GENERAL APTITUDE

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Races

Q. Two friends P & Q start from same point at the same time on a circular track 336 mt long in opposite directions at 6 m/s & 8 m/s respectively. When they meet again at the starting point for the first time they will be meeting on the track for 'n'th time. So what is 'n'?
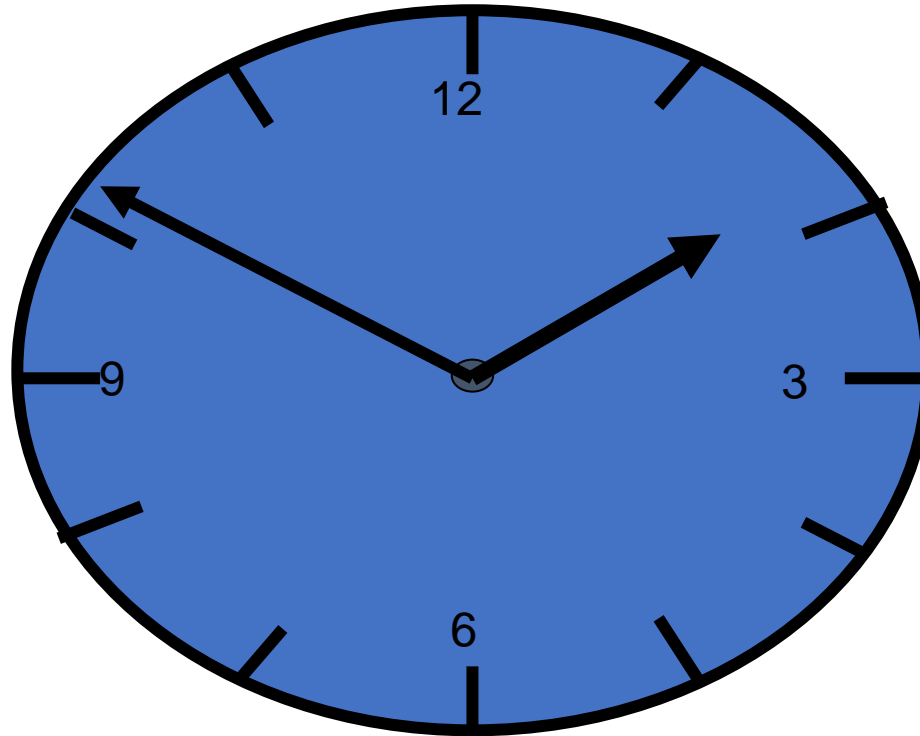
A.   56 sec   B. 112 sec   C. 168 sec   D. 214 sec

Ans : C

- Step 1 – Find the time taken by each runner to complete 1 round

- Step 2 – calculcate LCM(of those time)

- LapTm of P = dist/speed = 336/6 = 56 sec

-   LapTm of s = dist/speed = 336/8 = 42 sec

- LCM(56,42) = 168 sec

- So , they meet t the starting point for first time after 168 secs

Clocks

- → 360°
- → 60 minute spaces of 6° each
- → 12 Hours space of 30° each

Clocks

- 12 hr x 30° = 360°

- At night 12, day starts , both hands are at same place.

- Every hour they coincide once **but between 11-12 it coincides at 12**, so its 11 times only.

- The two hands coincide -
  - 11 times in 12 hours
  - 22 times in 24 hours

- The two hand are in opposite direction –
  - 11 times in 12 hours
  - 22 times in 24 hours
  - **Between 5-7 it happens only once at 6 o'clock.**

- The two hand make right angles –
  - 22 times in 12 hours
  - 44 times in 24 hours

Clocks

- 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	PM
12:00	12:00
1:05	1:05
2:11	2:11
3:16	3:16
4:22	4:22
5:27	5:27
6:33	6:33
7:38	7:38
8:44	8:44
9:49	9:49
10:55	10:55

The hands overlap about every 65 minutes, not every 60 minutes.

∴ The hands coincide 22 times in a day.

Clocks

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

A. 144⁰   B. 150⁰   C. 168⁰   D. 180⁰

- Soln:

- In one hour ----- the hour hand rotates 30°

- In 6 hours ------ the hour hand rotates 180°

- **<u>OR</u>**

- Number of hours from 8am till 2pm= 6hrs
  The rotation of an hour hand in one hour= 30°
  Total degree of rotation= 360°

  Therefore, the Angle traced by the hour hand in 6 hours is= (360/12)x6 = **180°**

- **Ans: D**

Clocks

Q. At what time between 4 and 5 o'clock will the hands of a watch be together/coincide?

A. 10 $\frac{9}{11}$ min past 4   B. 21 $\frac{10}{11}$ min past 4   C. 11 $\frac{10}{11}$ min past 4   D. 21 $\frac{9}{11}$ min past 4

Soln:

- **Ans: D**

- Draw diagram of clock here

$$T = \frac{D}{S}$$

$$= \frac{20}{11/12}$$

$$= \frac{20 \times 12}{11}$$

$$= \frac{240}{11}$$

$$= 21\frac{9}{11} \text{ mins. past 4}$$

Clocks

Q. At what time between 3 & 4 o'clock will the hands of the clock be in the opposite direction.

A. 40 $^9/_{11}$ min past 3   B. 30 $^{10}/_{11}$ min past 3

C. 49 $^1/_{11}$ min past 3   D. 41 $^9/_{11}$ min past 3

Ans : C

• Draw diagram of clock here

$$T = D/S$$

$$= \frac{45}{11/12}$$

$$= \frac{45 \times 12}{11}$$

$$= \frac{540}{11}$$

$$= 49 \frac{1}{11} \text{ mins. past 3}$$

Clocks

Q. At what time between 7 and 8 o'clock will the hands of a clock be in the same straight line but, not together?

A. 5 min. past 7   B. $5\frac{2}{11}$ min. past 7   C. $5\frac{3}{11}$ min. past 7   D. $5\frac{5}{11}$ min. past 7

Soln:

- **Ans: D**

- Draw diagram of clock here

$$T = D/S$$
$$= \frac{5}{11/12}$$
$$= \frac{5 \times 12}{11}$$
$$= \frac{60}{11}$$
$$= 5\frac{5}{11} \text{ mins. past 7}$$

Clocks

Q. At what time between 5.30 and 6 will the hands of a clock be at right angles?

A. $5\frac{2}{11}$ min. past 5   B. $43\frac{7}{11}$ min. past 5   C. 40 min. past 5   D. 45 min. past 5

Soln:

Ans: B

- Draw diagram of clock here

$$T(\text{mins}) = D/S$$

$$= \frac{40}{11/12}$$

$$= \frac{40 \times 12}{11}$$

$$= \frac{480}{11}$$

$$= 43\frac{7}{11} \text{ mins. past } 5$$

Clocks

Q. What is the angle between the hands of a clock at 7:23 am?

A.90˚   B. 85.5˚   C. 83.5˚   D. 81.5˚

Soln:

Angle θ = 30H – 11/2 M

$$= 30 \times 7 - \frac{11}{2} \times 23$$

$$= 210 - 253/2$$

$$= 210 - 126.5$$

$$= 83.5°$$

Ans : C

Clocks

Find the reflex angle between 2 hands of a clock at 10:25

A. 187.5°   B. 192.5°   C. 197.5°   D. 207.5°

Soln:

θ = | 30H -11/2 M | OR |30H – 5.5 M|

      = 30 x 10 - 11/2 x 25

      = 300 – 275/2

      = 300 – 137.5

      = 162.5 °

But reflex angle is greater than 180 ° and less than 360 °

360 – 162.5 = 197.5 °

- **Ans: C**

Clocks

Q. Find non reflex angle between 2 hands of a clock at 10:10

Soln:

θ = | 30H -11/2 M | OR |30H – 5.5 M|

         = 30 x 10 - 11/2 x 10

         = 300 – 55

         = 245°   ---- > its a reflex angle > 180°

But reflex angle is greater than 180 ° and less than 360 °

360 -245 = 115° ----$\rightarrow$ non reflex angle

Clocks(Assignment)

Q. What is the angle between the hands of a clock at 7:20 ?

A. 100°　　　　　B. 1921/2°　　　C. 195°　　　　　D. 197 1/2°

Ans : A

What is the angle between the hands of a clock at 2:30 ?

A. 144°　　　　　B. 150°　　　　C. 105°　　　　D. 180°

Ans : C

What is the angle between the hands of a clock at 3:30 ?

A. 144°　　　　　B. 150°　　　　C. 105°　　　　D. 75°

Ans : D

Calendar

- In Non Leap year –
  - 365 days
  - 1 year = 52 weeks + 1 odd day(extra day)
  - 28th February

- In Leap year –
  - 366 days
  - 1 year = 52 weeks + 2 odd days
  - 29th February

- A **century leap year** is a **year** that is exactly divisible by 400
  - **years** 1600 and 2000 were **century leap years**; (400,800,1200,1600,2000 – century leap years till date)
  - **years** 1700, 1800, and 1900 were not **century leap years**.

- To find the day of a week on a given date we use the concept of "**odd days**".

- 01/01/001 A.D(Anno Domini) was a Monday and 1st day of week so 1st January 0001 was a Monday.

Calendar

- In a century,
  - 24 leap year
  - 76 non leap years

    100 years

Leap year   non leap year

24x2   +   76 x 1

$=\dfrac{48}{7}$ $=\dfrac{76}{7}$

remainder

6   +   6 $= 12 \div 7 = 5 \leftarrow$ remainder

5 extra(odd) days in a century (100 years)

100 years = 5 odd days $\longleftarrow$ remainder

200 years = $10 \div 7 = 3$ odd days

300 years = $15 \div 7 = 1$ odd days

400 years = 0 odd days (as century leap year)

Calendar

Years	No. of odd
Ordinary year	1
Leap year	2
100 years	5
200 years	3
300 years	1
400 years	0

Calendar

Day of week	No. of odd
Sunday	0
Monday	1
Tuesday	2
Wednesday	3
Thursday	4
Friday	5
Saturday	6

Calendar

Month		Remainder
January	31 ÷ 7	3
February	28 ÷7 or 29 ÷ 7	0(non leap) or 1(leap)
March	31 ÷ 7	3
April	30 ÷ 7	2
May	31 ÷ 7	3
June	30 ÷ 7	2
July	31 ÷ 7	3
August	31 ÷ 7	3
September	30 ÷ 7	2
October	31 ÷ 7	3
November	30 ÷ 7	2
December	31 ÷ 7	3

Calendar

Q. What was the day of the week on 15th August, 1947?

Soln:

Completed till 1946

1946

$\frac{1900}{400}$ = 300 $\frac{46}{4}$ = 11(quotient)

1 odd day   46 + 11 = 57 $\frac{57}{7}$ = 1(remainder)

In 1946, odd days are,

1900   46

1   +   1   = 2 odd days

                 1946   month   date

Total odd days =   2   +   2   +   1   =   5 odd days

As per table for days of a week ,   5 ⟷ Friday

As month is August, go till July as per table,

J   F   M   A   M   J   J

3 + 0 + 3   + 2 + 3   + 2 + 3   = 16

Now, $\frac{16}{7}$ = 2 (remainder)

For date ,

$\frac{15}{7}$ = 1 (remainder)

Calendar

For Months -

J	F	M	A	M	J	J	A	S	O	N	D
0	3	3	6	1	4	6	2	5	0	3	5

For years -

1600 – 1699	6
1700 – 1799	4
1800 – 1899	2
1900 – 1999	0
2000 – 2099	6

Calendar

Q. What was the day of the week on 26th January, 1947?

Soln:

1. Last 2 digits of the year → 47

2. Divide by 4 (47 ÷ 4) = 11(quotient)

3. Take the date → 26

4. Take the no. of month → 0 (from table)

5. Take the no. of year → 0 (from table)
   _____
   84   (add)

6. Divide by 7 → $\frac{84}{7}$ = 0 (remainder)

Check table for day of the week

0   ←——→ Sunday

Calendar

Q. What was the day of the week on 29th February, 2012?

Soln:

1. Last 2 digits of the year →   12

2. Divide by 4 (12 ÷ 4) =   03(quotient)

3. Take the date →   29

4. Take the no. of month →   03 (from table)

5. Take the no. of year →   06 (from table)

                               53   (add)

6. Divide by 7 → $\frac{53}{7}$ = 4 (remainder)   subtract 1 from remainder

In this case for all dates of **January & February** in a leap year , 4 -1 =3

Check table for day of the week

3   ⟷   Wednesday

Calendar

Q. 15th August 1947 was a Friday. Find the day on 15th August 1977?

- Soln:

  1977

  - 1947
  _____

      30 years

Leap years between 1947 to 1977

1948	1964
1952	1968
1956	1972
1960	1976

8 years

    30   + 8   = 38

  total years leap

$\frac{38}{7}$ = 3 (remainder)

As 15th August 1947 was a Friday ,

So, Friday + 3 days = **Monday**

Calendar

Q. Today is Monday. Which day will be after 61 days?

Soln:

1 week = 7 days. Taking the multiple of 7

56 - Monday	or	63 - Monday
57 – Tuesday		62 - Sunday
58 – Wednesday		61 - Saturday
59 – Thursday		
60 – Friday		
61 - Saturday		
56 + 5 = 61 days		63 – 61 = 2 days
(add 5 days)	or	(subtract 2 days)

Calendar

Q. 4th January 2016 falls on Monday. What day of the week does 4th January 2017 lies?

Soln:

Normal year = 1 odd day

Leap year = 2 odd days

Jan 4, 2016 → Monday

+ 2 (as leap year)

Jan 4,2017 → Wednesday

Calendar

Q. What dates of May 2002 did Monday fall on?

Soln:

Lets take date = 1st May 2002

1. Last 2 digits of the year → 02
2. Divide by 4 (02 ÷ 4) = 00(quotient)
3. Take the date → 01
4. Take the no. of month → 01 (from table)
5. Take the no. of year → 06 (from table)

                                                   10 (add)

6. Divide by 7 → $\frac{10}{7}$ = 3 (remainder)

Check table for day of the week

3 ⟷ Wednesday

1st May 2002 falls on Wednesday

1	2	3	4	5	6
W	Th	F	Sa	Su	M

↑
first Monday

Now add 7 to it to find remaining Mondays

Dates on which Monday falls are -
6 , 13 , 20, 27

Calendar

Q. Which of the following days can never be the last day of a century?

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

- Soln:

- The last day of century can be only

- 1 odd day(Monday)

- 3 odd days (Wednesday)

- 5 odd days (Friday)

- 7 or 0 odd days (Sunday)

- So, century can never end in Tuesday , Thursday or Saturday.

Calendar

Q. If we have preserved the calendar of 2017. Find the next immediate year in which we can reuse.

Soln:

x/4 (x = given year)

$\frac{2017}{4}$ = 1 (remainder)

For any year divide by 4, the possibility of remainder is 0,1,2,3

If remainder = 0 → x + 28

If remainder = 1 → x + 6

If remainder = 2/3 → x + 11

So, $\frac{2017}{4}$ = 1(remainder)

2017 + 6 = 2023

Calendar

- Q. The day on 5th April of a year will be the same day on 5th of which month of the same year?
- A. 5th July   B. 5th August   C. 5th June   D. 5th October
- **Ans A**

- April & July for all years have the same calendar. So, a day on any date of April will be the same day on the corresponding date in July.
- The same day will fall on 5th July of the same year.

Calendar(Assignment)

Q. What was the day of the week on your birthdate?

Q. 13th October 2019 is a Sunday. Find the day on 13th October 1989?

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

Ans: C

Q. 1st March 2006 falls on a Wednesday .What day does 1st March 2010 fall on?

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

Ans: B

Q. Today is Monday. Which day will be after 64 days?

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

Ans: A

Q. Today is Monday. After 30 days it will be?

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

B. Ans: D

Probability

- How likely an event is supposed to happen.

- Probability $= \dfrac{\text{Favourable outcome}}{\text{Total number of outcomes}}$

- AND → multiply(x) e.g:- 1green and 1 blue ball in a box

- OR → Add (+) e.g:- 1 red or 1 blue ball in a box

- 1 bag has 3 balls, what is the probability of you picking up 2 balls?

  - $3C_2 = \dfrac{3 \times 2}{1 \times 2} = 3$

Total no. of balls
the bag contains

out of which how many balls
We need to choose
(tells number of times 3 has to be reduces)

$5C_3 \quad = \dfrac{5 \times 4 \times 3}{1 \times 2 \times 3} = 10$

No. of times we reduce

Points to Remember

- The **probability** of an event will not be less **than** 0.

- This is because 0 is impossible (sure that something will not happen).

- The **probability** of an event will not be **more than 1**. This is because **1** is certain that something will happen.

- The probability of an event is **a number** describing the chance that the event will happen.

- An event that is certain to happen has a probability of 1.

- An event that cannot possibly happen has a probability of 0.

- If there is a chance that an event will happen, then its probability is between 0 & 1.

Probability

Q. A bag contains 2 red, 3 green and 2 blue balls. Two balls are drawn at random. What is the probability that none of the balls drawn is blue?

A. 10/21   B. 11/21   C. 2/7   D. 5/7

Ans : A

Probability

Q. In a box, there are 8 red, 7 blue and 6 green balls. One ball is picked up randomly. What is the probability that it is neither red nor green?

A. 1/3   B. ¾   C. 7/19   D. 8/21   E. 9/21

Ans: A

Probability

Q. What is the probability of getting a sum 5 from two throws of a dice?

A.   1/9   B. 1/8   C. 1/7   D. 1/6

Ans : A

Probability

Q. Three unbiased coins are tossed. What is the probability of getting at most two heads?

A. ¾   B. ¼   C. 3/8   D. 7/8

Ans: D

Probability

Q. In a class, there are 15 boys and 10 girls. Three students are selected at random. The probability that 1 girl and 2 boys are selected, is:

A. 21/46   B. 25/117   C. 1/50   D. 3/25

Ans : A

Probability

Q. From a pack of 52 cards, two cards are drawn together at random. What is the probability of both the cards being kings?

A. 1/15

B. 25/57

C. 35/256

D. 1/221

Ans : D

Probability

A man tossed two dice. What is the probability that the total score is a prime number?

A. 5/12   B. 5/14   C. 5/20   D. 5/24

Ans : A

Probability(Assignment)

Q. A bag contains 4 white, 5 red and 6 blue balls. Three balls are drawn at random from the bag. The probability that all of them are red, is?

A. 1/22   B. 3/22   C. 2/91   D. 2/77

Ans : C

Probability(Assignment)

Q. What is the probability of getting a sum 9 from two throws of a dice?

A. 1/6   B. 1/8   C. 1/9   D. 1/12

Ans : C

Probability(Assignment)

Q. A bag contains 6 black and 8 white balls. One ball is drawn at random. What is the probability that the ball drawn is white?

A. ¾   B. 4/7   C. 1/8   D. 3/7

Ans : B

Probability(Assignment)

Q. A bag contains 6 blue balls, 3 white balls and 4 green balls. If two balls are drawn at random what is the possibility that they are not of the same colour?

      A. 6/13   B. 7/13   C. 9/13   D. 10/13

- ***Ans: C***

THANK YOU