

Chapter - 9

CLOCK & CALENDAR

Answer Key with Step-by-Step Solutions
Includes: All MCQs + Extra PYQs with Detailed Explanations

Previous Year Questions

- A clock is set right at 8 am. The clock gains 10 minute in 24 hours. What will be the true time when the cock indicates 1 p.m. on the following day?
 - 48 min. past 12
 - 46 min. past 12
 - 45 min. past 12
 - 47 min. past 12
- The calender for the year 1993 will be same for the year.
 - 2004
 - 1999
 - 1998
 - 2003
- A clock is set right at 5 a.m. The clock loses 16 minutes in 24 hours. What will be the true time when the clock indicates 10 pm. on 4th day.
 - 11 pm
 - 12 pm
 - 1 pm
 - 2 pm
- What was the day of the week on. 16th July 1776
 - Tuesday
 - Wednesday
 - Monday
 - Saturday
- How many days are there in X weeks X days.
 - $7x^2$
 - $8x$
 - $14x$
 - $7x$
- If immediate next day of Tomorrow in Sunday then what will be 3rd day before yesterday.
 - Monday
 - Tuesday
 - Saturday
 - Friday
- A watch which gains uniformly is 5 min, slow at 8 O' clock in the morning on Sunday and it is 5 min 48 sec. Fast at 8 pm. on following Sunday. When was it correct
 - 7 pm on Wednesday
 - 20min past 7pm on Wednesday
 - 18 min past 7 pm on Wednesday
 - 8 pm on Wednesday
- At what time between 5 and 6 will the hands of a clock coincide:
 - $200/11$
 - $300/11$
 - $400/11$
 - $250/11$
- In a whole 12 hours the minute hand overlap to the hour hand.
 - 11 times
 - 23 times
 - 22 times
 - 24 times
- What times in a day or 24 hours the angle between minute hand and hour hand is right angle.
 - 44 times
 - 22 times
 - 11 times
 - 12 times
- What time between 4 and 5' O clock will the hands of a clock be at rightangle for 2nd time.
 - $3\frac{8}{11}$
 - $38\frac{2}{11}$
 - $45\frac{9}{11}$
 - $40\frac{1}{11}$
- Find out the angle between hour hand and minute hand at 6 : 49.
 - 89.5°
 - 90°
 - 82°
 - 110°
- Find out the reflexive angles at 11:05.
 - 57.5°
 - 360.5°
 - 302.5°
 - 190°
- At what angle the hands of a clock are undivided at 15 minutes past 5.
 - 57.5°
 - 67.5°
 - 77.5°
 - 87.5°
- In every 60 minutes, the minute hand gains minutes on the hour hand.
 - 53
 - 54
 - 55
 - 56
- At what time, in minutes, between 3 O' clock and 4 O' clock both the needles will coincide each other.
 - $11\frac{4}{11}$ past 4
 - $13\frac{4}{11}$ past 3
 - $15\frac{4}{11}$ past 3
 - $16\frac{4}{11}$ past 3



17. An accurate clock shows 8 O' clock in the morning. Through how many degrees will the hour hand rotate when the clock show 2 O' clock in the afternoon.
 (a) 360° (b) 180°
 (c) 90° (d) 60°
18. The angle between minute hand and hour hand at 10 :20.
 (a) 170° (b) 200°
 (c) 120° (d) 150°
19. How much does a watch lose per day, if its hands coincide every 64 minutes.
 (a) $32\frac{8}{11}$ (b) $33\frac{8}{11}$
 (c) $34\frac{8}{11}$ (d) $35\frac{8}{11}$
20. Which year's calender is repeating calender for year 2016.
 (a) 2024 (b) 2023
 (c) 2044 (d) 2045
21. If in any month on third day it is Tuesday. How many maximum Sunday can be in the month?
 (a) 4 (b) 5
 (c) 3 (d) None of these
22. If on August 2nd, is Friday. What day will be day after thirteen day from 12 August?
 (a) Monday (b) Sunday
 (c) Wednesday (d) Saturday
23. In a 30 days month, there are five Saturday. What will be the first day of month?
 (a) Saturday (b) Friday
 (c) Friday or Saturday (d) Sunday
24. In any special month, three Sunday are on even number date which day will be on 15th date of month?
 (a) Thursday (b) Friday
 (c) Saturday (d) Sunday
25. If 3rd January is Sunday. Which date will be after three days from fourth Wednesday?
 (a) 30 January (b) 27 January
 (c) 26 January (d) 23 January
26. If in any month, 5th day is after two days from Monday. What day will be 18th in the month?
 (a) Monday (b) Tuesday
 (c) Wednesday (d) Thursday
27. If in December month on 17th day is Monday. What day will be maximum times in the month?
 (a) Monday (b) Tuesday
 (c) Wednesday (d) Friday
28. If on October 25, is Thursday, How many Monday will be in October month?
 (a) 3 (b) 4
 (c) 5 (d) 6
29. How many times the hands of clock will make right angle in a day?
 (a) 48 (b) 44
 (c) 43 (d) 42
30. In any year, world environment day was celebrated on Friday. In the same year on which day the children day was celebrated?
 (a) Friday (b) Tuesday
 (c) Saturday (d) Wednesday

Practice Set Solutions

1. (b); The year 2007 is an ordinary year. So, it has 1 odd day.
 1st day of the year 2007 was Monday.
 1st day of the year 2008 will be 1 day beyond Monday.
 Hence, it will be Tuesday.
2. (c); The year 2008 is a leap year. So, it has 2 odd days.
 1st day of the year 2008 is Tuesday (Given)
 So, 1st day of the year 2009 is 2 days beyond Tuesday.
 Hence, it will be Thursday.
3. (d); The year 2006 is an ordinary year. So, it has 1 odd day.
 So, the day on 8th Dec, 2007 will be 1 day beyond the day on 8th Dec, 2006.
 But, 8th Dec, 2007 is Saturday.
 \therefore 8th Dec, 2006 is Friday.
4. (a); The year 2004 is a leap year. So, it has 2 odd days.
 But, Feb 2004 not included because we are calculating from March 2004 to March 2005. So it has 1 odd day only.
 The day on 6th March, 2005 will be 1 day beyond the day on 6th March, 2004.
 Given that, 6th March, 2005 is Monday.
 6th March, 2004 is Sunday (1 day before to 6th March, 2005).
5. (d); Count the number of odd days from the year 2007 onwards to get the sum equal to 0 odd day.
 Year : 2007 2008 2009 2010 2011 2012 2013
 2014 2015 2016 2017
 Odd day : 1 2 1 1 1 2 1 1 1 2 1
 Sum = 14 odd days 0 odd days.
 Calendar for the year 2018 will be the same as for the year 2007.



6. (d); We shall find the day on 1st April, 2001.
 1st April, 2001 = (2000 years + Period from 1.1.2001 to 1.4.2001)
 Odd days in 1600 years = 0
 Odd days in 400 years = 0
 Jan. Feb. March April
 $(31 + 28 + 31 + 1) = 91$ days 0 odd days.
 Total number of odd days = $(0 + 0 + 0) = 0$
 On 1st April, 2001 it was Sunday.
 In April, 2001 Wednesday falls on 4th, 11th, 18th and 25th.
7. (c); 17th June, 1998 = (1997 years + Period from 1.1.1998 to 17.6.1998)
 Odd days in 1600 years = 0
 Odd days in 300 years = $(5 \times 3) = 1$ odd day
 97 years has 24 leap years + 73 ordinary years.
 Number of odd days in 97 years $(24 \times 2 + 73) = 121 = 2$ odd days.
 Jan. Feb. March April May June
 $(31 + 28 + 31 + 30 + 31 + 17) = 168$ days
 168 days = 24 weeks = 0 odd day.
 Total number of odd days = $(0 + 1 + 2 + 0) = 3$.
 Given day is Wednesday.
8. (d); 28 May, 2006 = (2005 years + Period from 1.1.2006 to 28.5.2006)
 Odd days in 1600 years = 0
 Odd days in 400 years = 0
 5 years = (4 ordinary years + 1 leap year) = $(4 \times 1 + 1 \times 2) = 6$ odd days
 Jan. Feb. March April May
 $(31 + 28 + 31 + 30 + 28) = 148$ days
 148 days = (21 weeks + 1 day) 1 odd day.
 Total number of odd days
 $= (0 + 0 + 6 + 1) = 7$ 0 odd day.
 Given day is Sunday.
9. (a); 15th August, 2010 = (2009 years + Period 1.1.2010 to 15.8.2010)
 Odd days in 1600 years = 0
 Odd days in 400 years = 0
 9 years = (2 leap years + 7 ordinary years) = $(2 \times 2 + 7 \times 1) = 11 = 4$ odd days.
 Jan. Feb. March April May June July Aug.
 $(31 + 28 + 31 + 30 + 31 + 30 + 31 + 15) = 227$ days
 227 days = (32 weeks + 3 days) 3 odd days.
 Total number of odd days = $(0 + 0 + 4 + 3) = 7 = 0$ odd days.
 Given day is Sunday.
10. (b); Each day of the week is repeated after 7 days.
 So, after 63 days, it will be Monday.
 After 61 days, it will be Saturday.
11. (c); 100 years contain 5 odd days.
 Last day of 1st century is Friday.
 200 years contain $(5 \times 2) = 10$ odd days.
 Last day of 2nd century is Wednesday.
 300 years contain $(5 \times 3) = 15$ odd days.
 Last day of 3rd century is Monday.
 400 years contain 0 odd day.
 Last day of 4th century is Sunday.
 This cycle is repeated.
 Last day of a century cannot be Tuesday or Thursday or Saturday.
12. (a); The century divisible by 400 is a leap year.
 The year 700 is not a leap year.
13. (b); x weeks x days = $(7x + x)$ days = $8x$ days.
14. (c); On 31st December, 2005 it was Saturday.
 Number of odd days from the year 2006 to the year 2009 = $(1 + 1 + 2 + 1) = 5$ days.
 On 31st December 2009, it was Thursday.
 Thus, on 1st Jan, 2010 it is Friday.
15. (c); The year 2004 is a leap year. It has 2 odd days.
 The day on 8th Feb, 2004 is 2 days before the day on 8th Feb, 2005.
 Hence, this day is Sunday.
16. (b); Angle traced by the hour hand in 5 hours = $(\frac{360}{12} \times 5)^\circ = 150^\circ$.
17. (c); In 12 hours, they are at right angles 22 times.
 In 24 hours, they are at right angles 44 times.
18. (a); The hands of a clock coincide 11 times in every 12 hours (Since between 11 and 1, they coincide only once, i.e., at 12 o'clock).
 AM: 12:00, 1:05, 2:11, 3:16, 4:22, 5:27, 6:33, 7:38, 8:44, 9:49, 10:55
 PM: 12:00, 1:05, 2:11, 3:16, 4:22, 5:27, 6:33, 7:38, 8:44, 9:49, 10:55
 The hands coincide 22 times in a day.
19. (c); $15 \times \frac{1}{2} = 7.5^\circ$
20. (a); $30^\circ + \frac{15}{2} = 37.5^\circ$
21. (c); Angle traced by hour hand in 12 hrs = 360° .
 Angle traced by hour hand in 5 hrs 10 min i.e.,
 $31/6$ hrs = $(\frac{360}{12} \times \frac{31}{6}) = 155^\circ$
22. (c); 22 time the hands of clock will be opposite directions in a day.



Distinct Solutions

45. (c); Angle between hands of clock = $60^\circ - 15 \times \frac{1}{2}$
 $= 52.5^\circ$

46. (a); Angle between hands of clock = $180 - 30 \times \frac{1}{2}$
 $= 165^\circ$



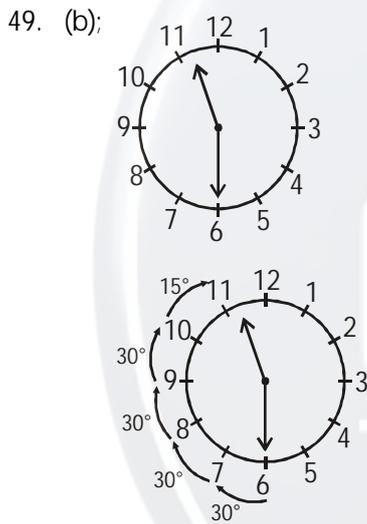
48. (a);

| | | | | | | |
|---|----|----|----|----|-----|----|
| | 2, | 4, | 6, | 8, | 10, | 12 |
| 2 | 1, | 2, | 3, | 4, | 5, | 6 |
| 3 | 1, | 1, | 3, | 2, | 5, | 3 |
| | 1, | 1, | 1, | 2, | 5, | 1 |

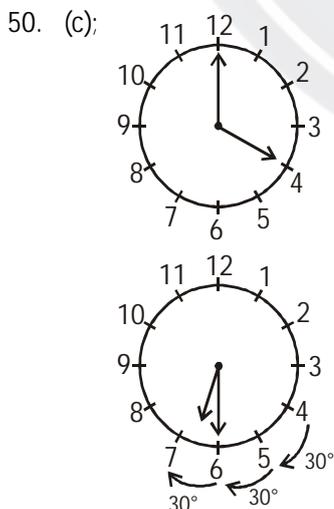
$2 \times 2 \times 3 \times 2 \times 5 = 120$ second = 2 minutes

∴ Bells ring together 1 times in 2 mnutes.

In 30 minutes bells ring together = $15 + 1 = 16$ times.



Clearly, time will be $11 : 52 \frac{1}{2}$ O'clock.



Clearly, time will be 6 : 30

51. (b); Time from 12 p.m. on Monday to 2 p.m. on the following Monday = 7 days 2 hours = 170 hours.

The watch gains $(2 + 4 \frac{4}{5})$ min or $\frac{34}{5}$ min in 170 hrs

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

2 min. are gained in $(170 \times \frac{5}{34} \times 2)$ hrs = 50 hrs.

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.

52. (d); At 3 o'clock, the minute hand is 15 min. spaces apart from the hour hand.

To be coincident, it must gain 15 min. spaces. 55 min. are gained in 60 min.

15 min. are gained in $(60/55 * 15)$ min = $16 \frac{4}{11}$ min

The hands are coincident at $16 \frac{4}{11}$ min past 3

53. (a); Next train time → 7 : 20
 Time of previous train → 7 : 20 – 4 : 30
 $= 2 : 50$ pm = 2 : 50 + 40 min = 3 : 30 pm

54. (c); We know that feb 29 only in leap year. Leap year comes again after 4 years.

55. (c); Present right time is 12 : 20 – 0 : 10
 $= 12 : 10$ pm
 Previous bus time was 12 : 10 – 0 : 25 = 11 : 45am
 So, time of next bus = 11 : 45 + 0 : 55 = 12 : 40 pm.

56. (b); Days between 3rd March to 2nd Oct.

March = 28 April = 30

May = 31 June = 30

July = 31 Aug. = 31

Sept. = 30 Oct. = $\frac{2}{213}$

No. of odd days = $213/7 = 3$

∴ Tuesday + 3 days = Friday

57. (a); Jan. = 5

Feb. = 29

March = 31

April = 30

May = 31

June = 30

July = 31

Aug. $\frac{= 15}{= 202}$

∴ No. of odd days = 6

∴ Saturday +6 days = Friday

58. (a); Time from 3 am Tuesday to 3 am Thursday = 48 hours.
 In 48 hours clock runs fast = 6 minutes
 \therefore Clock 6 minutes runs fast = 48 hours
 \therefore Clock 1 minute runs fast = $\frac{48}{6}$ hours.
 \therefore Clock 4 minutes runs fast $\frac{48}{6} \times 4 = 32$ hours
 Tuesday + 32 hours = on Wednesday 11 : 00 am
 (\therefore clock will show right time when it will run 4 minutes fast)

59. (a);
$$\begin{array}{r} 23 : 60 \\ - 12 : 40 \\ \hline 11 : 20 \end{array}$$

60. (d);
$$\begin{array}{r|l} 2 & 2, 3, 4, 5, 6 \\ 3 & 1, 3, 2, 5, 3 \\ \hline & 1, 1, 2, 5, 1 \end{array}$$

$2 \times 3 \times 2 \times 5 = 60$ second = 1 minute

bells ring 1 time in 1 min

- \therefore So in 60 minutes, the bells ring together
 60 times + 1 = 61 times

(\therefore Here in such kind of questions, we should add one because when the bells ring. First time together we count 1)

Previous Year Solutions

1. (a); Time from 8 a.m. on a day to 1 p.m. on the following day = 29 hrs.
 24 hours 10 min. of this clock = 24 hours of the correct clock.

$\frac{145}{6}$ hrs of this clock = 24 hours of correct clock

29 hours of this clock = $\frac{24 \times 6 \times 29}{145}$ hrs of correct clock
 = 28 hrs 48 in of correct clock.

Therefore, the correct time is 28 hrs 48 min after 8 a.m. That is 48 min. past 12.

2. (b); Given year is a general year then add digit 6
 1993 + 6 = 1999, is same as 1993.

3. (a); Time from 5 a.m. on a day to 10 p.m. on 4th day = 89 hours.
 Now 23 hrs 44 min of this clock = 24 hours of correct clock.

= $\frac{356}{15}$ hrs of the clock = 24 hours of correct clock.

= 89 hrs of this clock = $\frac{24 \times 15 \times 89}{356}$ hrs of correct clock.

= 90 hrs of correct clock.
 So, the correct time is 11 Pm.

4. (a); 16th July 1776 = (1775 years + period from 1776 to 16th July 1776), counting of odd days :
 1600 years have 0 odd day.
 100 years have 5 odd days.
 75 years = (18 leap years + 57 ordinary years)
 = (18 \times 2 + 57 \times 1) = 93 odd days
 = 13 week + 2 days = 2 odd days.

1775 years have odd days = (0 + 5 + 2) = 7 = 0 odd day

Jan to 16th July extra day = 28 week + 2 days = 2 days

So total no. of odd days = 2 days
 So the day is Tuesday.

5. (b); Total days = 7x + x = 8x days
 6. (a); If next day of tomorrow is Sunday then difference between 3rd day before yesterday is 6.
 So the day will be Sunday - 6 = Monday.

7. (b); This Sunday morning at 8 : 00 am., the watch is 5 min slow and the next Sunday at 8.00 pm it become 5 min 48 sec fast. The watch gains

$5 + 5 \frac{48}{60} = \frac{54}{5}$ min in a time of (7 \times 24) + 12 = 180

hours.
 To show the correct time, it has to gain 5 min.

$\frac{54}{5}$ min = 180 hours, 5 min = $\frac{180}{54} \times 5$

= $83 \frac{1}{3}$ hrs

Total hrs. = 72 hrs + $11 \frac{1}{3}$ hrs

= 3 day + 11 hrs + 20 min.

\therefore 20 min. past 7 pm on wednesday

8. (b); Let at x minutes hands coincide

$6x - \left(\frac{x}{2} + 150 \right) = 0$

$x = \frac{300}{11}$ min



9. (a); The both hands overlap to each other in an hour 1 times. In 12 hours it will be 11 times.
10. (a); Right angle between minute hand and hour hand occur two times in a hours.
12 hours = 22 times
24 hours = 44 times.
11. (b); Between 4 and 5' O clock, there are two times right angles occur. First at 5 min, second one at 7 block means 35 min so
- $$4 \text{ O' clock } 35 \times \frac{12}{11} = \frac{420}{11} = 38 \frac{2}{11}$$
12. (a); Angle between hour hand and minute hand.
- $$= \left| \frac{11 \times 49 - 60 \times 6}{2} \right| = \left| \frac{179}{2} \right| = 89.5^\circ$$
13. (c); Angle between both hands at 11.05 O' clock
- $$= \left| \frac{11 \times 5 - 60 \times 11}{2} \right| = \left| \frac{-605}{2} \right| = 302.5^\circ$$
14. (b); Angle between both hand at 5.15
- $$= \left| \frac{11 \times 15 - 60 \times 5}{2} \right| = \left| \frac{-135}{2} \right| = 67.5^\circ$$
15. (c); In every 60 minutes, the minute hand gain 55 minutes on the hour hand.
16. (d); The needles will coincide each other at
- $$= \frac{60}{11} \cdot 3 \text{ past } 3 = \frac{180}{11} \text{ past } 3$$
- $$= 16 \frac{4}{11} \text{ past } 3$$
17. (b); The angle covered through 8 O' clock to 2 O' clock is 180° .
18. (a); The angle between minute hand and hour hand at 10.20 O' clock is 170° .
19. (a); 55 min spaces are covered in 60 min
- 60 min spaces are covered in $\frac{60}{55} \times 60 \text{ min}$
- $$= 65 \frac{5}{11} \text{ min}$$
- Loss in 64 min = $65 + \frac{5}{11} - 64 = \frac{16}{11}$
- Loss in 24 hrs = $\frac{16}{11} \times \frac{1}{64} \times 24 \times 60 = 32 \frac{8}{11} \text{ min}$
20. (c); Given year is a leap year and every leap year calender repeat after 28 year so
2016 + 28 = 2044.
The calender of 2044 is similar as 2016 calender.
21. (b); Since 3rd day of the month = Tuesday.
So, 1st day of the month = Sunday
Therefore, 8th, 15th, 22th and 29th day of the month will be Sunday.
So, maximum 5 Sunday will be in a given month.
22. (b); 2nd August → Friday
12 August + 13 → 25 August
on 25 August, the day will be Sunday.
23. (c); In 30 days of month, day which is on 1st day or 2nd day will five times in a given month. Obviously it may be Friday or Saturday.
24. (c); Three Sunday are on even no. will be possible only if first Sunday is 2nd day of a month.
So, Sunday as in 2, 9, 16, 23, 30
25. (a); Three days after Wednesday = Saturday
Since 3rd January is Sunday
So, 2nd January will be Saturday
So, next Saturday will be 9, 16, 23, 30 January
∴ Required date = 30 January
26. (b); 3rd day → Monday
5th day → Wednesday
12th day → Wednesday
19th day → Wednesday
Then 18th day will be Tuesday.
27. (a); We know that in December, there are 31 days. So, day which are in 1st, 2nd and 3rd december will be maximum day.
Since 17th day of the month is Monday.
So, Monday date = 3, 10, 17, 24, 31 = 5 times
28. (c); 25th Oct. → Thursday
26th Oct. → Friday
27th Oct. → Saturday
28th Oct. → Sunday
29th Oct. → Monday
29. (b); Clock makes two right angle in an hour but it makes one right angle between 3 to 4 and 9 to 10, So in 24 hours, clock will make 44 times right angle.
30. (c); Saturday
World Environment day - 5 June
Children day - 14 Nov.
days between 5 June to 14 Nov.
June = 25
July = 31
Aug. = 31
Sep. = 30
Oct. = 31
Nov. = 14
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So, no. of odd day = 1
∴ Required day = Friday + 1 = Saturday

