

DAILY QUESTIONS

26<sup>TH</sup> JUNE '18

REASONING - CLOCKS

# CLOCKS

**Q.1) A clock strikes once at 1 o'clock, twice at 2 o'clock, thrice at 3 o'clock and so on. If it takes 5 seconds to strike 5 times at 5 o'clock, find the time taken by it to strike 11 times at 11 o'clock?**

- [a] 14 seconds**
- [b] 11 seconds**
- [c] 12.5 seconds**
- [d] 12 seconds**

**Solution (c)**

The time taken to strike 3 times is nothing but the time interval between the three strikes. Time taken to strike 3 times is equal to the sum of the two intervals. (i.e. between 1<sup>st</sup> and 2<sup>nd</sup> strikes and 3<sup>rd</sup> strikes) and so on. Hence, the time taken to strike n times is equal to the sum of (n-1) intervals. As the given watch strikes once at 1 o'clock and thrice at 3 o'clock, it strikes 5 times at 5 o'clock.

Time taken to strike at 5 o'clock = 4 times intervals = 5 seconds (from the data)

Time taken between two consecutive strikes = 1.25 second.

The clock strikes 10 times at 11 o'clock. Hence, it takes time equal to the sum of 10 intervals =  $10 \times 1.25$  seconds = 12.5 seconds

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**Q.2) A watch which gains uniformly was observed to be four minutes slow at 7:00 a.m. on a Monday and six minutes fast at 7:00 p.m. on the subsequent Wednesday. When did the watch show the correct time?**

- [a] 7:00 on Tuesday**
- [b] 8:00 a.m. on Tuesday**
- [c] 6:00 a.m. on Tuesday**
- [d] none of these**

### **Solution (a)**

**The duration from 7:00 a.m. on Monday to 7:00 p.m. on the subsequent Wednesday is 60 hours.**

**The total number of minutes gained by the clock in these 60 hours is 10 minutes.**

**The clock shows the correct time whenever it gains 4 minutes.**

**Time taken by the clock to gain 4 minutes is  $\frac{4}{10} \times 60 = 24$  hours.**

**After 24 hours from 7:00 a.m. on Monday i.e. 7:00 a.m. on Tuesday the clock shows the correct time.**

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**Q.3) Two clocks are showing correct time at 2:00 p.m. one clock loses 2.5 minutes in an hour, while the other gains 1.5 minutes in one hour. At 9:00 p.m. on the same day, by how much time will the two clocks differ?**

- [a] 21 minutes**
- [b] 28 minutes**
- [c] 24 minutes**
- [d] 40 minutes**

**Solution (b)**

**Clock 1 shows 2:57  $\frac{1}{2}$  minutes at 3 o'clock**

**Clock 2 shows 3: 1  $\frac{1}{2}$  minutes at 3 o'clock**

**Difference between the time shown by two clocks = 4 minutes**

**Duration from 2:00 pm to 9:00 p.m. = 7 hours**

**Hence, two clocks differ by  $7 \times 4 = 28$  minutes**

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**Q.4) What is the angle between the two hands of a clock when the time is 35 minutes past 6 o'clock?**

- [a]  $2 \frac{1}{2}^\circ$**
- [b]  $12 \frac{1}{2}^\circ$**
- [c]  $22 \frac{1}{2}^\circ$**
- [d]  $32 \frac{1}{2}^\circ$**

**Solution (b)**

**To solve these types of questions, the formula is  $\theta = [11/2 m - 30 h]$ , where m is minutes and h is hours**

**Here  $m=35$  ,  $h=6$**

$$\theta = [11/2(35) - 30 (6)]$$

$$= 192 \frac{1}{2} - 180$$

$$\theta = 12 \frac{1}{2}^\circ$$

**The angle between two hands is  $12 \frac{1}{2}^\circ$**

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**Q.5) By how many degrees does an hour hand move in three quarters of an hour?**

- [a]  $7.5^\circ$**
- [b]  $22.5^\circ$**
- [c]  $21.5^\circ$**
- [d]  $15^\circ$**

**Solution (b)**

**Hour hand covers  $30^\circ$  per hour, hour hand moves  $30^\circ \times \frac{3}{4} = 22.5$  in three quarters of an hour.**

**(as, 3 quarters of an hour =  $45/60 = \frac{3}{4}$ )**

**Q.6) If the seconds hands moves by  $240^\circ$ , then by how many degrees does the minute hand move in the same time?**

- [a]  $1^\circ$**
- [b]  $2^\circ$**
- [c]  $3^\circ$**
- [d]  $4^\circ$**

**Solution (d)**

**When the seconds hand moves by  $360^\circ$  in 1 minute, the minute hand moves by  $6^\circ$ . So, when the seconds hand moves by  $240^\circ$ , the minute hand moves by  $(240 \times 6)/360 = 4^\circ$**

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**Q.7) The reflection of a wall clock in a mirror shows the time as 3 hours 40 minutes. What is the actual time?**

- [a] 8 hours 20 minutes**
- [b] 8 hours 15 minutes**
- [c] 8 hours 45 minutes**
- [d] 8 hours 35 minutes**

**Solution (a)**

**When time is 3 hours 40 minutes, the hour hand will be between 3 and 4 minutes and minutes hand will be at 8. So, in the reflection the hour hand will be between 8 and 9 and the minute hand will be at 4. So, the time is 8 hours 20 minutes or**

**Mirror time = 12 - actual time = 12 - 3:40 = 8:20**

**Q.8) The minute hand of a clock overtakes the hour hand after every 70 minutes of correct time. How much time does the clock lose or gain in a day of normal time?**

- [a]  $93 \frac{39}{77}$  minutes
- [b]  $91 \frac{31}{77}$  minutes
- [c]  $92 \frac{24}{77}$  minutes
- [d]  $94 \frac{56}{77}$  minutes

**Solution (a)**

In a normal clock the minute hand overtakes the hour hand 11 times in 12 hours (12 hours = 720 minutes). Hence, it takes  $720/11 = 65 \frac{5}{11}$  minutes to overtakes once. But in the given clock the minute hand overtakes the hour hand in 70 minutes. Minute hand loses  $70 - 65 \frac{5}{11}$  i.e.  $4 \frac{6}{11}$  in 70 minutes

So, it loses  $50/11 \times (24 \times 60)/70$  minutes in 24 hours.

i.e.  $7200/77 = 93 \frac{39}{77}$  minutes.

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Q.9) At what time between 9 and 10 o'clock, will both the two hands of the clock coincide?

- [a]  $43 \frac{3}{11}$  minutes past 9 o'clock
- [b]  $45 \frac{6}{11}$  minutes past 9 o'clock
- [c]  $49 \frac{1}{11}$  minutes past 9 o'clock
- [d]  $49 \frac{6}{11}$  minutes past 9 o'clock

**Solution: (c)**

(when hands coincide with each other the angle between them is 0. Therefore, angle between two hands is given by

$$\theta = 30h - 11/2m \text{ ( as } 30h > 11/2m \text{)}$$

Here,  $h=9$

$$0 = 30 \times 9 - 11/2m$$

$$270 \times 2/11 = m$$

$$m = 49 \frac{1}{11} \text{ minutes}$$

so, the hands coincide at  $49 \frac{1}{11}$  minutes past 9 hours.

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Q.10) At what time between 7 o'clock and 8 o'clock are the two hands of a clock  $80^\circ$  apart?

- [a] 7 hours  $52 \frac{8}{11}$  min
- [b] 7 hours  $38 \frac{8}{11}$  min
- [c] 7 hours  $23 \frac{7}{11}$  min
- [d] both [a] and [c]

**Solution (d)**

By applying the formula ( $\theta = 11/2m - 30h$ )

In this problem  $\theta = 80^\circ$ ,  $h=7$ ,  $m=?$

We have  $m = [2(30h \pm \theta)] / 11$

$$= 2(30 \times 7 + 80) / 11$$

$$= 580 / 11 = 52 \frac{8}{11} \text{ min past 7 o'clock}$$

$$\text{And } 2(30 \times 7 - 80) / 11 = 260 / 11$$

$$= 23 \frac{7}{11} \text{ min past 7 o'clock}$$