6. (b) Time from noon on Sunday to 3 pm on Wednesday = 75 hours.

24 hours 2 minutes of the first clock

= 24 hours of the correct one.

$\Rightarrow$ 1 hour of the first clock

= 24 × (30/721) hours of correct one.

$\Rightarrow$ 75 ours of the first clock

= 24 × 30 × (75/721) hours of correct one

= 54000/721 hours

= 74 hours 53.7 min.

Hence the answer is 2:54 pm.

7. (a) At 9'o clock, the Minute Hand is ahead of Hour Hand by 45 minutes. The hands will be opposite to each other when there is a space of 30 minutes between them.

This will happen when the Minute Hand gains 15 minutes' space over Hour Hand.

Time taken by Minutes Hand to gain 15 minutes

$$=15\times\left(1+\frac{1}{11}\right)=15+\frac{15}{11}=15+1\frac{4}{11}=16\frac{4}{11}\text{ minutes.}$$

Hence the Hands are opposite to each other at $16\frac{4}{11}$ minutes past 9.

8. (a) The clock gains 15 min in 24 hours.

Therefore, in 16 hours, it will gain 10 minutes.

Hence, the time shown by the clock will be 4.10 am.

9. (d) Required angle = 240 – 24 × (11/2)

= 240 –132 = 108°.

10. (b) In a watch than is running correct the minute hand should cross the hour hand once in every $65+\frac{5}{11}$ min. So they should ideally cross 3 times once in

$$3\times\left(\frac{720}{11}\right)-\frac{2060}{11}\text{ min} = 196.36 \text{ minutes.}$$

But in the watch under consideration, they meet after every 3hr, 18 min and 15 seconds,

i.e. $\left(3\times60+18+\frac{15}{60}\right)=\frac{793}{4}\text{ min.}$

Thus, our watch is actually losing time (as it is slower than the normal watch). Hence when our watch elapsed $\left(1440\times\frac{196.36}{198.25}\right)=1426.27.$

Hence the amount of time lost by our watch in one day $=(1440\sim1426.27)=13.73$ ie 13 min and 50s (approx).

11. (a) Since, in one hour, two hands of a clock coincide only once, so, there will be value.

Required time $T=\frac{2}{11}(H\times30+A^\circ)$ minutes past H.

Here H = initial position of hour hand = 3 (Since 3 o'clock)

A° = required angle = 0°

(Since it coincides)

$$T=\frac{2}{11}(3\times30+0)\text{ minutes past 3}$$

$$=16\frac{4}{11}\text{ minutes past 3.}$$

12. (b) 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 $\left(2+4\frac{4}{5}\right)\text{min.}$

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

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

$\therefore$ 2 min. are gained in

EXERCISE 2

1. (a) Time between 10 a.m. on Monday to 10:30 a.m. on

Sunday = $144\frac{1}{2}$ hours.

$24\frac{1}{2}$ hours of incorrect clock = 24 hours of correct time.

$\therefore$ $144\frac{1}{2}$ hours of incorrect clock = x hours of correct time.

$\therefore$ $x = \frac{144\frac{1}{2}\times 24}{24\frac{1}{2}}$ = 144 hours i.e.,

The true time is 10 a.m. on Sunday.

2. (d) At 15 minutes past 5, the minute hand is at 3 and hour hand slightly advanced from 5. Angle between their 3rd and 5th position.

Angle through which hour hand shifts in 15 minutes is

$\left(15\times\frac{1}{2}\right)^\circ = 7\frac{1}{2}^\circ$

$\therefore$ Required angle = $\left(60+7\frac{1}{2}\right) = 67\frac{1}{2}^\circ$

3. (a) Time from 5 a.m. on a day to 10 p.m. on 4th day is 89 hours.

Now, 23 hrs. 44 min. of this clock are the same as 24 hours of the correct clock.

i.e., $\frac{356}{15}$ hrs. of this clock = 24 hrs. of correct clock.

$\therefore$ 89 hrs. of this clock = $\left(\frac{24\times 15}{356}\times 89\right)$ hrs. of correct clock

= 90 hrs of correct clock.

So, the correct time is 11 p.m.

4. (c) 55 min spaces are gained in 60 min

$\Rightarrow$ 35 min spaces will be gained in 38.18 min.

$\Rightarrow$ Answer = 7 hrs + 38.18 min.

5. (a) Time from 7 a.m. to quarter pas 4

= 9 hours 15 min.=555 min.

Now, $\frac{37}{12}$ min. of this watch = 3 min. of the correct watch.

555 min. of this watch = $\left(\frac{3\times 12}{37}\times 555\right)$ min.

= $\left(\frac{3\times 12}{37}\times\frac{555}{60}\right)$ hrs. = 9 hrs. of the correct watch.

Correct time is 9 hours after 7 a.m. i.e., 4 p.m.

6. (c) 26th Jan., 1950 = (1949 years + Period from 1st Jan., 1950 to 26th Jan., 1950)

1600 years have 0 odd day. 300 years have 1 odd day.

49 years = (12 leap years + 37 ordinary years)

= [(12 × 2) + (37 × 1)] odd days = 61 odd days

= 5 odd days.

Number of days from 1st Jan. to 26th Jan. = 26

= 5 odd days

Total number of odd days = (0 + 1 + 5 + 5) = 11

= 4 odd days

$\therefore$ The required days was 'Thursday'

7. (c) 2000 years have 2 odd days.

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009
Odd days	1	1	1	2	1	1	1	2	1

= 11 odd days = 4 odd days.

∴ January 12, 1979 was Friday.

15. (c) We go on counting the odd days from 1991 onwards till the sum is divisible by 7. The number of such days are 14 upto the year 2001. So, the calender for 1991 will be repeated in the year 2002.

16. (b) If the first working day happened to be Tuesday then 8th, 15th, 22nd and 29th of the month will be Tuesday. Hence, the last day of the month will be Wednesday (since, number of days in the month is 30). Thus, the next casual leave will be on Thursday.

17. (b) (i) Submitted application form : Monday

(ii) Holiday : Tuesday

(iii) Clearance from clerk : Wednesday

(iv) Clearance from senior clerk : Wednesday

(v) Submitted to the head clerk : Thursday