

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
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6	
7	
TOTAL	



General Certificate of Education
Advanced Level Examination
January 2013

Mathematics

MS2B

Unit Statistics 2B

Monday 28 January 2013 9.00 am to 10.30 am

For this paper you must have:

- the blue AQA booklet of formulae and statistical tables.

You may use a graphics calculator.

Time allowed

- 1 hour 30 minutes

Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Write the question part reference (eg (a), (b)(i) etc) in the left-hand margin.
- You must answer each question in the space provided for that question. If you require extra space, use an AQA supplementary answer book; do **not** use the space provided for a different question.
- Do not write outside the box around each page.
- Show all necessary working; otherwise marks for method may be lost.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- The **final** answer to questions requiring the use of tables or calculators should normally be given to three significant figures.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 75.

Advice

- Unless stated otherwise, you may quote formulae, without proof, from the booklet.
- You do not necessarily need to use all the space provided.



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3 A large office block is busy during the five weekdays, Monday to Friday, and less busy during the two weekend days, Saturday and Sunday. The block is illuminated by fluorescent light tubes which frequently fail and must be replaced with new tubes by John, the caretaker.

The number of fluorescent tubes that fail on a particular weekday can be modelled by a Poisson distribution with mean 1.5 .

The number of fluorescent tubes that fail on a particular weekend day can be modelled by a Poisson distribution with mean 0.5 .

(a) Find the probability that:

(i) on one particular Monday, exactly 3 fluorescent light tubes fail; *(2 marks)*

(ii) during the two days of a weekend, more than 1 fluorescent light tube fails; *(2 marks)*

(iii) during a complete seven-day week, fewer than 10 fluorescent light tubes fail. *(4 marks)*

(b) John keeps a supply of new fluorescent light tubes. More new tubes are delivered every Monday morning to replace those that he has used during the previous week. John wants the probability that he runs out of new tubes before the next Monday morning to be less than 1 per cent. Find the minimum number of new tubes that he should have available on a Monday morning. *(2 marks)*

(c) Give a reason why a Poisson distribution with mean 0.375 is unlikely to provide a satisfactory model for the number of fluorescent light tubes that fail between 1 am and 7 am on a weekday. *(1 mark)*

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QUESTION
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