Parul University
Faculty of Engineering and Technology
Department of Applied Science & Humanities
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Subject: Quant and Reasoning (303105311)
Branch: CSE/ IT

Unit: 8 – Clocks and Calendars

Calendar Reasoning Tricks, Notes, Questions

Days and Week

One week includes following 7 Days :
Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday
The days repeat itself after completion of week.

Odd Day

The remaining days after calculated Completed weeks are odd days. It can be find by divide the number of days from the 7, remainder is Odd Days.
Days of the week start from Monday (1 Jan 0001 was Monday) , Therefore, 1 odd day means Monday.

Odd Day	1	2	3	4	5	6	7/0
Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun

Months	**Days**	**Odd Days**
Jan, March, May, July, August, October, December	31	3
February Normal Year	28	0
February Leap Year	29	1

April, June, September, November	30	2

Tricks – Odd days in a Week -‘0 ‘

Add or Subtract 7 from any day, you will find same day.
Like 1 July 2020 is Wed, 8 July 2020 ?
1+7 = 8, Therefore, 8 July 2020 is Wednesday

Odd days in Months

Normal Year

- Normal year, which is not divisible by 4 is a Normal Year, However in Century year like 100, 200, 1900, 2000, it should not be divisible by 400.
- That means 1900 is divisible by 4 and we may think it a leap year, but it is century year (last two digits 00), we have to divide it by 400.
  Hence, it is Normal Year.
- Normal Year = 365 day = 52 weeks + 1 day (1 Odd Day)
  February – 28 days

Leap Year

Leap Year = 366 days = 52 weeks + 2 day (2 odd days)
February – 29 days

Example : Which of the following is a leap year
(a) 2021, (b) 2022 (c) 2023 (d) 2024

Answer : (d) 2024 is divisible by 4, therefore it is a Leap Year

Tricks Calendar Reasoning: First and Last day of a year

In a Normal Year
1 st day of the year = Last days of the year
1 Jan and 31 Dec will be same day
Example: 1 Jan 2022 is Saturday, and 31 Dec 2022 is also Saturday

What will be 1 Jan 2023 ?
Normal Year Sat +1 = Sunday

In Leap Year
31 Dec is 1+ 1st Jan Day
Example 1 Jan 2024 is Monday, 31 Dec 2024 = Monday+1 =Tuesday

After 400 Years Calendar repeat itself

1 Jan 2001 – Monday
1 Jan 2401 will Monday
1 Jan 1601 was Monday … etc

Odd days in Century and Last Day

Century	Odd Day	Last Day 31Dec	First Day 1Jan
100, 500, 900, 1300, 1700, 2100..	5 OD	Friday	Monday
200,600, 1000, 1400, 1800, 2200 ..	5+5=10 =3 OD	Wednesday	Saturday
300,700,1100,1500,1900,2300..	5+5+5 =15 = 1 OD	Monday	Thursday
400, 800,1200, 1600,2000,2400.. Century Leap Year	5+5+5+6 =21 = 0 OD	Sunday	Tuesday

Example Questions : Type wise

Type 1: Day and Month same Year Different

12 March 2018 is Sunday. What will be 12 March 2022 ?

Solution :

2018 NY -1
2019 NY -1
2020 LY- 2
2021 NY-1

OD -5 , Sunday +5 = Friday

Trick : 2022- 2018 = 4 Year + 1 LY = 5

23 March 1835 is Sunday. What will be 23 March 1882 ?

Solution

1882-1835 = 47 years + 12 LY = 59/7 = 3 OD
Sunday + 3 = Wednesday

NOTE : To calculate LY : LY after 1835 is 1836
LY after 1884
1884 – 1836 = 48/4 = 12 LY

Type -2 : Date and Year Same Month Different

04 March 2011 is Sunday. What will be 04 August 2011 ?

Solution

Odd day of Mar -3, Apr-2, May-3, Jun-2, July-3 = 13/7 = 6 OD
Sunday +6 = Saturday

Note : August OD will not be counted.

Type 3: Month and year Same Date Different

04 March 2022 is Friday. What will be 30 March 2022 ?

Number of days = 30-4 = 26 /7 = 5 OD
Friday +5 = Wednesday

Note : Friday (5) +5 = 10/7 = 3 (Wed)

Type 4: Date, Month, Year all different

Example 1: 11 July 2020 is Saturday, what will be 22 October 2028 ?

Years : 2028 -2020 = Year- 8 + LY- 2 = 10 , OD -3
Month : July – 3, Aug-3, Sep-2 =8, OD -1 (Oct will not be counted)
Date : 22-11 = 11, OD = 4
Total OD = 3+1+4 =8 , OD =1

Therefore, Sat +1 = Sunday

Example 2: 15 March 2021 is Monday, What will be 12 July 2023.

Year : 2023-2021 = 2 +0 (LY) = 2 OD
Months : March (31-15 =16) -2 OD, Apr-2, May-3, June-2, July 12 – 5 OD
Months OD : 2 + 2 + 3 + 2 + 5 = 14 = 0 OD
Total OD : Year + Months = 2 + 0= 8 OD -2

Therefore 12 July 2023 will be Monday + 2= Wednesday

Example 3 : 14 November 2020 is Saturday, What will be the day of 26 January 2026.

Month/Year	Day	Odd Days
Nov 2020	30-14=16	2
Dec 2020	31	3
2021 Full Year NY	365	1
2022 NY	365	1
2023 NY	365	1
2024 LY	366	2
2025 NY	365	1
Jan 2026	26	5
		16 = 2 OD

Therefore, 26 January 2026 = Saturday + 2 = Monday

Type- 5: Find the Day of a back date from the given date and day

When the day of a date is given and day of a date previous to it is asked. We will subtract the odd days from the given day.

Example: 26 January 2020 is on Sunday, What was the day on 26 January 1950.

Years : 2020-1950 – year -70 + LY -17 = 87 – **3 OD**
(Including – 2000 CLY,)
Note: For LY 2020 (Before Feb) – 1952 (NLY) = 68/4 =17

26 January 1950 was Sunday (0/7) – 3 = **Thursday**

Note : We will subtract the Odd days from the day

Example: 10 Feb 2020 is on Monday, What was the day on 25 December 1918.

Dec 2018, 31 – 25 = 6 OD
Year 2019 NY = 01 OD
Jan 2020 31 days = 3 OD
Feb 2020 , 10 days = 3 OD
Total OD = 6+1+3+3=13 = 6 OD

25 December 1918 was (Monday – 6) = **Tuesday**
Note : Monday 1+7 – 6 = 2nd day of week

Find the day of a given date

Example 1 : What was the day on 15 August 1947

Completed Year upto 15 Aug 1947 = 1900 + 46
Century (1900 years) Odd days = **1 OD**

46 (Years)+ 11 (LY)= 57 = **1 OD**

Completed Months of 1947 (NY): Jan-3, Feb-0, Mar-3, Apr-2, May-3, Jun-2, Jul-3,
Total OD = 16 = **2 OD**

Day of August-15 = **1 OD**

Total OD = Century –**1** + 46 Years –**1** + Months **2** + Days – **1** = **5 OD**

15 August 1947 was Friday (5 th Day of week)

(Note : Odd day for 300,700,1100,1500,1900,2300.. Century is 1
and Number of LY – 1948 – 1904 = 44/4 =11)

Example 2: Birth date of a student is 25 March 2004, Find the day of that day.

Completed Year : 2000 + 3
Century multiple of 400, code is 0, LY -0
Odd Day = 0 (C Code) + 3 (years) + 0 (LY) =3 OD

Completed Months of 2004 (LY): Jan-3, Feb-1 , = 4 OD

Days 25 = 4 OD

Total OD = 3+4+4 = 11 = 4 OD

25 March 2004 was the Thursday (4 th day of week)

Extra Questions

Q 1: **Ravi went to see a Movie, 9 day before. He see the Movie only on Friday. Today is what Day of week.**

Today = Friday + 9 = Friday + 2 OD = **Sunday**

Q 2: **29 Feb is Monday. what day was on 11 February.**

29, 22, 15 and 8 Feb Monday

8+3 = 11, Monday+3 = **Thursday**

Q 3 : **If this year is a Leap Year and 1 January is Monday. After How Many year 1 Jan will be on Monday.**

This Year LY – 1 Jan – Mon
After 1 Year NY – 1 Jan Wed (2 OD of previous Year)
After 2 Year NY – 1 Jan Thu (1 OD of previous Year)
After 3 year NY – 1 Jan Fri (1 OD of previous Year)
After 4 Year LY – 1 Jan Sat (1 OD of previous Year)
After 5 Year NY – 1 Jan Monday (2 OD of previous Year)

After 5 Year – (The total of Odd days is 7 Means Monday)

Alternate Method
Add the Odd day of years till it become 7 or multiple of 7.

2 LY + 1 NY + 1 NY + 1 NY + 2 LY = 7 (After 5 years)

Q 4: **Ram celebrated his 4th birthday on 29 Feb 2020. When he was born.**

4 Birthday 29 Feb 2020
3 Birthday 29 Feb 2016
2 Birthday 29 Feb 2012

Ram Birth Date 29 Feb 2008

Solved example

1. It was Sunday on Jan 1, 2006. What was the day of the week Jan 1, 2010?

A. Sunday
B. Saturday
C. Friday
D. Wednesday

Answer: Option C

2. What was the day of the week on 28th May, 2006?

A. Thursday
B. Friday
C. Saturday
D. Sunday

3. What was the day of the week on 17th June, 1998?

A. Monday
B. Tuesday
C. Wednesday
D. Thursday

Answer: Option c

4. What will be the day of the week 15th August, 2010?

A. Sunday
B. Monday
C. Tuesday
D. Friday

Answer: Option A
Explanation:

5. Today is Monday. After 61 days, it will be:

A. Wednesday
B. Saturday
C. Tuesday
D. Thursday

Answer: Option B

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6. If 6th March, 2005 is Monday, what was the day of the week on 6th March, 2004?

A. Sunday
B. Saturday
C. Tuesday
D. Wednesday

Answer: Option A

7. On 8th Feb, 2005 it was Tuesday. What was the day of the week on 8th Feb, 2004?

A. Tuesday
B. Monday
C. Sunday
D. Wednesday

Answer: Option C

8. Which of the following is not a leap year?

A. 700
B. 800
C. 1200
D. 2000

Answer: Option A

Clock Reasoning Formula, Tricks, Questions

Clock Reasoning Formula

Speed of Minute Hand (MH)

60 Minutes – 360 Degree
1 Minute – 360/60 = 6 Degree

Speed of Hour hand (HH)

12 hrs = 720 Minutes – 360 Degree
1 hr = 360/12 =30 Degree
1 Minute = 360/720 = ½ Degree

Minute and Hr Both Hands	Angle in Degree	Happened in 12 hrs
Coincident (ऊपर)	0	11
Right Angle	90	22
Opposite	180	11
Straight Line	0 or 180	22

Difference between Hour and Minute Hand in 1 Minute = 6 – ½ = 5 ½ = 11/2 Degree

Type-1: Find the Angle between Hour and Minute hand at a given Time

Example 1: Find angle between the Hrs and Minute hands at 7 hrs and 20 Minutes

The HH will be ahead of 7.
Upto 7 HH travel 7×30 210 degree
The angle travel by HH ahead of 7.

½ degree in every minute, and 20 x ½ = 10 degree
210+10 = 220 Degree

MH is exactly at 20 Minutes
Means travel 20×6 =120 degree
The Angle is 220 -120 = 100 Degree

Tricks: We can use the relative (Difference) speed of HH and MH i.e. 6-1/2 = 11/2 Degree
Formula : HH x 30 (–) MH x 11/2
7 x 30 – 11/2 x 20 = 210 – 110 = 100 degree

Example 2 : Find the Angle at 2 hrs and 40 Minutes

2 x 30 – 40 x 11/2 = 60 – 220 = 160 degree

Minutes Hand travel in 1 hr = 60 Minutes
Hour hand travel in 1 hr = 5 Minute
Therefore, Minutes Hand travel 60 – 5 = 55 Minutes more than HH.

Example: Between 3 and 4 when the clock Hands will be coincident

MH travel in 55 Minutes more in 60 Minutes
MH travel in 1 Minutes more in 60/55 Minutes
MH travel in 15 Minutes = 15 x 60/55 = 180/11 = 16 4/11 Minutes
3 hrs and 16 4/11 Minutes

Trick Formula: T hrs and Minutes X 12/11

3 hrs and 15 x 12/11 = 180/11 = 16 4/11 Minutes

T is First Time from the Given Time.
For Right Angle (90 degree), 2 time in every hr T : 60/11 x (T+- 3)
For any other angle we will check the Completed Minutes upto First Time

Example 3 : Between 9 and 10, when both Clock Needles, were in straight line, but not opposite.

Both Clock Needles are Coincident after 9.
Time is 9 Hrs and 45 x 12/11 = 9 hrs and 49 1/11 Minutes.

Example 4: Between 9 and 10, when both Clock Hands are opposite.

MH completed 15 Minutes
Time is 9 hrs and 15 x 12/11 = 9 hrs and 16 4/11 Minutes

Example 5: Between 6 and 7, when the Clock hands will made Right Angle Triangle.

There will be two Right Angle (90 Degree)
Case 1 : Minute hand just ahead of 15 Minute
6 hrs and 15 x 12/11 = 16 4/11 Minutes
Case 2 : MH just after 45 Minutes
6 hrs and 45 x 12/11 = 49 1/11 Minutes

Exercise:

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

A. 144°
B. 150°
C. 168°
D. 180°

Answer: Option D
Explanation:

Angle traced by the hour hand in 6 hours $=\frac{360}{12}*6=180$

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

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

Answer: Option D
Explanation:
Angle traced by hour hand in $\frac{125}{12}$ hrs $=(\frac{360}{12}X\frac{125}{12})^\circ=312\frac{1}{2}^\circ$

Angle traced by minute hand in 25 min $=(\frac{360}{12}X25)^\circ = 150^\circ$

Reflex angle = 360° - $(312\frac{1}{2}^\circ - 150^\circ) = 197\frac{1}{2}^\circ$

3. A clock is started at noon. By 10 minutes past 5, the hour hand has turned through:

A. 145°
B. 150°
C. 155°
D. 160°

Answer: Option C
Explanation: Angle traced by hour hand in 12 hrs = 360°.
Angle traced by hour hand in 5 hrs 10 min. i.e. $\frac{31}{6}$ hrs $=(\frac{360}{12}X\frac{31}{6})^\circ=155^\circ$