



A collage of various analytical chemistry and data visualization elements. It includes a lightbulb with a brain-like filament, a 3D pie chart, a flowchart with arrows, laboratory glassware like test tubes and flasks, a smartphone, and a computer keyboard. The background features a dark blue gradient with white confetti-like shapes.

EPEA516 ANALYTICAL SKILLS II

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Learning Outcomes

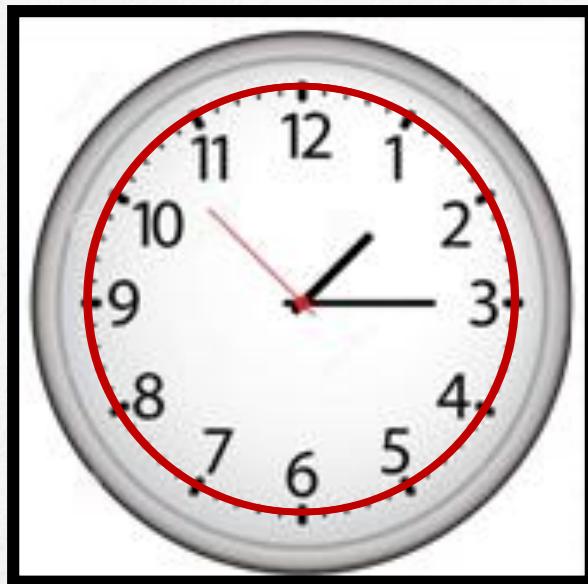


After this lecture, you will be able to

- analyze the basics relating to concepts of clock.

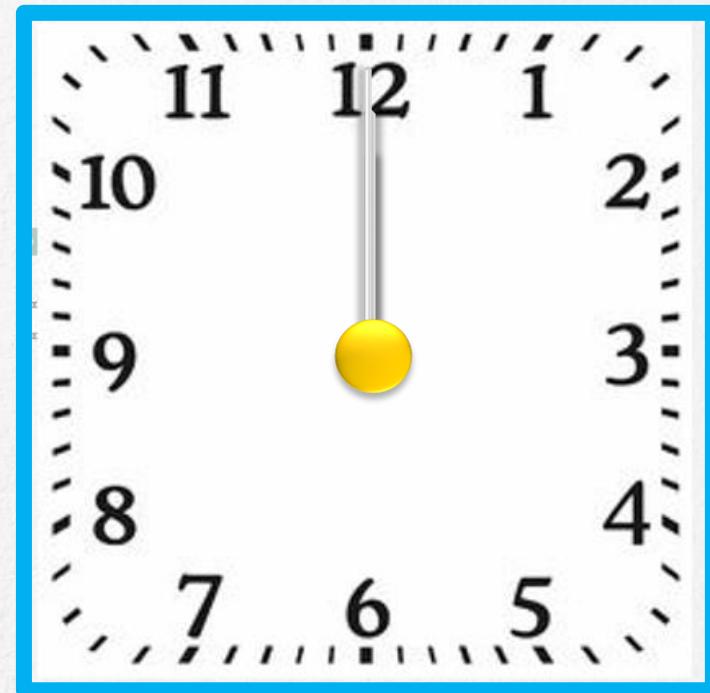
Concepts of Clock

- Circumference - 60 equal parts
- 60 equal parts - Minute Spaces



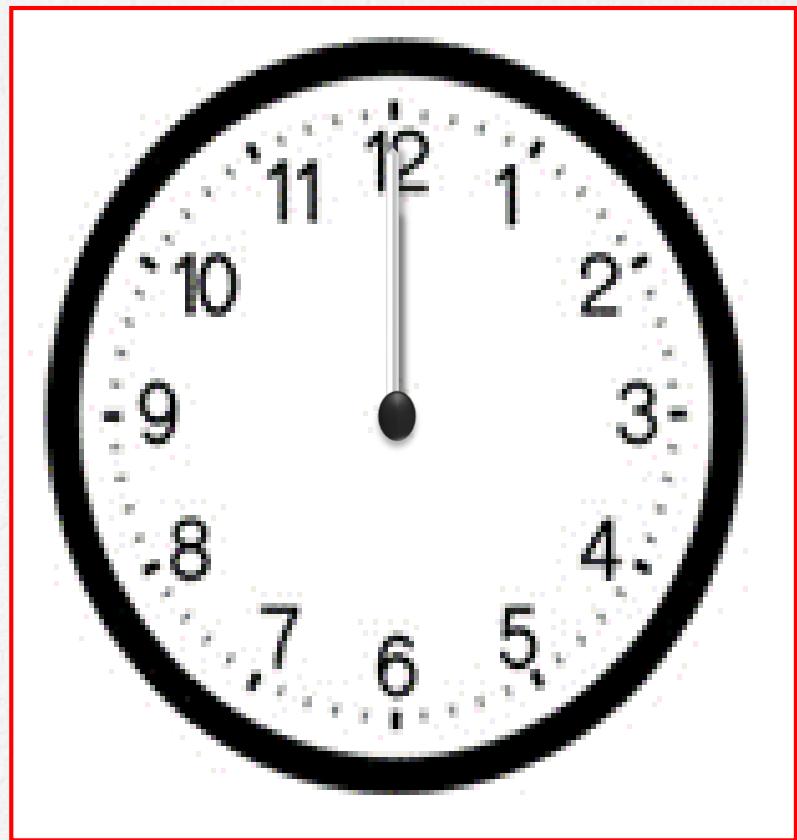
Concepts of Clock

- Smaller Hand - Hour Hand/Short Hand
- Larger Hand - Minute Hand/Long Hand
- Thin long Hand - Second Hand



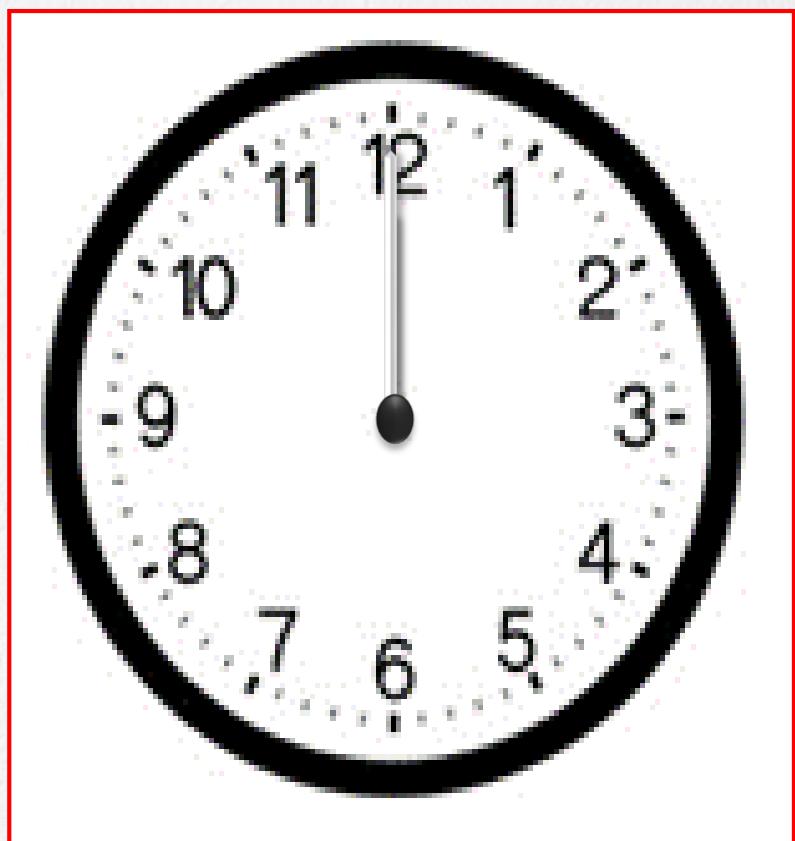
Concepts of Clock

- Angle traced by minute hand in 60 min. = 360°
- Angle traced by hour hand in 12 hrs. = 360°



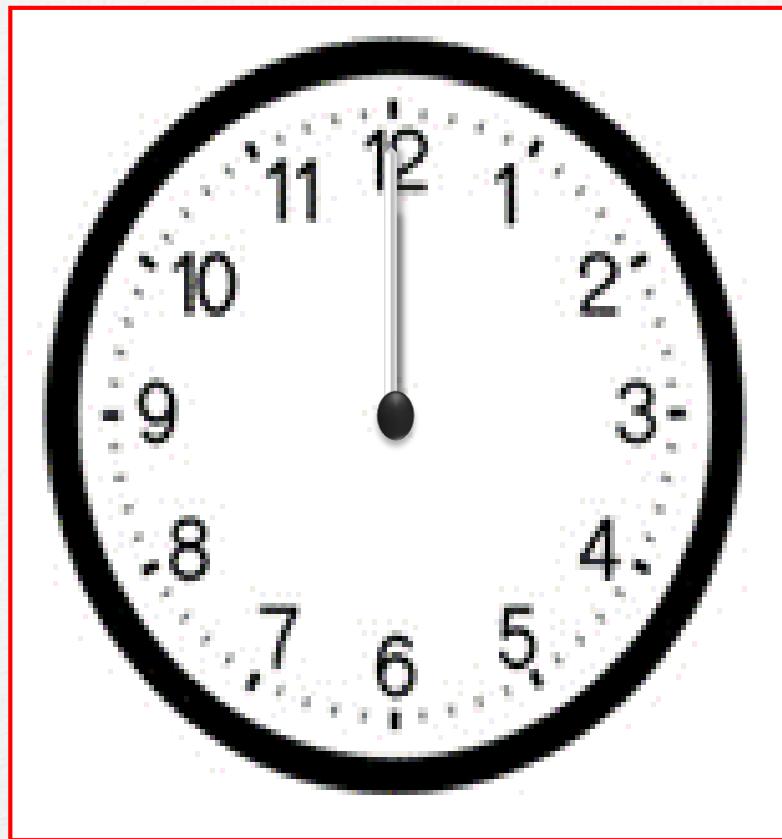
Concepts of Clock

The minute hand moves 12 times as fast as the hour hand.



Concepts of Clock

- The minute hand of clock gains 55 minutes on the hour hand of clock in 60 minutes.



Concepts of Clock

- In each minute
 - The minute hand moves through 6° .



Con



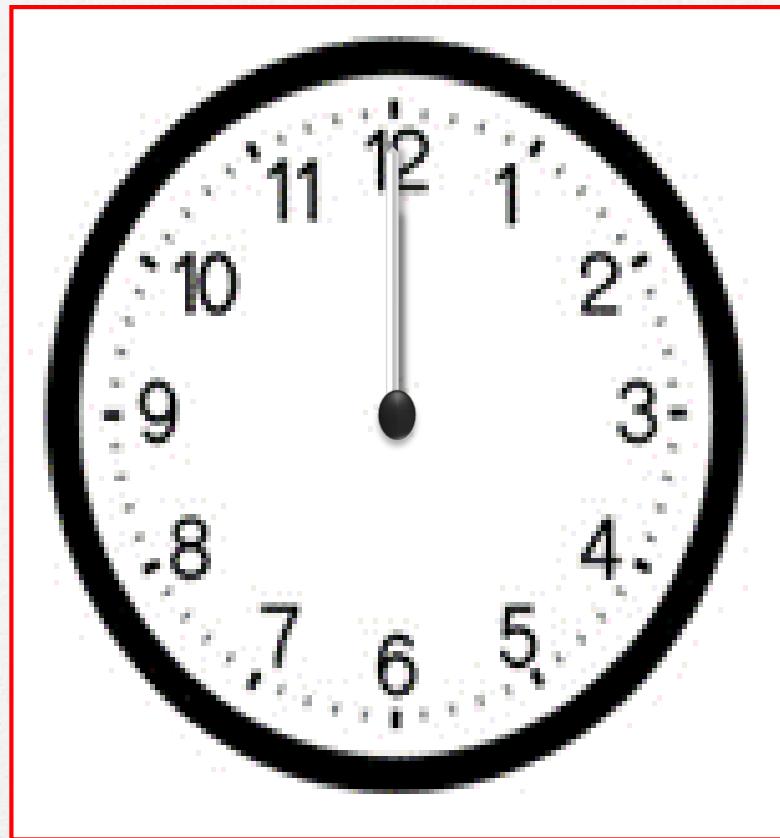
Concepts of Clock

- In each minute
 - The minute hand gains $5\frac{1}{2}^\circ$ than the hour hand.



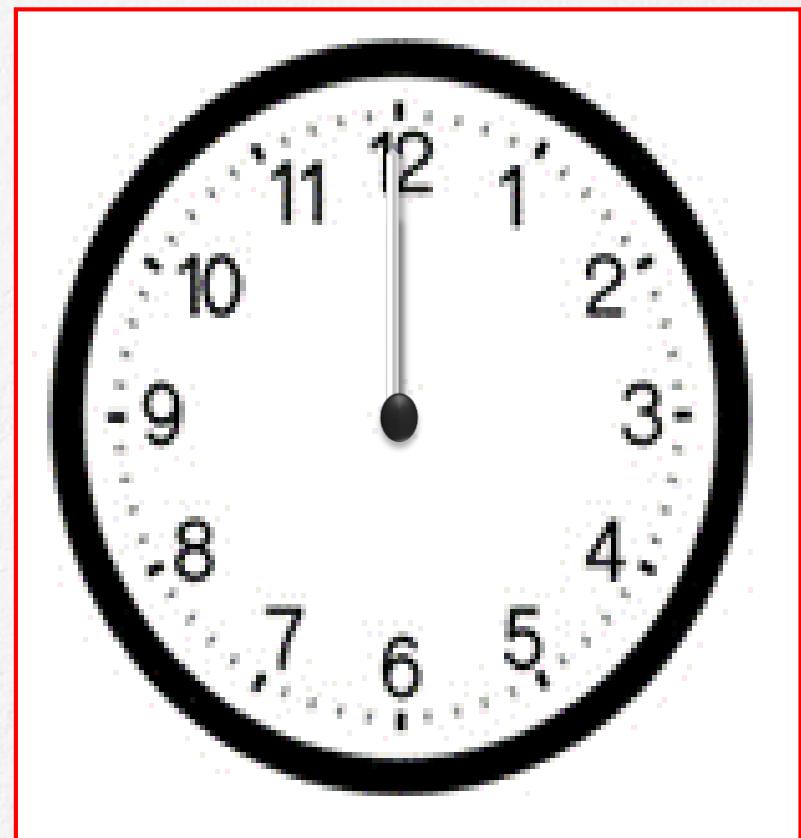
Concepts of Clock

- Both the hands of clock coincide once in every hour.



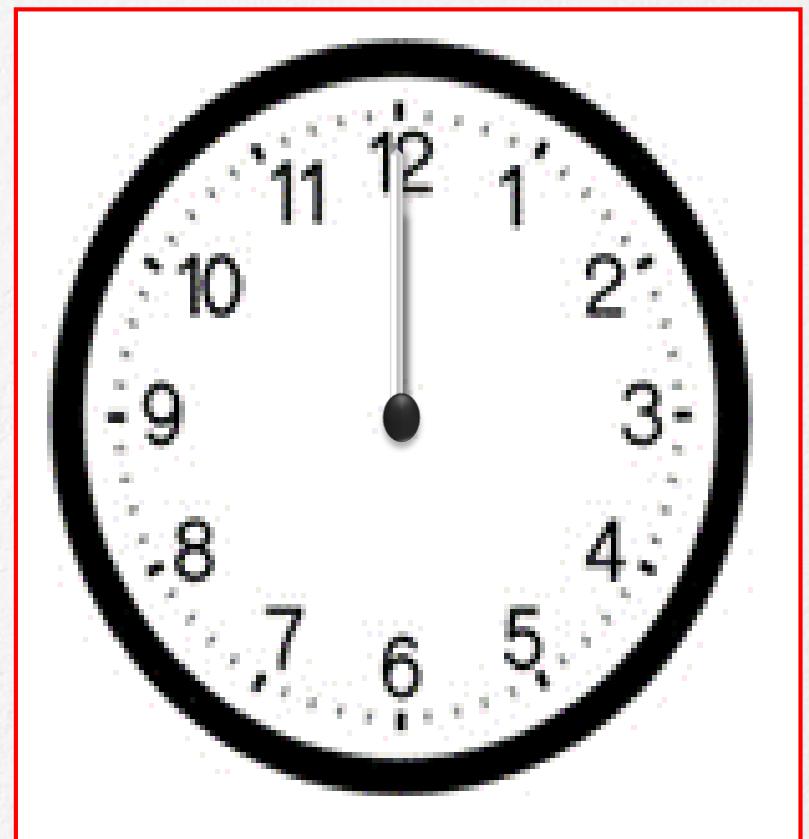
Concepts of Clock

- The hands of the clock are coincident.
- Angle - 0°



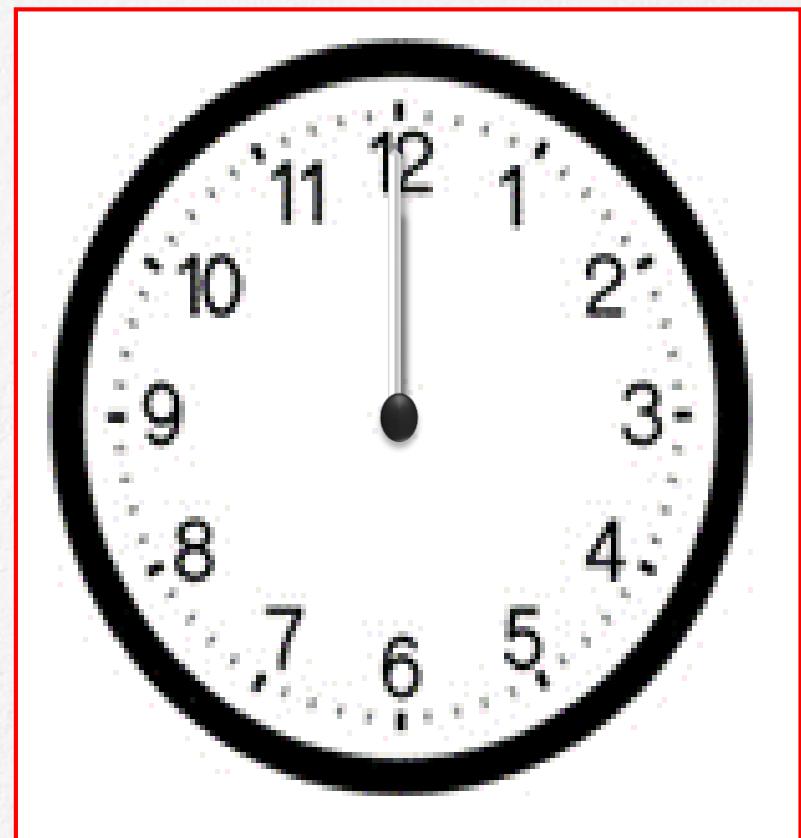
Concepts of Clock

- Both the hands of clock coincident or opposite to each other - Same straight line.



Concepts of Clock

- The hands of the clock point in opposite directions.
 - Angle – 180°



Concepts of Clock

- The two hands of clock are 15 minute spaces apart
 - Right Angle



Concepts of Clock

- The hands of a clock are twice at right angles
 - 15 minute spaces apart



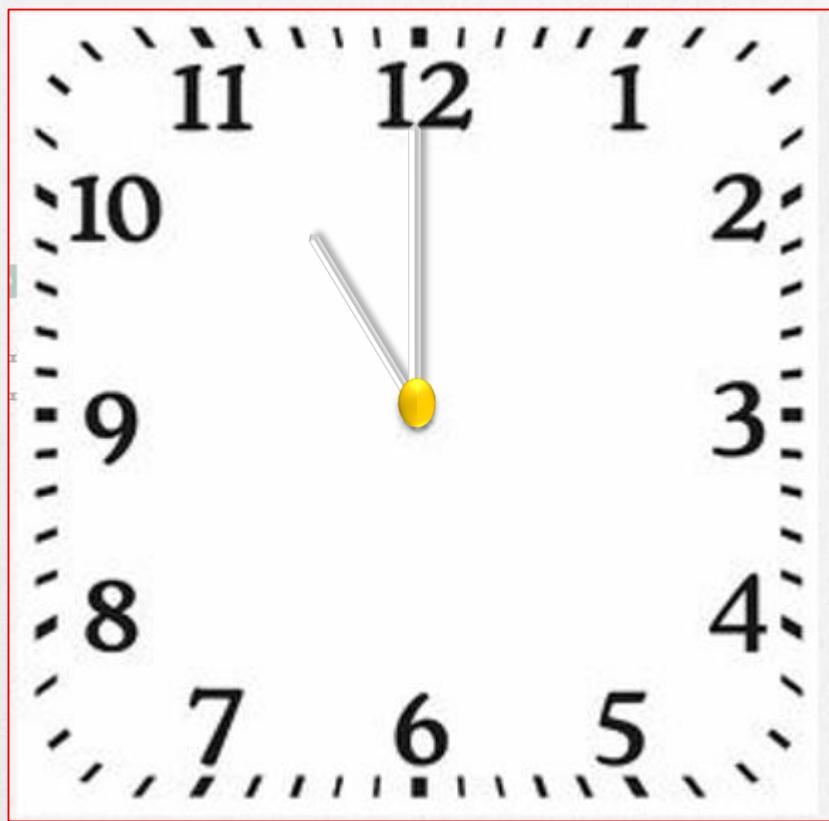
Concepts of Clock

- The two hands of clock are 30 minute spaces apart
 - Opposite Directions



Concepts of Clock

- Too Fast
 - Clock indicates 12:15 & Correct time - 12
 - Clock - 15 minutes too fast



Concepts of Clock

- Too Slow
 - Clock indicates 11:45 & Correct time - 12
 - Clock - 15 minutes too slow



Concepts of Clock

- Both the hands of a clock are together - After every $65\frac{5}{11}$ min.
- Clock is running fast - If both the hands of a clock are meeting after an interval $<65\frac{5}{11}$ min.
- Clock is running slow - If both the hands of a clock are meeting after an interval $>65\frac{5}{11}$ min.

Concepts of Clock

- Interchange of Hands
 - Whenever the hands of the clock interchange positions, the sum of the angles traced by hour hand and minute hand = 360° .

Concepts of Clock

- Interchange of Hands
 - After x minutes
 - Angle traced by minute hand in x min $= (6x)^\circ$
 - Angle traced by hour hand in x min $= (0.5x)^\circ$

$$\text{Therefore, } 0.5x + 6x = 360$$

$$6.5x = 360$$

$$x = \frac{360}{6.5}$$

Concepts of Clock

- Interchange of Hands

- $x = \frac{360 \times 10}{65}$

- $x = 55 \frac{5}{13}$ minutes

- Therefore, after every $55 \frac{5}{13}$ minutes, both the hands of a clock interchange their positions.

Conclusion

- 60 equal parts - Minute Spaces
- Hour Hand & Minute Hand/Long Hand
- In every hour
 - Both the hands coincide once.
 - Point in opposite directions once
 - Twice at right angles.
- Whenever the hands of the clock interchange positions, the sum of the angles traced by hour hand & minute hand = 360° .

Summary

- Concepts of Clock

That's all for now...