cause.

(i) A doctor vaccinates a child against measles.

What does the doctor inject into the child to make the child immune to measles?

_____

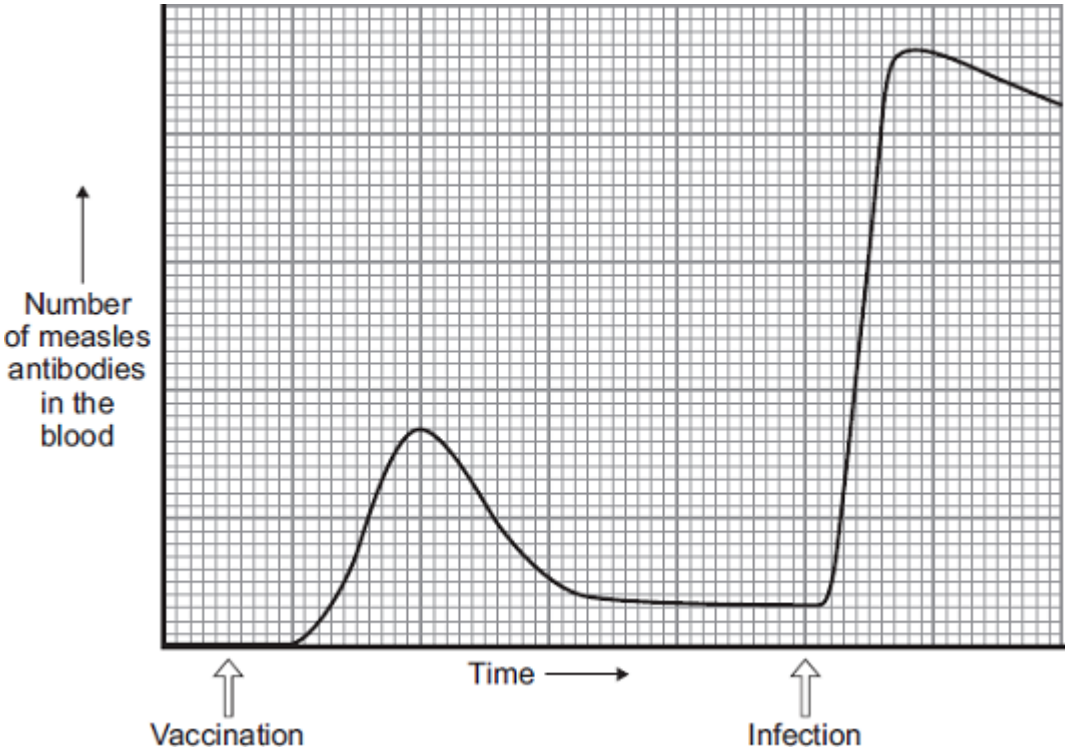
_____

_____

(2)

(ii) A few weeks after the vaccination, the child becomes infected with measles viruses from another person.

The graph shows the number of measles antibodies in the child's blood from before the vaccination until after the infection.



More measles antibodies are produced after the infection than after the vaccination.

Describe other differences in antibody production after infection compared with after vaccination.

_____

_____

_____

_____

_____

(3)

(iii) Vaccination against the measles virus will **not** protect the child against the rubella virus.

Why?

_____

(1)

(c) What is the advantage of vaccinating a large proportion of the population against measles?

_____

(1)

(d) In 2014 there was an outbreak of Ebola virus disease (EVD) in Africa.

At the time of the outbreak there were:

- no drugs to treat the disease
- no vaccines to prevent infection.

Why were antibiotics **not** used to treat EVD?

_____

_____

_____

(1)

(e) After the outbreak began, drug companies started to develop drugs and vaccines for EVD.

A drug has to be thoroughly tested and trialled before it is licensed for use.

Testing, trialling and licensing new drugs usually takes several years.

Draw **one** line from each word about drug testing to the definition of the word.

Word about drug testing	**Definition**
Dose	Side effects making the person ill
Efficacy	The concentration of the drug to be used and how often the drug should be given
Toxicity	Whether the drug works to treat the illness

(2)

(f) The results of drug testing and drug trials are studied in detail by other scientists.
Only then can the results be published by the drug company.
Suggest **one** reason why the results are studied by other scientists.

_____

_____

(1)

[14 marks]

Q4.

Photosynthesis uses carbon dioxide to make glucose.

(a) (i) Complete the equation for photosynthesis.

carbon dioxide + _____ $\xrightarrow{\text{energy}}$ glucose + _____

(2)

(ii) What type of energy does a plant use in photosynthesis?

_____

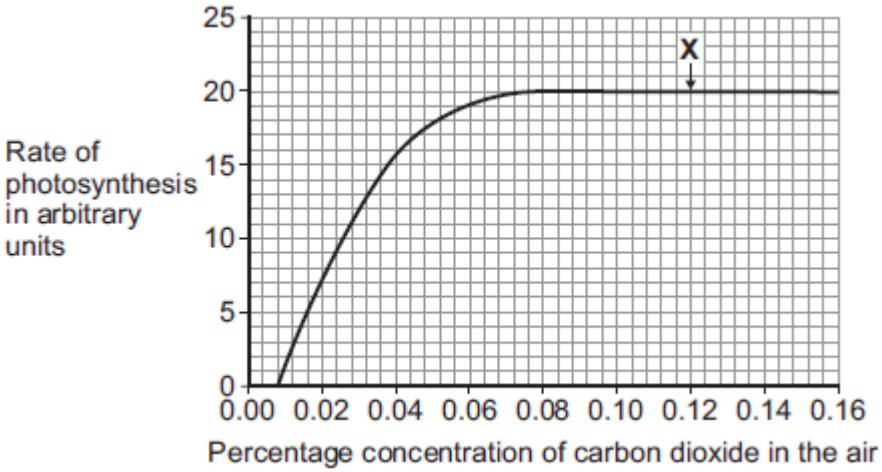
(1)

(iii) Which part of a plant **cell** absorbs the energy needed for photosynthesis?

_____

(1)

(b) The graph shows the effect of the concentration of carbon dioxide on the rate of photosynthesis in tomato plants at 20 °C.



(i) What is the maximum rate of photosynthesis of the tomato plants shown in the graph?

_____ arbitrary units

(1)

(ii) At point **X**, carbon dioxide is **not** a limiting factor of photosynthesis.

Suggest **one** factor that is limiting the rate of photosynthesis at point **X**.

_____

(1)

(c) A farmer plans to grow tomatoes in a large greenhouse.

The concentration of carbon dioxide in the atmosphere is 0.04%.
The farmer adds carbon dioxide to the greenhouse so that its concentration is 0.08%.

(i) Why does the farmer use 0.08% carbon dioxide?

Tick (✓) **one** box.

To increase the rate of growth of the tomato plants ☐

To increase the rate of respiration of the tomato plants ☐

To increase water uptake by the tomato plants ☐

(1)

(ii) Why does the farmer **not** use a concentration of carbon dioxide higher than 0.08%?

Tick (✓) **two** boxes.

Because it would cost more money than using 0.08% ☐

Because it would decrease the temperature of the greenhouse ☐

Because it would not increase the rate of photosynthesis of the tomato plants any further ☐

Because it would increase water loss from the tomato plants ☐

(2)

[9 marks]

Diabetes and Insulin

Q5.

Type 1 diabetes develops when the body does not produce enough insulin.

(a) Which body organ produces insulin?

_____

(1)

(b) One treatment for diabetes is to inject insulin.

The table gives the properties of four different types of insulin, **A**, **B**, **C** and **D**.

Type of insulin	Time taken for the insulin to begin to work in minutes	Time taken for insulin to reach maximum concentration in the blood in minutes	Time when insulin is no longer effective in hours
A	15-20	30-90	3-4
B	30-60	80-120	4-6
C	120-240	360-600	14-16
D	240-360	600-960	18-20

(i) Some people with diabetes need to inject insulin just before a meal to stop a big increase in blood sugar concentration.

Which type of insulin, **A**, **B**, **C** or **D**, should these people with diabetes inject just before a meal?

_____

Give the reason for your answer.

_____

_____

(2)

(ii) A person with diabetes is told to inject type **B** insulin immediately after breakfast at 09.00.
The person with diabetes is told to then inject a second type of insulin at lunchtime at 12.00.
The second type of insulin should keep the blood sugar level under control for the rest of the 24 hours.

Which type of insulin, **A**, **C** or **D**, should this person with diabetes inject at lunchtime?

_____

Give the reason for your answer.

_____

_____

(2)

[5 marks]

Genetic Crosses

Q6.

In humans, hair colour is an inherited characteristic.

Red hair is caused by a recessive allele.

(a) When does a recessive allele control the development of a characteristic?

Tick (✔) **one** box.

When the allele is present on only one of the chromosomes. ☐

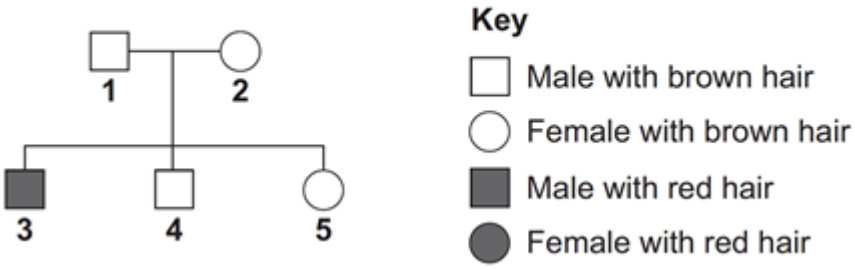
When the dominant allele is not present. ☐

When the allele is inherited from the female parent. ☐

(1)

(b) **Figure 1** shows the inheritance of hair colour in one family.

Figure 1



(i) Brown hair is caused by a dominant allele, **B**.

Red hair is caused by the recessive allele, **b**.

What combination of alleles does person **1** have?

Tick (✔) **one** box.

BB ☐

Bb ☐

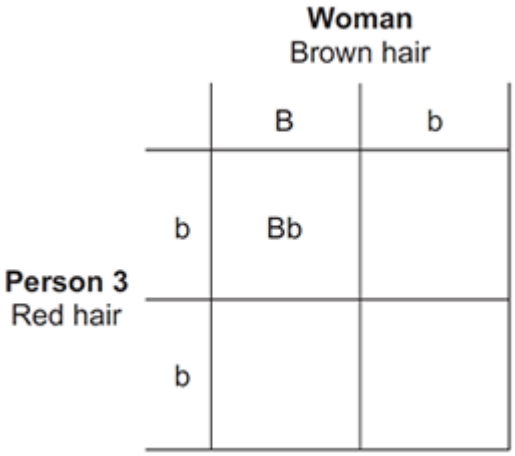
bb ☐

(1)

(ii) Person **3** married a woman with brown hair.

Figure 2 shows how hair colour could be inherited by their children.

Figure 2



Complete **Figure 2** to show the combination of alleles that the children would inherit.
One has been done for you.

(2)

(iii) What is the probability that one of the children would have red hair?

Tick (✔) **one** box.

1 in 2 ☐

1 in 3 ☐

1 in 4 ☐

(1)
[5 marks]

Q7.

Organisms have adaptations that enable them to survive in extreme conditions.

(a) The photograph shows an arctic fox.

Suggest **two** .ways in which the arctic fox is adapted for life in very cold conditions.

Explain how each adaptation helps the arctic fox to survive in very cold conditions.

Adaptation 1

_____

_____

How this adaptation helps the arctic fox to survive in very cold conditions.

_____

_____

_____

Adaptation 2

_____

_____

How this adaptation helps the arctic fox to survive in very cold conditions.

_____

_____

_____

(4)

(b) The photograph shows an antelope that lives in a sandy desert.

The antelope is prey to large cats such as lions.

Suggest **one** adaptation that helps this antelope avoid being killed by predators.

Explain how this adaptation helps the antelope avoid being killed by predators.

Adaptation

_____

_____

How this adaptation helps the antelope avoid being killed by predators.

_____

_____

_____

(2)

[6 marks]

Chemistry

Q1.

This question is about metal oxides.

When sodium is heated in oxygen, sodium oxide is produced.

(a) Balance the equation for the reaction.

_____ Na + O_2 → 2 Na_2O

(1)

(b) Why is this an oxidation reaction?

_____

_____

(1)

(c) Sodium oxide is added to water and shaken.
Universal indicator is added.
The pH of the solution is 14

What is the colour of the universal indicator?

Tick (✔) **one** box.

Green ☐

Purple ☐

Red ☐

Yellow ☐

(1)

(d) Aluminium oxide reacts with hydrochloric acid to produce a salt.

What is the name of the salt produced?

Tick (✔) **one** box.

Aluminium chloride ☐

Aluminium nitrate ☐

Aluminium sulfate ☐

Aluminium sulfide ☐

(1)

A student investigates the solubility of four metal oxides and four non-metal oxides in water.

The student tests the pH of the solutions formed.

The table shows the student's results.

Type of oxide	**Oxide**	**Solubility in water**	**pH of solution**
Metal oxides	Sodium oxide	Soluble	14
	Calcium oxide	Soluble	10
	Magnesium oxide	Slightly soluble	9
	Zinc oxide	Insoluble	No solution formed
Non-metal oxides	Carbon dioxide	Soluble	5
	Sulfur dioxide	Soluble	2
	Phosphorus oxide	Soluble	1
	Silicon dioxide	Insoluble	No solution formed

The student makes two conclusions.

Conclusion 1: 'All metal oxides produce alkaline solutions.'

Conclusion 2: 'All non-metal oxides produce acidic solutions.'

(e) Explain why the student's conclusions are only partly correct.

Use information from the table above.

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(f) Give an improved conclusion for metal oxides.

Use the table above.

_____

_____

_____

_____

_____

_____

_____

_____

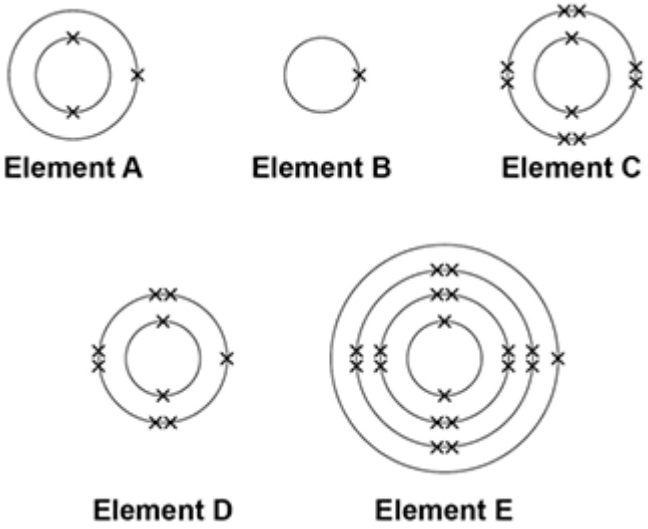
(2)

(Total 9 marks)

Q2.

The electronic structure of the atoms of five elements are shown in the figure below.

The letters are **not** the symbols of the elements.



Choose the element to answer the question. Each element can be used once, more than once or not at all.

Use the periodic table to help you.

(a) Which element is hydrogen?

Tick **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐ **E** ☐

(1)

(b) Which element is a halogen?

Tick **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐ **E** ☐

(1)

(c) Which element is a metal in the same group of the periodic table as element **A**?

Tick **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐ **E** ☐

(1)

(d) Which element exists as single atoms?

Tick **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐ **E** ☐

(1)

(e) There are two isotopes of element **A**. Information about the two isotopes is shown in the table below.

Mass number of the isotope	6	7
Percentage abundance	92.5	7.5

Use the information in the table above above to calculate the relative atomic mass of element **A**.
Give your answer to 2 decimal places.

_____

_____

_____

_____

_____

_____

_____

Relative atomic mass = _____

(4)

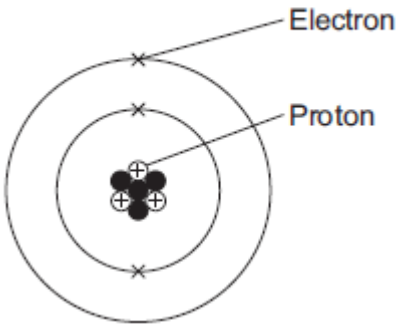
(Total 8 marks)

Q3.

There are eight elements in the second row (lithium to neon) of the periodic table.

(a) **Figure 1** shows a lithium atom.

Figure 1



(i) What is the mass number of the lithium atom in **Figure 1**?

Tick (✔) **one** box.

3 ☐

4 ☐

7 ☐

(1)

(ii) What is the charge of an electron?

Tick (✔) **one** box.

–1 ☐

0 ☐

+1 ☐

(1)

(iii) Protons are in the nucleus.
Which other sub-atomic particles are in the nucleus?

Tick (✔) **one** box.

ions ☐

molecules ☐

neutrons ☐

(1)

(b) What is **always** different for atoms of different elements?

Tick (✔) **one** box.

number of neutrons ☐

number of protons ☐

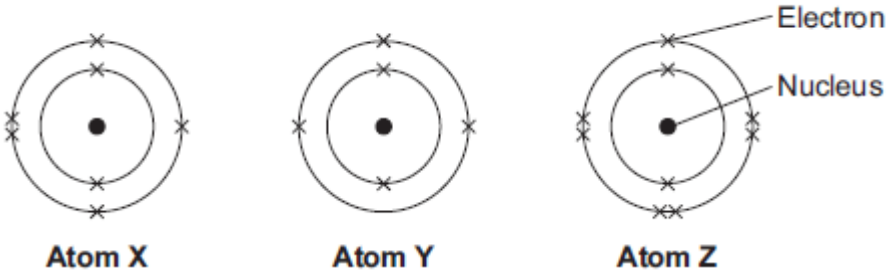
number of shells ☐

(1)

(c) **Figure 2** shows the electron arrangements of three different atoms, **X**, **Y** and **Z**.

These atoms are from elements in the second row (lithium to neon) of the periodic table.

Figure 2



Which atom is from an element in Group 3 of the periodic table?

Tick (✔) **one** box.

Atom X ☐

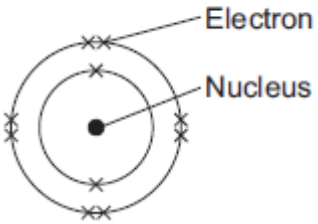
Atom Y ☐

Atom Z ☐

(1)

(d) **Figure 3** shows the electron arrangement of a different atom from an element in the second row of the periodic table.

Figure 3



(i) Give the chemical symbol of this element.

_____

(1)

(ii) Why is this element unreactive?

_____

_____

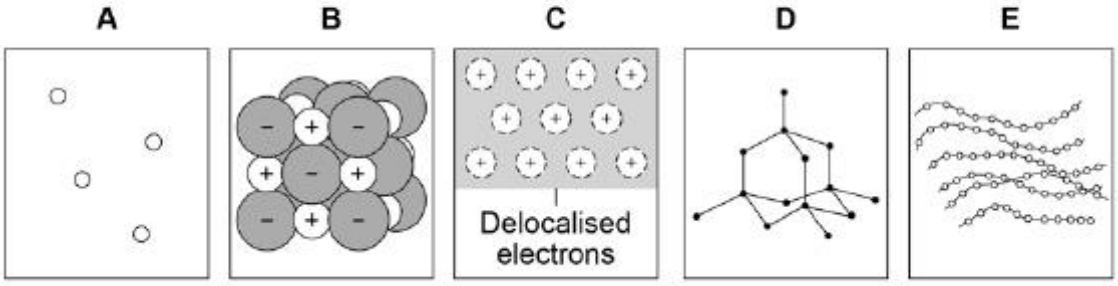
(1)

(Total 7 marks)

Q4.

Figure 1 shows the structure of five substances.

Figure 1



(a) Which diagram shows a gas?

Tick (✔) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐ **E** ☐

(1)

(b) Which diagram shows the structure of diamond?

Tick (✔) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐ **E** ☐

(1)

(c) Which diagram shows a metallic structure?

Tick (✔) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐ **E** ☐

(1)

(d) Which diagram shows a polymer?

Tick (✔) **one** box.

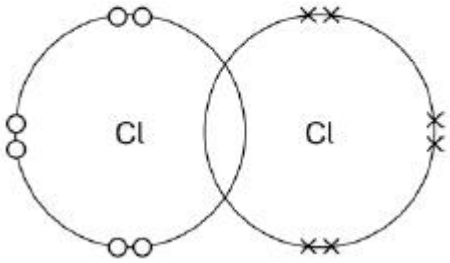
A ☐ **B** ☐ **C** ☐ **D** ☐ **E** ☐

(1)

(e) A chlorine atom has 7 electrons in the outer shell.
Two chlorine atoms covalently bond to form a chlorine molecule, Cl_2

Figure 2 is a dot and cross diagram showing the outer shells and some electrons in a chlorine molecule.
Complete the dot and cross diagram.
Show only the electrons in the outer shell.

Figure 2



(1)

(f) What is the reason for chlorine's low boiling point?
Tick (✔) **one** box.

Strong covalent bonds ☐

Strong forces between molecules ☐

Weak covalent bonds ☐

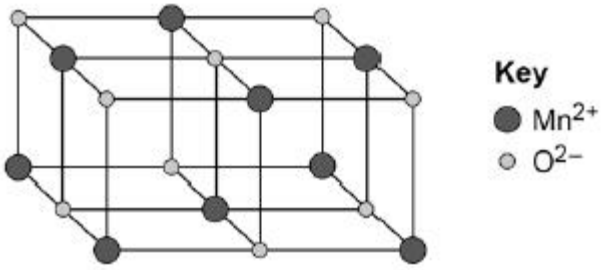
Weak forces between molecules ☐

(1)

Figure 3 represents the structure of manganese oxide.

Manganese oxide is an ionic compound.

Figure 3



(g) Determine the empirical formula of manganese oxide.

Use **Figure 3**.

_____

_____

Empirical formula = _____

(1)

(h) Why does manganese oxide conduct electricity as a liquid?

Tick (✔) **one** box.

Atoms move around in the liquid ☐

Electrons move around in the liquid ☐

Ions move around in the liquid ☐

Molecules move around in the liquid ☐

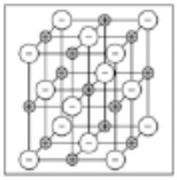
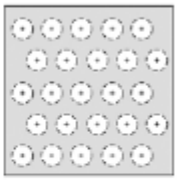
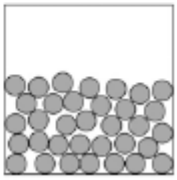
(1)

(Total 8 marks)

Q5.

This question is about different substances and their structures.

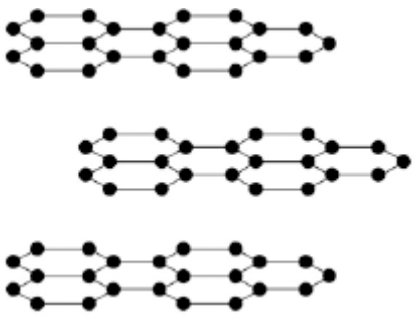
(a) Draw **one** line from each statement to the diagram which shows the structure.

Statement	Structure
The substance is a gas	
The substance is a liquid	
The substance is ionic	
The substance is a solid metal	
	

(4)

(b) **Figure 1** shows the structure of an element.

Figure 1



What is the name of this element?

Tick **one** box.

Carbon ☐

Chloride ☐

Nitrogen ☐

Xenon ☐

(1)

(c) Why does this element conduct electricity?

Tick **one** box.

It has delocalised electrons ☐

It contains hexagonal rings ☐

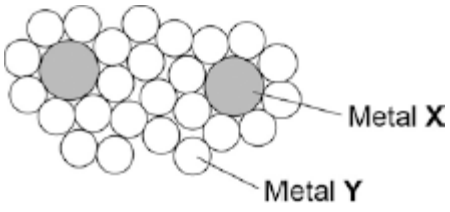
It has weak forces between the layers ☐

It has ionic bonds ☐

(1)

(d) **Figure 2** shows the structure of an alloy.

Figure 2



Explain why this alloy is harder than the pure metal **Y**.

_____

_____

_____

_____

(2)

(e) What percentage of the atoms in the alloys are atoms of **X**?

_____

_____

_____

_____

(2)

(f) What type of substance is an alloy?

Tick **one** box.

Compound ☐

Element ☐

Mixture ☐

(1)

(Total 11 marks)

Q6.

A student investigated the reactivity of three different metals.

This is the method used.

1. Place 1 g of metal powder in a test tube.
2. Add 10 cm^3 of metal sulfate.
3. Wait 1 minute and observe.
4. Repeat using the other metals and metal sulfates.

The student placed a tick in the table below if there was a reaction and a cross if there was no reaction.

	Zinc	**Copper**	**Magnesium**
Copper sulfate	✓	x	✓
Magnesium sulfate	x	x	x
Zinc sulfate	x	x	✓

(a) What is the dependent variable in the investigation?

Tick **one** box.

Time taken ☐

Type of metal ☐

Volume of metal sulfate ☐

Whether there was a reaction or not ☐

(1)

(b) Give **one** observation the student could make that shows there is a reaction between zinc and copper sulfate.

_____

_____

(1)

(c) The student used measuring instruments to measure some of the variables.

Draw **one** line from each variable to the measuring instrument used to measure the variable.

Variable	**Measuring instrument**
	Balance
	Measuring cylinder
Mass of metal powder	
	Ruler
	Burette
Volume of metal sulfate	
	Theromometer
	Test tube

(2)

(d) Use the results shown in table above to place zinc, copper and magnesium in order of reactivity.

Most reactive _____

_____

Least reactive _____

(1)

(e) Suggest **one** reason why the student should **not** use sodium in this investigation.

_____

_____

(1)

(f) Which metal is found in the Earth as the metal itself?

Tick **one** box.

Calcium ☐

Gold ☐

Lithium ☐

Potassium ☐

(1)

(g) Iron is found in the Earth as iron oxide (Fe_2O_3).

Iron oxide is reduced to produce iron.

Balance the equation for the reaction.

___Fe_2O_3 + ___C → ___Fe + ___CO_2

(1)

(h) Name the element used to reduce iron oxide.

_____

(1)

(i) What is meant by reduction?

Tick **one** box.

Gain of iron ☐

Gain of oxide ☐

Loss of iron ☐

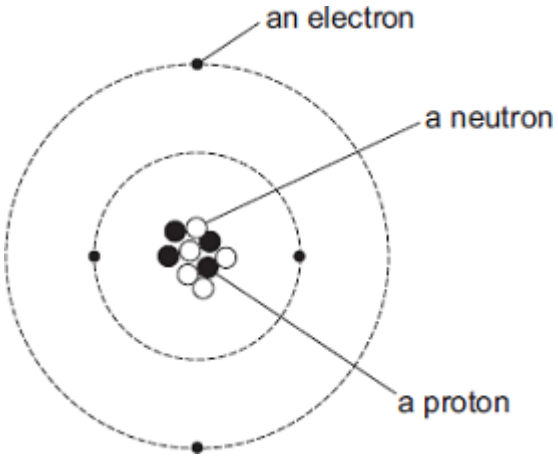
Loss of oxygen ☐

(1)

(Total 10 marks)

Q1.

The diagram represents an atom of beryllium. The three types of particle that make up the atom have been labelled.



(a) Use the labels from the diagram to complete the following statements.

Each label should be used once.

The particle with a positive charge is
_____ .

The particle with the smallest mass is
_____ .

The particle with no charge is
_____ .

(2)

(b) What is the mass number of a beryllium atom?

Draw a ring around your answer.

4	**5**	**9**	**13**

Give a reason for your answer.

_____

_____

(2)

(Total 4 marks)

Q2.

(a) Which one of the following is not an electromagnetic wave?

Tick **one** box.

Gamma rays ☐

Sound ☐

Ultraviolet ☐

X-rays ☐

(1)

(b) What type of electromagnetic wave do our eyes detect?

_____

(1)

(c) What is a practical use for infrared waves?

Tick **one** box.

Cooking food ☐

Energy efficient lamps ☐

Medical imaging ☐

Satellite communications ☐

(1)

Scientists have detected radio waves emitted from a distant galaxy.

Some of the radio waves from the distant galaxy have a frequency of 1 200 000 000 hertz.

(d) Which is the same as 1 200 000 000 hertz?

Tick **one** box.

1.2 gigahertz ☐

1.2 kilohertz ☐

1.2 megahertz ☐

1.2 millihertz ☐

(1)

(e) Radio waves travel through space at 300 000 kilometres per second (km/s).

How is 300 000 km/s converted to metres per second (m/s)?

Tick **one** box.

300 000 ÷ 1000 = 300 m/s ☐

300 000 × 1000 = 300 000 000 m/s ☐

300 000 + 1000 = 301 000 m/s ☐

300 000 – 1000 = 299 000 m/s ☐

(1)

(f) Write the equation which links frequency, wavelength and wave speed.

_____

(1)

(g) Calculate the wavelength of the radio waves emitted from the distant galaxy.

Give your answer in metres.

_____

_____

_____

wavelength = _____ m

(3)

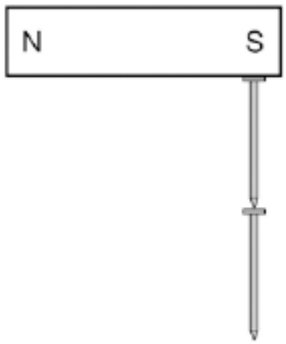
(Total 9 marks)

Q3.

Figure 1 shows two iron nails hanging from a bar magnet.

The iron nails which were unmagnetised are now magnetised.

Figure 1



(a) Complete the sentence.

Use a word from the box.

forced	**induced**	**permanent**

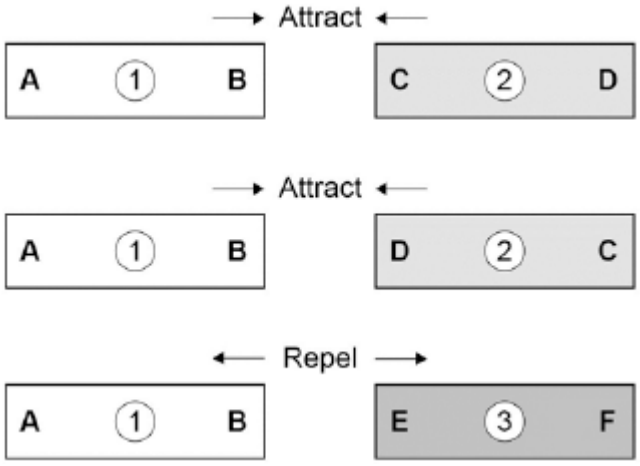
The iron nails have become _____ magnets.

(1)

(b) Each of the three metal bars in **Figure 2** is either a bar magnet or a piece of unmagnetised iron.

The forces that act between the bars when different ends are placed close together are shown by the arrows.

Figure 2



Which **one** of the metal bars is a piece of unmagnetised iron?

Tick **one** box.

Bar 1 ☐

Bar 2 ☐

Bar 3 ☐

Give the reason for your answer.

_____

_____

(2)

(c) A student investigated the strength of different fridge magnets by putting small sheets of paper between each magnet and the fridge door.

The student measured the maximum number of sheets of paper that each magnet was able to hold in place.

Why was it important that each small sheet of paper had the same thickness?

_____

_____

_____

(1)

(d) Before starting the investigation the student wrote the following hypothesis:

'The bigger the area of a fridge magnet the stronger the magnet will be.'

The student's results are given in the table below.

Fridge magnet	Area of magnet in mm^2	Number of sheets of paper held
A	40	20
B	110	16
C	250	6
D	340	8
E	1350	4

Give **one** reason why the results from the investigation **do not** support the student's hypothesis.

_____

_____

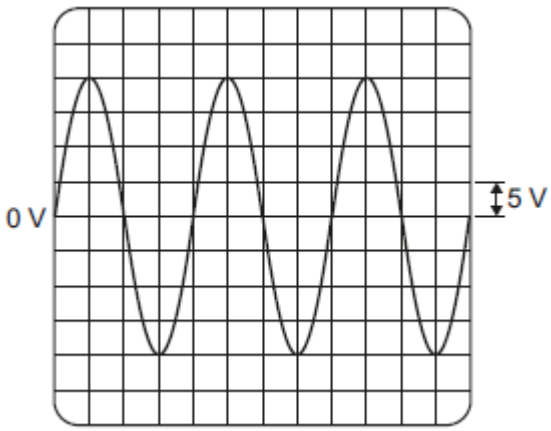
(1)

(Total 5 marks)

Q4.

(a) **Figure 1** shows the oscilloscope trace an alternating current (a.c.) electricity supply produces.

Figure 1



One vertical division on the oscilloscope screen represents 5 volts.

Calculate the peak potential difference of the electricity supply.

_____

Peak potential difference = _____ V

(1)

(b) Use the correct answer from the box to complete the sentence.

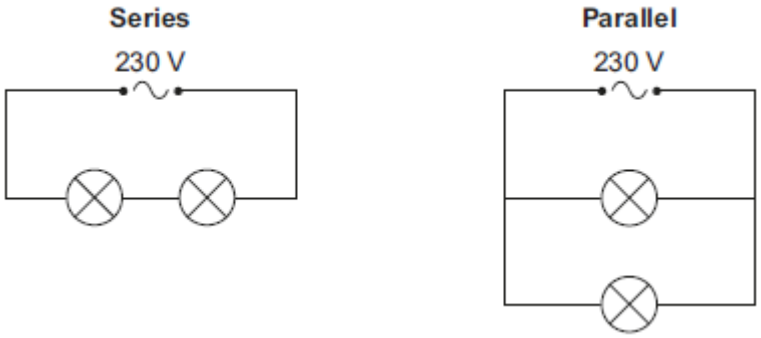
40	**50**	**60**

In the UK, the frequency of the a.c. mains electricity supply is _____ hertz.

(1)

(c) **Figure 2** shows how two lamps may be connected in series or in parallel to the 230 volt mains electricity supply.

Figure 2



(i) Calculate the potential difference across each lamp when the lamps are connected in **series**.

The lamps are identical.

_____

Potential difference when in series = _____ V

(1)

(ii) What is the potential difference across each lamp when the lamps are connected in **parallel**?

Tick (✔) **one** box.

115 V ☐ 230 V ☐ 460 V ☐

(1)

(iii) Give **one** advantage of connecting the lamps in parallel instead of in series.

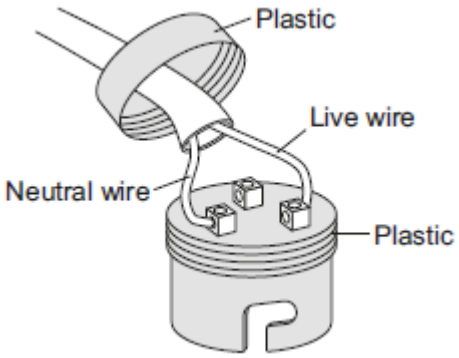
_____

_____

(1)

(d) **Figure 3** shows the light fitting used to connect a filament light bulb to the mains electricity supply.

Figure 3



The light fitting does **not** have an earth wire connected.

Explain why the light fitting is safe to use.

_____

_____

_____

_____

(2)

(e) A fuse can be used to protect an electrical circuit.

Name a different device that can also be used to protect an electrical circuit.

_____

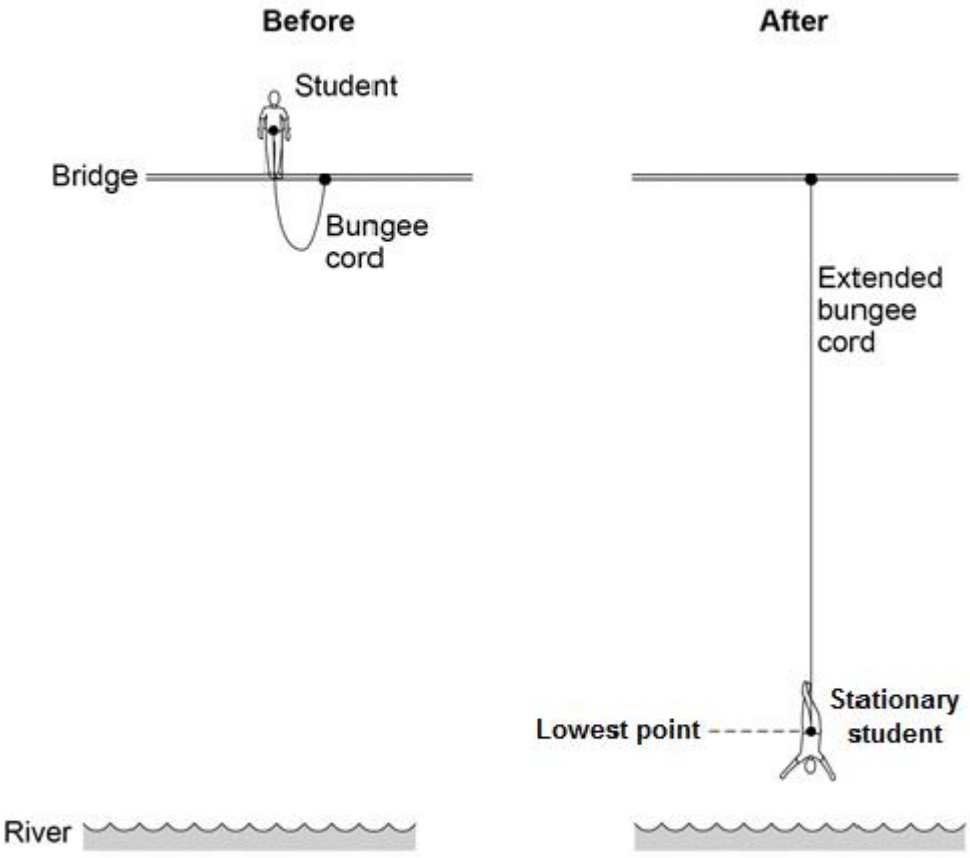
(1)

(Total 8 marks)

Q5.

The image below shows a student before and after a bungee jump.

The bungee cord has an unstretched length of 20 m.



(a) For safety reasons, it is important that the bungee cord used is appropriate for the student's weight.

Give **two** reasons why.

1.

_____

_____

2.

_____

_____

(2)

(b) The student jumps off the bridge.

Complete the sentences to describe the energy transfers.

Use answers from the box.

elastic potential	**gravitational potential**	**kinetic**	**sound**	**thermal**

Before the student jumps from the bridge he has a store of

_____ energy.

When he is falling, the student's store of _____

energy increases.

When the bungee cord is stretched, the cord stores energy as

_____ energy.

(3)

(c) At the lowest point in the jump when the student is stationary, the extension of the bungee cord is 35 metres.

The bungee cord behaves like a spring with a spring constant of 40 N / m.

Calculate the energy stored in the stretched bungee cord.

_____

_____

_____

Energy = _____ J

(2)

(Total 7 marks)

Q6.

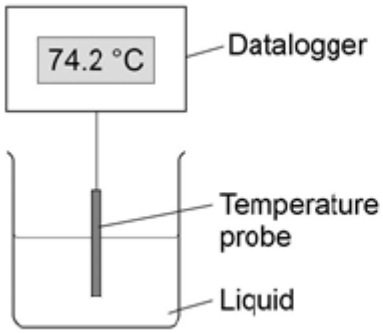
Two students investigated the change of state of stearic acid from liquid to solid.

They measured how the temperature of stearic acid changed over 5 minutes as it changed from liquid to solid.

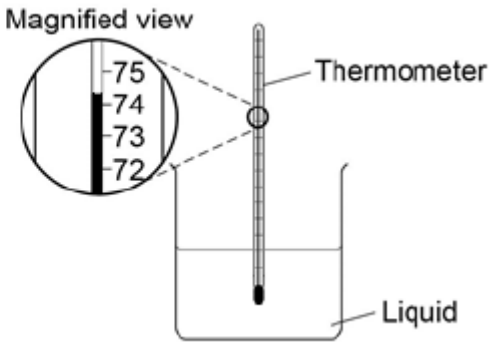
Figure 1 shows the different apparatus the two students used.

Figure 1

Student A's apparatus



Student B's apparatus



(a) Choose **two** advantages of using student **A**'s apparatus.

Tick **two** boxes.

Student **A**'s apparatus made sure the test was fair. ☐

Student **B**'s apparatus only measured categoric variables. ☐

Student **A**'s measurements had a higher resolution. ☐

Student **B** was more likely to misread the temperature. ☐

(2)

(b) Student **B** removed the thermometer from the liquid each time he took a temperature reading.

What type of error would this cause?

Tick **one** box.

A systematic error ☐

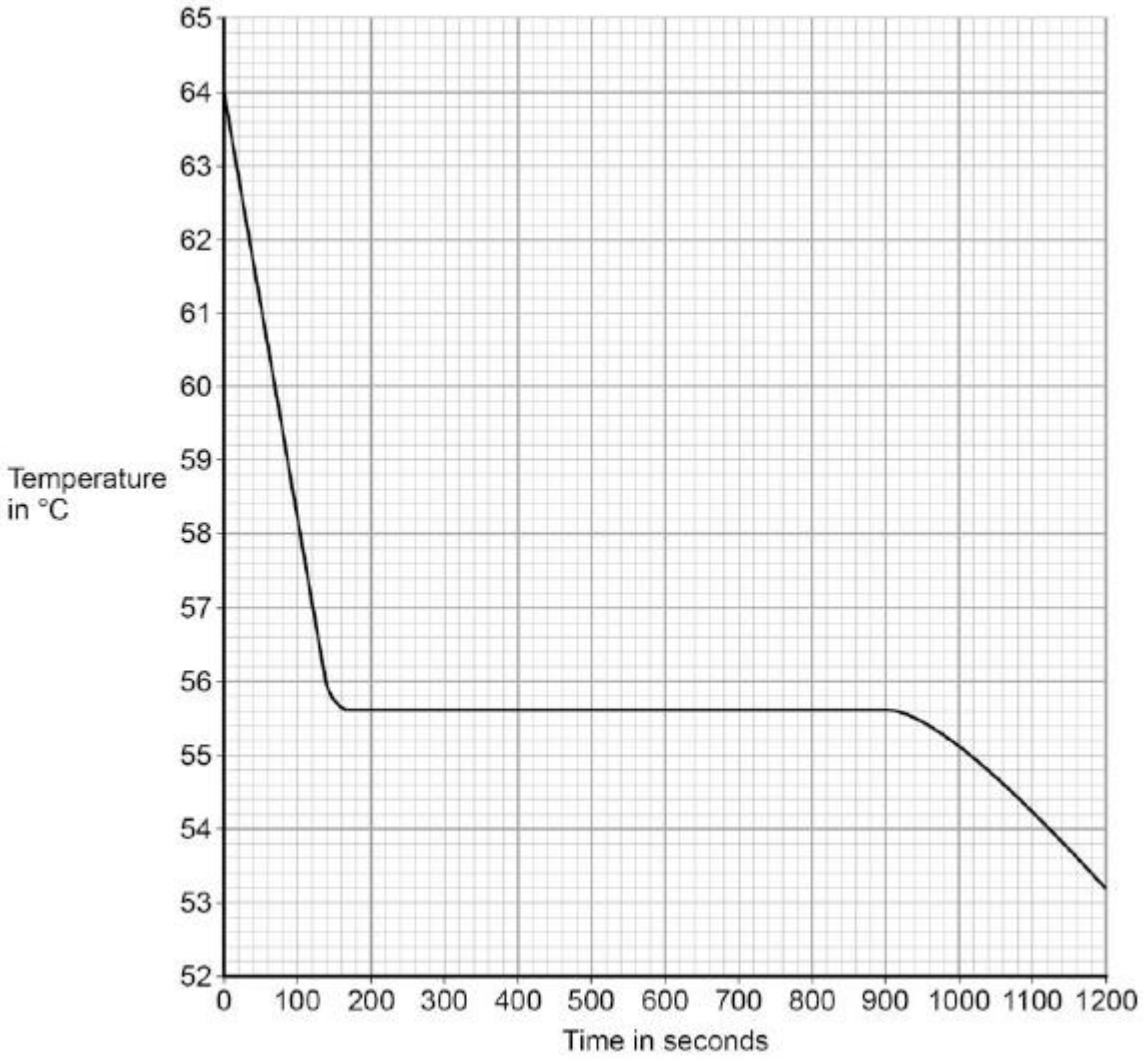
A random error ☐

A zero error ☐

(1)

(c) Student **A**'s results are shown in **Figure 2**.

Figure 2



What was the decrease in temperature between 0 and 160 seconds?

Tick **one** box.

8.2 °C ☐

8.4 °C ☐

53.2 °C ☐

55.6 °C ☐

(1)

(d) Use **Figure 2** to determine the time taken for the stearic acid to change from a liquid to a solid.

Time = _____ seconds

(1)

(e) Calculate the energy transferred to the surroundings as 0.40 kg of stearic acid changed state from liquid to solid.

The specific latent heat of fusion of stearic acid is 199 000 J / kg.

_____

_____

_____

Energy = _____ J

(2)

(f) After 1200 seconds the temperature of the stearic acid continued to decrease.

Explain why.

_____

_____

_____

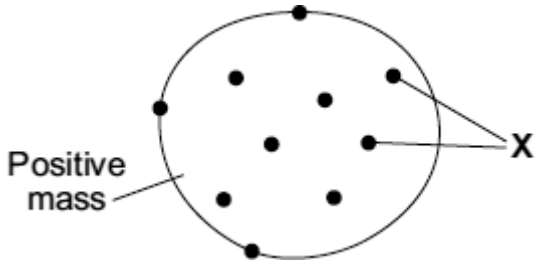
_____

(2)

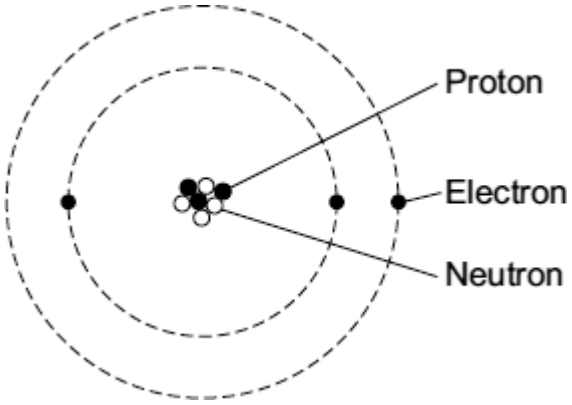
(Total 9 marks)

Q7.

The diagrams show two different models of an atom.



'Plum pudding' model



Model used today

(a) The particles labelled '**X**' in the plum pudding model are also included in the model of the atom used today.

What are the particles labelled '**X**' ?

_____

(1)

(b) Scientists decided that the 'plum pudding' model was wrong and needed replacing.

Which **one** of the following statements gives a reason for deciding that a scientific model needs replacing?

Tick (✓) **one** box.

The model is too simple. ☐

The model has been used by scientists for a long time. ☐

The model cannot explain the results from a new experiment. ☐

(1)

(c) The table gives information about the three types of particle that are in the model of the atom used today.

Particle	Relative mass	Relative charge
	1	+1
	very small	–1
	1	0

Complete the table by adding the names of the particles.

(2)

(Total 4 marks)

END OF EXAM

Edge Hill GCSE Science Equivalency Test

Practice Paper: *Answers*

Practice Paper: Answers
Biology

Animal Cells

Q1.

(a) cell membrane

extra boxes ticked negates mark

(1)

(b) nucleus

extra boxes ticked negates mark

(1)

(c) has a tail so it can swim (to an egg)

accept has many mitochondria to release energy to swim

(1)

(d) nucleus

(1)

cell wall

(1)

[5 marks]

Cancer

Q2.

(a) cells can break off

allow cells invade other tissues

(1)

cells multiply faster

(**1**)

can potentially result in death

(**1**)

(b) 96-66 = 30

(**1**)

30/66 x 100 = 45.5% increase

(1)

*allow 45.5 (%) with no working shown for **2** marks)*

[5 marks]

Q3.

(a) (i) any **one** from:

- (produce) toxins / poisons
- (cause) damage to cells
  kill / destroy cells
  allow kills white blood cells

(1)

(ii) produce antitoxins

(1)

engulf / ingest / digest pathogens / viruses / bacteria / microorganisms
accept phagocytosis or description
ignore eat / consume / absorb for engulf
ignore references to memory cells

(1)

(b) (i) dead / inactive / weakened
accept idea of antigen / protein

(1)

(measles) pathogen / virus
ignore bacteria

(1)

(ii) (after infection)
accept converse if clearly referring to before vaccination

(1)

rise begins sooner / less lag time

steeper / faster rise (in number)

(1)

longer lasting **or** doesn't drop so quickly
idea of staying high for longer
ignore reference to higher starting point

(1)

(iii) antibodies are specific or needs different antibodies
*accept antigens are different **or** white blood cells do not recognise virus*

(1)

(c) reduces spread of infection / less likely to get an epidemic
accept idea of eradicating measles

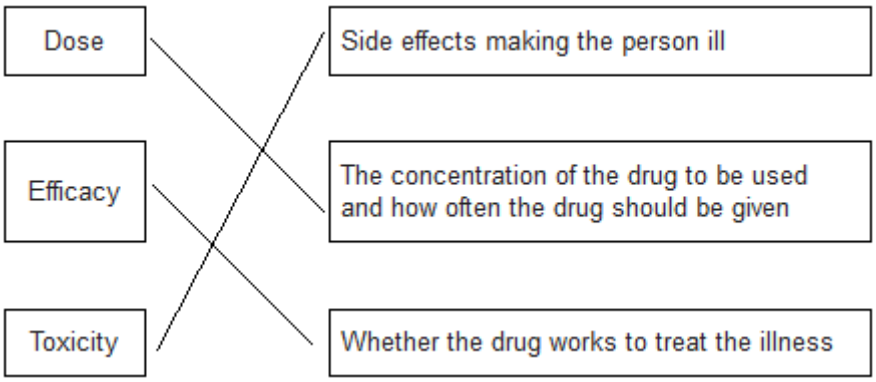
(1)

(d) antibiotics do not kill viruses

allow antibiotics <u>only</u> kill bacteria

(1)

(e)



*all correct for **2** marks*

*1 or 2 correct for **1** mark*

(2)

(f) any **one** from:

- to prevent false claims
- to make sure the conclusions are correct / valid
- to avoid bias

(1)

[14 marks]

Photosynthesis

Q4.

(a) (i) LHS = water

accept H_2O

*do **not** accept H^2O / H2O*

(1)

RHS = oxygen

accept O_2

*do **not** accept O / O^2 / O2*

(1)

(ii) light / sunlight

ignore solar / sun / sunshine

*do **not** allow thermal / heat*

(1)

(iii) chloroplasts

allow chlorophyll

(1)

(b) (i) 20

(1)

(ii) any **one** from:
- light (intensity)
- temperature.

(1)

(c) (i) To increase the rate of growth of the tomato plants

(1)

(ii) Because it would cost more money than using 0.08%

(1)

Because it would not increase the rate of photosynthesis of the tomato plants any further

(1)

[9 marks]

Diabetes and Insulin

Q5.

(a) pancreas

allow phonetic spelling

(1)

(b) (i) A

(1)

shortest / quicker time (to work)

(1)

(ii) D

(1)

acts for longest time

mark dependent on D

allow D will last until 09.00 / breakfast / 24 hours

(1)

[5 marks]

Genetic Crosses

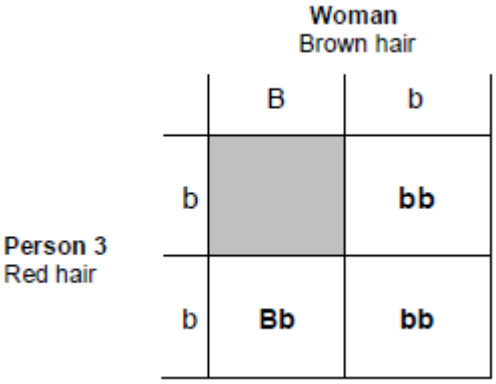
Q6.

(a) When the dominant allele is not present.

(1)

(b) (i) Bb

(1)



(ii)

3 correct = 2 marks
2 correct = 1 mark
1 or 0 correct = 0 marks
allow bB for Bb

(2)

(iii) 1 in 2

allow ecf from part ii

(1)

[5 marks]

Adaptation in Animals

Q7.

(a) **1** mark for each adaptation and **1** mark for its correct linked advantage

- long / thick hair / fur (1) for insulation (1)
  allow keeps warm
- small ears (1) for reduced heat loss (1)
- small feet (1) for reduced heat loss (1)
  ignore wide feet
  ignore prevent sinking
- white fur / coat (1) for camouflage / poor emitter (1)
- small SA/V ratio (1) reduces heat loss (1)
- thick layer of fat (1) insulates / keeps warm (1)

(Max 4)

(b) **1** mark for an adaptation and **1** mark for its correct linked advantage

- horns (1) for defence (1)
- long legs (1) for speed / escape / vision (1)

- light colour (1) for camouflage (1)
  allow pattern
- eyes on side of head (1) for wider field of vision (1)
- hooves (1) for speed / escape (1)
- large ears (1) to hear predators better (1)

(Max 2)

[6 marks]

Practice Paper: Answers
Chemistry

Q1 (a) $4\ Na + O_2 \longrightarrow 2Na_2O$

allow multiples

1

(b) (sodium) gains oxygen

1

(c) purple

1

(d) aluminium chloride

1

(e) **Level 2 (3-4 marks):**
Relevant reasons are identified, given in detail and logically linked to form a clear account.

Level 1 (1-2 marks):
Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

Level 0
No relevant content

Indicative content

conclusion 1
- pH values above 7 are alkaline
- sodium oxide, calcium oxide and magnesium oxide do form alkaline solutions (so correct for those)
- not all metal oxides form solutions (so incorrect for zinc oxide)

conclusion 2
- pH values below 7 are acidic
- carbon dioxide, sulfur dioxide and phosphorus oxide do form acidic

solutions (so correct for those)
- not all non-metal oxides form solutions (so incorrect for silicon oxide)]

4

(f) metal oxides produce alkaline solutions if they dissolve in water

*allow **1** mark for most metal oxides produce alkaline solutions*

2

[10]

Q2 (a) **B**

1

(b) **D**

1

(c) **E**

1

(d) **C**

1

(e) 92.5 × 6 **and**
7× 7.5

1

$\frac{607.5}{100}$

1

6.075

1

6.08

1

*allow 6.08 with no working shown for **4** marks*

[8]

Q3 (a) (i) 7

1

(ii) –1

1

(iii) neutrons

1

(b) number of protons

1

(c) atom **Y**

1

(d) (i) Ne

allow neon

1

(ii) has a full outer shell

allow in Group 0

allow a noble gas

or

full outer energy level

allow the shells are full

or

has 8 electrons in its outer shell

ignore in Group 8

1

[7]

Q4 (a) **A**

1

(b) **D**

1

(c) **C**

1

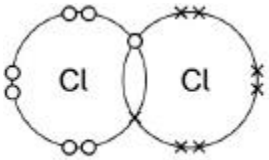
(d) **E**

1

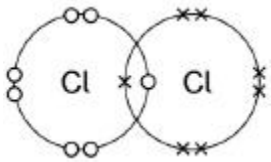
(e) bonding pair of electrons drawn

electrons can be dots, crosses or $e^{(-)}$ in any combination

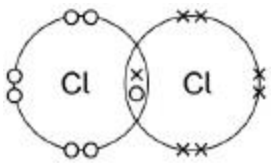
eg



or



or



*do **not** accept if electrons added to outer shells outside overlap*

1

(f) weak forces between molecules

1

(g) MnO

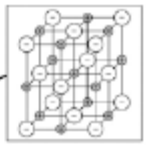
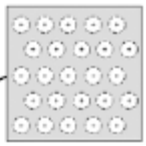
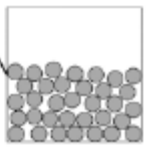
1

(h) ions move around in the liquid

1

[8]

Q5 (a)

Statement	**Structure**
The substance is a gas	
The substance is a liquid	
The substance is ionic	
The substance is a solid metal	
	

more than one line drawn from a variable negates the mark

4

(b) Carbon

1

(c) It has delocalised electrons

1

(d) the atoms / particles / ions are different sizes

*do **not** accept molecules*

1

so there are no rows / layers to slide

accept the layers are disrupted

1

(e) $\frac{2}{27} \times 100$

1

7.4%

1

*allow 7.4% with no working shown for **2** marks*

(f) Mixture

1

[11]

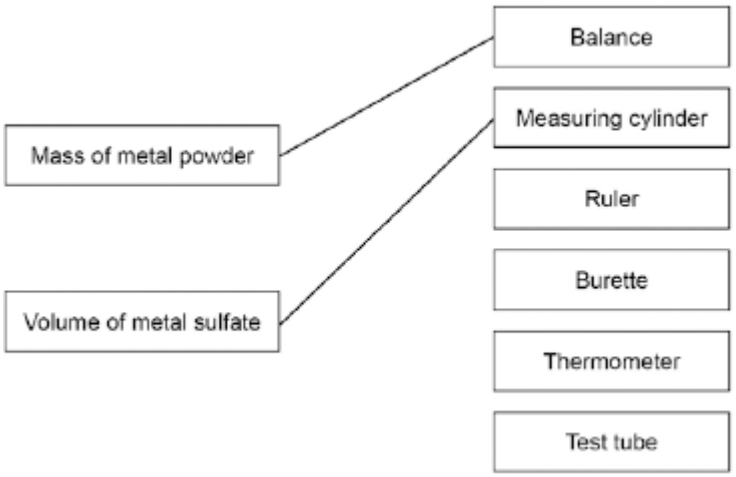
Q6 (a) Whether there was a reaction or not

1

(b) brown / orange / dark deposit on zinc
or
blue solution turns colourless / paler

1

(c)



more than one line drawn from a variable negates the mark

2

(d) (Most reactive) **Magnesium**
Zinc
(Least reactive) **Copper**
must all be correct

1

(e) would not be safe **or**

too reactive
allow too dangerous

1

(f) Gold

1

(g) $2Fe_2O_3 + 3C \rightarrow 4Fe + 3CO_2$
allow multiples

1

(h) carbon

1

(i) Loss of oxygen

1

[10]

Practice Paper: Answers
Physics

Q1 (a) proton

all 3 in correct order

electron

*allow **1** mark for 1 correct do **not***

neutron

accept letters p, e, n

2

(b) 9

reason only scores if 9 is chosen

1

number of neutrons and protons

1

[4]

Q2 (a) sound

1

(b) (visible) light

1

(c) cooking food

1

(d) 1.2 gigahertz

1

(e) 300 000 × 1000 = 300 000 000 m/s

1

(f) wave speed = frequency × wavelength

allow v = f λ

1

(g) 300 000 000 = 1200 000 000 × λ

*an answer of 0.25 scores **3** marks*

1

$\lambda = \frac{300\,000\,000}{1\,200\,000\,000}$

*allow ecf from **(e)***

1

λ = 0.25 (m)

1

[10]

Q3 (a) induced

1

(b) bar 2

1

(the same end) of bar 1 attracts both ends of bar 2

or

only two magnets can repel so cannot be bar 1 or bar 3

1

(c) so the results for each magnet can be compared

or

so there is only one independent variable

fair test is insufficient

allow different thickness of paper would affect number of sheets each magnet could hold

accept it is a control variable

1

(d) because the magnet with the biggest area was not the strongest

accept any correct reason that confirms the hypothesis is wrong eg smallest magnet holds more sheets than the largest

1

[5]

Q4 (a) 20

1

(b) 50

1

(c) (i) 115

1

(ii) 230

1

(iii) if one goes out the other still works

or

brighter

accept power (output) is greater

can be switched on/off independently is insufficient

1

(d) the outside/casing is plastic

there is plastic around the wires is insufficient

it is plastic is insufficient

1

and plastic is an insulator

an answer the light fitting is double insulated gains both marks

1

(e) (residual current) circuit breaker

accept RCCB

accept RCBO

accept RCCD

accept RCB

accept miniature circuit breaker / MCB

trip switch is insufficient

breaker is insufficient

do not accept earth wire

1

[8]

Q5 (a) any **two** from:

- bungee rope may snap
- rope may extend too much
- student may land in the river

2

(b) gravitational potential

correct order only

1

kinetic

1

elastic potential

1

(c) $\frac{1}{2} \times 40 \times 35^2$

1

24 500 (J)

accept 25 000 (J) (2 significant figures)

1

*allow 24 500 (J) with no working shown for **2** marks*

[7]

Q6 (a) Student A's measurements had a higher resolution

1

Student B was more likely to misread the temperature

1

(b) a random error

1

(c) 8.4 °C

1

(d) 740 (seconds)

allow answers in the range 730 – 780

1

(e) 0.40 × 199 000

1

79 600 (J)

1

*accept 79 600 (J) with no working shown for **2** marks*

(f) stearic acid has a higher temperature than the surroundings

accept stearic acid is hotter than the surroundings

1

temperature will decrease until stearic acid is the same as the room temperature / surroundings

1

[9]

Q7 (a) electron(s)

1

(b) 3rd box ticked

The model cannot explain the results from a new experiment

1

(c) all three correct

Particle
Proton
Electron
Neutron

*allow **1** mark for 1 correct*

2

[4]

1.