CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2013 series

0417 INFORMATION AND COMMUNICATION TECHNOLOGY

0417/21 Paper 2 (Practical Test A), maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

CAMBRIDGE
International Examinations

Header
Centre No left, file name right aligned 1 mark

Offshore Wind Energy

Report by: Candidate Name

Title
Data entry 100% accurate, centre aligned 1 mark
26 pt, sans-serif, bold & underlined 1 mark

Subtitle
Data entry 100% accurate, 18 pt sans-serif 1 mark
Italic, bold, right aligned 1 mark

A Global Power Source

Wind ver harnesses the of the wi p w g converting kinetic energy into mechanical y. Offshore wind power is widely d as the future of renewabl ind provides an power. It is growing at the rate of 30% annually and is extensively used in Europe, Asia and the United States.

New subhead 100% accurate & correct location 1 mark
All subheads (6) formatted centre, sans-serif, 14 pt, bold, u/l 1 mark

Appropriate image in correct location 1 mark
Text wrap, aligned left & top 1 mark
Resized 3.5 cm high, aspect ratio maintained 1 mark

From an emerging fuel source twenty years ago, wind e s transformed into a n business. I

Body text
3 columns, 1.5 cm col spacing 1 mark
12 pt, serif font 1 mark
Single line space, fully justified 1 mark

offshore wind farm being installed in Denmark in 1991. Europe has taken the lead due to strong wind resources, shallow water in the North Sea and the Baltic Sea, and Government recognition of the role offshore wind will play to meet renewable r t t C t id E growing in North America, Canada and Asia.

Onshore wind energy potential is concentrated in agricultural and industrial f north-western Europe. The largest e potential is found in low depth the North Sea, the Baltic Seas and the Atlantic Ocean, with some local opportunities in areas of the Mediterranean and Black Seas. The deep offshore potential is even larger but costs mean development is slow.

potential equal to three times its electricity demand. Surrounded by a large shallow continental shelf with good access to available strong and constant offshore winds it is ideally placed to exploit the enormous potential for offshore wind power and offshore wind farm development. The sea is relatively shallow around the land masses allowing for turbine foundations to be driven into the seabed rather than attempting to accomplish a complicated floating system of turbines. To date, 9 offshore wind farms have been built around the UK coastline with 330 offshore turbines, equating to 778.4 MW of installed capacity. The UK has a target of securing 15% of all its energy needs for electricity, heat and transport from renewable sources nd farms in the UK hore of power are:

Footer
Date left, Name & Cand Number right 1 mark

Name	Sea	Capacity
Thanet	North Sea	300
Gunfleet Sands	North Sea	172
Inner Dowsing	North Sea	120
Lynn	North Sea	97
Kentish Flats	North Sea	90

DB extract
Inserted in correct place within column width 1 mark
UK, Operational, North Sea 1 mark
Capacity >=90 1 mark
Descending order of Capacity 1 mark
Fields *Name*. *Sea*. *Capacity* in order 1 mark

Asia will soon overtake Europe as the region with the largest capacity.

Europe's offshore wind potential is huge with the technical potential of offshore wind being six to seven times greater than projected electricity demand. At the end of 2010 there were 1,136 offshore wind turbines installed and connected to the grid on 45 wind farms in 9 countries with an operating capacity of 2,396 MW. The 9 European countries with offshore wind power capacity in 2010 were:

Offshore wind power in Europe	
Country	Capacity (MW)
UK	1341
Denmark	854
Netherlands	249
Belgium	195
Sweden	164
Germany	92
Finland	26
Ireland	25
Norway	2.3

Table
Correct place, 2 cols 11 rows, within column width 1 mark
Data entry 100% accurate 2 marks
Top row cells merged 1 mark
Top row only text bold and centred 1 mark
Font matches body text 1 mark
Top two rows only shaded grey 1 mark

L

As
W
lar
30
M
MW) was the largest project under construction. These projects will be dwarfed by subsequent wind farms which are planned, including Dogger Bank at 9,000 MW, Norfolk Bank (7,200 MW), and Irish Sea (4,200 M).

Offsho
than o
transpo

but via undersea cables. The wind is much more reliable at sea, giving better and more consistent output and there is far less public opposit
The main bene
include:

Bullets
Square bullets applied 1 mark
1.5 line spacing 1 mark

- Higher wind speeds
- More often windy
- Less turbulence offshore
- Minimal visual impact
- se impact

sea is steadier, more not blocked by obstacles tains, trees and buildings, output and more consistent generation. This results in higher electricity yield per wind turbine.

Wind Energy Future

Over the past 10 years global wind power grow at an over 30%. technology costs have modern wind er ratings,

Page layout
A4 Landscape 1 mark
Top & bottom margins 2 cm, left & right 2.5 cm 1 mark
No widows/orphans, split lists/tables, blank pages 1 mark
Consistent spacing, 1 cls below paras & subheads, above & below extract & table 1 mark
Document complete/paragraphs intact 1 mark

efficiency and reliability. Countries all over the world are setting targets for wind power. It is estimated that 40,000 wind turbines will be installed in the next 10 years.

The European Union has set ambitious targets to provide 20% of Europe's energy from renewable sources by 2020. As a proven source of clean, affordable energy, wind resources have a vital role to play in realising these goals.

Conventional fuels have a dangerous impact on the climate and the drive for a future of cleaner, more sustainable energy technologies means wind power will go from strength to strength.

Power from North and Irish Seas

Title – correct, 100% accurate 1 mark

Country	ID	Name	Number	Distance	Operational	Capacity	Height	Sea	Turbine_Capacity
Belgium	BE06	Belwind	66	46.0	Yes	330	117.0	North Sea	5.0
Belgium	BE02	Bligh Bank	55	42.0	Yes	165	117.0	North Sea	3.0
Belgium	BE07	C-power II	60	27.0	Yes	216	130.0	North Sea	3.6
Belgium	BE04	Eldepasco	36	37.0	Yes	216	130.0	North Sea	6.0
Belgium	BE05	Th				30	157.0	North Se	5.0
Denmark	DK02					160			2.0
Denmark	DK05					209			2.3
Germany	DE01	Al				60			5.0
Germany	DE09	En				5			5.0
Germany	DE10	Hooksiel	1	0.4	Yes	5	151.0	North Sea	5.0
Ireland	IE01	Arklow Bank	7	10.0	Yes	25	129.0	Irish Sea	3.6
Netherlands	NL02	Egmond aan Zee	36	10.0	Yes	108	115.0	North Sea	3.0
Netherlands	NL01	Princess Amalia	60	23.0	Yes	120	99.0	North Sea	2.0
Norway	NR01	Hywind	1	10.5	Yes	2	106.2	North Sea	2.0
United Kingdom	UK04	Barrow	30	10.0	Yes	90	120.0	Irish Sea	3.0
United Kingdom	UK10	Beatricee Demonstration	2	23.0	Yes	10	170.0	North Sea	5.0
United Kingdom	UK14	Blyth	2	1.0	Yes	4	95.0	North Sea	2.0
United Kingdom	UK07	Burbo Bank					137.0	Irish Sea	3.6
United Kingdom	UK11	Gunfleet Sands					128.5	North Sea	3.6
United Kingdom	UK09	Inner Dowsing					133.5	North Sea	4.0
United Kingdom	UK06	Kentish Flats					115.0	North Sea	3.0
United Kingdom	UK08	Lynn	27	5.2	Yes	97	133.5	North Sea	3.6
United Kingdom	UK02	North Hoyle	30	8.0	Yes	60	107.0	Irish Sea	2.0
United Kingdom	UK03	Rhyl Flats	25	8.0	Yes	90	133.5	Irish Sea	3.6
United Kingdom	UK05	Robin Rigg	60	9.5	Yes	216	125.0	Irish Sea	3.6
United Kingdom	UK01	Scroby Sands	30				.0	North Sea	2.0
United Kingdom	UK19	Thanet	100				.0	North Sea	3.0
United Kingdom	UK21	Walney	51	14.0	Yes	184	137.0	Irish Sea	3.6
	Total turbines in operation		1002						

3 records added, 100% accurate 3 marks
Sorted by Country, then by Name 1 mark
Specified fields in correct order 1 mark
Data and labels all fully visible 1 mark
Landscape, 1 page wide 1 mark

Calculated field
Heading 100% accurate 1 mark
Calculated field 2 marks
Formatted to 1 dp 1 mark

Search
Sea = North Sea or Irish Sea 1 mark
Operational = Yes 1 mark

Calculated Sum of Number 1 mark
Label 100% accurate 1 mark

Candidate details on right 1 mark

Name, Centre Number, Candidate Number

Renewable Energy

Wind Power in Europe

Progress since 1 January 2009

Import 6 slides 1 mark
New slide as first slide – correct layout 1 mark
Text entry correct 1 mark

Renewable Energy

KEY FACTS

- Mostly used to generate electricity
- Fastest growing segment of all renewable energy sources
- Favourable climate conditions in Europe
- A pollution-free energy source

Renewable Energy

PRODUCTION

- 142,000,000,000 kWh of electricity produced
- Equal to 4.2% of EU's electricity demand
- Equivalent to the needs of 35 million EU households

Renewable Energy

INVESTMENT

- €11 billion invested in wind turbines
- Saved fuel costs of €5.4 billion
- Avoided CO_2 costs of €2.275 billion

Delete Slide 3 (*European Targets*) 1 mark
Move slide 6 (Production) to slide 3 1 mark

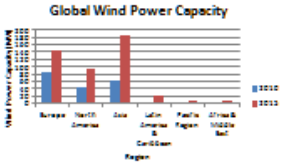
Renewable Energy

CO2

- Avoided 91 million tonnes of CO_2
- Equivalent of taking 46 million cars off the roads
- Equal to 27% of the EU-15s Kyoto obligation

Renewable Energy

GROWTH PREDICTIONS



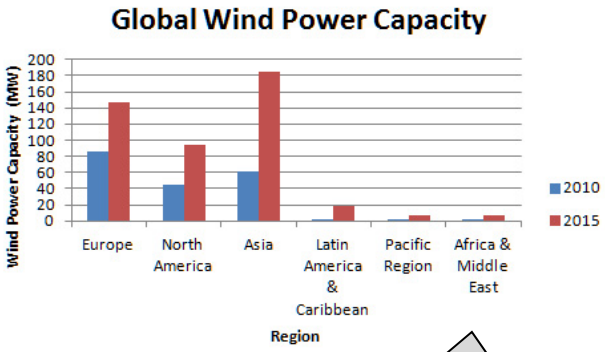
- China will be the fastest growing market
- Asia will overtake Europe as the region with the largest capacity

Print
Handout slides 6 to page 1 mark

Master slide
Correct image placed top right – no distortion 1 mark
Thick 3 pt horizontal line across slide below image 1 mark
Text *Renewable Energy*, 72 pt, serif, left, above line, no wrap 1 mark
Centre No, Cand No, Name, 10 pt, serif, bottom right 1 mark
Auto slide no, bottom left 1 mark
All items created and appear on all slides with no overlap 1 mark

Renewable Energy

GROWTH PREDICTIONS



- China will be the fastest growing market
- Asia will overtake Europe as the region with the largest capacity

Centre Number, Candidate number, Name

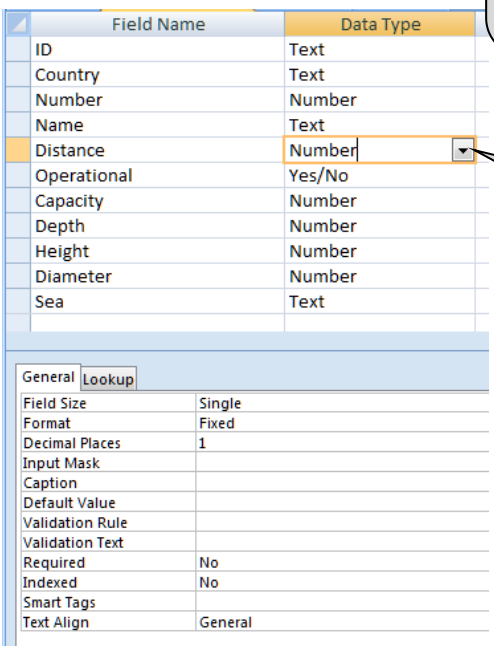
Vertical bar chart created from correct data	1 mark
Chart titles & legend created correctly, series labels displayed in full	1 mark
Chart placed to left of bullets	1 mark

Print
Single slide 1 mark

Step 2 & 3 Contact details and distribution list

Contact entry Abdul Amar, a.amar@cie.org.uk	1 mark
Contact entry Hussain Syed, h.syed@cie.org.uk	1 mark
Contact entry Oliver Johnson, o.johnson@cie.org.uk	1 mark
Created distribution list named Energy Team (100% accurate)	1 mark
3 contacts stored in Energy Team group	1 mark

Step 28 Database field structure

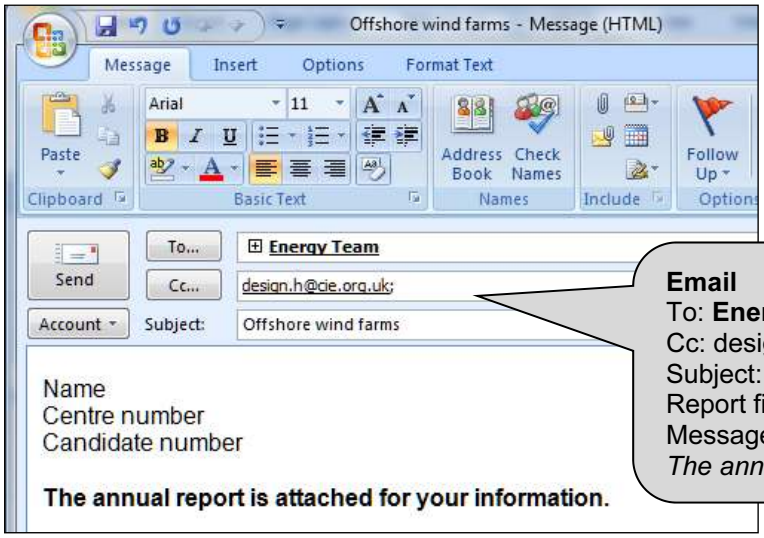


Database structure

Correct field names and data types	1 mark
Distance and *Height* formatted to 1 dp	1 mark
Operational as yes/no on report	1 mark
Boolean/logical set in design	1 mark

Centre Number

Step 51 Email Message



Email

To: **Energy Team** group	1 mark
Cc: design.h@cie.org.uk	1 mark
Subject: *Offshore wind farms*	1 mark
Report file attached (doc or rtf)	1 mark
Message text & personal details correct	1 mark

The annual report is attached for your information.