CLOCK & CALENDER

1. A watch loses 3 min and the other gains 4 min. daily. They were set right at 3 p.m. What time will the slower watch indicate the next day when the faster shows 9 p.m.?

(a) 8 min to 9 (b) 8:53

(c) $8\frac{262}{361}$ min to 9 (d) 9 min. to 9

Sol. (c) In 24 hours, the difference = 7 minutes. When the faster watch shows 9 p.m. The next day it shows 30 hours past 3 p.m. But when actually 24 hours (1440 minutes) are past, the clock shows 1444 minutes. So when it shows 30 hours (1800 minutes), the correct time = $(1800/1444)\times 1440 = 1795.0139$ minutes. Nor for the slower clock, it shows 1437 minutes when 1440 are past. So when 1795.0139 minutes are past (actually) it will show $1795.0139/(1440\times 1437) = 1791.2743$ minutes = 29 hours 51.2743 minutes = $8\frac{262}{361}$ minutes to 9 p.m. next day. Note : No need to get entangled in detailed calculations. Just understand the concept thoroughly.

2. How much a watch gains or loses per day, if its hands coincide every 62 minutes?

(a) 80.12 min loss (b) 85 min gain

(c) 80.12 gain (d) none of these

Sol. (c) The two hands of a clock coincide when the minute's hand gained 60 minutes over the hour's hand 55 minutes is gained in 60 minutes $\rightarrow 60$ minutes will be gained in $(60\times 60)/55 = 65.45$ minutes. But the hands are coinciding every 62 minutes $\rightarrow$ Gain in 62 minutes = $(65.42 - 62) = 3.45$ minutes. Gain in $\{(24\times 60)\times 3.45\} + 62 = 80.12$ minutes.

3. At what angle are the hands of a clock inclined at 20 minutes past 6 a.m.?

(a) 60° (b) 70° (c) 75° (d) 80°

Sol. (2) 1/3 or the hour is over. In one hour, the hour's hand covers 5 minutes, In 1/3 hour, it covers 5/3 minutes. Thus the minutes spaces between the two hands at 6 : 20 = (30 + 5/3) – 20 = 10 + 5/3. In a watch, every minute space is equivalent to 6 degrees required answer = $(10 + 5/3)\times 6 = 70$ degree.

Must be done mentally by a SHORTCUT. Angle *A* = 30° + 30° = 60°. Angle *B* = 30°/3 = 10° $\rightarrow$ 70° is the answer.

4. Grandfather's antique clock which gains uniformly is 10 min slow at 9:00 a.m. on Monday and is 10 min 48 sec fast at 9:00 p.m. on the following Monday. When was it correct?

(a) 11 pm, Wednesday

(b) 11 pm 32 min Thursday

(c) 11 pm 40 min Wednesday

(d) 11 pm 28 minutes, Thursday

Sol. (b) Total time from 9.00 am on a Monday to 9.00 pm on the following Monday = 7 days 12 hours = 180 hours. The clock gains (10 min + 10 min + 48 sec) = 20 min 48 sec in 180 hours. Since it gains 20.8 min in 180 hours, it will gain 10 min in $(10\times 180)/20.8 = 86.54$ hrs = 86 hrs 32 min. The correct time shown at 86 hrs 32 min past 9.00 am on the first Monday. The correct time was shown at 11 pm 32 min on Thursday.

5. Two clocks begin to strike 12 together. One strike its stroke in 33 seconds and the other in 22 seconds. The interval between the 6th stroke of the first and the 8th stroke of the second will be :

(a) 1.15 seconds (b) 2 seconds

(c) 1 seconds (d) none of these

Sol. (c) Since the first clock strikes (12 –1) or 11 strokes in 33 seconds or the interval between two successive strokes is 33/11 or 3 seconds Similarly, the interval between the two successive strokes of the other clock is 2 seconds. Now the 6th stroke of the first clock will come after $5\times 3 = 15$ seconds and the 8th stroke of the second will come after $7\times 2 = 14$ seconds. So the interval = (15-14)=1 second.

6. Which day cannot be the first day of a century?

(a) Monday (b) Tuesday

(c) Wednesday (d) Thursday

Sol. (c) The first day of a century must be either Monday, Tuesday, Thursday or Saturday. It can never be Wednesday, Friday or Sunday.

7. How often are the hands of a clock at right angle every day?

(a) 24 (b) 22 (c) 48 (d) 44

Sol. (d) The relative position of the hands is always repeated 11 times in 12 hours, hence hands are at right angle is 22 times in 12 hours because in one hour there is 2 right angle position and therefore, 44 times in every day or 24 hours. Ans 44 times.

8. I left home between 1 and 2, and on my return between 3 and 4, I found that the hands of may watch had exactly changed places. When did I leave home?

(a) $15\frac{75}{143}$ min. past 1 (b) $12\frac{65}{143}$ min. past 1

(c) $10\frac{10}{123}$ min. past 3 (d) $19\frac{12}{155}$ min. past 3

Sol. (1) The together will make two complete revolution and the hour hand will move through $2\times 60/13 = 120/13$ min div. At 1 O'clock the minute hand in 5 min. division behind, the hour hand, hence, it will have to gain 5 + (120/13)=185/13 minute divisions on the hour hand. The minute hand gain 185/13 min. Divisions in $185/13\times 12/11 = 15\frac{75}{143}$ min. past 1.

9. A man who went out between 3 and 4, and returned between 8 and 9, found that the hands of the watch had exactly changed placed. When did he return?

(a) $12\frac{5}{13}$ min. past 8 (b) $18\frac{6}{13}$ min. past 8

(c) $10\frac{4}{12}$ min. past 8 (d) $15\frac{7}{12}$ min. past 8

Sol. (b) Ratio of speed of minute and hour hand is 12 : 1. They together will make 5 complete revolutions and the hour hand will move through $(5\times 60)/13 = 300/13$ minute division. At 3 o'clock the minute hand is 15 divisions behind, the hour hand, hence it will have to gain [15 + 300/1 = 495/13] minute divisions on the hour hand.

The required time of return = $15 + 3.46 = 18\frac{6}{13}$ min. past 8.

10. What is the exact time between 6 and 7 o'clock at which the hour and minute hands of a clock occupy the same positions as were occupied by the minute and hour hands respectively at certain time between 2 and 3 o'clock?

(a) $12\frac{84}{143}$ min. past 6 (b) $19\frac{74}{142}$ min. past 6

(c) $21\frac{14}{123}$ min. past 6 (d) $31\frac{21}{140}$ min. past 6

Sol. (a) They together will make 4 complete revolution and the hour hand will move through $(4\times 60)/13 = 240/13$ minute division. At 2 o'clock the minute hand is 10 min. divisions behind the hour hand, hence it will have to gain (10 + 240/13) or 370/13 minute division on the hour hand. The position of minute hand gain 370/13 min. Divisions in $370/13\times 1/11 = 2.587$ min. The required time = 10 + 2.587 = 12.587 min = $12\frac{84}{143}$ minutes past 6.

11. A watch which is set correctly at noon indicates 10 minutes after 9 the same evening when the true time is 10. What is the true time when the watch indicates 11 on the same evening?

(a) Night (b) mid night

(c) mid morning (d) early morning

Sol. (b)

12. A watch which gains 5 seconds in every 3 min. was set right at 6 a.m. What was the true time in the afternoon of the same day when the watch indicated a quarter past 3 o'clock?

(a) 9 a.m. (b) 9 p.m. (c) 3 p.m. (d) none

Sol. (c)

13. A watch which is 10 min. too fast at noon on Monday gains 3 min. 12 sec. every 24 hours. What will be the time by it at a quarter past ten on the following Saturday morning?

(a) 5 min. 12 sec. to 11 (b) 10 min. 11 sec. to 12

(c) 11 min. 12 sec. to 10 (d) 19 min. 14 sec. to 11

Sol. (d)

14. Which of following can be the last day of a century :

(a) Tuesday (b) Thursday

(c) Saturday (d) Friday

Sol. (d)

15. I was born on Thursday, 28th June 1979. Which day had I celebrated my 18th birthday?

(a) Friday (b) Saturday

(c) Wednesday (d) Thursday

Sol. (b) Saturday