Published Mark Schemes for GCSE Engineering (Single Award)

Summer 2010

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NORTHERN IRELAND GENERAL CERTIFICATE OF SECONDARY EDUCATION (GCSE)
AND NORTHERN IRELAND GENERAL CERTIFICATE OF EDUCATION (GCE)

MARK SCHEMES (2010)

Foreword

Introduction

Mark Schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of 16- and 18-year-old students in schools and colleges. The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes therefore are regarded as a part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

The Council hopes that the mark schemes will be viewed and used in a constructive way as a further support to the teaching and learning processes.

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Rewarding Learning

General Certificate of Secondary Education
2010

Engineering

Paper 1
Unit 3: Engineering Technology

[GEE31]

MONDAY 17 MAY, AFTERNOON

MARK SCHEME

			AVAILABLE MARKS
1	**(a)** Bolt Cutters [1] Metal dustbin [1]	[2]	
	(b) Ladders [1] Greenhouse frame [1]	[2]	4
2	Pliers Half round file [1] File accepted Wrench [1] Centre punch [1] Punch accepted Calipers [1] Tap and die set [1]	[5]	5
3	**(a)** Function: – It is used where frequent adjustments are needed or part removal can be made quickly at some later stage. [1] Where it could be used: – Used with a nut to hold items together [1]	[2]	
	(b) Function: Used as an output device to illuminate [1] Where it could be used: – Electronic equipment [1]	[2]	
	(c) Function: – Used as an input switch operated by pneumatics [1] Where it can be used: – Industry – Assembly lines [1]	[2]	
	(d) Function: To move/hold large weights. Also used for precision movements. [1] Where it can be used: Lorries – Tipping action [1] Others accepted	[2]	8
4	**(a)** Computer Aided Design [1] Computer Aided Manufacture [1]	[2]	
	(b) Design can be modified [2] The design can be viewed from different angles [2] Others considered	[4]	
	(c) **(i)** Make sure all guards are in place Others considered	[2]	
	(ii) Less waste Time taken to make a product is reduced Others considered	[2]	10
5	**(a)** Ferrous metals contain iron and can rust. [1] Example Steel [1]	[2]	
	(b) Non-ferrous metals do not contain iron and do not rust [1] Example Aluminium [1]	[2]	
	(c) An alloy is a mixture of two or more metals, or a metal mixed with		

				AVAILABLE MARKS
		another element. [1] Example – Gold [1] Others accepted	[2]	
	(d) **(i)**	When two or more materials are combined by bonding a composite material is formed	[2]	
	(ii)	Tufnol	[1]	9
6	**(a)** **(i) (ii) (iii)**	Suitable descriptions pertaining to the two products they have chosen. Products and descriptions must be different in each case. Duplicate answers will not gain marks. ICT – Used to record stock [2] Materials – Ref. to modern materials used [2] Systems and control – monitoring manufacturing [2] Other similar answers accepted	[6]	
	(b) **(i) (ii) (iii)**	Suitable descriptions pertaining to the two products they have chosen. Products and descriptions must be different in each case. Duplicate answers will not gain marks. ICT – Used to record stock [2] Materials – Ref. to modern materials used [2] Systems and control – monitoring manufacturing [2] Other similar answers accepted	[6]	12
7	**(a)**	So that faulty products do not go out into the market place [2] To ensure that the products are made to the original specification [2] Others considered	[4]	
	(b)	This is the limit to which a product can be manufactured within a specified tolerance before it is unable to be used. This refers to the maximum and minimum tolerances a product can be made to. Other similar answers accepted	[2]	6
8	**(a)**	Cheaper They do not have to buy in special machinery to make the components Others accepted	[2]	
	(b) **(i)**	Name – Pop rivet [1] Application – Holding metal together. Airplane outer shell [1]	[2]	
	(ii)	Name – Washer [1] Application – to distribute the load of a threaded fastner. Usually used with a nut and bolt. [1] Other similar answers accepted	[2]	6

				AVAILABLE MARKS
9	**(a)**	Annealing – Softening of metal by heating and leaving to cool. [2 × 1] Hardening – Heating and rapidly cooling a metal. The metal is heated to its upper critical temperature then plunged into cold water. It leaves the metal brittle, so is often followed by a process called tempering. [2 × 1] Tempering – to make the metal tougher and less likely to break. [2 × 1] Other similar answers accepted.		
	(b)	Type of finish – Painting [1] Example – Hammerite [1] Type of finish – Plastic coating [1] Example – Fluidised power [1] Other answers accepted e.g. Type of finish – Lacquering Example – cellulose Others considered	[4]	10
10	**(a)**	Staff need to be retrained Staff may have to be laid off [2] High set up costs of the new machinery [2] Others considered	[4]	
	(b)	Robotic assembly lines [1] More computer orientated workplaces [1] Others considered	[2]	
	(c)	Saves warehouse space and costs [2] Reduced set up time Work/production synchronized with demand [2] Others considered.	[4]	12
			Total	**80**

New Specification

Rewarding Learning

General Certificate of Secondary Education
2010

Engineering

Paper 2
Unit 3: Engineering Technology

[GEE32]

THURSDAY 20 MAY, AFTERNOON

MARK SCHEME

AVAILABLE MARKS

1 **(a)** Punching [2]

(b) Good strength to weight ratio, strong
Non-ferrous metal
Others considered [1 × 2] [2]

(c) Holes drilled precisely in the rotary arms
All materials cut to length exactly
Others considered [1 × 2] [2]

(d) Advantage – The product can be assembled quicker
Others considered [2]

(e) Robotic assembly
Cutting of aluminium to the correct length
Others considered [2]

(f) Complex profiles can be manufactured.
Consistency across the length of the profile.
Less waste material.
Others considered [1 × 2] [2]

(g) Designs can be modified easily.
It is a quicker way of getting a virtual model
Others considered [1 × 2] [2]

(h) The buyer can see exactly what they are getting.
CAD has allowed a more aesthetically pleasing product to be designed through ongoing research and modifications.
Others considered [2]

(i) Length of the rotary arms
Hinging mechanism
Distance between the holes in the rotary arms
Others considered [2 × 1] [2]

Advantage for the consumer – Product is not faulty
An accurate and reliable product
Others considered [2] [2]

(j) Appropriate diagram showing how the folding and locking mechanism operate on the rotary clothes dryer line.
Marks will be awarded for
– Detail contained in sketches (4)
– Quality of sketches (3)
– Detailed notes (3) [10]

		AVAILABLE MARKS
(k) Appropriate modification showing how a storage compartment for pegs can be attached to the vertical central pole of the rotary clothes dryer line. Marks will be awarded for – Suitability of chosen method (4) – Quality of sketches (3) – Detailed notes (3) [10]		40
Total		40