Design & Technology

Mathematics for D&T – Statistics

Materials required for questions

- Pencil
- Rubber
- Calculator

Instructions

- Use black ink or ball-point pen
- Try answer all questions
- Use the space provided to answer questions
- Calculators can be used if necessary

Advice

- Marks for each question are in brackets
- Read each question fully
- Try to answer every question
- Don't spend too much time on one question

Good luck!

Q1. The table below shows the compressive failure loads for concrete **(3 marks)**

Failure load (MPa)	Number of failures
30	3
35	6
40	7
45	5
50	2

Q1a. What is the modal failure load of the concrete **(1 mark)**

Q1b. What is the median failure load of the concrete **(2 marks)**

Q1c. What is the mean failure load of the concrete **(3 marks)**

Q2. Two quality control checks are performed on a product. The first check has a 99% success rate and the second check has a 96% success rate. Find the probability that both checks fail **(3 marks)**

Q3. A new car has four quality control checks. The probability of failure for each check is shown below

- Fail in check A: 0.02
- Fail in check B: 0.043
- Fail in check C: 0.005
- Fail in check D: 0.012

A product will fail the quality control check if A, B and C fail together of if D fails. If 20,000 products are made, estimate how many will fail **(4 marks)**

Q4. The test scores for a DT class are shown by the table below. Draw a box plot below to show the results **(4 marks)**

Person	A	B	C	D	E	F	G
Test Score	69	47	56	94	82	37	74

Q5. If a student revises for their exam, the probability of passing is 0.8. However, if the teacher sets an extra difficult test the probability of passing goes down to 0.6. The probability the teacher sets an extra difficult exam is 0.25.

Q5a. Find the probability the student fails an extra difficult exam **(3 marks)**

Q5b. Find the probability the student fails regardless of how difficult the exam is **(3 marks)**

Answers
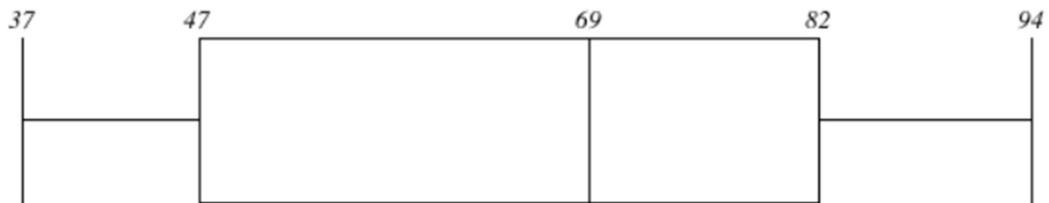
Q1a.
40MPa

Q1b.
40MPa

Q1c.
39.3MPa

Q2.
0.0004

Q3.
240.1 (241)

Q4.

Q5a.
0.4

Q5b.
0.25 (Draw a tree diagram)