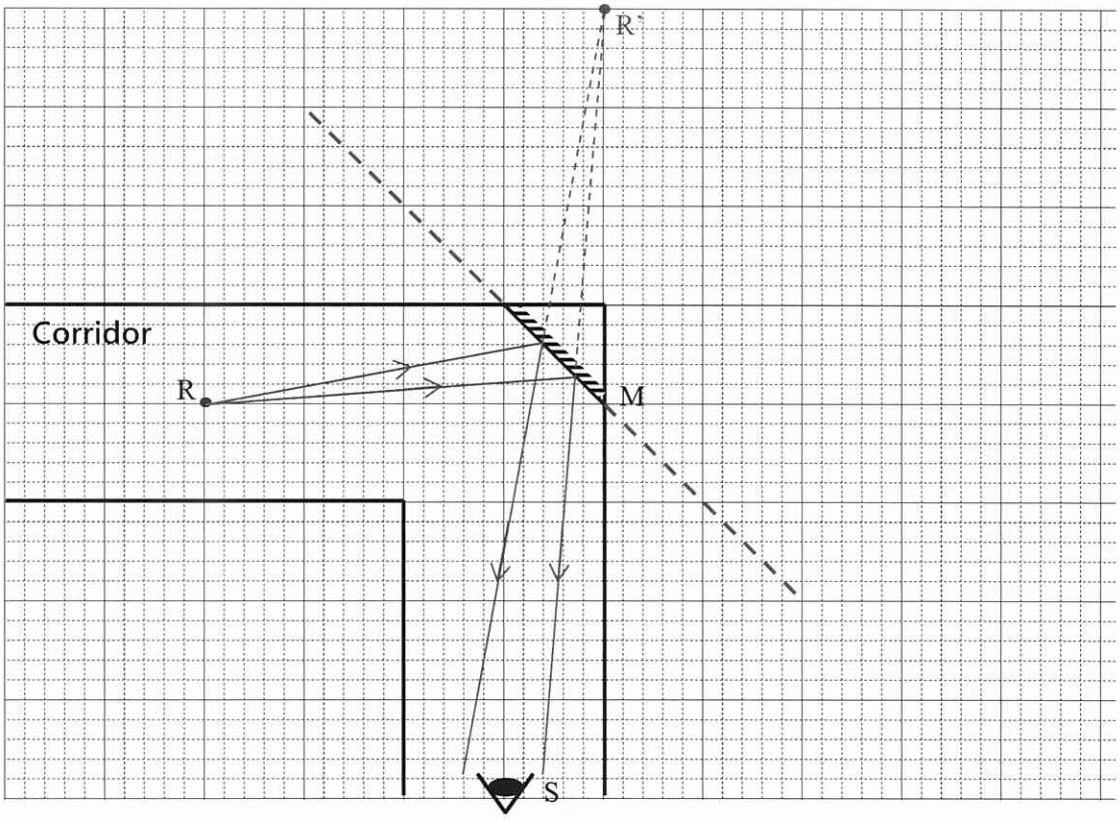
Pui Kiu Middle School
2013-14 Form 3 Physics
Final Examination
Suggested answer

Section A (40 分)

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

Section B (60分)

1a)



Position of marked image 1

1b) Correct light ray, correct use of solid line and dotted line 2,1
1 mark deduction for incorrect or missing arrow sign

1c) erect and laterally inverted / virtual image / same size as the object / image distance equal to object distance 1,1

2a) $\sin i / \sin r = n_x$
$\sin 32° / \sin 19° = n_x$ 1
$n_x = 1.63$ 1

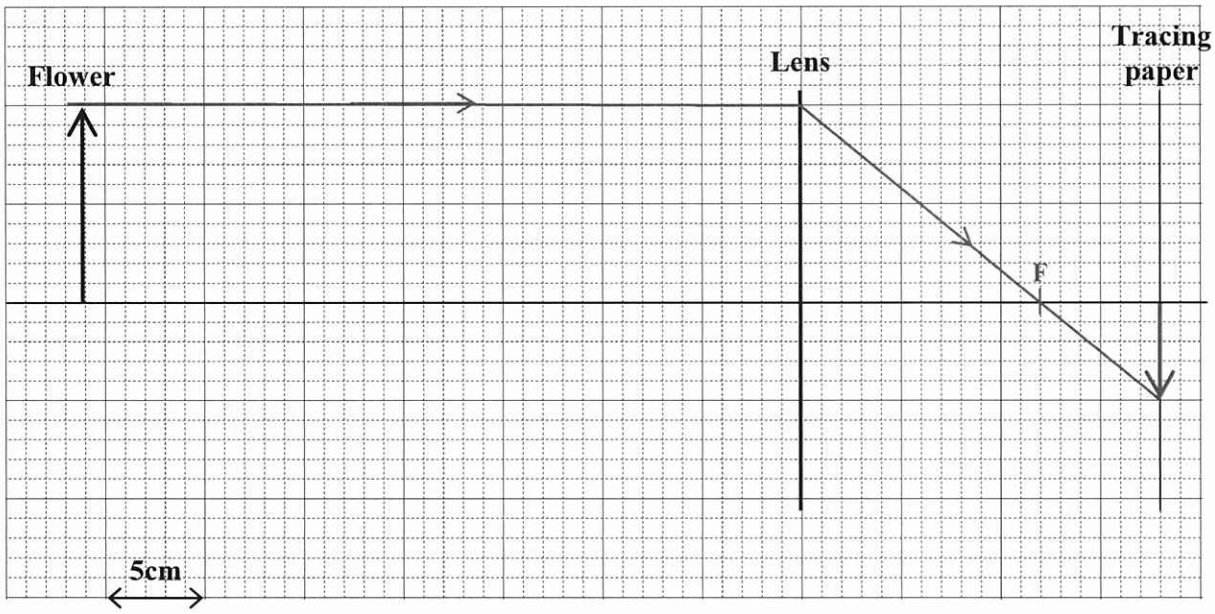
2b) $\sin 90° / \sin c = n_x$
$1 / \sin c = 1.628$ 1
$c = 37.9°$ 1

2c) The light ray is incident from the glass block on plane XY, and 1
the angle of incidence is greater than <u>37.9°</u> 1

3a) Convex lens. A real image can only be formed by a convex lens.
Only a real image can be formed on a translucent screen. 1+1,1

3b) $m = v/u$ 1
$m = 18/36 = 0.5$ 1

3c)



Position and orientation of the image in solid line. 1,1,1

3d) Correct light ray, labeled position of focus F（not necessary to be accurate） 1+1
Focal length = 12cm ± 1cm 1

3e) $1/u + 1/v = 1/f$ 1
$1/36 + 1/v = 1/-24$ (1/36 + 1/v = 1/24 給予 1 分) 2
$v = -14.4$ cm 1

4a) Put the bulb of the thermometer into a beaker of water with melting ice.
Wait until the alcohol level is steady and mark the alcohol level. 1
Heat up the ice water using the Bunsen burner until it boils. 1
Mark the alcohol level when the alcohol level is steady. 1
Divide the length between the two marks into 100 equal divisions. 1

4b) The ice must be pure. 1

4c) The calibration is performed under 1 standard atmospheric pressure. 1

5a) 0℃ 1

5b) $E = mc\Delta T$
$E = 0.5 \times 4200 \times (80-0)$ 1
$E = 168\ 000$ J 1

5c) 168 000 J。 1
According to Law of conservation of energy, the energy lost by the hotter object is equal to the energy gained by the colder object. 1

5d) $E = m_1 c \Delta T + m_2 l_f$ 1
$168\ 000 = 0.6 \times 2100 \times \Delta T + (0.6-0.15) \times 334\ 000$ 1,1
$168\ 000 = 1260\Delta T + 150300$
$17700 = 1260\Delta T$
$\Delta T = 14.0$℃
The initial temperature of the ice = -14.0℃ 1

6a) Turn on the power supply to boil the water 1
Wait for several minutes after the water is boiling, start the timer and record the reading of the electronic balance m_1 at the same time. 1
Wait for several minutes, stop the timer and record the reading of the electronic balance m_2 at the same time. 1
Record the reading of the timer t. 1
Using formula : $600 \times t = (m_1-m_2) \times l_v$ to calculate the specific latent heat of vapouration of water l_v 1

6b) $E=Pt$
$E=600 \times 146 = 87600$ J 1
$E = ml_v$ 1
$87600 = (642-606) \times l_v$
$l_v = 2.43 \times 10^6$ J 1

6c) Replace the beaker to a polystyrene cup to reduce heat loss to surroundings. 1

7a) The specific heat capacity of water is very high 1
so that after absorbing a larger amount of heat, the temperature of water only rises by a small amount. 1

7b) The pipes should be moved to the bottom of the tower. 1
When the water at the bottom of the tower is heated, the density of the water is decreased and the water will flow upward.
The water at the top of the tower will move downward and convection occurs. 1
Thus heat can be transferred steadily. This increases the efficiency of cooling. 1

7c) It has to be painted in white.
As the figure shows, the tower is under sunshine.
A white surface is a poor absorbers of radiation. 1
It reduces the amount of radiation absorption 1
to increase the efficiency of cooling.

7d) Dripping water can speed up the rate of evaporation, so as 1
to increase the rate of cooling. 1