

# Aptitude for Engineering Assessment (AEA) Sample Questions

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The following multiple-choice units are intended to provide an idea of the style of AEA questions. These questions are similar in structure and type to some questions that may appear in AEA. They are examples only and are not intended to be fully representative of AEA content or difficulty.

It is recommended that candidates print out the units below to gain a realistic idea of the tests layout.

## Test Component Descriptions

### Section 1 *Quantitative Reasoning and Problem Solving*

- Comprehension of quantitative relationships.
- Analysis and application of quantitative information.
- Quantitative problem solving — analysis to identify and comprehend the problem and key information, transformation and synthesis of information, identification and application of strategies, evaluation of strategies.

Information is presented as numbers, text, graphs, tables, diagrams, symbols.

### Section 2 *Scientific and Critical Reasoning*

- Comprehension and application of concepts, rules and relationships.
- Deductive and inductive reasoning.
- Evaluation of views, statements, hypotheses, arguments and evidence, including identification of main points, lines of reasoning, assumptions, flaws.
- Informal understanding and application of scientific method, and evaluation of approaches to scientific problems.

Information is presented as text, diagrams and tables.

### Section 3 *Interpersonal Understanding*

- Ability to have insight into the feelings of individuals in particular situations.
- Ability to ‘read’ social interactions through reasoning.
- Ability to use understanding of others’ feelings to work out strategies for dealing with particular social situations and working successfully with others.

Information may be presented as text, tables, diagrams and drawings.

# Section 1: Quantitative Reasoning and Problem Solving

## UNIT 1

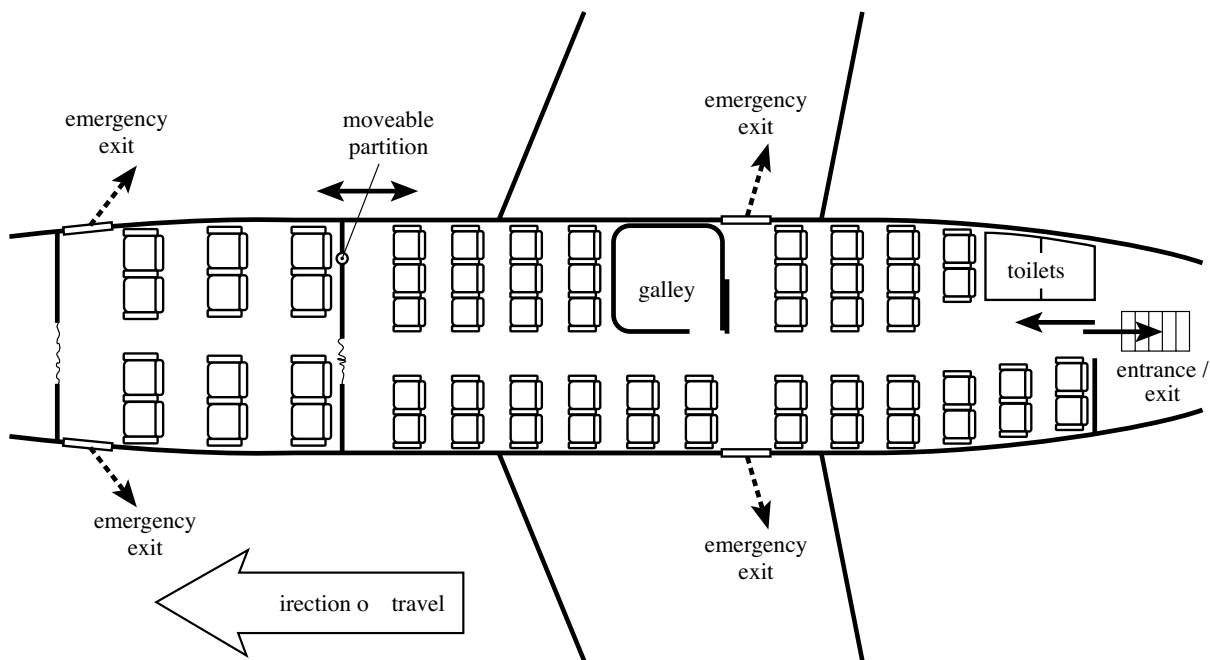
### Questions 1 – 4

GoGreat Airlines has a new class of aircraft, the A-13. The aircraft carries passengers who pay *Economy* fares, and a smaller number who pay higher *Business* fares for extra service and comfort. Seat prices vary from flight to flight.

The A-13 has a rear entrance/exit. It has emergency exits over each wing and at the front of the Business section.

The standard layout of seats is shown in the figure.

With this layout, seats in Rows E and K in Economy each have extra legroom. All Business class seats also provide extra legroom.



1 How many seats are provided for passengers in Economy?

- A 23
- B 24
- C 36
- D 47

- 2 Suppose that for a particular flight Business is full and the Business passengers pay \$200 per seat. All but four available Economy seats are filled with paying passengers. Economy passengers pay \$100 per seat.

How much will the total fares from the flight be?

- A \$6500
- B \$6700
- C \$6900
- D \$7100

- 3 In Economy, the armrests between adjacent seats can be raised out of the way, except for the seats with extra legroom.

When a flight is not full, people sometimes like to raise armrests and stretch across three seats to sleep.

At most, how many passengers could sleep in this way in Economy in an A-13?

- A 5
- B 7
- C 15
- D 21

- 4 Suppose a light lunch is to be served on an A-13 flight. Two flight attendants each serve lunch at the rate of one meal per one and half minutes. All Business seats are full, and all but seven Economy seats have passengers.

Of the following, what is the minimum time required to serve all the passengers?

- A 26 minutes
- B 35 minutes
- C 39 minutes
- D 41 minutes

## UNIT 2

### Questions 5 – 8

Figures 1 and 2 provide some information about a model of the relationship between leg length ( $L$ ), stride length ( $S$ ) and speed ( $v$ ) of various animals. For any individual, stride length and speed can vary, but leg length is fixed.

Figure 2 relates *Relative Stride Length* ( $\frac{S}{L}$ ) to a parameter known as the *Froude Number* ( $\frac{v}{\sqrt{gL}}$ ).

The line of best fit shown was obtained from individuals, travelling at various speeds, of a number of four-legged and two-legged animal species. Also shown are three points based on values obtained from individuals of three species.

- $L$  and  $S$  are in metres (m)
- $v$  is in metres per second ( $\text{m s}^{-1}$ )
- $g$  is acceleration due to gravity on Earth and is approximately equal to  $10 \text{ m s}^{-2}$

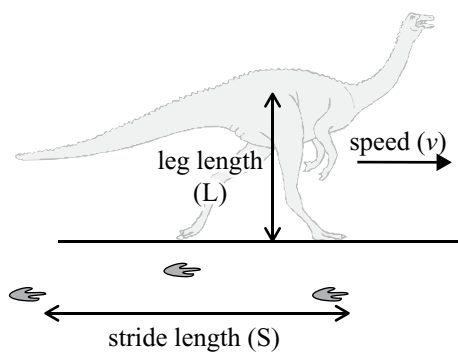


Figure 1

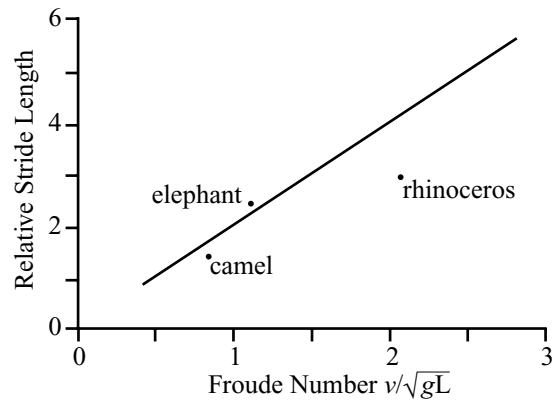


Figure 2

- 5 If an animal has a Relative Stride Length of more than 2, it is considered to be running.

Which of the individual animals shown in Figure 2 was running?

- A the elephant only
- B the rhinoceros only
- C the camel and the rhinoceros
- D the elephant and the rhinoceros

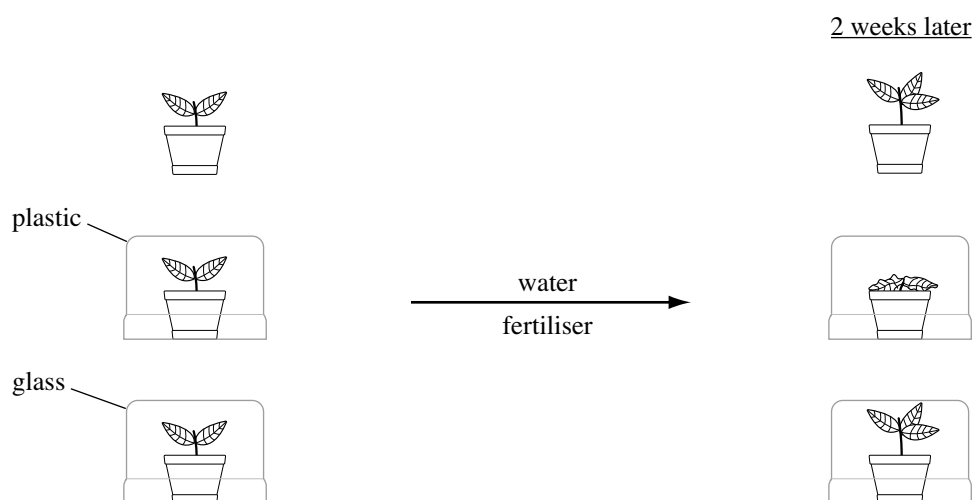
- 6 For the line of best fit, the ratio of Relative Stride Length to Froude Number is approximately
- A 1:1 .
  - B 1:2 .
  - C 2:1 .
  - D 4:1 .
- 7 Based **just** on Figure 2, which of the individual animals shown had the greatest leg length?
- A elephant
  - B camel
  - C rhinoceros
  - D There is insufficient information provided to answer this question.
- 8 According to the line of best fit, two animals with the same Froude Number must have approximately the same value for
- A  $S/L$ .
  - B  $v$  only.
  - C  $L$  only.
  - D both  $v$  and  $L$

## Section 2: *Scientific and Critical Reasoning*

### UNIT 3

#### Questions 9 – 11

Rico wanted to see whether plants grow better when covered with clear plastic than when uncovered. He planted broad beans in three identical pots using the same soil. One pot was left uncovered, and two of the pots were covered, one with clear plastic and the other with glass. All other factors — sun, water, fertiliser, size of cover, and so on — were as similar as possible. After two weeks, two plants had grown normally, while the one under the plastic cover had died (Figure 1).



**Figure 1**

Rico wondered whether something in the plastic could have killed the plant. To test this idea, he set up five broad bean plants, using glass covers (of the same size as before). In four of these set ups there was a piece of plastic dangling above the plant. The plastic in each case was a type of phthalate. The results after two weeks are shown in Table 1.

The molecular weights of the phthalates are also shown in Table 1. (Molecular weight indicates the relative mass of a molecule of a substance.)

**Table 1**

Set up	Type of phthalate	Molecular weight	Result
1	-	-	Grew
2	di-ethyl	222	Died
3	di-butyl	278	Died
4	di-(ethyl-hexyl)	390	Grew
5	di-decyl	446	Grew

- 9 In the second experiment (Table 1), which one of the following best helps explain why all the set ups had a cover?
- A Plants would grow if there was no cover.
  - B Phthalates were shown to react with glass.
  - C When doing experiments, as few set ups as possible should be used.
  - D It is important to keep the conditions of the set ups similar except for one variable.
- 10 Which one of the following is the best conclusion from Rico's experiments?
- A Plants should not be covered by plastic.
  - B Plants are damaged by all types of phthalate.
  - C Plants are damaged by some types of phthalate.
  - D Plants are usually damaged by the presence of phthalate.
- 11 On the basis of Rico's experiments, a gardener would be most justified in concluding that covers should **not** be made of
- A any type of phthalate.
  - B phthalates with lower molecular weights.
  - C phthalates with higher molecular weights.
  - D phthalate unless there is enough water and fertiliser.

## UNIT 4

### Questions 12 – 15

Consider the following passage and answer the questions that follow accordingly.

Humans may have reached northern Europe (including England) 200 000 years earlier than previously thought. Stone tools found in England suggest that early humans were there 700 000 years ago.

The stone tools were discovered at a site in Suffolk. The tools have been dated using several methods. Firstly, the magnetic polarity of iron-containing minerals in the sedimentary rocks where the tools were found is aligned north-south, just as it is today. Since the Earth's magnetic field underwent a polarity reversal 780 000 years ago, the site must be younger than that.

The tools were found beneath glacial ice deposits laid down during a period 450 000 years ago when the region was blanketed in ice, so they must be older than this. Also present at the site were fossils of a water vole *Mimomys*, which was superseded by another vole species called *Arvicola* around 500 000 years ago.

A new amino-acid dating technique gives an estimate of 700 000 years old. The method was used to measure the breakdown of amino acids within shells of a freshwater snail species found with the tools at the site.

- 12 When were humans previously thought to have reached northern Europe?
- A 450 000 years ago
  - B 500 000 years ago
  - C 700 000 years ago
  - D 900 000 years ago

- 13 Without the amino acid evidence, which one of the following is the best estimate of the age of the tools?
- A 500 000 years old
  - B 700 000 years old
  - C 450 000 to 500 000 years old
  - D 500 000 to 780 000 years old
- 14 Of the following, which best indicates the value of the water vole fossils to the dating of the site?
- A The fossils confirm the date of the glacial deposit.
  - B The fossils suggest that the glacial deposits were 50 000 years older than first thought.
  - C The *Arvicola* fossils indicate that the site is more than 500 000 years old.
  - D The *Mimomys* fossils indicate that the site is more than 500 000 years old.
- 15 If found, which one of the following would place the most doubt on the conclusion that early humans were at the site 700 000 years ago?
- A the freshwater snail species was part of the diet of *Mimomys*
  - B the freshwater snail species was part of the diet of *Arvicola*
  - C the freshwater snail species became extinct 500 000 years ago
  - D the freshwater snail species did not exist before 500 000 years ago

## Section 3: *Interpersonal Understanding*

### UNIT 5

#### Questions 16 – 18



*"Just for future reference, save your private heartache for the third or fourth date."*

- 16 The woman in the cartoon has found the man's 'private heartache'
- A confusing.
  - B intriguing.
  - C distressing.
  - D uninteresting.
- 17 The woman suggests that, for a first date, the man has
- A lacked generosity.
  - B been too reserved.
  - C chosen an inappropriate venue.
  - D revealed too much about himself.
- 18 Which word best describes how the man would be likely to feel after the woman's remark?
- A irritated
  - B dejected
  - C satisfied
  - D optimistic

## UNIT 6

### Questions 19 and 20

*The following passage is from a short story. Paul, a school teacher, has been accused of hitting a student. He has voluntarily taken time off work. He has been home for a few days but has told his wife, Carol, only that he needs to take some time off. They are at the dinner table.*

Carol propped herself up on her elbows. 'I heard some kids talking this afternoon,' she said. 'They were talking about you in the library.'

'What did they say?'

'Just tell me, Paul,' she said. 'I just want to know why you aren't at work.'

'Why? What did they say?'

5

'What do you think they said? What could they say?'

He put his hands over his face and breathed loudly.

'Tell me, Paul. Please tell me. Why aren't you at work?'

'I need a break,' he said rubbing his thumb over his lips. 'I just need a break.'

'But is it true what they said? Is it?'

10

He looked at her like he wasn't sure what to say.

'The kids, Paul. The kids.' She leaned towards him. 'Is it true what they said. They said that you hit one of the students,' Carol said. 'Did you?'

He looked up at her. 'What do you think? Do you think that I could do that? Do you?'

15

'No,' she said. 'But the kids ...'

19 In this passage, Carol is trying to

- A punish Paul.
- B protect the students.
- C clarify the situation.
- D avoid confronting Paul.

20 Paul did hit a student. When he says 'Do you think that I could do that?' (line 14) he is

- A expressing total surprise.
- B defending his behaviour.
- C avoiding answering the question.
- D trying to make light of the incident.

## Answers

1	<b>D</b>		11	<b>B</b>
2	<b>B</b>		12	<b>B</b>
3	<b>A</b>		13	<b>D</b>
4	<b>C</b>		14	<b>D</b>
5	<b>D</b>		15	<b>D</b>
6	<b>C</b>		16	<b>D</b>
7	<b>D</b>		17	<b>D</b>
8	<b>A</b>		18	<b>B</b>
9	<b>D</b>		19	<b>C</b>
10	<b>C</b>		20	<b>C</b>

**ACKNOWLEDGMENTS** — *The New Yorker*, p. 67, March 29, 2004; Patrick Cullen: 'Mauve', *The Best Australian Stories 2005*, pp. 23 and 24, Ed. Frank Moorhouse, Melbourne: Black, Inc., Schwartz Publishing Pty Ltd, 2005.

