

FUKIEN SECONDARY SCHOOL
S3 First Term Uniform Test (2020-2021)
Physics
(45 minutes)

Date: 19th October 2020

Time: 11:30a.m. – 12:15p.m.

Name: _____

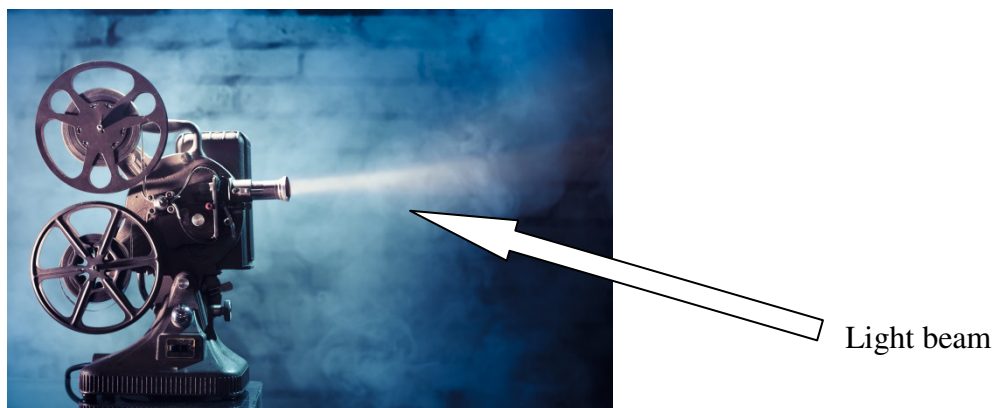
Class: _____ No.: _____

Instructions to students:

1. Write your name, class and class number on both the question paper and the answer sheets.
2. Answer ALL questions.
3. Write down all the answers on the answer sheets.
4. Hand in the question paper and the answer sheets at the end of the examination.
5. The total mark of the paper is 60.
6. The paper consists of two sections: Section A Multiple Choice Questions (20 marks) and Section B Structured Questions (40 marks).
7. The numerical answers should be either exact or correct to 3 significant figures.

Section A: Multiple Choice Questions (20 marks)

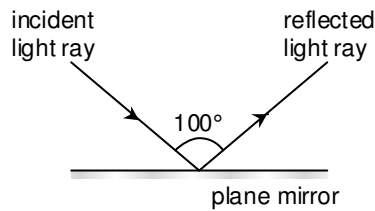
1.



In cinemas, we can see the light beam travelling from the film projector to the screen because

- (1) light travels from the projector to our eyes.
 - (2) part of the light travelling to the screen is reflected to our eyes.
 - (3) light does not travel in a straight line.
- A. (1) only
B. (2) only
C. (1) and (3) only
D. (2) and (3) only

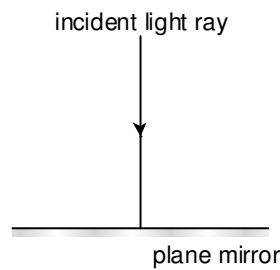
2.



A ray of light is reflected by a plane mirror as shown above. The angle between the incident ray and the reflected ray is 100° . What is the angle of reflection?

- A. 40°
- B. 50°
- C. 80°
- D. 100°

3. A ray of light is directed perpendicularly to a plane mirror as shown below.

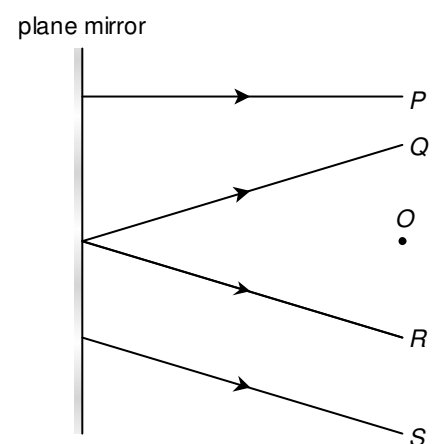


If the mirror rotates through an angle of 15° , what is the angle of reflection?

- A. 5°
- B. 10°
- C. 15°
- D. 20°

4. A point object O is placed in front of a plane mirror as shown on the right. Which ray is a reflected ray coming from the object?

- A. P
- B. Q
- C. R
- D. S



5. A plane mirror moves towards a boy at a velocity of 3 cm s^{-1} . What is the velocity of his image?

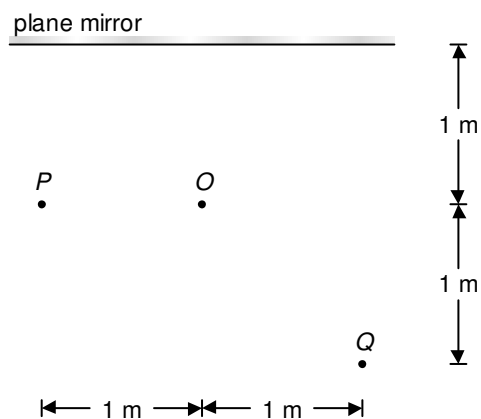
- A. 6 cm s^{-1} (towards the boy)
- B. 3 cm s^{-1} (towards the boy)
- C. 6 cm s^{-1} (away from the boy)
- D. 3 cm s^{-1} (away from the boy)

6. The figure below shows the image of a digital clock formed by a plane mirror. What is the actual time shown by the clock?



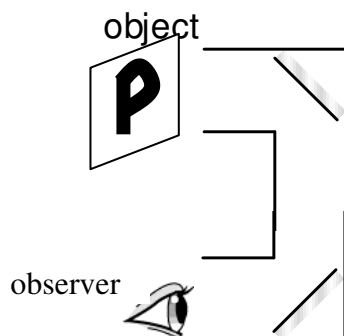
- A. 02:05
- B. 02:50
- C. 05:02
- D. 05:20

7. Three dancers O , P and Q stand in front of a plane mirror as shown below. What is the minimum width of the mirror for dancer O to see both dancers P and Q ?



- A. 0.5 m
- B. 0.667 m
- C. 0.833 m
- D. 1 m

8. An object is placed near one end of a periscope as shown below. Which of the following figures best represents the image observed?



- A. **b** B. **p** C. **d** D. **P**

9. A three dimensional object is composed of three mutually perpendicular particles (labelled as U, V and W respectively). It is placed in front of a plane mirror. An image is formed behind the mirror and observed by an observer as shown in Figure (a) below. Now the orientation of the object is changed and the orientation of the image is also changed as shown in Figure (b).

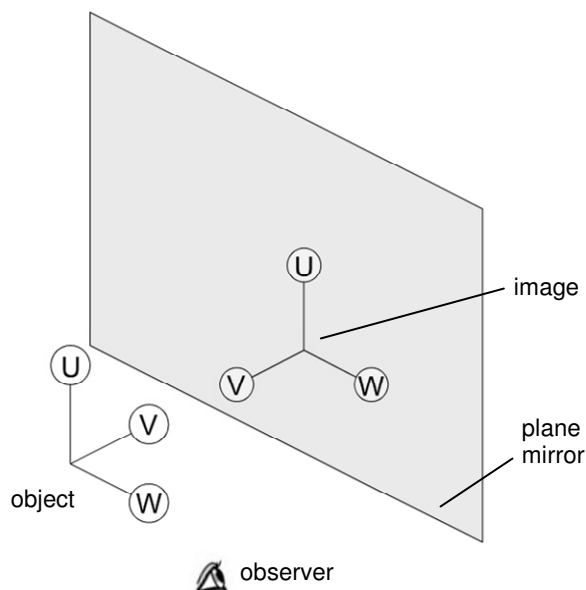


Figure (a)

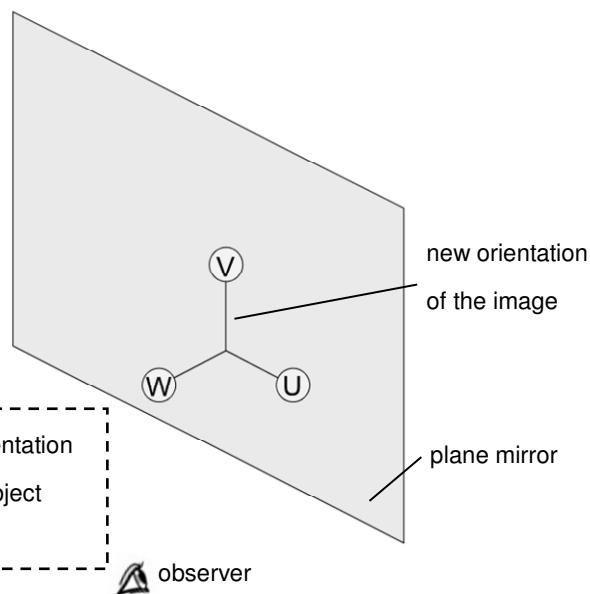


Figure (b)

Which of the following figures best shows the new orientation of the object?

- A. B. C. D.

10. A boy stands in front of a plane mirror hanging on a wall. He can only see part of his body. If he moves towards to the mirror,

- A. his image in the mirror will turn upside down.
- B. he will see more of his body.
- C. he will see less of his body.
- D. he will see the same part of his body

End of Section A

Section B: Structured Questions (40 marks)

1. (a) A ray of light strikes a mirror as shown in Figure 1(a) below.

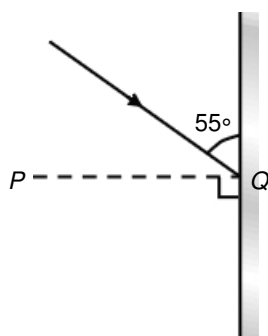


Figure 1(a)

Find the angle of incidence and the angle of reflection.

(2 marks)

- (b) As shown in Figure 1(b) on the answer sheet, a ray of light strikes M_1 with an angle of incidence of 60° .

- (i) Complete the path of the light ray. (2 marks)
- (ii) Find the angle of reflection of the light ray reflected by M_2 . Show your steps of calculation. (3 marks)
- (iii) Find the angle between the incident ray to M_1 and the reflected ray after two reflections. Show your steps of calculation. (3 marks)

2. As shown in Figure 2 on the answer sheet, an object is placed in front of a plane mirror.

- (a) Draw the image formed by the mirror. (2 marks)
- (b) Complete the reflected rays p , q and r . (4 marks)

3. (a) Compare regular reflection and diffuse reflection. State ONE difference and ONE similarity. (4 marks)

- (b) Figure 3 shows an ambulance. Explain why the word AMBULANCE is printed in the form as shown in the figure. (3 marks)



Figure 3

4. As shown in Figure 4 on the answer sheet, a man, represented by the arrow HF stands 0.5 m in front of a large plane mirror. The man is 1.8 m tall and his eyes are 1.7 m above the ground. A tree, represented by arrow TR has a height of 2.5 m. It is 2.5 m behind the man.
- Find the distance between the man and the image of the tree. (2 marks)
 - Draw, two light rays on Figure 4, to show how the man sees the image of the tree. (4 marks)
 - Use the answer in (b), find the minimum length of the mirror for the man to see the entire tree. (1 mark)
 - If the man stands 2 m in front of the mirror, what would the answer in (c) change? (2 marks)

5. A reflecting telescope was invented by Newton and is commonly used for observing planets. It uses a curved mirror and a plane mirror to reflect light and form an image. The ray diagram of a simple reflecting telescope is shown in Figure 5 below.

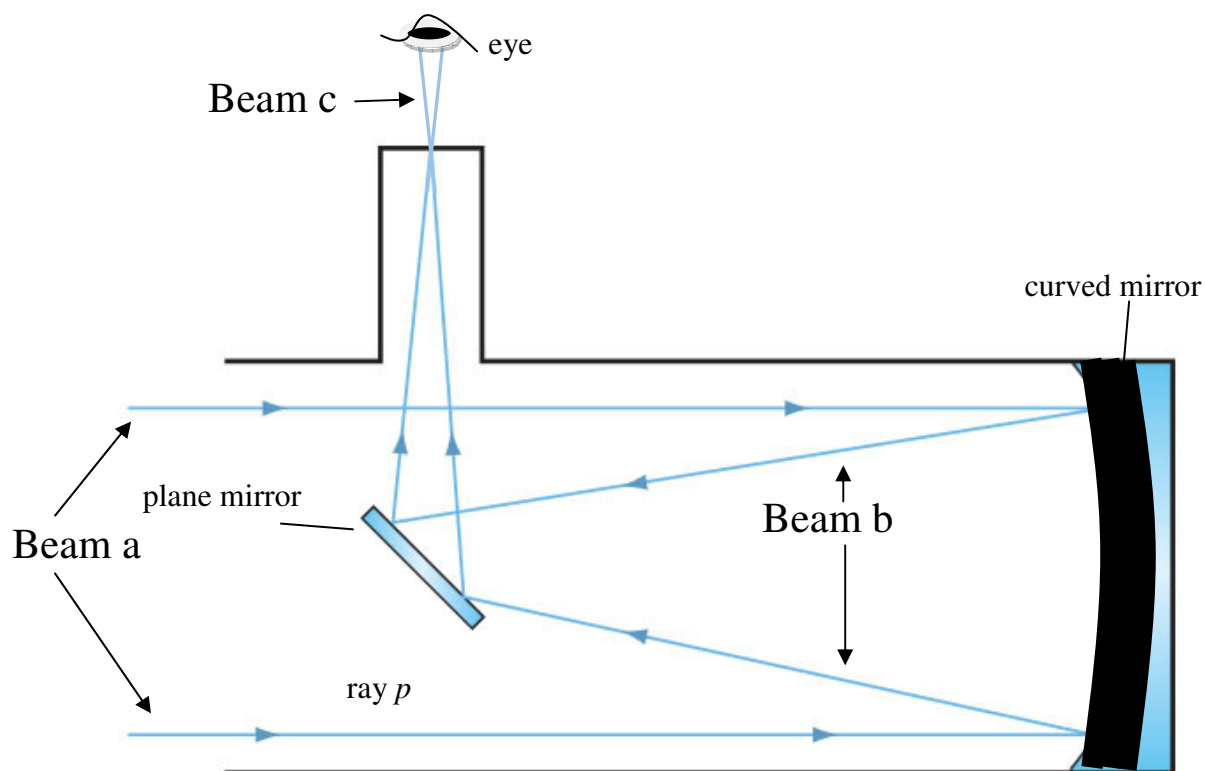


Figure 5

END OF PAPER