Pearson Edexcel GCE

Applied Information and Communication Technology
Unit 3: The Knowledge Worker

19 – 23 May 2014 **Time: 2 hours 30 minutes**	Paper Reference **6953/01**

You must have:
Short treasury tag, cover sheet, GemPowder_exam.txt, PixiePlates_exam.xlsx

Instructions
- Complete your candidate details on the cover sheet provided.
- All printouts must contain your name, candidate number, centre number and activity number.
- At the end of the examination:
  – *all printouts should be placed in the correct order*
  – *use a treasury tag to attach your printouts (as shown) to page 2 of the cover sheet.*

Information
- The total mark for this paper is **90**. There are **four** activities in this examination totalling 88 marks. **2** further marks are allocated to Standard Ways of Working.
- The marks for **each** question, within an activity, are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

Advice
- Read through the Scenario carefully.
- Work through the activities in order.
- Attempt **ALL** activities.
- Label your printouts clearly as instructed.
- Printing must be undertaken within the examination time.

Turn over ▶

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Scenario

<h2 style="text-align:center">Pixie Plates</h2>

Pixie Plates were the idea of Amanda Lemmons, a fine arts student at Leeds Metropolitan University. On her course Amanda studied a unit on computer graphics. She became fascinated with the pixilation that occurs when a bitmap graphic is expanded too much. She experimented with 10 by 10 grids and came up with an idea for a physical manifestation of pixilation. She used 1 mm square wire mesh to create a 10 by 10 grid and inserted small semi-precious gems into each section of the grid to form a pattern or design. A simple fastener was attached to the wire mesh, which clipped onto special chains to form necklaces and bracelets. She paid her way through university selling this homemade jewellery on market stalls in and around the Leeds area.

On leaving university she sold the idea to LFG plc, a large jewellery manufacturer with retail shops throughout the country. This gave her enough money to follow her profession as an artist without having to worry about how to pay for food and shelter.

LFG made a few minor modifications to the idea. It developed a method of producing artificial stones by compressing the powder produced when gems were shaped for other jewellery. This means that LFG can make money from the waste product of the manufacturing processes.

The artificial stones are identically sized and shaped to fit into the wire mesh. The weight of the stones is measured in carats, each carat being 0.2 of a gram. The weight of a stone produced by compressing the powder is half a carat.

LFG also produces display cases for Pixie Plates and has designed clip and pin-and-butterfly fixings to which single Pixie Plates can be attached, making earrings.

Demand for Pixie Plates took off when Rebecca Rose, the celebrated actress, wore a necklace of Pixie Plates when she received an award for best actress for her role in 'La Feuille Nouvelle'.

The popularity of Pixie Plates is helped by the current trend in jewellery collection. Pixie Plate collectors are always on the lookout for new designs to add to their collections. Demand for the new designs can be predicted. LFG has developed a formula to do this based on their retail price.

Each month LFG produces three new designs for Pixie Plates. To appeal to all potential customers it sets the designer the target of producing one to retail at between £50 and £100, one in the range £500 to £750 and one which would be between £1,000 and £2,000.

As the amount and type of gem powder available each month varies, depending on other jewellery LFG has produced, the designer is asked to design the new Pixie Plates to use up what is available. For example, one month it has a lot of citrine so the designs would be mostly orange.

The previous designer started to work on a spreadsheet model to help her with the design process. It was not only to help her with what the designs would look like but also to calculate how many of each design would be needed and whether she had enough raw material to produce the predicted number of Pixie Plates. Unfortunately for LFG, she got a new job as a designer of crystal for a famous glass producer in Ireland. She left the unfinished model with notes for the next Pixie Plate designer.

Worksheet	Description
Designs	This is the worksheet I was going to use to put together the actual designs. As well as three areas to try out different designs, there is a corresponding area for each design that will calculate how many stones of each kind are used and how much a Pixie Plate will cost to produce. There will also be a totals area to keep track of the total number of stones required for this month's orders and the amount of raw material remaining.
Stones	This worksheet will contain the amount of gem powder I have available for this month's designs.
Stock Control	This worksheet will keep track of the amount of gem powder I have used for each design and also the amount remaining.

Some cells in the model are password protected. Should you wish to experiment with the model, the password is *edexcel*. Be aware that if you change the contents of any protected cell the model may not work.

Your Task

You have been employed by LFG as the new Pixie Plate designer. When LFG employed you it was as interested in your IT skills as your artistic talent as it wanted someone to complete the spreadsheet model. Your task is to complete the spreadsheet model and produce this month's three Pixie Plate designs.

Note: For this examination you will not receive marks for the artistic merit of your Pixie Plates. You should concentrate on whether there is enough of a particular gem powder to fill the order and whether you produce designs in the specified price range.

The Data

The data file **GemPowder_exam.txt** contains the amount (in grams) of each powder you have available for your designs. It also contains the cost per carat for each stone.
The selling price is set at the total value of all the stones used in the design.

Instructions to Candidates

All printouts must have a header and a footer. The header must contain the activity number. The footer must contain your name, candidate number and centre number.

Minimum font size of 10 must be used throughout.

All spreadsheet printouts should show gridlines and row and column headers.

For some of your spreadsheet printouts you may need to adjust column widths. To do this you will need to unprotect the worksheets. The password is *edexcel*.

Activity 1 – Understanding the situation (suggested time 15 minutes)

LFG has appointed you not only as a Pixie Plate designer but also as an IT specialist. It wishes you to complete the model.

Note: Bullet pointed answers or numbered lists must be used for parts (a) and (b).

On **one** sheet of A4:

(a) List 10 points from the scenario you consider relevant to creating the model.

(10)

(b) What constraints, with regards to price, have the management of LFG given you for creating the Pixie Plates?

(3)

(c) Describe **one** other constraint (other than the price) you have to take into account when you are creating your designs.

(2)

Save and print your work.

(Total for Activity 1 = 15 marks)

Activity 2 – Computer modelling (suggested time 1 hour)

You should ensure that each printout is on **one** sheet of A4 only.

The model is stored as **PixiePlates_exam.xlsx**

Open the spreadsheet model and familiarise yourself with it.

(a) **Stones**

❑ Import the data contained in the file **GemPowder_exam.txt** into cells F7:G14 of the 'Stones' worksheet.

   Hint: You may have to unprotect the worksheet to do this.

(1)

❑ Enter a formula into cell H8 of the 'Stones' worksheet that will convert the weight of citrine powder available in grams to carats. Replicate this formula down to cell H14.

(1)

❑ Print off columns B–H and rows 7–14 of the 'Stones' worksheet showing **formulae**.

(b) **Designs – Part 1**

The 'Designs' worksheet contains three areas in which to create your designs C7:L16, O7:X16 and AA7:AJ16.

Each design has a calculation area D18:L24, P18:X24 and AB18:AJ24 respectively. Cells in each of the calculation areas are merged in the same way so that the formulae in D18:L24 can be copied/replicated into the other two areas. **You must not unmerge these cells**.

When you build formulae in D18:L24 you will need to be careful to set the absolute addressing so that the formulae will refer to the correct ranges and cells in the design grid above.

❑ Cell D18 is a merged cell that will count the number of citrine stones in the left-hand design. Enter a formula into cell D18 that will count the number of times the value "C" appears in the range C7:L16.

   Hint: Remember this formula has to be replicated down as well as copied into cells P18 and AB18 to count the citrine stones in your other two designs.

❑ Replicate this formula down to D24.

❑ Enter a formula into the merged cell F18 to read the cost per carat for citrine from the 'Stones' worksheet.

❑ Replicate this formula down to F24.

❑ Enter a formula into the merged cell I18 to calculate the cost of citrine stones in the left-hand design.

   Remember: each stone in the design weighs half a carat.

❑ Replicate this formula down to cell I24.

(7)

❑ Print off columns B–L and rows 17–25 of the 'Designs' worksheet showing **formulae**.

(c) **Designs – Part 2**

The calculation area for the middle design P18:X24 has merged cells in the same format as the calculation area of the left-hand design. This means that the formulae could be copied from the left-hand area to the middle.

❑ Enter formulae into the area P18:X24 to do the same calculations for the middle design as the formulae in cells D18:L24 did for the left-hand design.

(5)

❑ Print off columns N–X and rows 17–25 of the 'Designs' worksheet showing **formulae**.

(d) **Designs – Part 3**

The calculation area for the right-hand design AB18:AJ24 has merged cells in the same format as the calculation area of the left-hand design. This again means that the formulae could be copied from the left-hand area to the right-hand area.

❑ Enter formulae into the area AB18:AJ24 to do the same calculations for the right-hand design as the formulae in cells D18:L24 did for the left-hand design.

(2)

❑ Print off columns Z–AJ and rows 17–25 of the 'Designs' worksheet showing **formulae**.

❑ Reset the 'Designs' worksheet to **data** view and set the width of columns B–AK to 2.

(e) **Stock Control – Part 1**

❑ Enter formulae into cells D7, E7 and F7 of the 'Stock Control' worksheet to read the total cost of each of your designs from the 'Designs' worksheet.

The formula to calculate the number of a particular Pixie Plate LFG expects to sell is:

$$50\ 000\ 000/(\text{cost of Pixie Plate})^2$$

(Fifty million divided by the square of the cost of the Pixie Plate)

❑ Enter a formula into cell D8 of the 'Stock Control' worksheet, which if the cost of the Pixie Plate design is greater than zero will calculate the number of that design LFG expects to sell. Otherwise display zero.

❑ Replicate this formula across to cell F8.

❑ In cell D9 of the 'Stock Control' worksheet enter a formula to calculate the total number of citrine stones expected to be used for all the left-hand designs LFG expects to sell.

❑ Replicate this formula down to cell D15.

❑ In cell E9 of the 'Stock Control' worksheet enter a formula to calculate the total number of citrine stones expected to be used for all the middle designs LFG expects to sell.

❑ Replicate this formula down to cell E15.

❑ In cell F9 of the 'Stock Control' worksheet enter a formula to calculate the total number of citrine stones expected to be used for all the right-hand designs LFG expects to sell.

❑ Replicate this formula down to cell F15.

(7)

❑ Print off columns A–F and rows 6–15 of the 'Stock Control' worksheet showing **formulae**.

(f) **Stock Control – Part 2**

❑ Enter a formula into cell G9 of the 'Stock Control' worksheet to calculate the total number of citrine stones LFG expects to need for all three designs.

❑ Replicate this down to cell G15.

❑ Enter a formula into cell H9 of the 'Stock Control' worksheet to calculate the total weight in carats of citrine stones LFG expects to need for all three designs.

Remember: 1 stone = half a carat

❑ Replicate this formula down to cell H15.

❑ Enter a formula into cell I9 of the 'Stock Control' worksheet to calculate the total weight in grams of citrine stones LFG expects to need for all three designs.

❑ Replicate this formula down to cell I15.

❑ Enter a formula into cell J9 of the 'Stock Control' worksheet to calculate the weight in grams of citrine powder that is left of the original amount held on the 'Stones' worksheet.

❑ Replicate this formula down to cell J15.

(4)

❑ Print off columns A–B and G–J and rows 7–15 of the 'Stock Control' worksheet showing **formulae**.

(g) **Designs – Part 4**

❑ Enter a formula into the merged cell AN18 of the 'Designs' worksheet to read the number of citrine stones used from the 'Stock Control' worksheet.

❑ Replicate this formula down to AN24.

❑ Enter a formula into the merged cell AP18 of the 'Designs' worksheet to read the weight in grams of citrine powder remaining from the 'Stock Control' worksheet.

❑ Replicate this formula down to AP24.

(2)

❑ Print off columns AL–AS and rows 17–24 of the 'Designs' worksheet showing **formulae**.

(h) **Use the Model**

Designs are created by entering the first letter of the stone you require in the grid. All cells in a grid must have a stone in them for it to be a valid design.

Remember: You are not going to be assessed on the artistic merit of your designs, simply that your designs conform to the constraints detailed in the scenario.

❑ Create **three** designs conforming to the constraints detailed in the scenario.

(6)

❑ Print off columns B–AS and rows 7–25 of the 'Designs' worksheet showing **data**.

(i) **Printouts**

❑ Collect your printouts together, ensure you have printed them correctly and that they are in the order you have been asked to print them.

(4)

❑ Make sure you save your spreadsheet.

(Total for Activity 2 = 39 marks)

Activity 3 – Wall Mount (suggested time 30 minutes)

One of the directors of LFG wants to see if there is a market for a 4 cm x 4 cm wall-mounted Pixie Plate. His idea is that it should be made up of 1 carat stones in a 20 by 20 wire mesh. The production manager has said that the compression machine can be set up to produce 1 carat stones. You have been asked to produce a design for a limited edition wall mount. LFG will produce 200 of whatever design you come up with, regardless of the cost. The 'Wall Mount' worksheet needs to be set up to design a wall mount using stones made with the gem powder you have left over after the previous designs.

(a) **Wall Mount – Part 1**

- ❑ In the merged cell AA8 of the 'Wall Mount' worksheet enter a formula that will count the number of citrine stones in your design.

- ❑ Replicate this formula down to AA14.

- ❑ In the merged cell AC8 of the 'Wall Mount' worksheet enter a formula that will read the cost per carat of citrine from the 'Stones' worksheet.

- ❑ Replicate this formula down to AC14.

- ❑ In the merged cell AF8 of the 'Wall Mount' worksheet enter a formula that will calculate the cost of the citrine stones used in your design.

- ❑ Replicate this formula down to AF14.

(4)

- ❑ Print off columns Y–AI and rows 7–15 of the 'Wall Mount' worksheet showing formulae.

(b) **Wall Mount – Part 2**

- ❑ In the merged cell AA21 of the 'Wall Mount' worksheet enter a formula that will calculate the number of citrine stones that will be used in the manufacture of the proposed number of wall mounts.

- ❑ Replicate this formula down to AA27.

- ❑ In the merged cell AC21 of the 'Wall Mount' worksheet enter a formula that will calculate the weight in carats of citrine stones that will be used in the manufacture of the wall mounts.

- ❑ Replicate this formula down to AC27.

- ❑ In the merged cell AE21 of the 'Wall Mount' worksheet enter a formula that will calculate the weight in grams of citrine powder that will be used in the manufacture of the wall mounts.

- ❑ Replicate this formula down to AE27.

- ❑ In the merged cell AG21 of the 'Wall Mount' worksheet enter a formula that will calculate the weight in grams of citrine powder that will be left after the manufacture of the wall mounts.

❑ Replicate this formula down to AG27.

(7)

❑ Print off columns Y–AI and rows 17–27 of the 'Wall Mount' worksheet showing **formulae**.

(c) **Use the Model**

Designs are created by entering the first letter of the stone you require in the grid. All cells in a grid must have a stone in them for it to be a valid design.

Remember: You are not going to be assessed on the artistic merit of your designs, simply that your designs conform to the constraints detailed in this activity.

❑ Create a design conforming to the constraints detailed in this activity.

(5)

❑ Print off columns C–V and rows 7–26 of the 'Wall Mount' worksheet showing **data**.

❑ Print off columns Y–AI and rows 7–27 of the 'Wall Mount' worksheet showing **data**.

(d) **Printouts**

❑ Collect your printouts together, ensure you have printed them correctly and that they are in the order you have been asked to print them.

(3)

(Total for Activity 3 = 19 marks)

*Activity 4 – User Guide (suggested time 35 minutes)

LFG is pleased with your design work and has decided to promote you to chief designer of costume jewellery. LFG has employed a new designer to take over your role with the Pixie Plates. It has asked you to produce a brief user guide so that the new designer will know how to use the system.

Note: the model is now complete and you will not have to explain how to enter any formulae.

The user guide should contain:

❑ a suitable title

❑ the data that the new designer will need to enter each month and the source of this data

❑ a description of how to use the design worksheets, how to enter a design, and how to ensure the constraints are met

❑ an evaluation of how well the spreadsheet model enables the designer to handle the objectives and constraints of the design process

❑ any tips on how to make the model easier to use, which you think will help the new designer.

Proof read your user guide.

Marks will be awarded for the Quality of your Written Communication (QWC).

Save and print your work.

(Total for Activity 4 = 15 marks)

Standard Ways of Working

All printouts must contain the activity number, your name, candidate number and centre number.

Pages must be securely fastened to the cover sheet and in the correct order.

Minimum font size of 10 should be used for all word processed documents.

(Standard Ways of Working = 2 marks)

TOTAL FOR PAPER = 90 MARKS

Write your name here

Surname		Other names

Pearson
Edexcel GCE

Centre Number

Candidate Number

Applied Information and Communication Technology
Unit 3: The Knowledge Worker

COVER SHEET

19 – 23 May 2014

Paper Reference
6953/01

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Punch a hole in the top left corner of each printout.
- Ensure your printouts are in the correct order and attach them to page 2 of this cover sheet using a treasury tag.
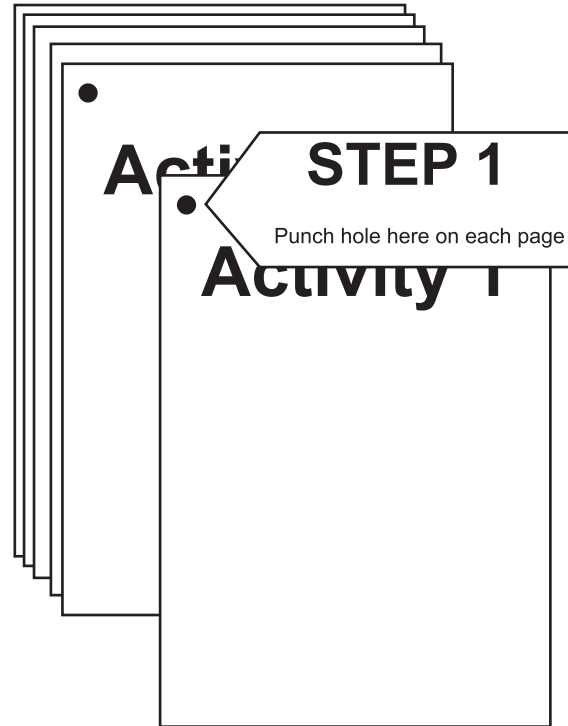
Turn over ▶

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Put 'treasury tag' through this hole

STEP 1

Punch hole here on each page

Activity 1

Activity 1

STEP 2 **Arrange your pages in this order, face up.**

Activity 1
Activity 2
Activity 3
Activity 4

STEP 3 Put a 'treasury tag' through all your pages

STEP 4 (last)

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A1		
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A3		
A4		
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Activity 2		
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Activity 4		
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