

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
AS GCE
F732/01
GENERAL STUDIES
The Scientific Domain

TUESDAY 22 MAY 2012: Morning
DURATION: 1 hour
plus your additional time allowance
MODIFIED ENLARGED

Candidates answer on the Answer Booklet.

OCR SUPPLIED MATERIALS:

8 page Answer Booklet
(sent with general stationery)

OTHER MATERIALS REQUIRED:

An electronic calculator

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the spaces provided on the Answer Booklet. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Answer **ALL** the questions in Section A and **ONE** question in Section B.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- You are advised to divide your time equally between Sections A and B.
- **THE QUALITY OF YOUR WRITTEN COMMUNICATION WILL BE ASSESSED, INCLUDING CLARITY OF EXPRESSION, STRUCTURE OF ARGUMENTS, PRESENTATION OF IDEAS, GRAMMAR, PUNCTUATION AND SPELLING.**

SECTION A

Answer ALL the questions in this section.

- 1 This question is about measurement and problem solving.**

John wants to measure the mass of his head as a percentage of the mass of his whole body. With the help of his friend Joe, he conducts the following experiment:

John lies in a bath. Joe fills the bath with water until John's whole body (including his head) is immersed, then marks the level of the water on the side of the bath (point X).

John lifts his head out of the water. Joe notes the fall in the level of the water and marks the new level on the side of the bath (point Y).

John gets out of the bath. Joe notes the fall in the level of the water and marks the new level on the side of the bath (point Z).

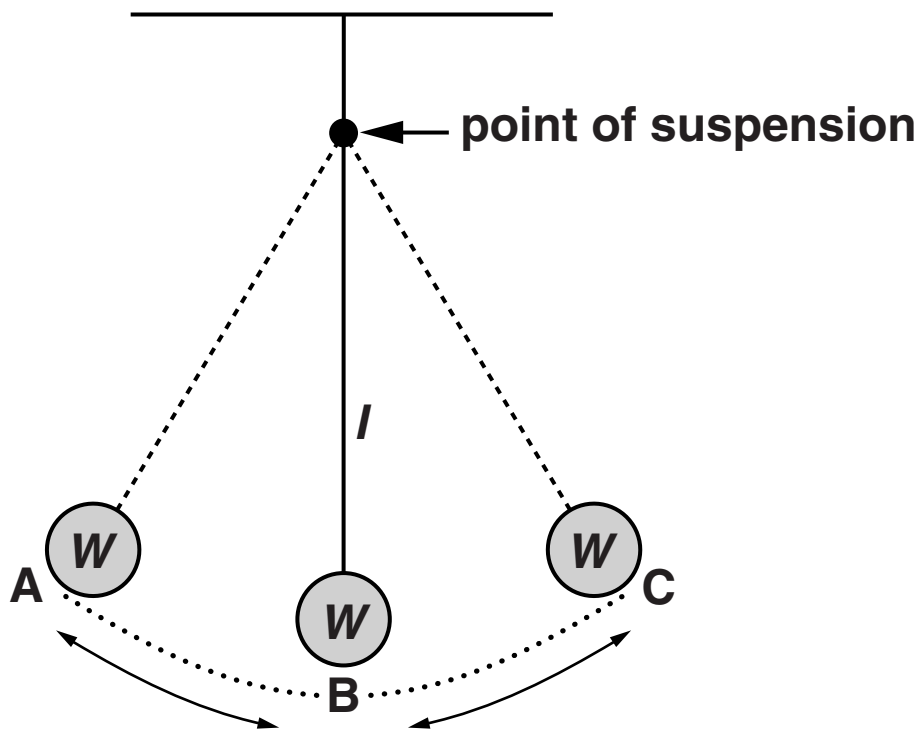
John empties the bath. Using a 5-litre bucket, he re-fills the bath. He records the volume of water required to re-fill the bath to each of the marked points X, Y and Z.

Using the volumes recorded, John is able to calculate the mass of his head as a percentage of the mass of his whole body.

- (a) Outline THREE potential sources of inaccuracy in measuring the volumes of water involved. [7]**
- (b) Suggest TWO ways in which John could improve his experiment. [5]**

- 2 Fig. 1 shows a simple pendulum in which a weight (W) is suspended on a piece of thin wire of length (l).

FIG. 1 A SIMPLE PENDULUM



The time taken for one swing of the pendulum, from B to C to A and back to B is called its period of swing (T). This period of swing helps scientists to find an approximate measure of g , the acceleration of a falling object due to the pull of gravity.

- (a) Tables 1 and 2 show the results of two experiments carried out in a school laboratory using a simple pendulum.

TABLE 1 CHANGING THE MASS OF THE WEIGHT (W) ON THE PENDULUM

MASS IN GRAMS	TIME IN SECONDS FOR 1 SWING
100	1.09
200	1.10
300	1.10
400	1.09

TABLE 2 CHANGING THE LENGTH (l) OF THE PENDULUM

LENGTH IN cm	TIME IN SECONDS FOR 1 SWING
100	2.00
200	2.83
400	4.01
800	5.67

Identify, using the data in the tables, **ONE** conclusion you can draw about the period of swing of a pendulum when there is:

- (i) a change in the mass of the pendulum [3]
- (ii) a change in the length of the pendulum. [3]

- (b) For a simple pendulum the formula linking T , l and g is shown below:

$$T = 2\pi \sqrt{\frac{l}{g}}$$

KEY:

π to be of value $22/7$ or 3.14 .

Where T (period of swing) is the time taken in seconds for one swing of the pendulum.

l is the length of the pendulum.

g the acceleration of a falling object due to gravity.

In a school laboratory experiment a pendulum of length 100 cm was used. The period of swing averaged over 20 swings was found to be 2 seconds.

Calculate to one decimal place the value for g in cm/s^2 (centimetres per second squared).

You must show clearly how you reached your answer. [6]

- (c) The acceleration of a falling object in a vacuum near the surface of the earth is defined to be precisely as 9.80665 m/s^2 . Suggest TWO reasons for the result found in the school laboratory experiment differing from this value. [6]

Section A Total [30]

BLANK PAGE

SECTION B

Answer ONE question in this section. Your answer should be in continuous prose.

- 3 Fig. 2 (opposite) shows a map of a rural site that has been quarried for sand. The quarry has filled with water and the local council wants to redevelop the lake and surrounding open land. Suggest facilities that could be provided for EACH of the following:**

**field investigations by A level students
leisure activities for young and old
local commercial and retail industries wishing to expand their premises.**

**How might conflicts of interest between these THREE groups be resolved in the design of the area?
[30]**

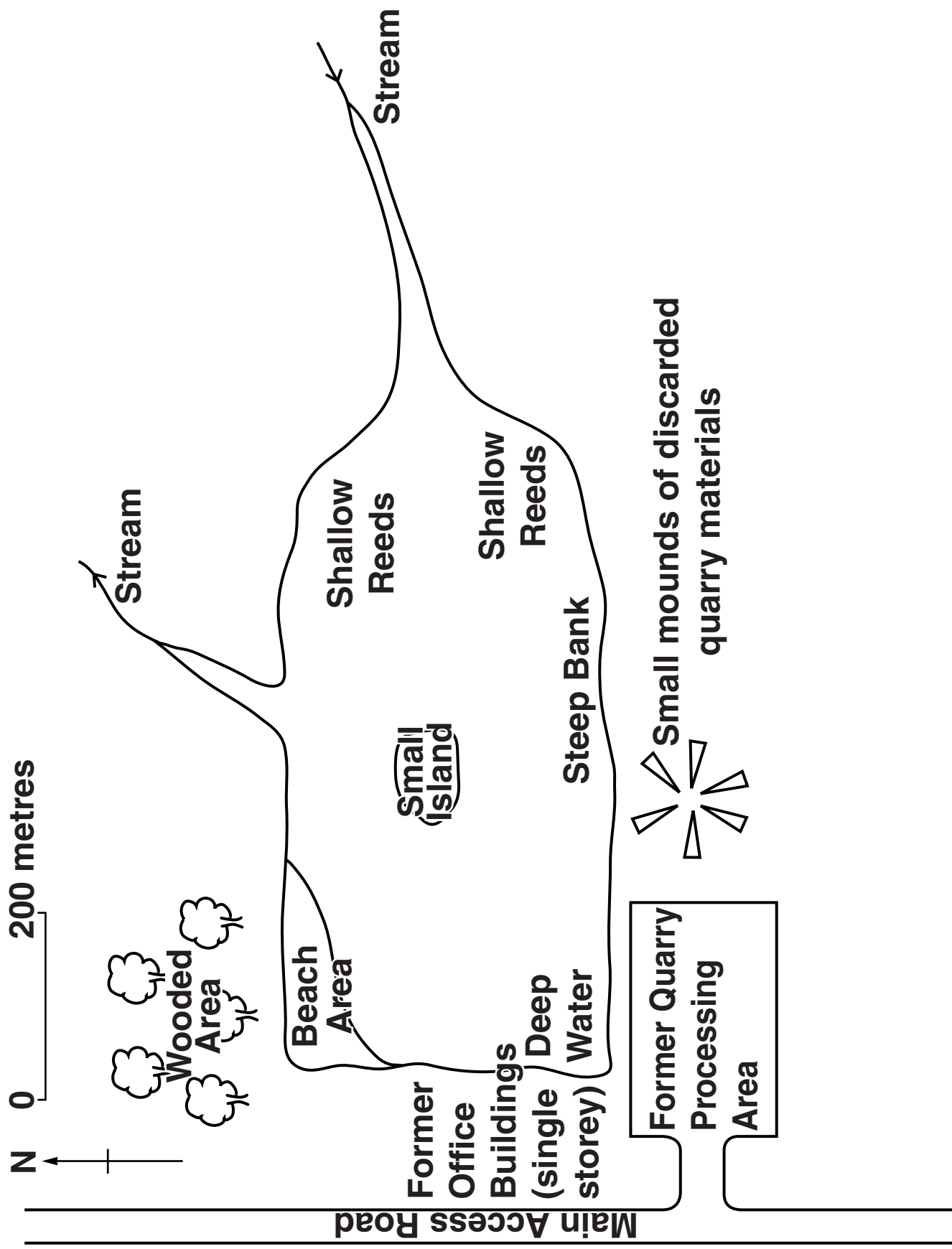
- 4 Historically, attempts have been made to control the birth rate of the human population, because of high or increasing levels of poverty or overpopulation, because of environmental concerns or for religious reasons.**

Describe the DISADVANTAGES of EACH of the following methods of controlling birth rates:

**contraceptive devices
allowing couples only one child
termination of pregnancies.
[30]**

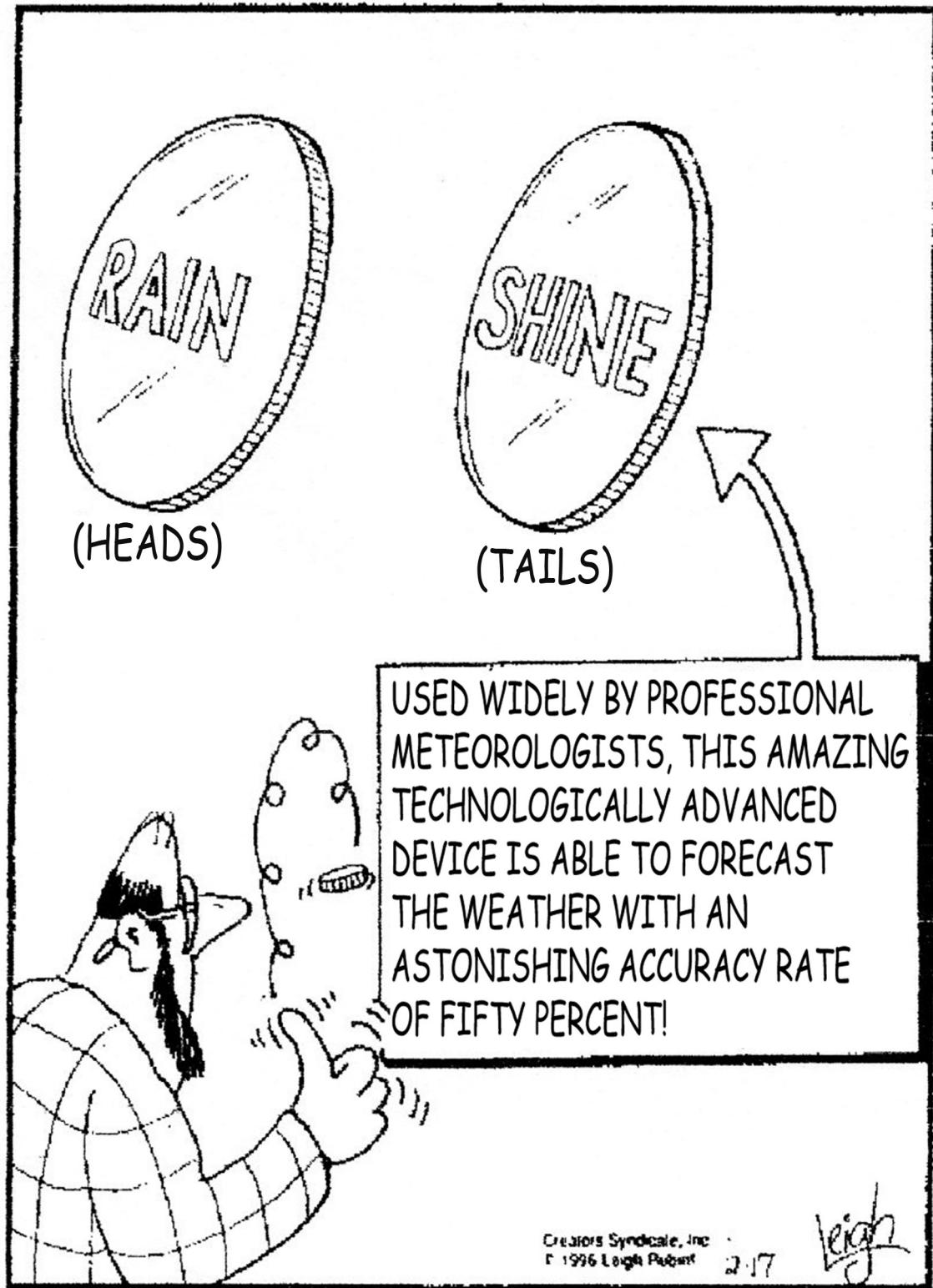
TURN TO PAGE 10 FOR SECTION B, QUESTION 5

FIG. 2



- 5 This question is about forecasting events. The cartoon takes a rather negative view of the success of forecasters.

RUBES by LEIGH RUBIN



By permission of Leigh Rubin and Creators Syndicate, Inc.

In this cartoon, a meteorologist is flipping a coin in the air. Above him are two, large coins. One coin carries the word ‘Rain’, with the word ‘Heads’ below, while the other coin has ‘Shine’ with ‘Tails’ below. Inset is the following information, from which an arrow points to the ‘Shine’ (Tails) coin:

“Used widely by professional meteorologists, this amazing technologically advanced device is able to forecast the weather with an astonishing accuracy rate of fifty percent!”

Forecasts are made for many everyday events, such as:

**the cost of erecting a new building
the next volcanic eruption
the cost of fuel in five years’ time
the number of people likely to contract influenza next winter
the areas liable to flood in the event of prolonged heavy rain.**

Using TWO examples of different types of forecast, suggest reasons for these being inaccurate.

[You may include forecasts listed in the question.]

[30]

Section B Total [30]

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.