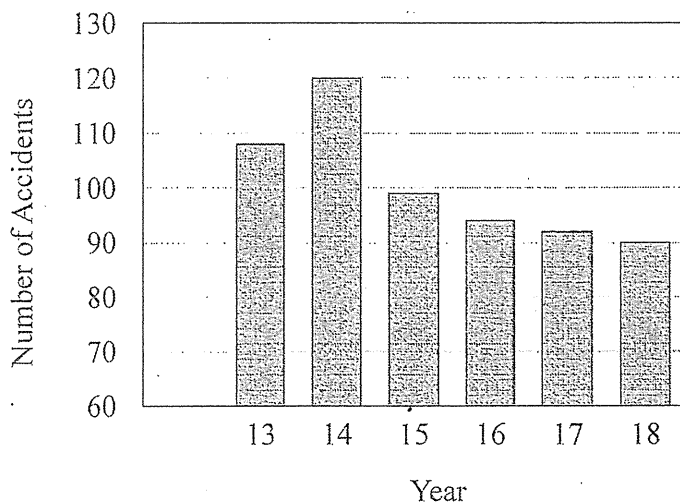


※ 考生請注意：本試題不可使用計算機。 請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

Short-answer questions (100%)

1. When it comes to hand tool design, what are the design considerations for safe operation? (10%)
2. (1) How are working and long-term memory related? Explain the mechanism. (6%)
(2) What are the four types of long-term memories? (4%)
3. Name 4 types of coding used to help with the identification of a control. (8%)
4. Name three methods that designers generally use to design good qualitative displays? Provide examples with drawings to illustrate your answers (12%)
5. Explain Hick's Law. How Hick's Law could be applied in control panel design? (10%)
6. When organizing data into tables, what is the disadvantage of having too many classes? What is the disadvantage of having too few classes? (4%)
7. The bar graph below shows the number of car accidents occurring in one city in each of the years 2013 through 2018. The number of accidents dropped in 2014 after a new speed limit was imposed. Why is the graph misleading? How would you redesign the graph to be less misleading? (6%)



8. The blood types for 40 people who agreed to participate in a medical study were as follows. Construct a relative frequency distribution for the data. (10%)

O	A	A	O	O	AB	O	B	A	O
A	O	A	B	O	O	O	AB	A	A
A	B	O	A	A	O	O	B	O	O
O	A	O	O	A	B	O	O	A	AB

9. The highest temperatures ever recorded (in °C) in 13 different Taiwan counties are shown below. Calculate the interquartile range and construct a boxplot for the data. (10%)

32	31	33	33	36	38	34
35	37	39	37	40	41	

10. Joe is long-jumper. Josh is a sprinter (短跑運動員). They both are good friends. Last weekend they compete at the track along with 4 other athletes in each of their respective events. Joe thinks he is a better athlete than Josh. Do you agree with Joe? Show the evidence for accepting/rejecting his claim. (10%)

Athlete	Joe	Athlete #1	Athlete #2	Athlete #3	Athlete #4
Distance (ft)	23	24	20	21	19

Athlete	Josh	Athlete #A	Athlete #B	Athlete #C	Athlete #D
Time (sec)	15	17	14	19	16

11. A variable is normally distributed with a mean of 100 and a standard deviation of 10. A student wanted to find the percentage of observations of the variable lying between 106 and 110. What is wrong with his solution? (10%)

Student's solution:

$$\text{z-scores: } \frac{106-100}{10} = 0.6 \quad \frac{110-100}{10} = 1.0$$

Percentage of scores lying between 106 and 110

= difference between z-scores

$$= 1.0 - 0.6 = 0.4$$

$$= 40\%$$