# Clocks

## Solution

**1.(D)** To coincide, At 3'o clock minute hand to travel for 15 min to cover 90°.
Degrees covered by minute hand in one minute $=\frac{360}{60}=6°$

$\text{Relative speed}=6-\frac{1}{2}=\left(5\frac{1}{2}\right)^\circ$

By keeping hour hand on hold,

$\text{Required time}=\frac{90\times 2}{11}$

$=16\frac{4}{11}$ minutes.

**2.(D)** To be in a straight line, the minute hand has to travel just 30°.

$\text{Relative speed}=5\frac{1}{2}^\circ$

By keeping hour hand on hold,

$\text{Required time}=\frac{30\times 2}{11}=5\frac{5}{11}$ minutes

**3.(A)** Time from 12 p.m. on Monday to 2 p.m. on the following Monday = 7 days 2 hours = 170 hours

$\therefore$ The watch gains $\left(2+4\frac{4}{5}\right)$ min.

or $\frac{34}{5}$ min. in 170 hr.

Now, $\frac{34}{5}$ min. are gained in 170 hrs

$\therefore$ 2 min. are gained in

$\left(170\times\frac{5}{34}\times 2\right)$ hrs $=50$ hrs

So, the watch is correct 2 days 2 hrs after 12 p.m. on Monday i.e. it will be correct at 2 p.m. on Wednesday.

**4.(D)** Every day, the time gap between the two clocks becomes 15 minutes. When the gap between them becomes 24 hrs then the two watches will show same time.
[An argument runs in this type of questions that the gap should be of 12 hours. But note that the time mentioned is 3:00 p.m. and not 3 o'clock. When the time mentioned is 3:00 p.m., that means that the difference between 3:00 p.m. and 3:00 a.m. is important, whereas when 3 o'clock is mentioned, that difference is immaterial and hence a gap of 12 hours is taken.]
To create a gap of 15 minutes, it takes 1 day.
To create a gap of 24 hours, it will take

$=\frac{1\times 24\times 60}{15}=96$ days

**5.(D)** To show the correct time again, watch must create 24 hours difference.
So, the required time

$=\frac{4}{3}\times\frac{60\times 24}{24}=80$ days

**6.(D)** The clock starts by showing correct time and after every 24 hours and hence (n + 1) times in n days.
So, it will show correct time 8 times in 7 days.

**7.(B)** In 12 hours they are 11 times in a straight line.
So, in 24 hours they will be 22 times.

**8.(D)** Total time hour hand has to travel = 6 hours.
Hence, Angle traced by hour hand in 6 hours

$=\left(\frac{360}{12}\times 6\right)^\circ=180°$

**9.(D)** At 5'o clock the angle between hour and minute hand will be 150°.
The minute hand have to cover 15 × 6° = 90°
In this 15 min hour hand will also move

$=15\times\frac{1}{2}=7.5°$

So, required angle

$360-(150°+90°-7.5°)=127\frac{1}{2}°$

**10.(C)** Required angle

$=270°-(6°\times 20)+\left(\frac{1}{2}°\times 20\right)=160°$

**11.(D)** At 10'o clock the angle between hour hand and minute hand will be 60°.

To be at 10:25, the minute hand will cover
$= 25 \times 6° = 150°$.
Hour hand will travel in this
$25 \text{ min} = 25 \times \frac{1}{2}^{\circ} = 12.5°$
So, angle between them at 10 : 25.
$= 150° + 12.5° = 162.5°$
So, reflex angle = $360° - 162.5°$
$= 197.5°$

**12.(D)** Since between 2 − 4 O' clock and 8 − 10 O' clock two hands of a clock make 90° angle only 2 times while in rest of the hours two hands make 90° angle 2 times every one hour. Hence, they are at right angle 22 times in 12 hours and 44 times in 24 hours.