UNSW Global
THE UNIVERSITY OF NEW SOUTH WALES
SYDNEY • AUSTRALIA

PAPER F

Practice Questions

ICAS International Competitions and Assessments for Schools

DO NOT OPEN THIS BOOKLET UNTIL INSTRUCTED.

STUDENT'S NAME:

Read the instructions on the **ANSWER SHEET** and fill in your **NAME, SCHOOL** and **OTHER INFORMATION**.
Use a 2B or B pencil.
Do **NOT** use a pen.
Rub out any mistakes completely.

You **MUST** record your answers on the **ANSWER SHEET**.

SCIENCE

Mark only **ONE** answer for each question.
Your score will be the number of correct answers.
Marks are **NOT** deducted for incorrect answers.

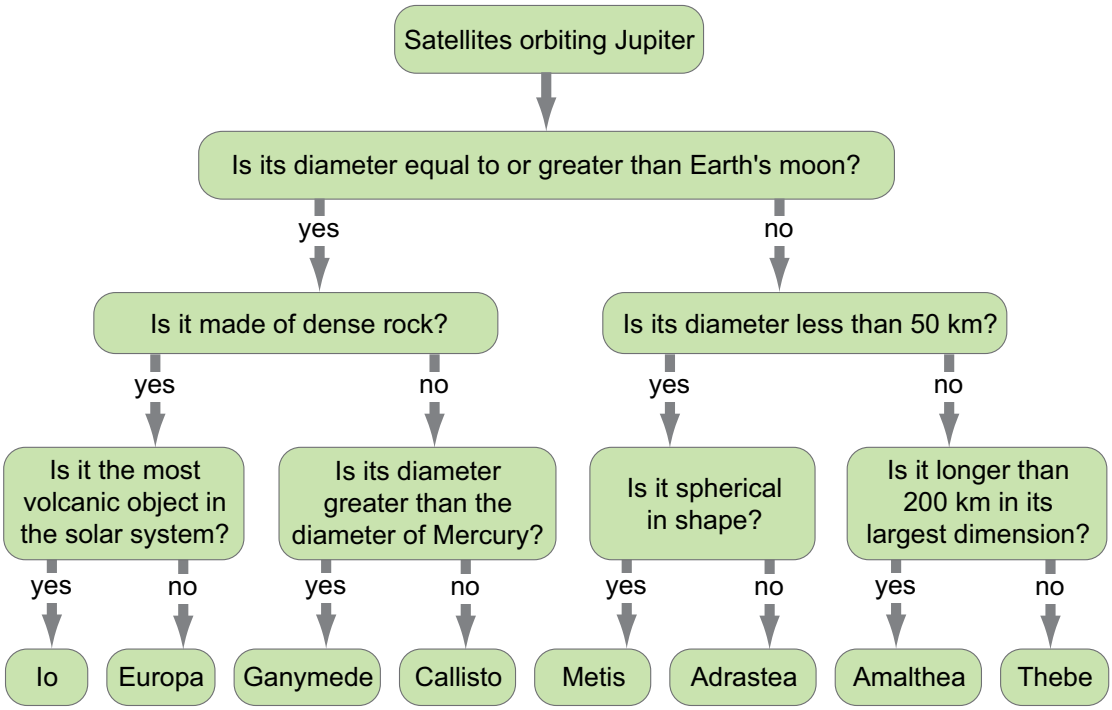
Use the information provided to choose the **BEST** answer from the four possible options.
On your **ANSWER SHEET** fill in the oval that matches your answer.

You may use a calculator and a ruler.

Educational Assessment

1. Mercury has a diameter of 4 900 km.
Earth's moon has a diameter of 3 500 km.

The flow chart distinguishes between eight inner satellites of the planet Jupiter.



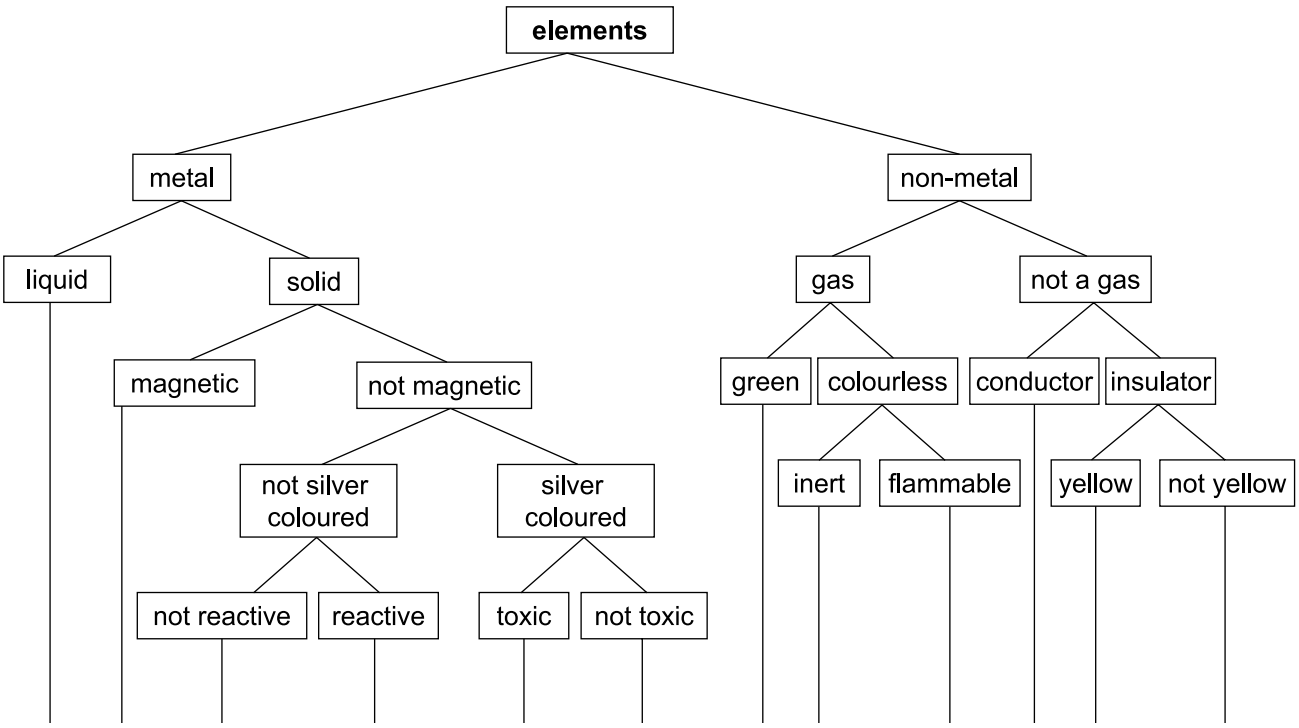
One of Jupiter's inner satellites has a diameter of 4 800 km and is **not** made of dense rock.

Which satellite is this?

(A) Io (B) Europa (C) Ganymede (D) Callisto

For questions 2 and 3 use the information below.

The following flow chart can be used to distinguish between 12 elements.



2. Gold is a yellow metallic solid that is not attracted to magnets.

According to this flow chart, which letters could correspond to gold?

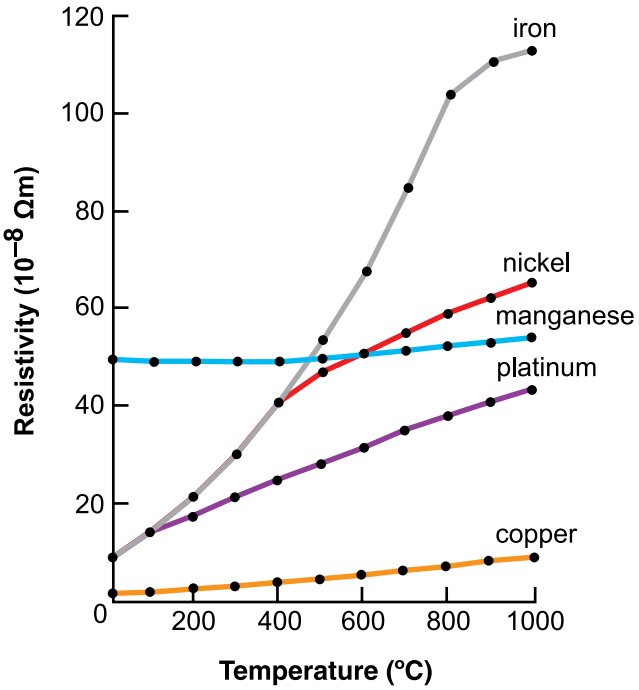
(A) O or P
(B) P or Q
(C) Q or R
(D) S or T

3. Element Y is sulfur and element X is carbon. Which feature is used in the key to distinguish between them?

(A) Carbon is black and sulfur is yellow.
(B) Carbon is a conductor and sulfur is an insulator.
(C) Carbon is a gas and sulfur is not a gas.
(D) Sulfur burns with a flame and carbon glows red hot.

4. The lower the resistivity, the better the metal's ability to conduct electricity.

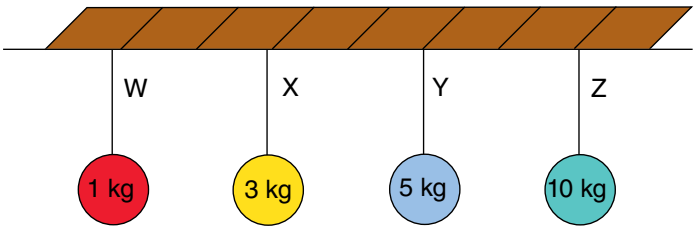
The graph shows the resistivity of several metals.



Which metal is the poorest conductor at 400 °C?

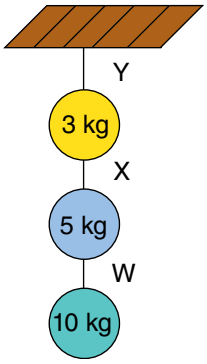
(A) copper
(B) iron
(C) manganese
(D) platinum

5. Peter has four types of string that he labels W, X, Y and Z. The diagram shows the maxi hat each can support without breaking.

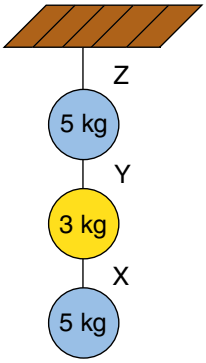


In which diagram will all the strings remain unbroken?

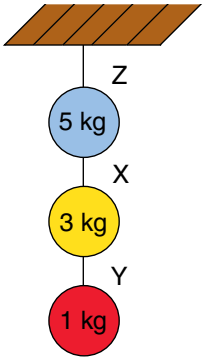
(A)



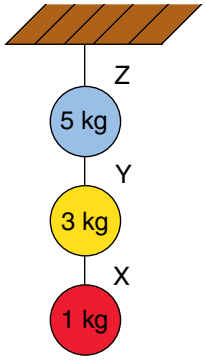
(B)



(C)

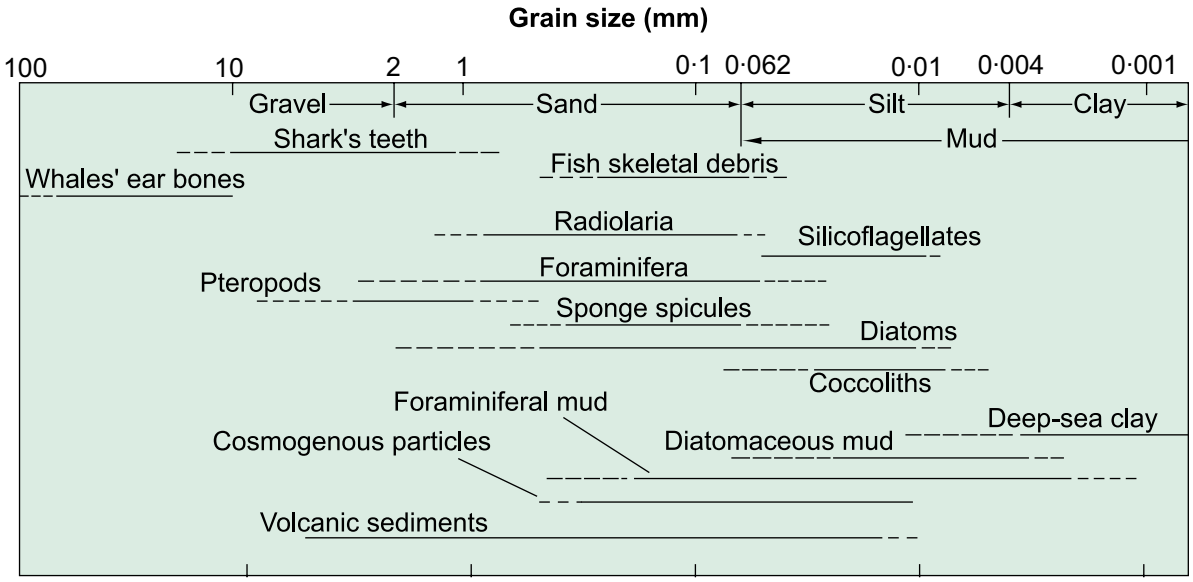


(D)



For questions 6 and 7 use the information below.

The diagram shows the sizes of some deep-sea sediments.



6. Which sediment is likely to completely pass through a sieve with mesh size 0.1 mm?

(A) coccoliths
(B) radiolaria
(C) diatoms
(D) pteropods

7. Which sediments would be hardest to separate from each other using sieves?

(A) whales' ear bones and shark's teeth
(B) radiolaria and sponge spicules
(C) silicoflagellates and pteropods

8. The table shows characteristics of some mineral gemstones.

Gem	Composition	Colour(s)	Hardness	
emerald	beryllium aluminium silicate	dark green	7.5 – 8	gl
sapphire	aluminium oxide	blue	9	diamon
pyrope	magnesium aluminium silicate	dark red	6.5 – 7.5	diamond-li
white opal	anhydrous silicone dioxide	white with play of colours	4.5 – 6.5	glass-like
kunzite	lithium aluminium silicate	pink to violet	6.5 – 7	glass-like
ruby	magnesium aluminium oxide	dark red	7.5 – 8	glass-like
matara	zirconium silicate	colourless	6.5 – 7.5	diamond-like

Anne chose a characteristic and divided the gemstones into two groups according to that characteristic. Jack chose a different characteristic and did the same thing.

Here are their groups.

Anne's groups

Group 1	Group 2
emerald, pyrope, kunzite, matara	sapphire, white opal, ruby

Jack's groups

Group 1	Group 2
emerald, kunzite, white opal, ruby	sapphire, pyrope, matara

Which characteristic did Anne and Jack each use to put the gems into these groups?

	Anne	Jack
(A)	hardness	lustre
(B)	hardness	colour
(C)	composition	lustre
(D)	composition	colour

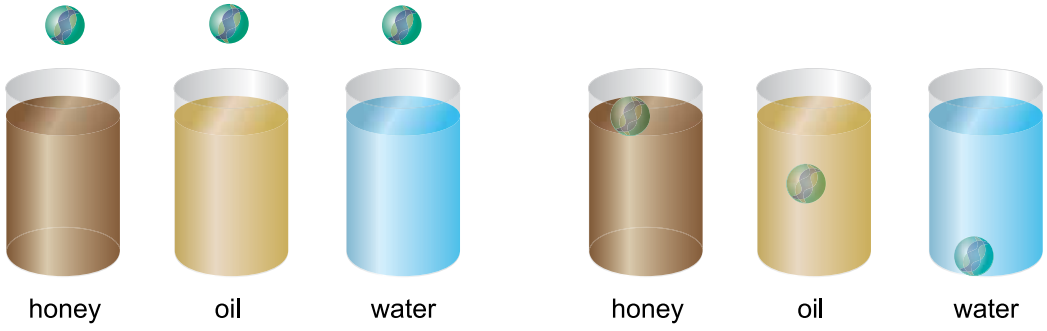
For questions 9 and 10 use the information below.

Reports about science experiments often include:

- a title
- an introduction
- an aim
- a method of how the experiment was to be carried out
- results (what was observed)
- a discussion of the results
- a conclusion

A student wrote a report containing a number of points.

1) 'Which liquid is the most viscous?'
2) The viscosity of the liquid is how 'thick' it is. The more viscous the liquid, the slower the marble will pass through it.
3) To determine the most viscous: honey, oil or water.
4) Set up three identical jars filled with the different liquids.
5) Drop a marble in each jar at the same time and record the marble's position after one second.
6)



time = 0 seconds **time = 1 second**

7) The marble in the honey was near the top of the jar while the marble in the water was at the bottom of the jar.
8) Water was the most viscous liquid tested.

9. Which points are the student's results?

(A) 4 and 5
(B) 5 and 6
(C) 6 and 7
(D) 7 and 8

10. Was the student's conclusion correct? Why?

	Conclusion correct?	Reason
(A)	no	The marble went through the water the slowest.
(B)	yes	The marble went through the water the slowest.
(C)	yes	The marble went through the honey the slowest.
(D)	no	The marble went through the honey the slowest.

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The following year levels should sit THIS Paper:

Australia	Year 8
Brunei	Form 2 & 3
Hong Kong	Form 2
Indonesia	Year 9
Malaysia	Form 2
New Zealand	Year 9
Pacific	Year 8
Singapore	Secondary 1
South Africa	Grade 8

PAPER **F**

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PAPER **F** | **SC**

ICAS International Competitions and Assessments for Schools

UNSW THE UNIVERSITY OF SYDNEY

HOW TO FILL OUT THIS SHEET:

USE 2B OR B PENCIL

- Rub out all mistakes completely.
- Print your details clearly in the boxes provided.
- Make sure you fill in only one oval in each column.

EXAMPLE 1: Debbie Bach

FIRST NAME	LAST NAME
DEBBIE	BACH

EXAMPLE 2: Chan Ai Beng

FIRST NAME	LAST NAME
CHAN	AI BENG

EXAMPLE 3: Jamal bin Abas

FIRST NAME	LAST NAME
JAMAL BIN	ABAS

FIRST NAME to appear on certificate

LAST NAME to appear on certificate

Are you male or female?

○ Male ○ Female

Does anyone in your home usually speak a language other than English?

○ Yes ○ No

School name: _____

DATE OF BIRTH

Day	Month	Year
0 1 2 3	0 1	0 1 2 3 4 5 6

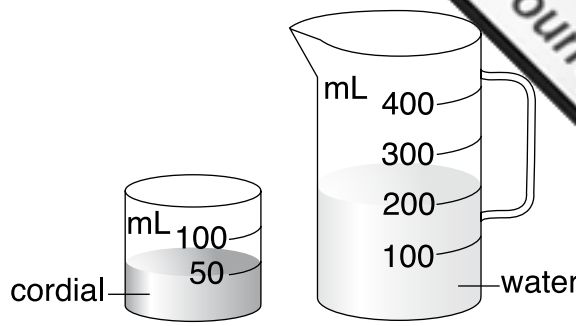
CLASS (optional)

A B C D E F G H I J K L M N O P Q

TO ANSWER THE QUESTIONS

Example: Ari added cordial to water to make a jug of drink.
What will be the volume of the drink in the jug?

(A) 50 mL
(B) 150 mL
(C) 200 mL
(D) 250 mL



The answer is 250 mL, so you would fill in the oval (D),
as shown.

(A) (B) (C) ●

USE 2B OR B PENCIL

START

1	(A)	(B)	(C)	(D)
2	(A)	(B)	(C)	(D)
3	(A)	(B)	(C)	(D)
4	(A)	(B)	(C)	(D)
5	(A)	(B)	(C)	(D)
6	(A)	(B)	(C)	(D)
7	(A)	(B)	(C)	(D)
8	(A)	(B)	(C)	(D)
9	(A)	(B)	(C)	(D)
10	(A)	(B)	(C)	(D)

PAPER

QUESTION	KEY	KEY REASONING	EL OF CULTY
1	D	Start at the top of the diagram. The satellite's diameter of 4 800 km is greater than the diameter of the Earth's moon (3 500 km), but less than Mercury's diameter of 4 900 km.	E
2	C	Start at the top. Gold is a metal, solid, is not magnetic and not silver coloured, so it could be either Q or R, depending on its reactivity.	Easy
3	B	From the flow chart, both sulphur and carbon are non-metals, not a gas, but one of them is a conductor and the other an insulator. Black is not in the key, so A is wrong. Carbon is a solid, so C is wrong. How they burn is not in the key, so D is wrong.	Easy
4	C	The graph shows the resistivity of some metals; the lower the resistivity the better the conductor. The question asks to identify the poorest electrical conductor, which means the one with the highest resistivity. At 400 °C, the metal with the highest resistivity, and is therefore the poorest conductor, is manganese.	Medium
5	D	For the strings to remain unbroken, the strength of each string must exceed the mass it is required to support. That is, the top string must be capable of supporting the total mass of the three weights, the middle string must be capable of supporting the mass of the two weights beneath it, and the bottom string must be capable of supporting the mass of the bottom weight. This occurs only in option (D), where string Z (capable of supporting 10 kg) is supporting three weights with a total mass of 9 kg, string Y (capable of supporting 5 kg) is supporting two weights with a total mass of 4 kg, and string X (capable of supporting 3 kg) is supporting a mass of 1 kg.	Medium
6	A	To completely pass through a sieve with a mesh size 0.1 mm, the sediments must be smaller than 0.1 mm. Of the four sediments listed only coccoliths are completely smaller than 0.1 mm (0.1 mm < size of coccolith < 0.004 mm).	Medium/Hard
7	B	If the sediments are similar in size they would be difficult to separate using sieves. The greater percentage of overlap, the more difficult they would be to separate with a sieve. The greatest percentage of overlap occurs between radiolaria and sponge spicules.	Medium/Hard
8	C	According to the table, Anne's group 1 gemstones are all silicates and her group 2 gemstones are all oxides. Therefore she has grouped the gemstones according to their composition. Jack's group 1 gemstones are all glass-like, and his group 2 gemstones are all diamond-like. Therefore he has grouped the gemstones according to their lustre.	Medium/Hard
9	C	Results are 'observations' made using our five senses, particularly sight. We can see the marbles above the jars at time = 0 s, and we can see the jars with the marbles in them at t = 1 s, at different positions within the liquids. So point 6 and point 7 of the report are observations. Note that which liquid is the most or least viscous is an inference which is based on observations. It itself is not an observation.	Medium/Hard
10	D	The more viscous the liquid, the slower the marble will pass though it. After 1 s the slowest marble will have moved the smallest distance. This occurs in honey; therefore, it is the most viscous of these liquids.	Medium/Hard

LEGEND

Level of difficulty refers to the expected level of difficulty for the question.

Easy	more than 70% of candidates will choose the correct option.
Medium	about 50–70% of candidates will choose the correct option.
Medium/Hard	about 30–50% of candidates will choose the correct option.
Hard	less than 30% of candidates will choose the correct option.