# CALENDER

### **Two Types of years**

- Ordinary year = 365 Days (i) = 52 weeks + 1 day Extra
- Leap Year = 366 Days = 52(ii) weeks + 2 days Extra Distinction (to know) of leap year An year which is divisible by 4 completely is called Leap Year otherwise called simple year.

But in case of century year. We divide that year by 400, if divided completely will called Leap Year otherwise called Simple Year.

Ex.

- Ex. In 1323, 1726, 1186, 1943, 1784, 2012 Find which is Leap Year and which is Ordinary Year?
- 1323 ▶ Not divisible by 4 Sol. hence **b** Ordinary year 1726 ▶ Not divisible by 4 hence **b** Ordinary Year 1186 ▶ Not divisible by 4 hence **b** Ordinary Year 1943 ▶ Not divisible by 4 hence **b** Ordinary Year 1784 Þ Divisible by 4 hence ▶ Leap Year 2012 Þ divisible by 4 hence ▶ Leap Year

## **Century Year Case**

In 1700, 1200, 500, 1900, Ex. 2000. 2100. Find which is Leap Year and which is ordinary Year?

# All are century years hence we check these years dividing by 400

(b) 1700 b Not divisible by 400 hence 
Ordinary Year 1200 b divisible by 400 hence b Leap Year 500 b Not divisible by 400

hence Ordinary Year 1900 Not divisible by 400 (C) hence Ordinary Year 2000 b divilsible by 400 hence b Leap Yaer 2100 b Not divisible by 400 hence Ordinary year Extra Days/Odd days:- Most of questions from this topic depend on Extra days Methods to Find Extra days:-(a) Extra days in days  $\frac{\text{days}}{7}$  = Remaining days are Ex. Extra days Find Extra days in 77 days, 12 days, 67 days, 41 days, 39 days, 26 days **Sol.** In 77 days =  $\frac{77}{7}$  = 0(Remainder) hence 0 is Extra day In 12 days =  $\frac{12}{7}$  = 5 (Remainder) hence 5 is E.D (E,D - Extra E.x Days) In 67 days =  $\frac{67}{7}$  = 4 (Remainder) hence 4 is E.D In 41 days =  $\frac{41}{7}$  = 6 (Remainder) hence 6 is E.D Similarly, In 39 days Þ 4 E.D In 26 days Þ 5 E.D Here we found that the Extra days always comes 0 to 6. Extra days in months **b** Months are of Four types (i) 28 days = 0 E.D(ii) 29 days = 1 E.D

(iii) 30 days = 2 E.D

(iv) 31 days = 3 E.D

# Extra days in Years **b** Odd days in a Ordinary Year = 1 Odd days in a Leap Year = 2Formula =

year + no. of Leap Year in these Year

=Remainder Where, Leap Year

 $=\frac{\text{No. of year}}{4}=(\text{Quotient})$ 

Find Odd days in 10 years

Leap years =  $\frac{10}{4}$  = 2 (Remainder)

odd days =  $\frac{\text{year} + 2}{7}$  =Remainder

$$=\frac{10+2}{7}=\frac{12}{7}$$

= 5 (Remainder)  
Find odd days in 46, 99, 53, 76,  
83 years respectively?  

$$\blacktriangleright$$
 In 46 years  
No. of Leap Years =  $\frac{46}{4}$  = 11  
(Quotient)  
odd days =  $\frac{46+11}{4}$  =  $\frac{57}{4}$  = 1

odd days = 
$$\frac{40411}{7} = \frac{57}{7} = 1$$
  
(Remainder)

▶ In 99 years,

No. of Leap Years =  $\frac{99}{4}$ = 24 (Quotient) odd days =  $\frac{99+24}{7} = \frac{123}{7}$ = 4 (Remainder) ▶ In 53 year,

No. of Leap Years =  $\frac{53}{4}$  = 13 (Quotient) odd days =  $\frac{53+13}{7} = \frac{66}{7} = 3$ (Remainder) ▶ In 75 years, No. of Leap Years =  $\frac{76}{4}$  = 19 (Quotient) odd days =  $\frac{76+19}{7}$  $=\frac{95}{7}=4$ (Remainder) ▶ In 83 Years No. of Leap Years  $=\frac{83}{4}=20$  (Quotient) odd days =  $\frac{83+20}{7}$  $=\frac{103}{7}=5$  (Remainder) Thus, in 46, 99, 53, 76, 83 Years 1, 4, 3, 4, 5 Extra days Respectively Note: If result of odd days comes more than 7 then we will again divide these days by 7 and Remainder would be 'Odd days' Odd days in 100 years 99 years + 100th year (Ordinary Result) 4 days + 1 day = 5 days Extra Odd days in 200 years In 100 Years = 5 days )×2 )×2 In 200 Years = 10 days But 10 days can never be odd days, hence we will divide it by 7 again and remainder would be odd days  $\frac{10}{7}$  = 3 (Remainder) Odd days in 300 years **b** Ţ Ţ Ţ

But 8 can not be odd days, hence  $\frac{8}{7}$  = 1 odd day Odd days in 400 years b But 7 can not be odd days, hence =  $\frac{7}{7}$  = 0 odd day Initial 400 Years calendar used in next 400 to 800 years and repeated again and again in every 400 years ▶ As in 400 year E.D = 0 Note:- Every multiple of 400 have

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odd days = 0Now we can find odd days in any no. of years Ex. Odd days in 1700 Years Þ 1600+100 + 5 = 5 days Ex. Odd days in 2100 Years

2000+100 + 5 = 5 daysEx. Odd days in 1900 years 1600+300 0 + 1 = 1 days Odd days in 1322 years Ex. 1200+100+22

1 + 5 + 5 = 10 daysLeap years  $\frac{22}{5}$  = 4 (Quotient)

Odd day= $\frac{22+4}{7}$ =5 (Remainder)

10 can not be odd days =  $\frac{10}{7}$ 

= 3 Remainder Odd days in 1745 years Ex. 1600 + 100 + 45 $\bigcup_{0} + 5 + 0 = 5$ 

To find the day of the week on a particular date when no preference day is given:

When we count no. of odd days on the given particular date. Then we write

Sunda	ay for	Þ	0 odd day			
Monday for		Þ	1 odd day			
Tuesday for		Þ	2 odd days			
Wednesday		Þ	3 odd days			
Thursday		Þ	4 odd days			
Friday		Þ	5 odd days			
Satur	day	Þ	6 odd days			
Ex.1	What was the day of week on 14th June, 1993?					
	(a) Tuesda	ıy (t	) Wednesday			
	(c) Monday	y (c	l) Sunday			
Sol.	(c) Odd da	ays in	1992 years Þ			
	1600	+300	+92			
	Ļ	Ļ	Ļ			
	0 +	- 1 +	3 = 4			
	We take 1992 years. Because 1993rd was running than,					
	In 92 years = 92 years + 23 Leap year					
	$= \frac{115}{7} = 3 $ (Remainder)					
	Odd days in Months					
	Jan Feb M J J 3 0	larch . J 3	April May JJ 2 3 = 11			
	1993rd w Hence its	vas a Febr	ordinary year. uary would be			
	Odd days	in da	vs b			
	In June 1	4 day	vs completed			
	Total odd days = $4 + 11 + 0 = 15$					
	15 days can not be odd days,					
	then = $\frac{15}{-}$	5 = 1	5.7			
	7					
	On this June 199 day Extra	parti 3 we Þ	cular date 14 count only one			
	For 1 day	Extra	a Þ <b>Monday</b>			
Ex.2	What was 13th Apri	the of 172	day of week on			
	(a) Monda	· - ·	(b) Tuesdav			
	(c) Wedne	esdav	(d) Thursday			
	. /	5	., 5			

**Sol.** Write completed years, months days till 13th April 1723. And find odd days in these days

In 22 Year Leap Year =  $\frac{22}{4}$ 

= 5 (Quotient)

Then odd days

 $=\frac{22+5}{7}=\frac{27}{7}$ 

= 6 (Remainder)

Total odd days

= 0 + 5 + 6 + 3 + 0 + 3 + 6 = 23 23 days can never be odd days, so we divide 23 by 7 and remainder would be odd days?

 $\frac{23 \ days}{7}$  =2(Remainder)

For 2 odd days **b** Tuesday

#### TYPE - II

When the day of week is asked on a particular date. And reference day is given

**Ex.3** If the third day of month is Monday. Which of the following will be the 29th day of week?

(a)	Friday	(b)	Saturday
(c)	Sunday	(d)	Monday

(c) Sunday (d) Mor **Sol.** (b) 3rd = MondayThe,  $3^{rd} + 7 = 10^{th} P$  Monday

 $10^{th} + 7 = 17^{th} P$  Monday  $17^{th} + 7 = 24^{th} Monday$  $24^{th} + 5 = 29th$ 

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Monday + 5 = **Saturday** 

- Ex.4 If the 26<sup>th</sup> day of month is Friday. Which of the folowing will be the 5<sup>th</sup> day of week?
  26th 7 = 19 7 = 12 7 = 5th If Friday on 26<sup>th</sup> day, then Also Friday on 5<sup>th</sup> day
- Ex.5 23rd March of a general year was Tuesday. Then what was the day of the week on 17 July

of this year? (a) Friday (b) Sunday (c) Saturday (d) Thursday Sol. (d) 23rd March **b** Tuesday Left days in March = 31 - 23 = 8April = 30 May = 31 June = 30 Till 17th July = 17Total = 116 Odd days in 116 =  $\frac{116}{7}$  = 4 (Remainder) ▶ Add these odd days in the day of 23rd March Tuesday + 4 = **Saturday** Ex.6 9th June of a Leap Year was on Thursday. Then what was the day of week on 17 February. (a) Wednesday (b) Monday (c) Thursday (d) Tuesday Sol. (a) Left days in Feb ▶ 29 - 17 =12 (Because It is a leap year) March Þ 31 April 30 Þ May Þ 31 June 9 Þ Total 113 Days
 Odd days in 113 days =  $\frac{113}{7}$ = 1 (Remainder) Because the day of June is given and day of February is asked. Hence we go back no. of odd days. 9th June 

Thursday - 1 = Wednesday Note: (i) First day and the last day of Every General year are same (ii) Last day of a Leap Year precedes one day to the first day of that year In G.Y. In L.Y. 1 Jan Þ Monday Then.

31 December♭ Monday in leap year 1 Jan ♭ Monday Then,

- 31 Dec. Tuesday
- 1 Jan of next
- year F Tuesday 1 Jan of next
- yearÞ Wednesday

# Result

- 1. If date is same, month is same, and we cross a G.Y (28th February). Then we forward 1 day.
- 2. If date is same, month is same and we cross a L.Y (29th February). Then we forward 2 days.
- **Ex.7.** If 15th of February 1789 is Friday what will be the day of 15th of February 1790?
  - (a) Monday
  - (b) Saturday
  - (c) Tuesday
  - (d) Wednesday
- **Sol**. (b) 15th Feb, 1789 Friday 15th Feb, 1790 P ? date same = 15

  - Month same **b** February
- We cross
  - Þ G. Y. (28th Feb. of 1789)
  - Hence we forward 1 day
  - Friday + 1 Þ Saturday
  - Ex.8 The Republic day in 1996 was celebrated on Wednesday. On what day was it celebrated in the year 1997?
    - (a) Thursday (b) Friday
    - (c) Saturday (d) Sunday
  - Sol. (b) date same Þ 26 Month same Þ January
  - We Cross
  - L.Y. (29th Feb of 1996)
     Hence we forward 2 days
     Wednesday + 2 days > Friday
  - **Note: (i)** Next year calendar after any Leap Year can be used after 6 year:
  - (ii) 2nd and 3rd year calendar after any leap year can be used after 11 year.
    - 1960→Leap Year

next year

1961 Calendar \_\_\_\_\_ 1967

 $1962 \xrightarrow{1}{+11} 1973$ 1960 Leap year 3rd Year after 1960 1963 1974 For Example Ex.9 Calendar of 1991 could be

used again? (a)1990 (b) 1992 (c)1997 (d) 2002

Sol. (d) ,1988 3rd year after 1988 1991 +11= **2002** 

- Ex.10. Calendar of 1985 could be used again? (a) 1990 (b) 1991
  - (d) 1992 (c) 1996
- Sol. (b) 1984
  - next year
  - 1985 +6 = 1991
- □ Table for birthday, anniversary, Republic, Independence celebrated on same day b

Till 28 Feb.	add 5 year	add 6 year	
After Feb.			add 5 year

Ex.11. Rohit birth day was on 16 January 1991 on Monday. When would he celebrated his birth day again on Monday (a) 1997 (b) 1999 (c) 2001 (d) 2002 Sol. (d) 1988 is a Leap Year 1991 = (1988 + 3) Year in Hence according to table add 11 year in 1991 for his next birth day 1991 + 11 = 2002 Ex.12. Independence day in 1984 was celebrated on Tuesday. In which year was it celebrated on same day? (a) 1990 (b) 1991 (c) 1992 (d) 1993 (a) 1984 is a leap year Sol. Hence according to table add 6 year in 1984 for same day on Independence day Þ 1984 + 6 = 1990

Ex.13. How many Leap years in 400 year? or How much times 29 Feb comes in 400 year? (a)97 (b) 99 (c) 100 (d) 102

Sol. (a) From 1 to 100 years Leap

Years are = 24But 100<sup>th</sup> is not a Leap Year Similarly from 101 to 200 year = 24From 201 to 300 year = 24 But from 301 to 400 year = 25Because 400th is a Leap Year Total = 24 + 24 + 24 + 25 = 97

□ Last days of century years may be Only Þ Monday, Wednesday, Friday, Sunday Because In 100 year odd days = 5 (Friday) In 200 year odd days = 3 (Wednesday) In 300 year odd days = 1 (Monday) In 400 year odd days = 0 (Sunday)

- □ Months of a L.Y which have same day on 1st day.
  - Þ Jan, October
  - Þ Feb, March, Nov.
  - Þ April, July
  - ▶ Sep, Dec.