WORKSHEET ②

A. Tick (✓) the correct option.

1. The image formed by convex mirror is
   - a. erect and diminished.
   - b. erect and enlarged.
   - c. inverted and diminished.
   - d. inverted and enlarged.

2. The focus of concave mirror is
   - a. real.
   - b. virtual.
   - c. undefined.
   - d. at the pole.

3. A converging mirror is known as
   - a. convex.
   - b. concave.
   - c. plane.
   - d. cylindrical.

4. A real and enlarged image can be obtained by using a
   - a. convex mirror.
   - b. plane mirror.
   - c. concave mirror.
   - d. either convex or plane mirror.

5. Type of image that can be obtained on a screen.
   - a. Virtual.
   - b. Real.
   - c. Diverging.
   - d. Converging.

B. Fill in the blanks.

1. If the focal length of a mirror is 15 cm. The type of mirror is _____

2. The distance between the pole and focus is called the _____

3. Heights or distances measured above and perpendicular to the principal axis are taken as _____

4. Nature of image is not affected by the position of object in a _____

5. Rays of light parallel to principal axis meet at _____ after reflection from a concave mirror.

C. State whether the following statements are true or false.

1. The real image formed in a concave mirror is always diminished.

2. It is not possible to get a diminished, erect and virtual image with a concave mirror.

3. The ray of light originating from centre of curvature of a spherical mirror returns along the same path after reflection.

4. A virtual image formed by a spherical mirror is always on the other side and is erect.

5. The image is real and inverted if magnification is positive.

Name: ....   Teacher's signature: ....

Class: .... IX ....   Date: ....

D. Match the following.

1.	Magnification of a mirror	half of radius of curvature
2.	Concave mirror	convex mirror
3.	Used in reflectors	converging mirror
4.	Focal length	$\dfrac{-v}{u}$
5.	In street lighting	concave mirror

E. Answer the following questions.

Very short answer questions

1. A ray strikes normally on the mirror. If the mirror is turned by 25°. Calculate the angle between reflected and incident ray.

2. With the help of a suitable diagram, explain what is the nature, position and size of the image when object is placed at centre of curvature of a concave mirror?

Short answer questions

1. Define the following terms related to spherical mirrors.

    i. aperture,

    ii. pole, and

    iii. centre of curvature.

2. Where would you place a small lamp with respect to concave mirror to produce

    i. a parallel beam,

    ii. a divergent beam,

    iii. a convergent beam?

Long answer questions

1. Write any three uses of concave mirror.

2. What is the nature of image formed by a concave mirror when object is between F and C. Explain with diagram.

ANSWERS

WORKSHEET 2

A. Tick (✓) the correct option.

1. a
2. a
3. c
4. c
5. b

B. Fill in the blanks.

1. convex mirror
2. focal length
3. positive
4. convex mirror
5. focus

C. State whether the following statements are true or false.

1. F
2. T
3. T
4. T
5. F

D. Match the following.

1. Magnification of a mirror $\dfrac{-v}{u}$

2. Concave mirror   converging mirror

3. Used in reflectors   concave mirror

4. Focal length   half of radius of curvature

5. In street lighting   convex mirror

E. Answer the following questions.
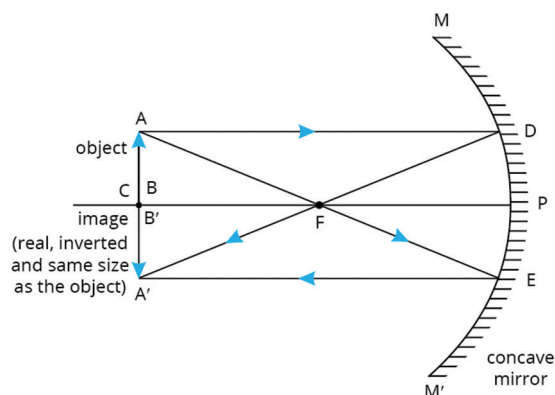
Very short answer questions

1. Angle between new position of reflected ray and incident ray

   = 2 × 25°

   = 50°

2. **Position:** At the centre of curvature

   Nature: Real and inverted

   Size: Same size as the object

Position of the object: at C

Short answer questions

1. i. **Aperture:** The effective width (distance) of the spherical mirror from which reflection of light can take place is called its aperture.

   ii. **Pole:** The centre of a spherical mirror is called its pole. It is denoted by P. It is the middle point of a spherical mirror.

   iii. **Centre of curvature:** The geometric centre of the hollow sphere of which the spherical mirror is a part is called the centre of curvature of the spherical mirror. It is denoted by C. The centre of curvature of a concave mirror is in front of it but the centre of curvature of a convex mirror is located behind it..

2. i. Lamp should be placed at infinity.

   ii. Lamp should be placed beyond the centre of curvature or at the C or between the C and focus or at the f.

   iii. Lamp should be placed between the pole and focus.

Long answer questions

1. Concave mirrors are used in the following ways:

   i. For heating purpose: They are used for converging solar radiations in solar cookers to generate adequate heat for cooking purposes.

   ii. As reflectors: They are used as reflectors in projectors, lighthouse headlights, searchlights, torches, etc. to obtain a parallel beam of light. This is possible when the source of light (i.e. the bulb) is placed at the focus of the concave mirror, the concave mirror acts as a reflector. Large concave mirrors are used in reflecting telescopes.

   iii. As shaving mirrors: Concave mirrors are used as shaving mirrors and as make-up mirrors to see the enlarged, erect image of the face (for this to happen, the face must be placed close to the mirror, i.e. within the focal point of the mirror).

2. **Image formed when the object is placed between the focus (F) and the centre of curvature (C)**

   In Figure, an object AB is placed between the focus (F) and the centre of curvature (C). We draw a ray AD from the object parallel to the principal axis. This ray gets reflected at D and then passes through the focus (F). A second ray of light AE passing through the centre of curvature C strikes the mirror normally (or perpendicularly) at point E and gets reflected along the same path. The two reflected rays, DF and EC which are converging actually intersect at a point A'. Thus, A' is the real image of A and A'B' is the real image of the object AB and the image can be received on a screen. So, when an object is placed between the focus (F) and the centre of curvature (C), the image formed has the following characteristics:

   Position: Beyond the centre of curvature

   Nature: Real and inverted

   Size: Larger than the object (magnified)
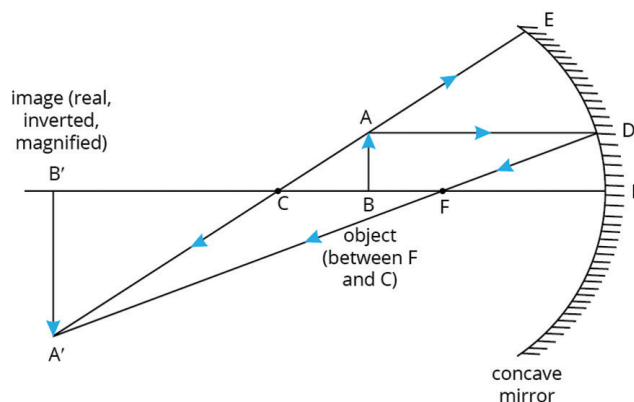
Position of the object: between F and C