

**THE PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
TOPICAL EXAMINATION SERIES No. 04
FORM THREE PHYSICS**

TIME 3 :00 HOURS

Year 2024

SUB TOPIC: REFLECTION OF LIGHT FROM CURVED MIRROR

INSTRUCTION

1. This paper consists of section A, B and C with a total of Eleven (11) questions
2. Answer ALL question in section A and B and Two (2) from section C
3. Section A carries sixteen (16) marks, Section B fifty-four (54) marks and section C Thirty (30) marks
4. Non-programmable calculators may be used
5. Cellular phones and any unauthorized materials are NOT allowed in the examination room

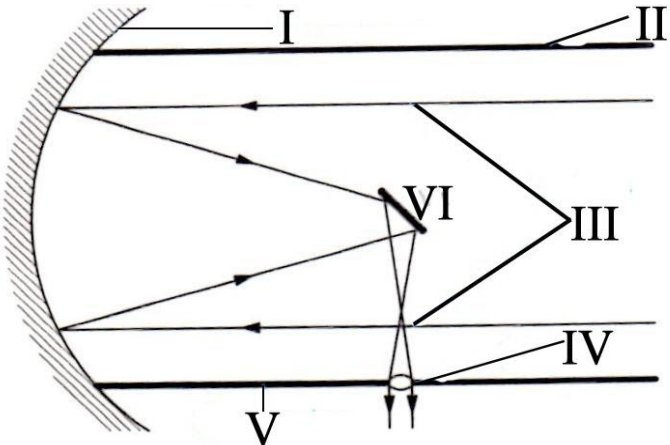
Write your Examination name on every page of your answer sheet provided

SECTION A (16 Marks)Answer **all** questions in this section

1. i) Is the phenomenon of thrown back of the light rays when strikes the highly polished surface like a mirror
- a) Refraction of light
 - b) Reflection of light
 - c) Transmission of light
 - d) dispersion of light
- ii) If the glass is silvered from outside so that light can be reflected from inside, it is called _____
- a) Concave or converging mirror
 - b) Concave or diverging mirror
 - c) Convex or diverging mirror
 - d) Convex or converging mirror
- iii) If the coating is done so that the reflection is from outside it is called _____
- a) Concave or converging mirror
 - b) Convex or converging mirror
 - c) Concave or diverging mirror
 - d) Convex or diverging mirror
- iv) For a concave mirror, _____ it is the point at which all rays parallel and close to the principal axis appear to converge after reflection
- a) Focal point
 - b) Principal axis
 - c) Focal length
 - d) Converging mirror
- v) It is the center of the sphere which the mirror is made
- a) Pole
 - b) Concave mirror
 - c) Centre of curvature
 - d) Radius of curvature

- vi) The geometric centre of the spherical mirror is called _____
- a) Centre of curvature
 - b) Pole
 - c) Focal length
 - d) Diverging mirror
- vii) In the case of convex mirror, _____ is the point at which all rays parallel and close to the principal axis appears to diverge from after reflection
- a) Converging mirror
 - b) Focal length
 - c) Principal axis
 - d) Focus
- viii) It is the distance between the centre of the sphere and the vertex
- a) Pole
 - b) Principal focus
 - c) Radius of curvature
 - d) Centre of curvature
- ix) The line joining the pole of the mirror and its centre of curvature is called _____
- a) Principal focus
 - b) Convex mirror
 - c) Principal axis
 - d) Focal length
- x) The distance between the pole and the principal focus is known as
- a) Focal length
 - b) Focal points
 - c) Converging mirror
 - d) Focus

2. Matching the parts of a concave mirror in a reflecting telescope in column A with their corresponding answer in column B.

COLUMN A	COLUMN B
	<p>A. Concave mirror</p> <p>B. Brass tube</p> <p>C. Convex mirror</p> <p>D. lens</p> <p>E. Light rays</p> <p>F. Test tube</p> <p>G. Light rays from a star</p> <p>H. Principal axis</p> <p>I. Image</p>

SECTION B (54 Marks)

Answer **all** questions in this section

3. (a) You are provided with two types of mirrors, concave mirror and convex mirror. What type of the mirror among the two will you prefer on driving car to see the traffic at your back? Explain your choice.

b) Mr. Robert Msaki wants to form an image in concave mirror using a ray diagram but he gets confusion with the rules of reflection of rays on concave mirror. You are a form three student help him to explain three rules to be followed during image formation in concave mirror.

C) An object 20cm high is placed 40cm in front of a concave mirror of focal length 15cm. determine the position and magnification of the image formed.

4. (a) State one example of the use of a convex mirror and indicate why it is preferred to a plane mirror

b) An object is set 20cm in front of a lens and the real, inverted, magnified and great distance image was formed. State the type of the lens used and determine the value of focal length.

5. (a) An object 20mm high stands on the axis of a concave mirror of focal length 100mm and at a distance of 300mm from the mirror. Draw a scale diagram to find the position, size and nature of the image produced.

b) Use a ray diagram to show an enlarged and upright image of an optical pin when erected in front of a concave mirror.

6. State briefly

a) Position of the image of a very distant object in a concave mirror

b) Cause for a blurred image in a concave mirror or concave lenses

7. a) i) Explain the terms opaque and translucent and give an example of each.

ii) Danger signs along the road as well as tail and brake lamps of motor vehicle rear are painted in red. Briefly explain the reason behind.

b) What is the basic difference between real and virtual image as formed by curved surfaces?

c) A convex mirror of focal length 18cm produces an image on its axis 6 cm away from the mirror. Calculate the position of object.

8. (a) What is meant by reflection of light

(b) A virtual image always produces _____, _____ and _____ image

(c) A convex mirror produces an image which is diminished four times when an object is placed 40 mm in front of it. Find the position of the image and the focal length of the mirror

SECTION C (30 Marks)Answer **only two** questions from this section

9. (a) Why are convex mirrors used as driving mirror? Give two reasons

(b) Three plane mirrors are arranged along three sides of a square. A ray of light is incident on the left side mirror at its midpoint with an angle of 40° to the mirror. Draw the appropriate path of the ray and calculate the angle through which the ray is turned at each of the three reflections

10. (a) What happens to the image formed by a convex mirror as the object distance is decreased?

a) Show that to obtain an image with a magnification of m using a concave mirror with a focal length f_1 , the object distance, u is given by:

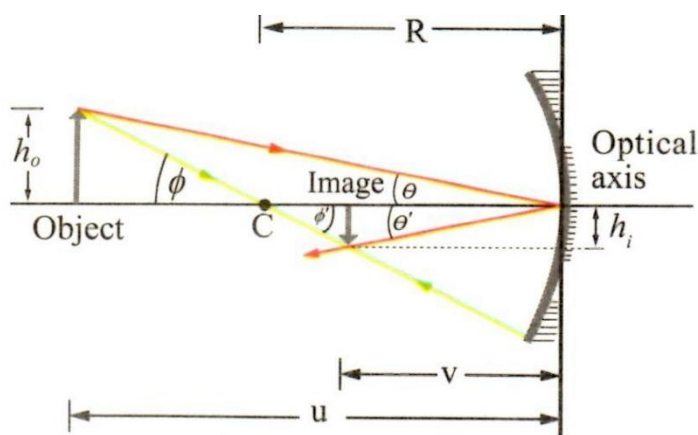
$$U = \frac{M + I}{M} f$$

c) Parallel light rays from a distant star are incident on a concave mirror with a radius of curvature of 120 cm. How far from the mirror will the star's image be formed?

11. (a) By using the diagram below, show that

i) $M = \frac{-v}{u}$

ii) $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$



b) The sign conventions for the given quantities in the mirror equation and magnification equations are as follows;

- i) f is positive if _____
- ii) f is negative if _____
- iii) v is positive if _____
- iv) v is negative if _____
- v) h_1 is positive if _____
- vi) h_1 is negative if _____

c) Complete the tables below by summarizing the image characteristics formed by a concave mirror for different position of the object.

Position of object	Position of image	Nature of image	Image size
At infinity			
Beyond C			
At C			
Between F and C			
At F			
Between F and PS			