# NEW STANDARD ACADEMY
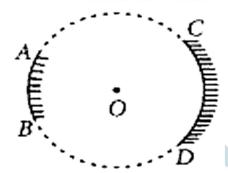
## PHYSICS

1. 1. AB and CD, two spherical mirrors, from parts of a hollow spherical ball with its centre at O as shown in the diagram. If arc AB = 12 arc CD, what is the ratio of their focal lengths? State which of the two mirrors will always form virtual image of an object placed in front of it and why?



2. List two properties of the images formed by convex mirrors. Draw ray diagram in support of your answer.

3. A concave mirror is used for image formation for different positions of an object. What inferences can be drawn about the following when an object is placed at a distance of 10 cm from the pole of a concave mirror of focal length 15 cm?
   (a) Position of the image
   (b) Size of the image
   (c) Nature of the image

4. A concave mirror has a focal length of 20 cm. At what distance from the mirror should a 4 cm tall object be placed so that it forms an image at a distance of 30 cm from the mirror? Also calculate the size of the image formed.

5. An object 4 cm in height, is placed at 15 cm in front of a concave mirror of focal length 10 cm. At what distance from the mirror should a screen be placed to obtain a sharp image of the object. Calculate the height of the image

6. The image formed by a spherical mirror is real, inverted and its magnification is -2. If the image is at a distance of 30 cm from the mirror, where is the object placed? Find the focal length of the mirror. List two characteristics of the image formed if the object is moved 10 cm towards the mirror.

7. To construct a ray diagram we use two rays of light which are so chosen that it is easy to determine their directions after reflection from the mirror. Choose these two rays and state the path of these rays after reflection from a concave mirror. Use these two rays to find the nature and position of the image of an object placed at a distance of 15 cm from a concave mirror of focal length 10 cm.

8. A spherical mirror produces an image of magnification -1 on a screen placed at a distance of 40 cm from the mirror.
   (i) Write type of mirror.
   (ii) What is the nature of the image formed?
   (iii) How far is the object located from the mirror?
   (iv) Draw the ray diagram to show the image formation in this case.

9. A student wants to project the image of a candle flame on a screen 48 cm in front of a mirror by keeping the flame at a distance of 12 cm from its pole.
   (a) Suggest the type of mirror he should use.
   (b) Find the linear magnification of the image produced.
   (c) How far is the image from its object?
   (d) Draw ray diagram to show the image formation in this case.

10. A student wants to obtain an erect image of an object using a concave mirror of 12 cm focal length. What should be the range of distance of the candle flame from the

mirror? State the nature and size of the image he is likely to observe. Draw a ray diagram to show the image formation in this case.

## CHEMISTRY

11. A liquid compound is being used as an additive in petrol. What is the name and formula of this compound?
12. Give the products formed by the oxidation of ethanol.
13. What happens when ethanol reacts with
    (a) sodium       (b) ethanoic acid/$H_2SO_4$.
14. Which compound is formed by the dehydration of ethanol ?
15. How would you test (a) an alcohol (b) a carboxylic acid?
16. Which methanol or ethanol is fatal, explain?
17. Give important uses of ethanol and ethanoic acid.
18. Explain the terms (a) esterification (b) hydrolysis (c) saponification.
19. Which of the following compounds (a) turn blue litmus to red (b) liberate CO2 with sodium hydrogen carbonate (c) form an ester with alcohol (d) form an ester with carboxylic acid.
    $CH_3CHO$ $CH_3OH$, HCOOH, $C_2H_5OH$, $CH_3COOH$, HCHO
20. A carbon compound 'P'on heating with excess conc. $H_2SO_4$ forms another carbon compound 'Q' which on addition of hydrogen in the presence of nickel catalyst forms a saturated carbon compound 'R' One molecule of 'R' on combustion, forms two molecules of carbon dioxide and three molecules of water. Identify P, Q and R and write chemical equations for the reactions involved.

## BIOLOGY

21. What is the vegetative propagation? Where this method of reproduction find its application? List the advantages of vegetative propagation.
22. What is meant by pollination? What are its two type? What are the agents which help in pollination?
23. Define the term double fertilization in plants. After fertilization name the part in each case which develops into
    (i) the fruit             (ii) the seed.

24. What is the basis for evolution? Where is the zygote located in the flower after fertilization?
25. Draw a labelled diagram of L.S. of flower. What is the function of anther?
26. Why does menstruation occur?
27. Give any five difference between fragmentation and regeneration?
28. Give the significance of vegetative propagation?
29. Write any four importance of:
    (a) Mitosis       (b) Meiosis?
30. What is so peculiar about the binary fission in leishmania?

## MATHS

31. Show that the polynomial $9x^2+6x+4$ has no real zeroes.
32. Show that $3,-1$ and$-\frac{1}{2}$ are zeroes of the polynomial $2x^3-3x^2-8x-3$.
33. Find the zeroes of the polynomial $f(x)=x^2 + 6x-11$. Also verify the relationship between the zeroes and coefficients of $f(x)$.
34. If 2/3 and -3 are zeroes of the polynomial $ax^2 + 7x+b$, then find the values of a and b.
35. If two zeroes of the polynomial $x^3-4x^2-3x+12$ are $\sqrt{3}$ and $-\sqrt{3}$. Then find its third zero
36. If one of the zeroes of the cubic polynomial $x^3+ax^2+bx+c$ is -1 then prove that the product of other two zeroes is b-a+1.
37. If the zeroes of the polynomial $x^3-3x^2+x+1$ are a-b, a and a+b, find the val;ue of a and b.
38. Find all quadratic polynomials whose sum and product of zeroes are 7/6 and -1/2 respectively.
39. From a quadratic polynomial whose one zero is 8 and the product of zeroes is -56.
40. Find a cubic polynomial with the sum ,sum of the products of its zeroes taken two at a time, and the product of its zeroes as 5,-7,-14 respectively.