OCR
RECOGNISING ACHIEVEMENT

GCSE

Manufacturing

General Certificate of Secondary Education

Unit **B232/02:** Manufacturing Processes

Mark Scheme for June 2012

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

Question			Answer	Marks	Guidance
1	(a)		**Complete the links below to identify which manufacturing sector makes the product listed.** Chemical and Pharmaceutical to Bleach Motor manufacture to Laminated windscreen Packaging to Coffee jar Electronic and Communications to Webcam Paper & print to Child's book Food and drink to Energy bar (6x1)	**[6]**	Award one mark for each correct link shown.
	(b)		**State two manufacturing sectors not shown above and give one example of a product made in that sector.** **Electrical** • Torch • Electric kettle • Alarm clock **Clothing and textile** • Denim jeans • Fashion shoes • Nurse's uniform **Furniture** • Dining table • Kitchen cabinet • Armchair **Machinery and equipment** • Power drill • Wheelbarrow • Washing machine 2 x (1+1)	**[4]**	Award one mark for each of two different sectors from those shown above and award one mark for naming a correct product from that sector. Accept 'trade' names e.g., 'Wrangler jeans', 'Nike sports shoe'

Question			Answer	Marks	Guidance
2	(a)		**Complete the table below by adding the following manufacturing stages in the correct order.** Production planning Processing and production Packaging (3 x 1)	**[3]**	Award one mark for each correct position in the table.
	(b)	(i)	**Give two factors that should be considered when selecting materials for a product.** • Form of supply • Cost / value for money • Material characteristics (colour, texture, taste, recyclability), suitable production method • Health and safety (1+1)	**[2]**	Award one mark for each of two relevant factors.
		(ii)	**Describe, using one example, the benefits of using 'smart' materials in a product.** e.g. gives the user a better product /better features, visual indication of temperature change, returns to original shape when heated/subjected to an electrical impulse, a company might sell more products because of better protection for the user	**[3]**	Award one mark for an example and a further two marks for a description of the benefit. Some justification required for full marks Do **not** reward repetition.

Question			Answer	Marks	Guidance
3	(a)		**Many factors need to be considered when choosing production methods for manufactured products.** **Give two factors that should be considered and explain why each factor is important**		Award one mark for relevant factor and two marks for an explanation of its importance.
		(i)	**Factors** could relate to: batch size, client specifications, cost of buying and installing new equipment		
		(ii)	**Importance** could include: to ensure the company doesn't buy expensive mass production equipment if the batch size is small, other answers could relate to quality, materials, staff skills, health & safety		
			2 x (1 + 2)	**[6]**	
4	(a)		**Explain why a manufacturer would make a prototype before production.** Answers could include: To avoid making costly mistakes, to get client feedback, check processes work, check materials are easy to work with, allows for 3D visualisation, virtual testing	**[3]**	Award up to three marks for a detailed explanation of why a prototype may be made.
	(b)		**Describe one process that could be used to make a prototype** SLA (Stereo Lithography Apparatus)/ Rapid prototyping technology, can be made by hand, 3D printing, SLS (Selective Laser Sintering)	**[3]**	Award one mark for naming a process and a further two marks for a description.

5	**(a)**		**Give two reasons why companies use control systems to monitor manufacturing processes.** Can give greater control over manufacturing process, can give early indication of faults in the production process, can monitor breakdowns, data collection, (2 x 1)	**[2]**	Award one mark for each reason.
	(b)		**Name one input device used in a basic control system.** e.g., Switch, transducer, sensors (all types) e.g. PIR,	**[1]**	Award one mark for naming a correct input. Accept any input device that is relevant to a manufacturing process.
	(c)	**(i)**	**Name one output device used in a control system.** e.g., Motor, lamp, buzzer, pneumatic arm,	**[1]**	Award one mark for naming a correct output. Accept any output device that is relevant to a manufacturing process. Do not accept computer peripheral devices e.g., printer, plotter, scanner or similar.
		(ii)	**Give one example of its use in manufacturing.** e.g., use of a buzzer to give audible warning if process is faulty	**[1]**	Award one mark for an answer which relates to any viable manufacturing process.
	(d)		**Explain how the use of feedback from a control system may be used to improve quality.** Answers could include: Outputs feed information back to the PLC which uses the feedback to automatically adjust the process back into tolerance, highlights problems in a process quickly so that adjustments to can be made	**[3]**	Award one mark for an example and a further two marks for an explanation of how feedback data could be used to improve product quality. Some justification required for full marks

Question			Answer	Marks	Guidance
6			**A manufacturing company is considering the purchase of a CAD/CAM (Computer Aided Design / Computer Aided Manufacturing) system for its design work.**		Award one mark for each answer.
	(a)		**Give three benefits of using CAD when producing designs.** Designs can easily be loaded to modify, changes can be sent quickly by email, C.A.D can be used to check the changes, quick to make copies or variations of same design, saves paper, saves storage space, 3D drawings/visualisations can be made, simulations 3x1	**[3]**	Do not accept answers like: 'more accurate', 'faster', 'easier to use' or similar
	(b)		**Describe two issues that a company should consider before buying a new CAD/CAM system.** Answers could include: Is the CAD system compatible with the company's current systems, the cost of training existing/new operators and how long it will take, the cost buying/installing the equipment and its breakeven period, 2 x 2	**[4]**	Award one mark for naming an issue and one further mark for a description of the issue.

Question			Answer	Marks	Guidance
7			**Explain, using examples, how the following three factors could affect the quality of the finished product. Use a different example for each factor.**		
		(i)	**Materials used.** Answers could include: High quality materials could improve the quality of the product, whether the materials need to be stored in a certain environment, are the materials compatible with the product use/ client specifications.	**[3]**	Award one mark for an example and a further two marks for an explanation. Some justification required for full marks
		(ii)	**Processes used.** Answers could include: Is the process being used of a high enough level of accuracy so that the product will be improved, will the use machines for large batches give a product quality better than if it were made manually, does it need to be made by hand	**[3]**	Award one mark for an example and a further two marks for an explanation. Some justification required for full marks
		(iii)	**Batch size.** Small quantity hand made products may be more accurate, easier to control small batch quantities, large batches using automation could give better consistency of product, but if process fails all could be wrong, larger batches justifies expense of better machinery or materials	**[3]**	Award one mark for an example and a further two marks for an explanation. Some justification required for full marks

Question			Answer	Marks	Guidance	
					Content	Levels of response
8*			Award up to six marks for a discussion or critical evaluation of relevant implications regarding health and safety issues for a manufacturer when introducing modern technology.	[6]	**Responses must relate to the effects on the manufacturer and not on the workforce.** Examples and relevant points could include: Costs involved in possible re-training of the workforce in new skills, handling of new materials may need extra safety training/protection; Additional risk assessment may be required; Possible environmental consequences,	**Level 3 (5 – 6 marks)** Candidates provide a thorough analysis and show a clear understanding of the required question material. Specialist language and terms would be used in the appropriate areas being discussed and the required information will be well structured in its presentation. Candidates will demonstrate an accurate level of spelling, punctuation and grammar. **Level 2 (3 – 4 marks)** Candidate provides an adequate discussion which shows a reasonable level of understanding of the question material. There will be some evidence of the use of specialist language although not always in the appropriate areas being discussed. Information, for the most part, will be reasonably structured but, again, may contain occasional errors in spelling, punctuation and grammar. **Level 1 (0 – 2 marks)** Candidate provides a basic discussion which shows some understanding of the question material but uses little or no specialist language. Answers may well be ambiguous or disjointed. Contains obvious errors in spelling, punctuation and grammar
			Total	**60**		

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity

OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553