AUSTRALIAN SCIENCE INNOVATIONS

Australian Science Olympiads

2019 AUSTRALIAN SCIENCE OLYMPIAD EXAM

PHYSICS

TO BE COMPLETED BY THE STUDENT. USE CAPITAL LETTERS.

First Name: ……...…..…… Last Name……

Date of Birth: ……/……/...……

☐ Male ☐ Female ☐ Unspecified Year 10 ☐ Year 11 ☐ Other: …….

Name of School: ……..……..**State:** ……...

Examiners' Use Only:

11	12	13	14	T

Question 11

11 a) (i)

Object	Mass	Momentum at t_1	Velocity at t_2	Velocity after t_3	Displacement from t_1 to t_3
1	$m = 25$ kg	$p_{m1} =$	$v_{m2} =$ -0.5 ms^{-1}	$v_{m3} =$	$s_m = -30$ cm
2	$M = 35$ kg	$p_{M1} =$	$v_{M2} =$	$v_{M3} =$	$s_M =$
1+2	$m + M =$	$p_{\text{tot1}} =$	$v_{\text{cm2}} =$	$v_{\text{cm3}} =$	$s_{\text{cm}} =$

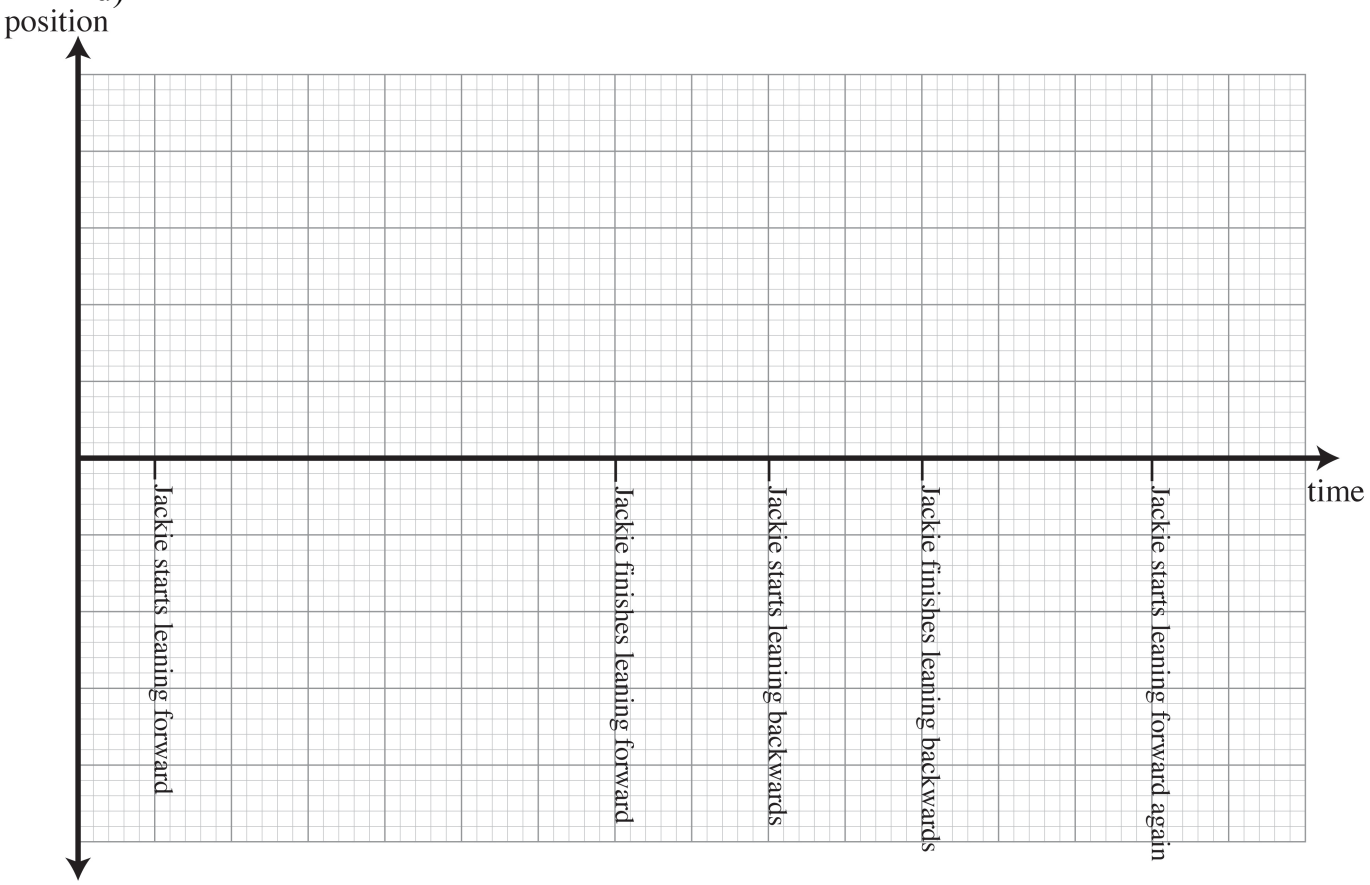
11 a) (ii)

Question 11

11 b) (i) & (ii)

11 c)

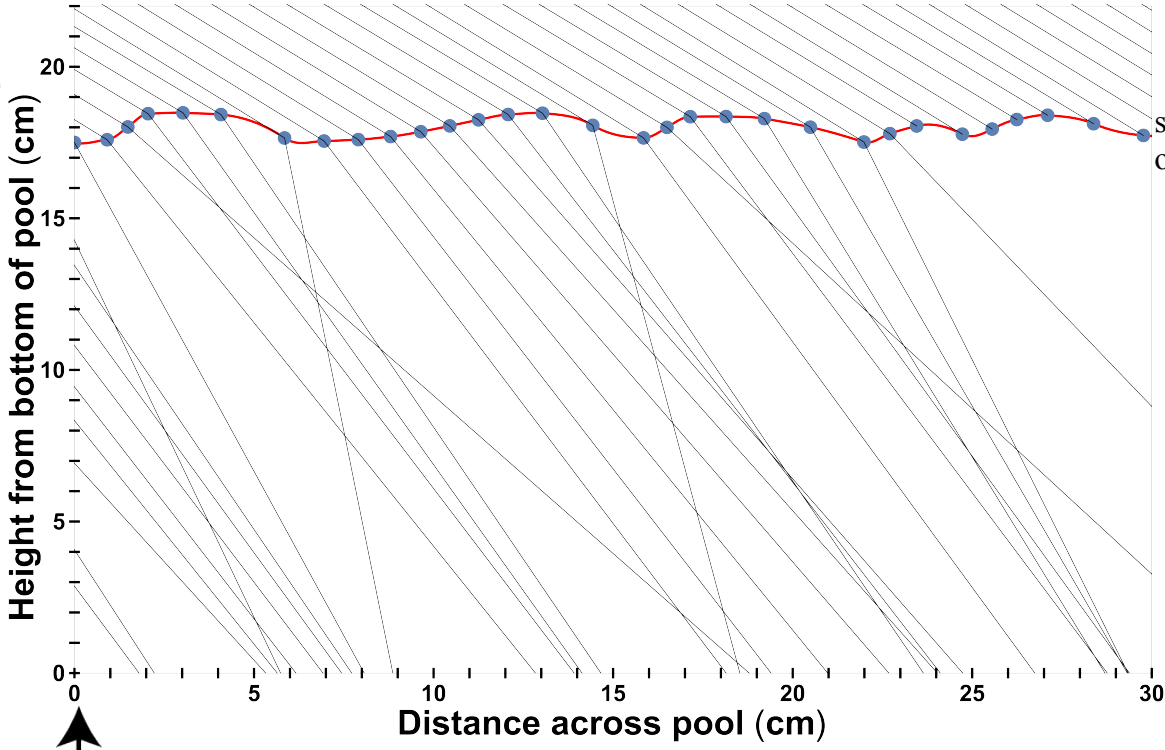
11 d)

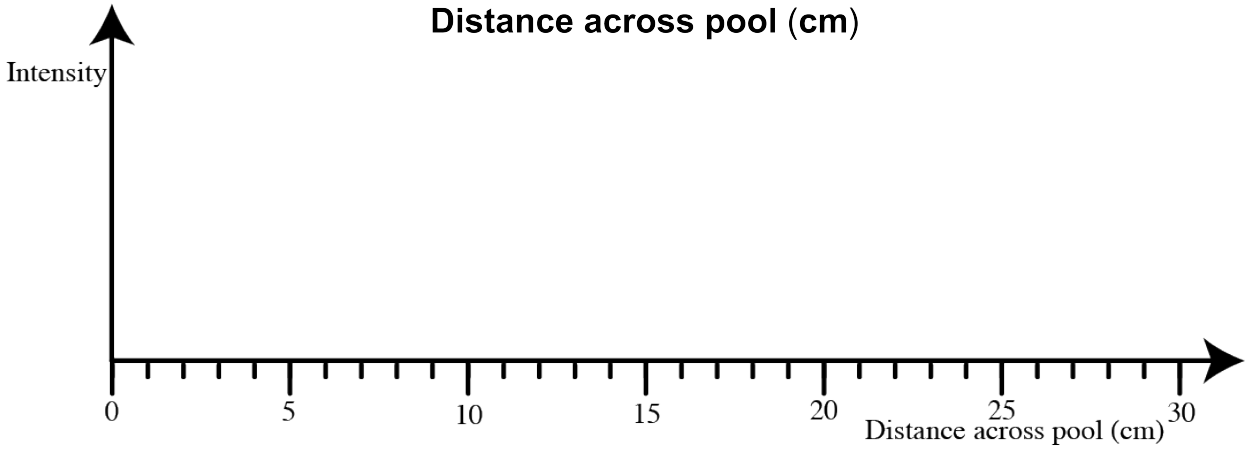


Question 12

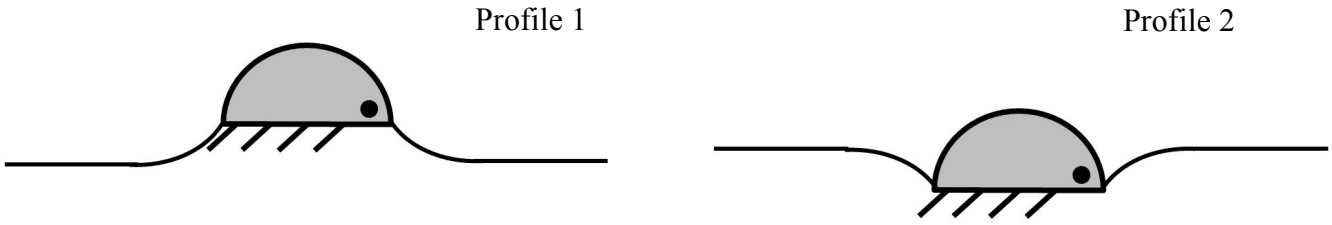
12 a)

(i) & (ii)





12 b)



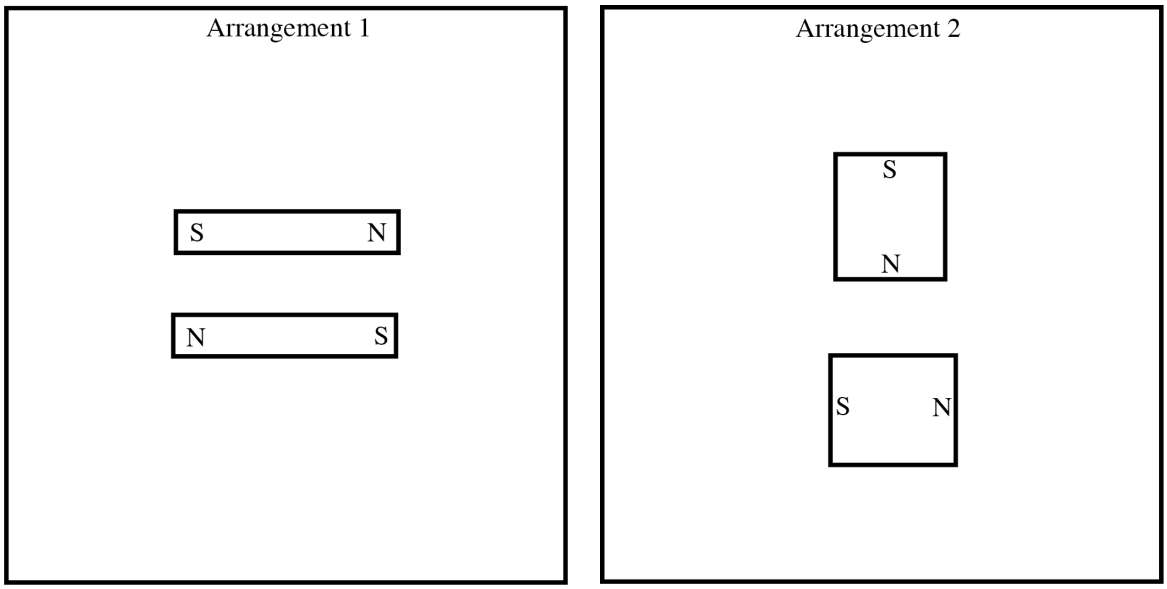
Question 12

12 c)

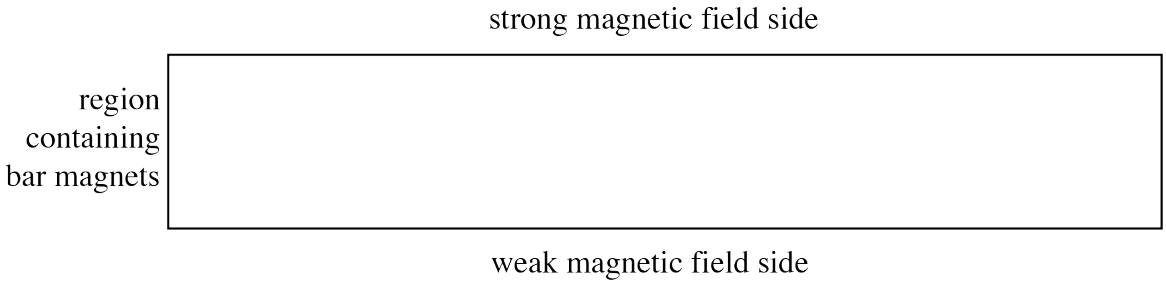
12 d)

Question 13

13 a)



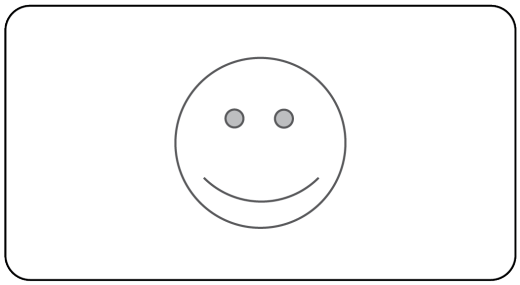
13 b)



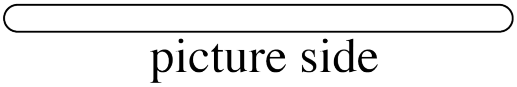
Question 13

13 c)

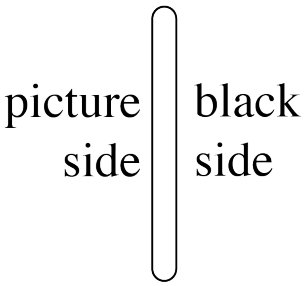
black side



picture side



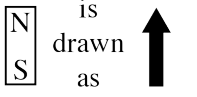
top edge

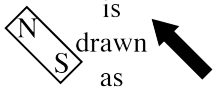


side edge

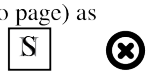
How to draw bar magnets as arrows:

The arrow points in the direction of the north pole.

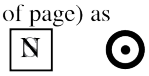




Draw a magnet with north pole into the page, (arrow pointing into page) as

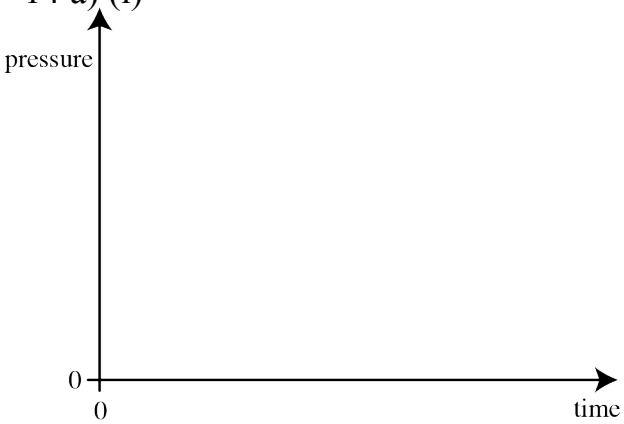


Draw a magnet with south pole into the page, (arrow pointing out of page) as



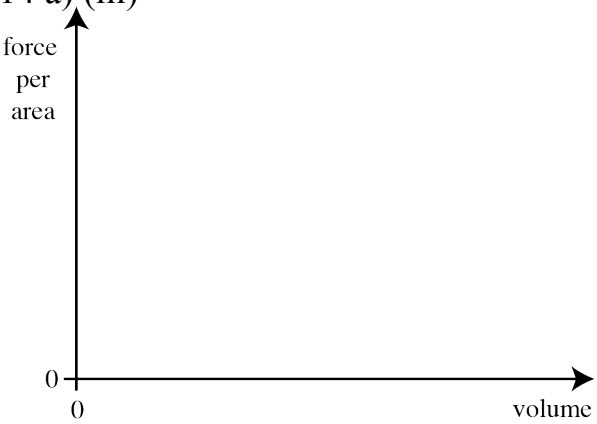
Question 14

14 a) (i)

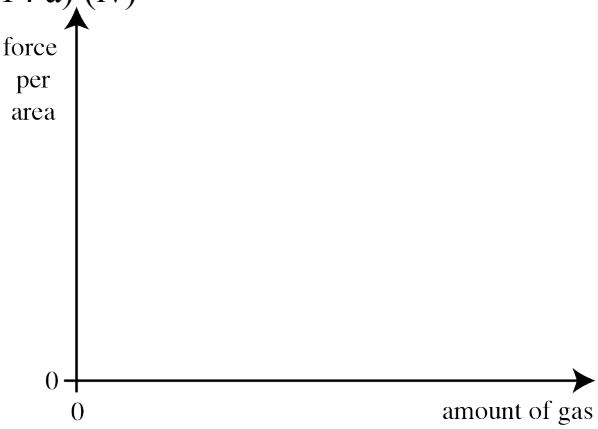


14 a) (ii)

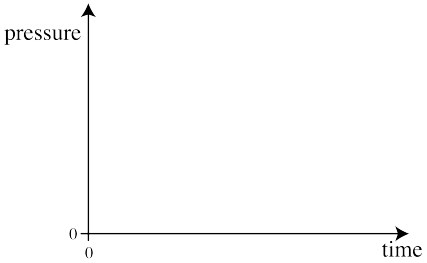
14 a) (iii)

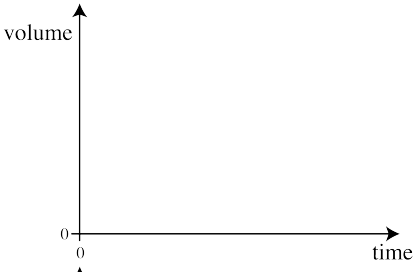


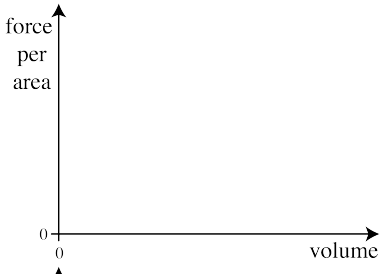
14 a) (iv)

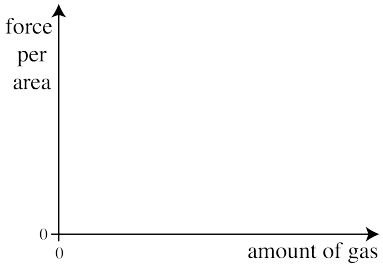


14 b)









Question 14

14 c)

14 d)

Most likely sources of uncertainty	Effect on results

Question Number: ____

Question Number: ____

Question Number: ____

Integrity of Competition

If there is evidence of collusion or other academic dishonesty, students will be disqualified. Markers' decisions are final.