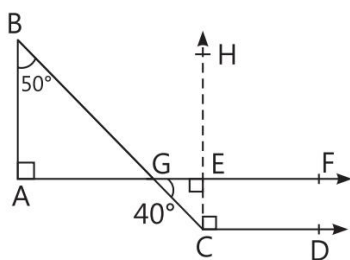# Lines and Angles

Case Study Based Questions

Case Study 1

Satyam was playing with torch. He put mirrors at different places and threw torch light over them. When he threw light, it got reflected as shown below in geometrical figure.

On the basis of the above information, solve the following questions.

Q 1. Which of the following set of points is a collinear?

    a. G, F, H   b. B, A, G   c. G, E, F   d. E, C, D

Q 2. The degree measure of ∠BGA is:

    a. 55°   b. 60°   c. 50°   d. 40°

Q 3. The degree measure of ∠BGE is:

    a. 140°   b. 45°   c. 50°   d. 55°

Q 4. The relation between line segments EF and CD is:

    a. parallel   b. perpendicular
    c. intersecting   d. not defined

Q 5. In the given figure, one of the vertically opposite angle pair is:

    a. ∠GAB and ∠ABG   b. ∠GEH and ∠HEF
    c. ∠AGB and ∠CGE   d. ∠HEF and ∠FEC

Solutions

1. (c)

In the given options, only points G, E and F lie in a line. Hence, it is collinear.

So, option (c) is correct.

2. (d) ∠BGA = ∠CGF   [vertically opposite angles]
   ∴   ∠BGA = 40°
   So, option (d) is correct.

3. (a) ∵ The sum of linear pair is 180°.
   ∴ ∠BGA + ∠BGE = 180°
   ⇒   40° + ∠BGE = 180°
   ⇒   ∠BGE = 140°
   So, option (a) is correct.

4. (a) It is clear from the figure that line CH is perpendicular to the lines EF and CD. Therefore, line segments EF and CD are parallel.
   So, option (a) is correct.

5. (c) ∠AGB and ∠CGE

Case Study 2

In a science experiment, a chemical was allowed to flow with high force and high temperature on the floor and the results were recorded. The movement of chemical is as shown in geometrical form as below.
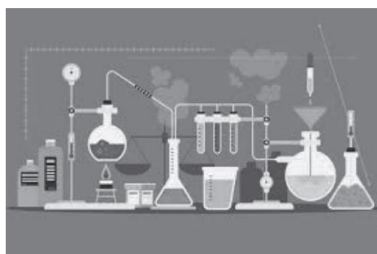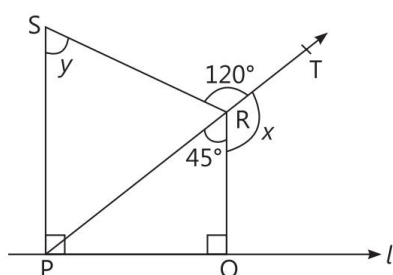
On the basis of the above information, solve the following questions.

Q 1. Which of the following line segment is parallel?

a. PR and RQ

b. PS and QR

c. SR and PR

d. QR and RS

Q 2. Measure of angle x is:

a. 130°   b. 125°   c. 135°   d. 140°

Q 3. Which of the following points are collinear?

a. S, P and R

b. P, R and Q

c. P, R and T

d. T, R and Q

Q 4. Measure ∠SRP is:

    a. 50°   b. 45°   c. 55°   d. 60°

Q 5. The sum of angles ∠PRQ + ∠QRT is a

    a. complementary   b. supplementary
    c. Both a. and b.   d. None of these

Solutions

1. (b) In the given figure, line segments SP and QR are perpendicular to the line l. Therefore, line. segments PS and QR are parallel.

So, option (b) is correct.

2. (c)

From figure,

$$∠PRQ + ∠TRQ = 180° \quad \text{[By linear pair]}$$
$$⇒ \quad 45° + x = 180°$$
$$⇒ \quad x = 135°$$

So, option (c) is correct.

3. (c) As we know that three points are said to be collinear, if all three points lie in a line.

In the given options, only points P, R and T lies on a line. Thus, they are collinear points.

So, option (c) is correct.

4. (d) By definition of complete angle,

$$∠SRT + ∠TRQ + ∠PRQ + ∠SRP = 360°$$
$$∴ \quad 120° + 135° + 45° + ∠SRP = 360°$$
$$⇒ \quad ∠SRP = 360° − 300°$$
$$= 60°$$

So, option (d) is correct.
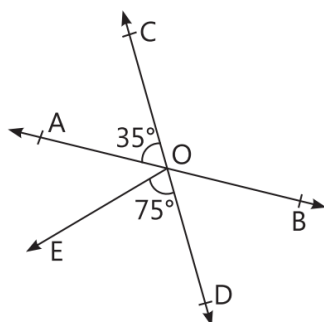
5. (b) ∵ ∠PRQ + ∠QRT = 45° + 135° = 180°

Hence, sum of two angles is a supplementary.

So, option (b) is correct.

Case Study 3

A math's teacher was teaching students about intersecting lines.
Suppose AB and CD are two intersecting lines, which meets at point O. In this point O, she draw a line OE and all these lines were making different angles with each other.

After explaining the description of the figure, she asked the following questions from the students.

On the basis of the above information, solve the following questions.

Q 1. Find the measure of ∠BOD.

Q 2. Check whether pair of angles ∠AOC and ∠BOC makes a linear pair.

Q 3. Which of the following angles form a non collinear lines?
   (i) A, O, B   (ii) C, O, E

Q 4. Find the measure of ∠AOE.

Solutions

1. From figure,
   ∠BOD = ∠AOC = 35°
                 [Vertically opposite angles]

2. From figure, it is clear that
   ∠AOC + ∠BOC = 180°
                 [∵ AB is a straight line]
   Hence, ∠AOC and ∠BOC makes a linear pair.

3. (i) It is clear from the figure that points A, O and B form a collinear point.

(ii) It is clear from the figure that points C, O, E forms a non-collinear point.

Hence, points C, O, E form a non-collinear line.

4. From the given figure, CD is a line segment.

Therefore, the sum of all angles of the same side of a line is 180°.

$\therefore \angle COA + \angle AOE + \angle EOD = 180°$

$\Rightarrow \quad 35° + \angle AOE + 75° = 180°$

$\Rightarrow \qquad \angle AOE = 180° - 110°$

$\qquad\qquad\qquad = 70°$