



SNS COLLEGE OF TECHNOLOGY
An Autonomous Institution
Coimbatore-35



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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

23GET275 – VQAR I

II YEAR/ III SEMESTER

UNIT 1 – QUANTITATIVE ABILITY II

TOPIC 2 : Problems on Clocks

23/9/2024

Problems on Ages /23GET275 – VQAR I/S.SHARMILA/AP/EEE/SNSCT



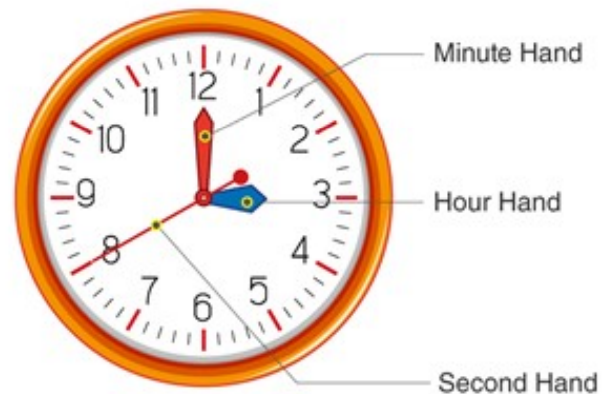
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Introduction



- A Clock is a circular device provided with three hands viz. an hour hand, minute and second hand. The study of the clock is known as “**horology**”





Structure of a Clock



A clock is composed of **360** degrees and divided into **12** equal divisions. The angle between the consecutive divisions is obtained by dividing the total angle of clock **360°** by the number of divisions i.e. **12**.

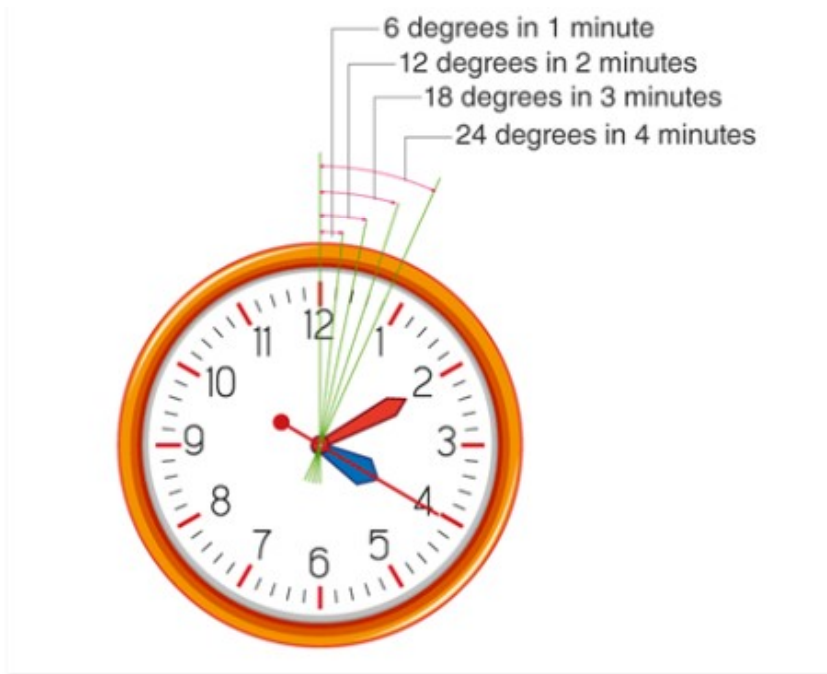




Angle divisions of a clock



Angular value of a minute = $(30^\circ)/5 = 6^\circ$



Minute(s)	Angular values
1	6°
2	12°
3	18°
4	24°
5	30°
6	36°
7	42°
8	48°
9	54°
10	60°



A first collision of the hands in a clock at midnight

Problems



Frequency of collision	Time in mixed fraction	Exact time
1 st	12:0:0	12:0:0
2 nd	1:5:5/11	1:5:27
3 rd	2:10:10/11	2:10:54
4 th	3:16:16/11	3:16:21
5 th	4:21:9/11	4:21:16
6 th	5:27:3/11	5:27:36
7 th	6:32:8/11	6:32:43
8 th	7:38:2/11	7:38:10
9 th	8:43:7/11	8:43:38
10 th	9:49:1/11	9:49:5
11 th	10:54:6/11	10:54:32
12 th	11:59:11/11	12:0:0





Problems



An accurate clock shows 7 a.m. Through how many degrees will the hour hand rotate when the clock shows 1 p.m.?

- A. 154° B. 180°
C. 170° D. 160°

angle traced by hour hand in 12 hrs. = 360°

From 7 to 1, there are 6 hours.

Angle traced by the hour hand in 6 hours = $6 * (360/12) = 180^\circ$

correct answer.

Option B





Problems



At what time between 5.30 and 6 will the hands of a clock be at right angles?

- A. 44 minutes past 5 B. $44 \left(\frac{7}{11} \right)$ minutes past 5
C. $43 \left(\frac{7}{11} \right)$ minutes past 5 D. 43 minutes past 5

Given: $H = 5$ and $A = 90$, since 5 and 6 lies in the first half, a positive sign is considered.

$$T = \frac{2}{11} [H \cdot 30 \pm A]$$

$$T = \frac{2}{11} [5 \cdot 30 + 90]$$

$$T = \frac{2}{11} [240] = \frac{480}{11} = 43 \left(\frac{7}{11} \right)$$

correct answer.

Option C





Problems



An accurate clock shows 8 o'clock in the morning. Through how many degrees will the hour hand rotate when the clock shows 2 o'clock in the afternoon?

- a) 144°
- b) 150°
- c) 168°
- d) 180°

Angle traced by the hour hand in 6 hours = $= \left(\frac{360}{12} \times 6 \right)^\circ = 180^\circ.$





Problems



The reflex angle between the hands of a clock at 10.25 is:

- Ⓐ 180°
- Ⓑ $192 \frac{1}{2}^\circ$
- Ⓒ 195°
- Ⓓ $197 \frac{1}{2}^\circ$

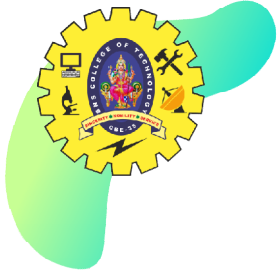
$$\text{Angle traced by hour hand in } \frac{125}{12} \text{ hrs} = \left(\frac{360}{12} \times \frac{125}{12} \right)^\circ = 312 \frac{1}{2}^\circ.$$

$$\text{Angle traced by minute hand in 25 min} = \left(\frac{360}{60} \times 25 \right)^\circ = 150^\circ.$$

$$\therefore \text{Reflex angle} = 360^\circ - \left(312 \frac{1}{2} - 150 \right)^\circ = 360^\circ - 162 \frac{1}{2}^\circ = 197 \frac{1}{2}^\circ.$$

Answer: Option Ⓓ





THANK YOU

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