



Unit Number

**U3051246/KA3T****Key Skills****Application of Number****Level 3****Monday 23 May 2005****Total Marks: 50****No. of Questions: 6****Time: 1 hour 30 minutes****Materials required for examination**

This test paper

An answer booklet

A pen with black or blue ink

A pencil and eraser

A ruler marked in mm and cm

2mm squared paper

A scientific calculator

**You may use a bilingual dictionary****Instructions to Candidates**

Do NOT open this test paper until you are told to do so by the supervisor.

In the boxes on the answer book, write your centre number, registration number, surname and initials. The paper reference is shown above.

Write in black or blue ink only.

At the end of the test, hand the test paper, the Answer Booklet(s) and all notes to the supervisor.

**Information for Candidates**

There are two parts to this test.

Part A (total 31 marks) consists of 5 short-answer questions.

Part B (total 19 marks) consists of 1 extended-answer question.

Try to answer ALL the questions.

**Advice to Candidates**

Make sure that your writing is clear, and show all your working.

Read each question carefully.

If you need extra paper, use a second answer booklet. Make sure you put your personal details on the front of this booklet too.

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## Part A - Short answer questions

1 During the year 2002 worldwide sales of ring tones generated an estimated £621 million in revenue. Of this revenue, £44 million was paid to songwriters in royalties. The cost of downloading a ring tone in the United Kingdom was approximately £3.00.

- a For each mobile phone ring tone downloaded in the UK, how much was paid to songwriters?

**2 marks**

Revenue from worldwide sales of mobile phone ring tones grew by 58% from 2001 to reach £621 million in 2002.

- b How much **more** revenue was generated by sales of ring tones in 2002 than in 2001?

**2 marks**

The Christmas 2002 number one single had sold 213 000 copies by Christmas Eve. During its first few days in the charts this single sold 33 500 copies and 50 000 ring tones were downloaded.

- c If the proportion of copies sold to ring tones downloaded continued at the same rate as they did during this single's first few days in the charts, how many ring tones in total would be downloaded by Christmas Eve?

**1 mark**

**Total 5 marks**

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- 2 The Department of Transport carried out a survey to investigate the speed of cars travelling on urban roads with a speed limit of 30 miles per hour. The results are shown in the table below.

**Department of Transport survey results**

Speed (s) in miles per hour	Percentage of cars (%)
$10 \leq s < 20$	7
$20 \leq s < 30$	28
$30 \leq s < 35$	33
$35 \leq s < 40$	22
$40 \leq s < 45$	8
$45 \leq s < 50$	2

**Total number of cars observed was 1952**

Source: Transport Statistics Great Britain: 2002 Edition (Department for Transport)

- a Use the data in the table to calculate the total number of the cars observed that travelled at 30mph or exceeded the speed limit in the Department of Transport survey.

**1 mark**

- b Calculate an estimate of the mean recorded speed of cars in this survey.

**3 marks**

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On behalf of residents of an urban road who believe that cars travelling outside their homes are exceeding the 30mph speed limit, a local council carried out its own survey to investigate the speed of cars in this road. The results from the local council survey are shown below.

**Local council survey results**

- **Mean car speed 29mph**
- **Median car speed 33mph**
- **Inter quartile range of car speeds 3mph**
- **Total number of cars observed 250**

- c Which of the two averages in the local survey council results is more significant from the residents' point of view? Explain your answer.

**2 marks**

The residents of the urban road compare the results from the Department of Transport survey with those from the local council survey.

- d Comment on the percentage of cars obeying the speed limit in each survey.

**2 marks**

**Total 8 marks**

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- 3** In November 2002 the Prestige, a tanker carrying 77 000 tonnes of crude oil, split in half and sank in a storm off the coast of Northern Spain.
- the standard unit of capacity for oil is a barrel.
  - in November 2002 one barrel of oil was worth \$25.50.

One barrel of oil is equal to 42 gallons

1240 litres of crude oil weigh 1 tonne  
1 gallon is equal to 4.55 litres

- a** What was the value of the Prestige's cargo of crude oil in dollars when it sank.

**3 marks**

The accident released an estimated 6 500 tonnes of crude oil into the sea in the form of an oil slick. The thickness of the oil slick was 0.12mm.

- b** What was the area covered by the oil slick?

**3 marks**

**Total 6 marks**

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- 4 Old-fashioned beach huts have become increasingly popular in recent years. A family are interested in using one and find information about a beach hut site.

On a map of a beach hut site, drawn to a scale of 1 : 5 000, the length of the site measures 18.6cm and the width of the site measures 13.1cm.

- a What are the dimensions of the actual site?

1 mark

The cost of beach accommodation for sale on this site is given below.

Type of accommodation	Dimensions	Selling price
beach day-hut (for day use only)	7 feet by 8 feet	£9 000
beach chalet (for day and night use)	16 feet by 10 feet	£54 000

- b How much greater is the cost per square foot of the beach chalet than the cost per square foot of the beach day-hut?

2 marks

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The council owns 18 day-huts. Of these, the council rents out  $\frac{2}{3}$  on a daily basis and  $\frac{1}{3}$  on a weekly basis. All of the council's day-huts are rented out for six weeks of the main summer holiday period in July and August.

The council's charges for renting out day-huts are shown below.

Months of the year	Charge per day	Charge per week
April, May, June and September	£18	£36
July and August	£20	£82

- c How much should the council collect in rental payments for its beach day-huts over the six weeks in July and August?

**1 mark**

During the winter season rental prices are cheaper. A private owner offers her beach day-hut for rental at the following rates.

**Beach day-hut rental charge for the period October to March (inclusive)**

- £15 weekly
- £195 for the whole period plus £25 towards the licence fee

- d Calculate the number of weeks at which the period rental is the better deal.

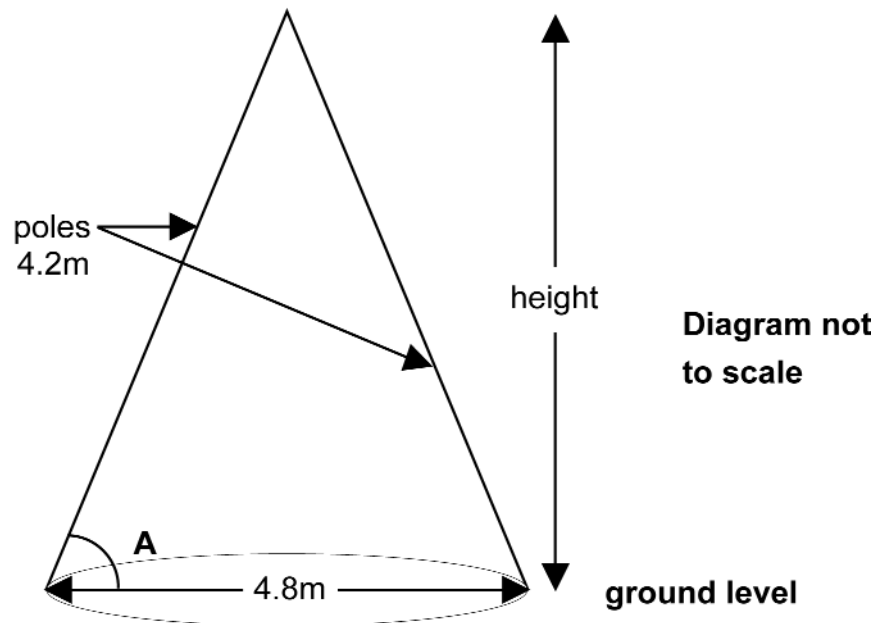
**2 marks**

**Total 6 marks**

- 5 The remains of the oldest known dwelling in Britain were discovered in Scotland. Charred stumps of wooden poles set into the ground in a circular shape indicate that it resembled a North American Indian tent.

From this evidence archaeologists drew a simplified diagram to refer to in order to make a reconstruction of the dwelling.

**Simplified diagram to show the cross-section of the dwelling**



In the simplified diagram the diameter of the circular base of the dwelling is 4.8 metres. The length of each identical supporting pole is 4.2 metres.

- a What is the vertical height from the base at ground level to the highest point of the dwelling ? 2 marks
- b Find the angle shown as A on the diagram between the pole and the base at ground level. 2 marks
- c Show how you can check your answer to part b. 1 mark

The archaeologists wanted to know how much material was needed to cover the tent. They used the following formula to work out the approximate surface area of the dwelling.

$$A = 3.2pr$$

where **A** is the surface area in square metres  
**p** is the length of the pole in metres  
**r** is the radius of the base of the dwelling in metres

- d Use the formula to calculate the approximate surface area of the dwelling.

**1 mark**

**Total 6 marks**

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**Part B - Extended-answer question.**

- 6** Tobacco is thought to be a major contributor to some life threatening diseases. Smoking is less prevalent in the United Kingdom than in some other countries.

A survey carried out in Russia found that 48.5% of a sample consisting of equal numbers of men and women were smokers. In this sample more men smoked than women. The difference between the percentages for men and women was 37%.

- a** Write two equations about the percentage of men and the percentage of women in the sample who smoke. **1 mark**
- b** Use your equations to calculate the percentage of men in the sample who smoke and the percentage of women in the sample who smoke. **2 marks**
- c** Show how you can check your answers to part b. **1 mark**

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The table below gives the percentage of regular cigarette smokers in the United Kingdom by gender and age for the years 1986, 1991, 1995 and 1999.

Year	1986	1991	1995	1999
<b>Men by age in years</b>	<b>Percentage regularly smoking</b>			
16 - 19	30	28	28	30
20 - 24	41	37	40	42
25 - 34	37	36	34	37
35 - 49	37	34	31	32
50 - 59	35	28	27	27
60 - 79	28	24	18	16
Year	1986	1991	1995	1999
<b>Women by age in years</b>	<b>Percentage regularly smoking</b>			
16 - 19	30	31	27	31
20 - 24	38	38	38	39
25 - 34	35	34	30	33
35 - 49	34	33	28	29
50 - 59	35	29	26	27
60 - 79	22	19	17	16

- d** Refer to the data in the table to compare regular cigarette smoking in men and women in 1999 in the UK. Briefly comment on your findings.  
**1 mark**
- e** On the same axes draw two line graphs to compare trends in regular cigarette smoking in men and women aged 35 to 49 years from 1986 to 1999 in the UK.  
**5 marks**
- f** Describe what your line graphs show. Make two significant points.  
**2 marks**

Smoking is thought to be the primary cause of lung cancer. Deaths from lung cancer in men in the United Kingdom fell from 111 per hundred thousand in 1974 to 63 per hundred thousand in 1999. This represents a decrease of about 2.2% each year.

- g** Assuming this decrease continues at the same rate, how many complete years will it take for the number of deaths from lung cancer to fall from 63 to fewer than 55 per hundred thousand per year?

**2 marks**

Sales of products to help smokers quit the habit increased in the run up to the new millennium. The value of the sales of nicotine patches in 1999 grew by 40% on the value of sales in 1998 to reach £23 million.

- h** What was the value for sales of nicotine patches in 1998?

**1 mark**

In the year 2000 a survey found that 72% of smokers in the UK wanted to give up. It was estimated that the population of the UK in that year was 58 774 000 and 27% of the population were smokers.

- i** Use the data to calculate the number of smokers in the UK who wanted to give up in the year 2000.

**2 marks**

Insurance companies want to know whether or not their customers are smokers. The guaranteed life cover (the amount to be paid out in the event of death), with a monthly premium (payment) of £15, for a female non-smoker aged 50 years and a female smoker aged 50 years is given below.

**Female non-smoker**  
Age 50 years

<b>Premium per month in £s</b>	15
<b>Life cover in £s (policy payout)</b>	9520

**Female smoker**  
Age 50 years

<b>Premium per month in £s</b>	15
<b>Life cover in £s (policy payout)</b>	5460

- j What is the ratio of the life cover for a female 50 year-old non-smoker to the life cover for a female 50 year-old smoker if both pay a monthly premium of £15? Write your answer in its simplest form.

**1 mark**

A 50 year-old male non-smoker takes out a life cover policy with a premium of £20 per month. This premium (12 payments per year) will not change. If he dies at the same age as his father, 18 years and 9 months after taking out this policy, his family will receive a policy payout of £9 300.

- k Assuming he keeps up his monthly payments, what approximate fraction of the policy payout will he have paid in monthly premium payments over the 18 years and 9 months?

**1 mark**

**Total 19 marks**

## End of test

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