

Please read the instructions printed below. **One** of these sheets, suitably completed, should be attached to the assessed work of **each** candidate.

<b>Specification Code</b>	<b>J649</b>	<b>Unit Code</b>	<b>B483</b>		<b>Session</b>	<b>Jan / June</b>	<b>Year</b>	<b>2</b>	<b>0</b>		
---------------------------	-------------	------------------	-------------	--	----------------	-------------------	-------------	----------	----------	--	--

<b>Centre Name</b>		<b>Centre Number</b>					
--------------------	--	----------------------	--	--	--	--	--

<b>Candidate Name</b>		<b>Candidate Number</b>				
-----------------------	--	-------------------------	--	--	--	--

You need to produce a laboratory notebook or file in which you have recorded four activities. These must include:

1. a report on how science is used in the workplace [11 marks];
2. the production of pure, dry samples from two types of chemical reaction [13 marks];
3. a report on the assembly and assessment of the effectiveness of one electronic or optical device [7 marks];
4. a report on mechanical devices [6 marks];
5. a report on monitoring the growth/development/response of an organism [13 marks].

<b>A typical candidate at grades GG, FF, EE will:</b>	<b>A typical candidate at grades DD, CC, BB will:</b>	<b>A typical candidate at grades BB, AA, A*A* will:</b>	<b>Teacher Comment</b>	<b>Location</b>	<b>Mark</b>
<p><b>a1</b></p> <ul style="list-style-type: none"> <li>• identify careers that are available in science and science-related industries;</li> <li>• in the study of organisations that use science identify the work carried by one organisation;</li> <li>• identify where an organisation is located;</li> <li>• identify the job titles of people in the organisation;</li> <li>• identify how the people in the organisation use science;</li> <li>• the report has little structure or follows a structure provided by worksheets.</li> </ul> <p style="text-align: right;"><b>0 1 2 3 4 5</b></p>	<p><b>a2</b></p> <ul style="list-style-type: none"> <li>• describe the work carried out in two organisations that use science;</li> <li>• identify one reason for the location of each of the two organisations;</li> <li>• list the qualifications required by employees of the organisation;</li> <li>• describe how employees in the two organisations use science; the report is coherent and has an appropriate structure.</li> </ul> <p style="text-align: right;"><b>6 7 8</b></p>	<p><b>a3</b></p> <ul style="list-style-type: none"> <li>• explain the importance of work that is carried out in two organisations that use science, these should be chosen from an international, a national and a local example;</li> <li>• explain the location of the two organisations giving a minimum of one scientific, economic, social and environmental reasons;</li> <li>• explain how the qualifications and skills enable the employees of the organisation enable them to carry out their role;</li> <li>• relate the work carried out by the employees of the two organisations to the underpinning science;</li> <li>• the report is concise, logical and well sequenced, with appropriate use of textual and visual material</li> </ul> <p style="text-align: right;"><b>9 10 11</b></p>			(11)

A typical candidate at grades GG, FF, EE will:	A typical candidate at grades DD, CC, BB will:	A typical candidate at grades BB, AA, A*A* will:	Teacher Comment	Location	Mark
<p><b>b1</b></p> <ul style="list-style-type: none"> <li>identify the type of chemical reaction used to obtain each product;</li> <li>identify the products and reactants of each reaction;</li> <li>follow step by step instructions to obtain products, using appropriate safety procedures;</li> <li>measure the yield of each product;</li> <li>give the reason(s) for the difference between the actual yield and percentage yield; for one of these reactions, on an industrial scale, identify energy inputs and waste produced.</li> </ul> <p style="text-align: right;"><b>0 1 2 3 4 5</b></p>	<p><b>b2</b></p> <ul style="list-style-type: none"> <li>describe the type of chemical reaction used to obtain each product;</li> <li>write a word equation for each chemical reaction; follow instructions to obtain products, using appropriate safety procedures;</li> <li>carry out appropriate calculations to measure the actual yield and determine the percentage yield of each product given the theoretical yield;</li> <li>describe the weaknesses of the technique used to produce each chemical product;</li> <li>for one of these reactions, on an industrial scale, list the energy inputs at each stage of the reaction and describe methods used to treat and dispose of waste</li> </ul> <p style="text-align: right;"><b>6 7 8 9</b></p>	<p><b>b3</b></p> <ul style="list-style-type: none"> <li>explain the underlying chemistry involved in each type of chemical reaction used to obtain each product, and explain the industrial importance in this, of this type of reaction;</li> <li>write a balanced chemical equation for each chemical reaction;</li> <li>given a range of apparatus to choose from candidates are able to independently obtain their product;</li> <li>carry out appropriate calculations to determine quantities of reactants required, and the actual yield and percentage yield of each product;</li> <li>identify sources of error and suggest improvements to the technique used to synthesise each product;</li> <li>for one of these reactions, on an industrial scale, explain the energy inputs required at each stage and evaluate methods used to treat and dispose of waste.</li> </ul> <p style="text-align: right;"><b>10 11 12 13</b></p>			(13)
<p><b>c1</b></p> <ul style="list-style-type: none"> <li>identify the use of electronic or optical devices;</li> <li>follow instructions to assemble an electronic or optical device with guidance following appropriate safety procedures;</li> <li>identify whether the device that they produced met the original brief.</li> </ul> <p style="text-align: right;"><b>0 1 2</b></p>	<p><b>c2</b></p> <ul style="list-style-type: none"> <li>identify a range of components in these electronic or optical devices;</li> <li>follow instructions to assemble an electronic or optical device, with some guidance, using appropriate safety procedures;</li> <li>describe the weakness(es) of the device.</li> </ul> <p style="text-align: right;"><b>3 4 5</b></p>	<p><b>c3</b></p> <ul style="list-style-type: none"> <li>describe the functions of the components used in these electronic or optical devices;</li> <li>assemble an electronic or optical device independently using appropriate safety procedures, selecting the most appropriate components for the device;</li> <li>describe the weakness(es) of the device and suggest improvements that could be made to overcome them</li> </ul> <p style="text-align: right;"><b>6 7</b></p>			(7)

A typical candidate at grades GG, FF, EE will:	A typical candidate at grades DD, CC, BB will:	A typical candidate at grades BB, AA, A*A* will:	Teacher Comment	Location	Mark
<p><b>d1</b></p> <ul style="list-style-type: none"> <li>identify simple types of mechanical devices;</li> <li>when given the components, follow instructions with guidance to assemble a mechanical device using appropriate safety procedures;</li> <li>measure and record the forces applied and forces produced by a mechanical device.</li> </ul> <p style="text-align: right;"><b>0 1 2</b></p>	<p><b>d2</b></p> <ul style="list-style-type: none"> <li>identify a range of components in these mechanical devices;</li> <li>follow instructions to assemble a mechanical device with little guidance, using appropriate safety procedures;</li> <li>calculate the amount the device multiplies forces, the work done by the device and the efficiency of the device.</li> </ul> <p style="text-align: right;"><b>3 4</b></p>	<p><b>d3</b></p> <ul style="list-style-type: none"> <li>explain how these components are used in mechanical devices;</li> <li>investigate the performance of at least two mechanical devices, including one specified commercial device;</li> <li>carry out appropriate calculations to explain and evaluate the performance of at least two mechanical devices, including one specified commercial device.</li> </ul> <p style="text-align: right;"><b>5 6</b></p>			(6)
<p><b>e1</b></p> <ul style="list-style-type: none"> <li>identify the organism to be monitored;</li> <li>follow instructions to monitor the activity of an organism;</li> <li>make and record simple observations and/or measurements with guidance;</li> <li>present data in simple charts /graphs/images;</li> <li>describe their findings;</li> <li>identify any weaknesses of the monitoring process used.</li> </ul> <p style="text-align: right;"><b>0 1 2 3 4</b></p>	<p><b>e2</b></p> <ul style="list-style-type: none"> <li>give reasons for monitoring the activity of the chosen organism;</li> <li>produce a schedule for monitoring the activity of an organism;</li> <li>make and record accurate observations and/ or measurements independently;</li> <li>process the data with some guidance where appropriate and present the data in a suitable format;</li> <li>explain their findings using simple scientific knowledge and understanding;</li> <li>describe the effect of the weaknesses of the monitoring process used.</li> </ul> <p style="text-align: right;"><b>5 6 7 8</b></p>	<p><b>e3</b></p> <ul style="list-style-type: none"> <li>explain the importance of this monitoring process in a scientific context;</li> <li>produce a detailed plan for monitoring the organism which defines the conditions that will be monitoring/controlling;</li> <li>make and record sufficient accurate observations and/or measurements;</li> <li>manipulate the data independently using sophisticated techniques;</li> <li>use a full and detailed understanding of the science involved to explain their findings;</li> <li>review the work, identify sources of error and suggest improvements to their monitoring technique.</li> </ul> <p style="text-align: right;"><b>9 10 11 12 13</b></p>			(13)
(50)					

**Guidance on Completion of this Form**

- One sheet should be used for each candidate.
- Please ensure that the appropriate boxes at the top of the form are completed.
- Circle the mark awarded for each strand of the marking criteria in the appropriate box and also enter the circled mark in the final column.
- Add the marks for the strands together to give a total out of 50. Enter this total in the relevant box.