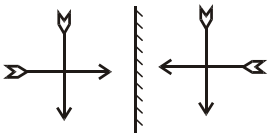
11
CHAPTER

CLOCK

1. Image
2. Angle
3. Time
4. Error

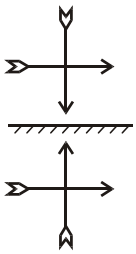
(1) Image/Mirror/Water Image

(1)



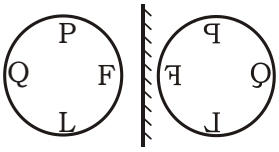
In mirror, left Right (change)
Top and bottom (same)

(2)

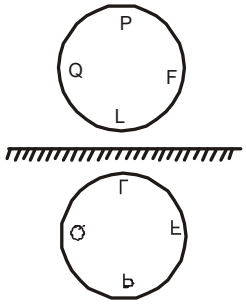


In water, Top – bottom (change)
Left and Right (Same)

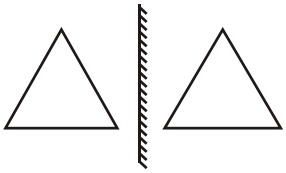
(3)



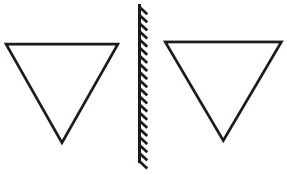
(4)



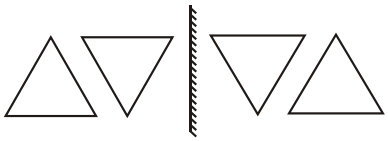
(5)



(6)

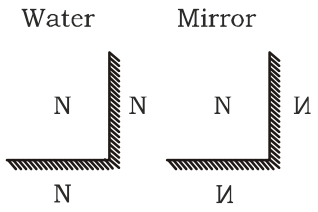


(7)

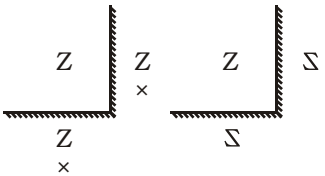


& mirror and water fiq.

(8)

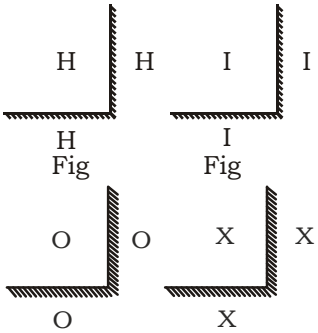


(9)

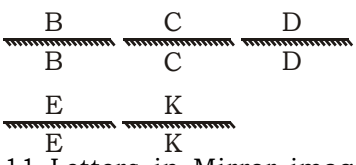


- 4 Letters in mirror and water image is same. i.e. O, X, I, H

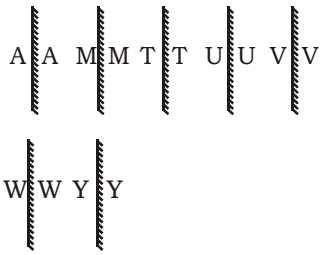
(10)



❑ 9 Letters in water image is same
5 + 4 (9) B , C , D , E, K, O, X, I, H



❑ 11 Letters in Mirror image is same



❑ Clock Mirror
9 – 3
10 – 2
12 – 12
7 – 5
6 – 6

HR : MIN
12 : 00
or
11 : 60

To know the mirror image subtract from Clock 12 : 00 or 11 : 60

eg : 8 : 40

HR : MIN
12 : 00
– 8 : 40
3 : 20

eg : 2 : 47

11 : 60
–2 : 47
9 : 13

eg : 22 : 13 or 10 : 13

11 : 60
–10 : 13
1 : 47

❑ Subtract from 18 : 30 to know Clock water Image

eg: 8 : 20 — 18 : 30 Ans.
– 8 : 20
10 : 10

If in Options 10 : 10 is not given, than reduce 1 hour

eg 9 : 00 — 18 : 30
– 9 : 00
09 : 30 Ans.
8 : 30 Ans.

eg: 8 : 30 — 18 : 30
– 8 : 30
10 : 00 Ans.
9 : 00 Ans.

eg : 1 : 30 → 18 : 30 − 1 : 30 → 24 hr 17 : 00, 12 hr 5 : 00 Ans.

eg : 2 : 53 → 17 : 90 − 2 : 53 → 15 : 37 → 1 hr less 3 : 37 → 2 : 37

Note : [18:30 or 17: 90] both are the same

eg : 22 : 27 —— 10 : 27
24 hr 12 hr

18 : 30
− 10 : 27
08 : 03 Ans.

- Minute Hand

60 min —— 360°

1 min —— $\frac{360°}{60}$ = 6°

Min hand = 6°/min

- Hour Hand

12 hr — 360°

1 hr — $\frac{360°}{12}$ = 30°

60 min — $\frac{30}{60} = \frac{1°}{2}$

Hour hand — $\frac{1°}{2}$ /min

Hour hand — 30°/ hr.
& from 2 P.M —— 4 P.M
Hour hand — 2hr =120min

\ 1 min = $\frac{1°}{2}$

120 min = $\frac{120}{2}$ = 60° Ans.

Q. CGL – 2015
12:00 Noon to 3 : 00 : 45 min

Sol.
12 :00
3 : 45 > Dff 3 hr 45 min
3 × 60 + 45 = 225 min

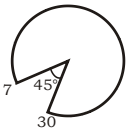
Hour hand = 1 min − $\frac{1°}{2}$

225 min = $\frac{225}{2}$ =112.5° Ans.

-

Total = $\frac{360°}{12}$ = 30°

Q. What is the angle between both the hands at 7 : 30
360° – 45° = (30°+15°)
315 ° or 45° Ans.



- Angle : $\frac{60(H)-11(min)}{2}$

eg: 7 : 30 find Angle
Hr : min

$\frac{60(H)-11(min)}{2} = \frac{60' 7-11' 30}{2}$

$= \frac{420-330}{2} = \frac{90}{2}$ = 45° Ans.

or 360° – 45° = 315° Ans.

eg.: Hr min
5 : 10

$= \frac{60' 5+11' 10}{2} = \frac{300+110}{2}$

$= \frac{190}{2}$ = 95°

or 360° – 95° = 265° Ans.

eg : 5 : 40 find smaller Angle

$\frac{60(H)-11(min)}{2}$

$= \frac{60' 5-11' 40}{2}$

$= \frac{300-440}{2} = \frac{140}{2}$ = 70° Ans.

eg : Hr : min

$12 : 20 = \frac{12' 60-11' 20}{2}$

$= \frac{720-220}{2} = \frac{500}{2}$ = 250°

360 – 250° = 110° Ans.

or

12 : 20 let 12 be 00

$\frac{0' 60-11' 20}{2} = \frac{220}{2}$ = 110°

eg: Hr : min
3 : 24

$= \frac{3' 60-11' 24}{2}$

$= \frac{180-264}{2} = \frac{84}{2}$ = 42° Ans.

eg : $3 : 12 = \frac{3' 60-11' 12}{2}$

$= \frac{180-132}{2} = \frac{48}{2}$ = 24° Ans.

eg: $7 : 46\frac{4}{11}$ find angle

$46\frac{4}{11} = 46 + \frac{4}{11} = \frac{46' 11+4}{11}$

$= \frac{510}{11} = 7 : \frac{510}{11}$

$= \frac{60' 7-11}{2}, \frac{510}{11}$

$= \frac{420-510}{2} = \frac{90}{2}$ = 45° Ans.

Q. At what time between 7:00 and 8:00 are the hands at angle 45°

Time : $\frac{2}{11}(A_1 + A_2)$

A_1 = [Smaller number × 30
A_2 = Given angle

eg: 7 : 00 to 8 : 00
A_1 7×30 = 210°
A_2 45°

Time : $\frac{2}{11}$ (210° + 45°) 2nd time

$\frac{2}{11} \times 255 = \frac{510}{11} = (46\ \frac{4}{11})$

$\frac{2}{11}$ (210 – 45°)

Ist time

$\frac{2}{11} \times 165° = 30° = (7 : 30)$ Ans.

Ist time = –
2nd time = +

eg: 5 : 00 & 6 : 00 ; 95° = ?

$A_1 = 5 \times 30 = 150$ $\frac{2}{11}(150 - 95°)$

$A_2 = 95°$ $\frac{2}{11} \times 55 = 5$

= 5 :10 Ans.

eg: 12 :00 & 1 : 00 & 110° = ?
A_1 = 00 × 30 = 0

$A_2 = 110°$ $\frac{2}{11}$ (0 + 110°) = $\frac{2}{11}$ × 110 = 20° & 12 : 20 Ans.

eg when angle between 12 : 00 & 1 : 00 is 250°

Sol. 12:00 1:00

$\frac{2}{11}$ (0× 30 + 250°)

$\frac{2}{11}\times 250° = \frac{500}{11} = 45\frac{5}{11}$

$12 : 45\frac{5}{11}$

= 250°/110° Ans.

eg: 5 : 30 & 6: 00 A_2 : 70°

5 : 00 & 6 : 00

$\frac{2}{11}(A_1 + A_2)\ \frac{2}{11}$ (5× 30 +70°)

$= \frac{2}{11} \times (150\ 70)$

$= \frac{2}{11} \times 220 = 40° = 5 : 40$Ans.

Q. When in between 3:00 and 4:00, minute hand leg by 4 minute from hour hand in a clock?

Sol. 1 min — 6° $\frac{2}{11}$ (3 × 30 – 24°)

4 min : 24° $\frac{2}{11} \times (90 - 24)$

$\frac{2}{11} \times 66 = 12$

3 : 12 Ans.

Q When in between 3:00 and 4:00, minute hand ahead by 7 minute from hour hand in a clock?

$A_1 = 3 \times 30 = 90°$ $\frac{2}{11}(A_1 + A_2)$

$A_2\ \frac{2}{11}$ (90° + 42°)

7 min = 42° $\frac{2}{11} \times 132 = 24$

3 : 14 min

Q. At what time between 8 : 00 and 9 : 00 clock are the nanda opposite to each?

Sol. 8 : 00 & 9 : 00 total : 360°

Half : 180°

$A_1 = 8 \times 30 = 240$

$A_2 = 180°$

$\frac{2}{11} \times (A_1 + A_2)$

$\frac{2}{11}$ (240° + 180°)

$\frac{2}{11} \times 420 = \frac{840}{11} = 76\frac{4}{11}$ but

$\frac{2}{11}$ (240 – 180)

$\frac{2}{11} \times 60 = \frac{120}{11} = 10\frac{10}{11}$

It is greater than 60 mins.

$8 : 10\frac{10}{11}$

Hence angle 180° comes once in an hour

CLOCK

Number of times hands of a clock makes 180°/Straight line

1 hr — 1 times

12 hr — 11 times

24 hr –22 times

0° = 12 o'clock

Q. From 5 pm to 11 pm

Sol. 5pm — 11pm — Diff = 6 hr.

(12:00 o' clock) 0° — 6 time Ans.

(6 : 00) — 180° 6 — 1 = 5 times

Q. From 11 AM to 5 PM

Sol. 11Am — 5 Pm — Diff = 6 hr.

12:00 0° —— ?

6 — 1 = 5 times Ans.

6 : 00 180°—— ? 6 times Ans.

Q. From Sunday 5 pm to Monday 7 pm how many times hands of clock are in straight line.

Sol. from Sunday 5 pm to Monday 7 pm

Sunday – 5 p.m. 180°

24 hr — 22 times 22

Monday 5 pm

Monday 7 pm $\frac{1}{23} + \frac{2}{24}$

= 47 times

Q. Number of times hands of a clock make 90°

90° Right angle – 3: 00 o'clock 9:00 o'clock

1 Hr — 2 times

12 Hr — 22 times

24 Hr — 44 times

Q. How many times hands of clock makes right angle.

Sol. One days– 24 Hr – 44 times

Q. from 1 pm to 5 pm

Sol. 1 pm —— 5p.m. – (4hr)

12 :00 0° – ? 4 times Ans

6 : 00 180° ? 4 times Ans.

3:00 /9:00 – 90° ? 8 – 1 = 7 times **Ans**

Q, from 2 pm to 10 pm

2 pm से 10 pm

Sol 2 pm — 10 pm — (8Hr)

12:00 0° — 8 times Ans.

6 : 00 180° – 8 – 1 = 7 times Ans.

3 : 00, 9 : 00 — 90°

8 × 2 = 16– 2 = 14 times.

CLOCK ERROR

TYPE - I

Q. If in a clock minute hand cross hour hand in 65 minute, then how many times clock in 24 hr goes slow down or fast

$$\left(\frac{65\frac{5}{11} - \text{Time}}{\text{Time}}\right) \times \text{Total time(Hr / days)}$$

Sol. $\frac{65\frac{5}{11} - 65}{65} \times 24$ = 65 subtract

from $65\frac{5}{11} = \frac{5}{11}$

$\frac{5}{11 \times 65} \times 24 = \frac{24}{143}$ fast Hrs.

Q If in a clock minute hand cross hour hand in 60 minute, then how many times clock in 22 hr goes slow down or fast

$= \frac{65\frac{5}{11} - 60}{60} \times 22 = \frac{65\frac{5}{11}}{60} \times 22$

$= \frac{60}{11 \times 60} \times 22 = +2$ Fast

TYPE - II

Q. A clock which moves continuously fast, It lags 5 minute on Sunday 8 am, it is ahead 7 minute on Tuesday 8 am then find when clock shows right time?

Sol. Sun day– 8 Am—— –5 times
Tuesday 8 Am – +7 times > 48hr

formula:-1st $\frac{\text{slow / fast}}{\text{slow} + \text{fast}} \times$ total

time = $\frac{5}{12} \times 48 = 20$ Hr

Sunday 8 am + 20 hr

= Monday 4 am

Q. A clock which moves continuously fast, It lags 9 minute on Sunday 10 pm, it is ahead 3 minute on Tuesday 10 pm then find when clock shows right time?

Sol. $24 + 12 = 36\text{hr}$ < Sun – 10 am — –9 min; Mon – 10 pm — +3 min

$\frac{9}{12} \times 36 = 27$ hr

Sunday – 10 am + 27 hr = Monday = 1pm

Q. A clock which moves continuously fast, It lags 10 minute on Sunday 7 am, it is ahead 5 minute on Tuesday 7 am then find when clock shows right time?

Sol. $48 + 12 = 60\text{hr}$ < Sun – 7 am — –10 min; Tue – 7 pm — –5 min

$\frac{10}{15} \times 60 = 40$ hr

Sun 7 am +24 hr Mon -7 Am +12 h Mon 7 pm + 4n = Monday 11 pm **Ans.**

TYPE - III

- A clock fast 1 hour in each 24 hour. If clock shows correct time on Sunday 9 am then what is the correct time, when clock, shows 11:00 am Tuesday?

Sol.

Right	Wrong
24hr	25 hr
W –	R
25 –	24

Sun – 9:00 AM; Tues – 11:00 AM > 50 Hr

50 $\frac{24}{25} \times 50 = 48$ HR (Right)

Tuesday 9:00 AM Ans.

Q. 24 hr — 4 hr slow

Same	Right wrong
24 20 —	24 – 4 = 20 hr
W R	

20 24

Sun 7 AM; Tuesday 7AM > 48 Hr + 12 hr = 60hr

$= \frac{24}{20} \times 60 = 72$ hr

Sun 7 am + 72 hr Wed 7 Am = 3 days Ans.

Clock we read

Image – (a) 12 : 00 or 11 : 60

Water – (b) 17 : 90

(2) Angle $\frac{60\text{hr} - 11\text{min}}{2}$

(3) time : $\frac{2}{11}$ $(A_1 + A_2)$

(4) 0° – 12h – 11 times

180° – 12hr – 11 times

Error

$= \frac{65\frac{5}{11} - \text{time}}{\text{time}} \times$ T.T

= Wrong + Right (?)

EXERCISE – I

TYPE -I

1. What angle is made by minute hand in 29 sec.?
   (a) 1740° (b) 2.9°
   (c) 29° (d) 260°
2. What angle is made by hour hand in 36 sec?
   (a) 120° (b) 3°
   (c) $\left(\frac{3}{10}\right)^0$ (d) $\left(\frac{10}{3}\right)^0$
3. What angle is made by minute hand in 59 sec ?
   (a) 6° (b) 5°
   (c) 5.9° (d) 4.9°
4. What angle is made by second hand in 15 sec.?
   (a) 15° (b) 1.5°
   (c) $\left(\frac{1}{8}\right)^\circ$ (d) 90°

TYPE -II

5. What time is shown by the mirror if the real time is 9 : 27
   (a) 3 : 33 (b) 2 : 33
   (c) 3 : 27 (d) 2 : 23
6. Time appears in the mirror 11 : 09. Then what time will be appear in clock?
   (a) 1 : 51 (b) 12 : 09
   (c) 12 : 51 (d) 1 : 09
7. Time appears in the mirror 6 : 00. Then what is the correct time in clock?
   (a) 5 : 58 (b) 6 : 60
   (c) 6 : 00 (d) 6 : 01
8. If reflecting time is 3 : 43 then the real time of clock is?
   (a) 3 : 17 (b) 7 : 17
   (c) 8 : 17 (d) 8 : 43
9. If the time in clock is 12 : 23. What is the time in the mirror?
   (a) 12 : 33 (b) 11 : 37
   (c) 12 : 37 (d) 1 : 23

TYPE -III

10. Time in a clock is 3 : 13, what time will be appear in water?
    (a) 3 : 17 (b) 2 : 17
    (c) 3 : 23 (d) 2 : 13
11. Time appears in water is 5 : 47, what will be correct time in watch.
    (a) 12 : 47 (b) 12 : 43
    (c) 1 : 47 (d) 1 : 43
12. Water image of a clock is showing time 4 : 42 what is the real time?
    (a) 1 : 48 (b) 2 : 48
    (c) 12 : 48 (d) 12 : 42
13. If time in a clock is 7 : 35 then at what time will be appear in water?
    (a) 11 : 35 (b) 10 : 35
    (c) 10 : 05 (d) 10 : 55
14. If time in a clock is 9 : 11, then at what time will appear in water?
    (a) 9 : 19 (b) 8 : 11
    (c) 8 : 19 (d) 9 : 30
15. If time in a clock is 8 : 52, then at what time will appear in water?
    (a) 8 : 38 (b) 9 : 52
    (c) 8 : 22 (d) 9 : 38

TYPE -IV

16. What angle is made by minute and hour hand at 4 : 12?
    (a) 66° (b) 44°
    (c) 54° (d) 60.5°
17. What is the angle between minute and hour hand at 9 : 53?
    (a) 121.5° (b) 21.5°
    (c) 130° (d) 68.5°

18. What is the angle between minute and hour hand at 12 : 46?
(a) 97° (b) 107°
(c) 153° (d) 7°

19. What is the angle between minute and hour hand at 7 : 09?
(a) 120.5° (b) 160.5°
(c) 49.5° (d) 19.5°

20. What is the angle between minute and hour hand at 11 : 10?
(a) 265° (b) 175°
(c) 85° (d) 95°

21. What is the angle between minute and hour hand at 3 : 56?
(a) 152° (b) 228°
(c) 360° (d) 142°

22. What is the angle between minute and hour hand at 12 : 20?
(a) 260° (b) 110°
(c) 120° (d) 20°

TYPE -V

23. At what time between 6 to 7 O' clock minute and hour hand will coincide?
(a) $6 : 38\frac{2}{11}$ (b) $6 : 43\frac{7}{11}$
(c) $6 : 32\frac{8}{11}$ (d) $6 : 5\frac{5}{11}$

24. At what time between 10 to 11 O' clock minute and hour hand will coincide or makes 0° angle?
(a) $10 : 43\frac{7}{11}$ (b) $10 : 38\frac{2}{11}$
(c) $10 : 54\frac{6}{11}$ (d) $10 : 10\frac{10}{11}$

25. At what time between 2 to 3 O' clock minute and hour hand will be at right angle to each other or makes 90° angle
(a) $2 : 32\frac{8}{11}$ (b) $2 : 27\frac{3}{11}$
(c) $2 : 10\frac{10}{11}$ (d) $2 : 16\frac{4}{11}$

26. At what time between 6 to 7 O' clock minute and hour hand will be at right angle or makes 90° angle?
(a) $6 : 38\frac{2}{11}, 6 : 43\frac{7}{11}$
(b) $6 : 43\frac{7}{11}, 6 : 49\frac{1}{11}$
(c) $6 : 49\frac{1}{11}, 6 : 16\frac{4}{11}$
(d) $6 : 16\frac{4}{11}, 6 : 54\frac{6}{11}$

27. At what time between 3 to 4 O' clock minute and hour hand are opposite to each other?
(a) $3 : 43\frac{7}{11}$ (b) $3 : 38\frac{2}{11}$
(c) $3 : 49\frac{1}{11}$ (d) $3 : 54\frac{6}{11}$

28. When did the minute and hour hand makes 180° angle between 6 to 7 O' clock?
(a) $6 : 54\frac{6}{11}$ (b) 6 : 60
(c) 6 : 00 (d) $6 : 5\frac{5}{11}$

29. At what time between 8 to 9 O' clock the minute and hour will apart 7 minutes to each other?
(a) $8 : 42, 8 : 51\frac{3}{11}$
(b) $8 : 36, 8 : 51\frac{3}{11}$
(c) $8 : 09, 8 : 47\frac{4}{11}$
(d) $8 : 17, 8 : 28\frac{9}{11}$

TYPE -VI

30. The minute hand of a clock overtakes the hour hand at intervals of 64 minutes of correct time. How much a day does the clock gain or lose?
(a) $43\frac{9}{11}$ minute loss
(b) $32\frac{8}{11}$ minute gain
(c) $33\frac{9}{11}$ minute gain
(d) $32\frac{8}{11}$ minute loss

31. The minute hand of a clock overtakes the hour hand at intervals of 66 minute of correct time. How much a day does the clock gain or lose?
(a) $11\frac{109}{121}$ minute gain
(b) $11\ \frac{109}{121}$ minute loss
(c) $11\frac{117}{121}$ minute gain
(d) $11\frac{117}{121}$ minute loss

32. A clock is set right at 8 a.m. on Sunday. It gains 8 minutes in 24 hours. What is the correct time when the clock indicates 9 p.m. on upcoming Sunday?
(a) 9 P.M (b) 8 : 30 P.M
(c) 8 P.M (d) 10 P.M

33. A clock is set right at 10 A.M on Sunday. It loses 8 minutes in 24 hours. What is the correct time when the clock indicates 9 P.M on next Sunday?
(a) 9 P.M (b) 9 A.M
(c) 10 A.M (d) 10 P.M

34. A watch which gains uniformly is 4 minute slow at 9 A.M on Sunday, and is 4 minute 15 sec. fast at 9 P.M on upcoming Friday. When was it correct?
(a) 2 A.M Thursday
(b) 6 P.M Wednesday
(c) 1 A.M Wednesday
(d) 6 P.M

35. A watch which loses uniformly is 3 minute fast at 6 A.M on Thursday and is 3 minute 12 sec. slow at 5 P.M on upcoming Wednesday. When was it correct?
(a) 9 P.M on Sunday
(b) 9 A.M on Monday
(c) 9 A.M on Sunday
(d) 8 A.M on Sunday

ANSWER KEYS

(Exercise- I)

1. (b)	5. (b)	9. (b)	13. (d)	17. (b)	21. (d)	25. (b)	29. (b)	32. (c)	34. (c)
2. (c)	6. (c)	10. (b)	14. (c)	18. (b)	22. (b)	26. (c)	30. (b)	33. (d)	35. (c)
3. (c)	7. (c)	11. (b)	15. (d)	19. (b)	23. (c)	27. (c)	31. (b)		
4. (d)	8. (c)	12. (a)	16. (c)	20. (c)	24. (c)	28. (c)			

EXERCISE – II

1. By looking in a mirror it appears that it is 6 : 30 in the clock. What is the real time?
   (a) 6 : 30 (b) 5 : 30
   (c) 6 : 00 (d) 5 : 00

2. After 9'O clock at what time between 9 p.m and 10 p.m will the hour and minute hands of a clock point in opposite direction?
   (a) 15 minutes past 9
   (b) 16 minutes past 9
   (c) $16\frac{4}{11}$ minutes past 9
   (d) $17\frac{1}{11}$ minutes past 9

3. At what time are the hand of clocks together between 6 and 7?
   (a) $32\frac{8}{11}$ minutes past 6
   (b) $34\frac{8}{11}$ minutes past 6
   (c) $30\frac{8}{11}$ minutes past 6
   (d) $32\frac{5}{7}$ minutes past 6

4. A clock only with only dots marking 3, 6, 9 and 12 positions has been kept upside down in front of mirror. A person reads the time in the reflection of the clock as 4.50. What is the actual time?
   (a) 08 : 10 (b) 01 : 40
   (c) 04 : 50 (d) 10 : 20

5. A clock only with dots marking 3, 6, 9, and 12 O' clock positions has been kept upside down in front of a mirror. A person reads the time in the reflection of the clock as 10 : 20. What is the actual time?
   (a) 07 : 10 (b) 02 : 40
   (c) 04 : 50 (d) 10 : 20

6. A clock goes slow from midnight by 5 min. at the end of the first hour, by 10 min. at the end of the second hour, by 15 min. and the end of the 3rd hour and so on. What will be the time by this clock after 6 hours?
   (a) 6 : 00 am (b) 5 : 30 am
   (c) 6 : 30 am (d) 5 : 15 am

7. A clock goes fast by one minute during the first hour, by two minutes at the end of the second hour, by 4 minutes at the end of 3rd hour, by eight minutes by the end of 4th hour, and so on. At the end of which hour, will it be fast by just over sixty minutes?
   (a) Fifth (b) Sixth
   (c) Seventh (d) Eighth

8. A clock with only dots marking 3, 6, 9 and 12 positions has been kept upside down in front of a mirror. A person reads the time in the reflection as 9.50. What is the actual time?
   (a) 2 : 15 (b) 8 : 40
   (c) 8 : 50 (d) 4 : 15

9. A clock with only dots marking 3, 6, 9, and 12 positions has been upside down in front of a mirror. A person reads the time in the reflection as 6 : 10 The real time is:
   (a) 06 : 50 (b) 12 : 40
   (c) 11 : 20 (d) 6 : 10

10. A clock with only dot markings 3, 6, 9 and 12 positions has been kept upside down in front of a mirror. A person reads the time in the reflections of the clock as 12 : 30 the actual that will be
    (a) 12 O' clock (b) 12 : 30
    (c) 6 O' clock (d) 03 : 45

11. The bus for Chennai leaves every 30 minutes from a bus depot. The enquiry clerk told a passenger that the bus for Chennai left 10 minutes ago, and the next bus will leave at 10 : 30 a.m. What was the time when enquiry clerk told this?
    (a) 10 : 20 a.m. (b) 10 : 10 a.m.
    (c) 10 : 00 a.m. (d) 09 : 50 a.m.

12. If 50 minutes ago, it was 45 minutes past four O' clock, how many minutes is it until six O' clock?
    (a) 45 (b) 15
    (c) 25 (d) 35

ANSWER KEYS

(Exercise- II)

1. (b)	3. (a)	5. (a)	6. (b)	7. (c)	8. (b)	9. (c)	10. (c)	11. (b)	12. (c)		
2. (c)	4. (b)										

SOLUTION
EXERCISE – I

1. (b) as we know,
Minute hand in 1 minute = 6°
Minute hand in 60 second = 6°
Then in 1 Sec
$= \frac{6}{60}$
and In 29 sec = $\frac{6}{60} \times 29 =$ **2.9°**

2. (c) as we know hour hand in 1 hour = 30°
In 60 minute = 30°
In 3600 sec = 30°
Then, In 1 sec. = $\frac{30}{3600} = \frac{1}{120°}$
In 36 Sec = $\frac{1}{120°} \times 36 =$ **3/10°**

3. (c) Minute hand in 1 sec. = $\frac{1}{10°}$
Then in 59 sec. = $\frac{1}{10} \times 59 =$ **5.9°**

4. (d) Second hand in 1 sec. = 6°
Then in 15 sec = 15 × 6 = **90°**

5. (b) Because the time 9 : 27 lies b/w 1 : 00 to 11 : 00, hence we subtract this time from 11:60,
11 : 60 – 9 : 27 = **2 : 33**

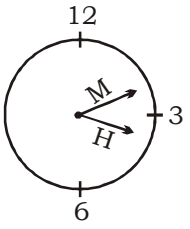
6. (c) Because the time 11 : 09 lies between 11 : 00 to 1 : 00, Hence we subtract that time from 23 : 60
23 : 60 – 11 : 09 = **12 : 51**

7. (c) Because the time 6 : 00 lies between 1 : 00 to 11 : 00, hence we subtract that time from 11 : 60
11 : 60 – 6 : 00 = 5 : 60
5 : 60 Means **(6 : 00)**

8. (c) Because the time 3 : 43 lies between 1 : 00 to 11 : 00 Hence we subtract that time from 11 : 60
11 : 60 – 3 : 43 = **8 : 17**

9. (b) Because the time 12 : 23 lies between 11 : 00 to 1 : 00, Hence we subtract that time from 23 : 60
23 : 60 – 12 : 23 = **11 : 37**

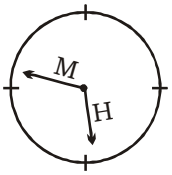
10. (b) In water Image the time 3 : 13 has the both hands between 12 : 00 to 6 : 00 clockwise hence we subrtract that time from 5 : 30
5 : 30 – 3 : 13 = **2 : 17**



or

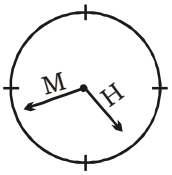
18 : 30
–3 : 13
15 : 17
–1 ↓
14 : 17

11. (b) In the time 5 : 47 hour hands of the clock is between 12 : 00 to 6 : 00 and the minute hand of the clock is between 6 : 00 to 12 : 00 clock wise hence we subtract that time from 5 : 90

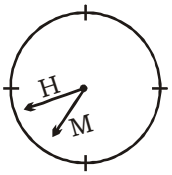


5 : 90 – 5 : 47 = 00 : 43
0 : 43 means **12 : 43**

12. (a) In the time 4 : 42 hour hand of the clock is between 12 : 00 to 6 : 00 and the minute hand of the clock is between 6 : 00 to 12 : 00. Hence we sutruct that time from 5 : 90
5 : 90 – 4 : 42 = **1 : 48**

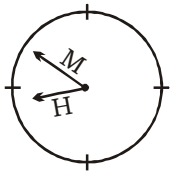


13. (d) In this time 7 : 35 both hands are between 6 : 00 to 12 : 00 clockwise. Hence we subtract that time from 17 : 90
17 : 90 – 7 : 35 = **10 : 55**



14. (c) In this time 9 : 11, the hour hand of the clock is between 6 : 00 to 12 : 00 clockwise and minute hand is between 12 : 00 to 6 : 00 clockwise. Hence we subtract that time from 17 : 30.
17 : 30 – 9 : 11 = **8 : 19**

15. (d) In this time 8 : 52, both the hands of clock are between 6 : 00 to 12 : 00 clockwise. Hence we subtract that time from 17 : 90
17 : 90 – 8 : 52 = **9 : 38**



16. (c) Formula for Angle = H × 30 = $x°$
$M \times \frac{11}{2} = y°$
(Subtract smaller from larger)
Hence, H = 4, M = 12
4 × 30 = 120°
$12 \times \frac{11}{2} = 66°$
120° – 66° = **54°**

17. (b) By Angle Formual,
H = 9, M = 53
9 × 30 = 270°
$53 \times \frac{11}{2} = 291.5°$
291.5° – 270° = **21.5°**

18. (b) By Angle Formula = H
= 12, M = 46
12 × 30 = 360°
$46 \times \frac{11}{2} = 253°$
360° – 253° = **107°**

19. (b) By Angle Formula
H = 7, M= 9
7 × 30 = 210°
$9 \times \frac{11}{2} = 49.5°$
210° – 49.5° = **160.5°**

20. (c) By Angle Formula
H = 11, M= 10

$11 \times 30 = 330°$

$10 \times \frac{11}{2} = 55°$

$330° - 55° = 275°$

But 275° is more than 180° hence we subtract this angle from 360°

$360° - 275° =$ **85°**

21. (d) By Angle Formula

H = 3, M = 56

$3 \times 30° = 90°$

$56 \times \frac{11}{2} = 308°$

$308° - 90° = 218°$

But 218° is more than 180° hence we subtract this Angle from 360°

$360° - 218° =$ **142°**

22. (b) By Angle Formula

H = 12, M = 20

$12 \times 30 = 360°$

$20 \times \frac{11}{2} = 110°$

$360° - 110° = 250°$

But 250° is more than 180° hence subtract this angle from 360°

$360° - 250° =$ **110°**

23. (c) "Coincide means O° Angle"

By Unique Formula

$$= H : \left(H \times 5 \pm \frac{\text{Angle}}{6}\right) \times \frac{12}{11}$$

Angle = 0°, h = 6 then

$$= 6 : \left(6' \; 5 \pm \frac{0}{6}\right), \frac{12}{11}$$

$$= 6 : (30 \pm 0) \times \frac{12}{11}$$

$$= 6 : \frac{360}{11} = \mathbf{6 : 32\frac{8}{11}}$$

24. (c) By Unique Formula Here

H = 10, Angle = 0

$$10 : \left(10' \; 5 \pm \frac{0}{6}\right), \frac{12}{11}$$

$$10 : (50 \pm 0) \times \frac{12}{11}$$

$$10 : \frac{600}{11}$$

$$\mathbf{10 : 54\frac{6}{11}}$$

25. (b) By unique Formula Here

H = 2, Angle = 90°

$$2 : \left(2' \; 5 \pm \frac{90}{6}\right), \frac{12}{11}$$

$$2 : (10 \pm 15) \times \frac{12}{11}$$

$$2 : (25) \times \frac{12}{11}, \; 2 : (-5) \times \frac{12}{11}$$

$$2 : \frac{300}{11} \quad 2 : \frac{-60}{11}$$

This is not possible $\mathbf{2 : 27\frac{3}{11}}$

26. (c) By unique Formula

H = 6, Angle = 90°

$$6 : \left(6' \; 5 \pm \frac{90}{6}\right), \frac{12}{11}$$

$$6 : (30 \pm 15) \times \pm \frac{12}{11}$$

$$6 : (30 + 15) \times \frac{12}{11}, 6 : (30 - 15) \times \frac{12}{11}$$

$$6 : \left(45' \; \frac{12}{11}\right), \; 6 : \left(15' \; \frac{12}{11}\right)$$

$$6 : \frac{540}{11}, 6 : \frac{180}{11}$$

$$\mathbf{6 : 49\frac{1}{11}, 6 : 16\frac{4}{11}}$$

27. (c) By unique formula

H = 3, Angle = 180°

Note: Hands are opposite means 180°

$$3 : \left(3' \; 5 \pm \frac{180}{6}\right), \frac{12}{11}$$

$$3 : (15 \pm 30) \times \frac{12}{11}$$

$$3 : (15 + 30) \times \frac{12}{11}, 3 : (15 - 30) \times \frac{12}{11}$$

$$3 : (45) \times \frac{12}{11}, \quad 3 : (-15) \times \frac{12}{11}$$

$$3 : \frac{540}{11}, \quad 3 : \left(-\frac{180}{11}\right)$$

angle = 180°

$$\mathbf{3 : 49\frac{1}{11}}$$

28. (c) By unique formula

H = 6 Angle = 180°

$$6 : \left(6' \; 5 \pm \frac{180}{6}\right), \frac{12}{11}$$

$$6 : (30 \pm 30) \times \frac{12}{11}$$

$$6 : (30 + 30) \times \frac{12}{11}, 6 : (30 - 30) \times \frac{12}{11}$$

$$6 : (60) \times \frac{12}{11}, \quad 6 : (0) \times \frac{12}{11}$$

$$6 : \frac{720}{11}, \mathbf{6 : 00}$$

Not possible

Note: Minute and hour hand does not makes 180° Angle between 5 to 6 and 6 to 7 O' clock . It makes it correct at 6 O' clock.

29. (b) $\frac{\text{Angle}}{6}$ = minutes

By unique formula

$$8 : (8 \times 5 \pm 7) \times \frac{12}{11}$$

$$8 : (40 \pm 7) \times \frac{12}{11}$$

$$8 : (40 + 7) \times \frac{12}{11}, 8 (40 - 7) \times \frac{12}{11}$$

$$8 : 47 \times \frac{12}{11}, 8 : 33 \times \frac{12}{11}$$

$$8 : \frac{564}{11}, 8 : \frac{396}{11}$$

$$\mathbf{8 : 51\frac{3}{11}, 8 : 36}$$

30. (b) Normal watch overtakes

$$\text{in} = 65\frac{5}{11} \text{ minute}$$

This watch overtakes in = 64 minute

It means In 64 minutes the clock gains

$$= 65\frac{5}{11} - 64 = 1\frac{5}{11} = \frac{16}{11} \text{min.}$$

"In one day = 24 × 60 minutes"

Then in 1 minute clock gains

$$= \frac{16}{11' \; 64}$$

In 24 × 60 Minute clock gains

$$= \frac{16' \; 24' \; 60}{11' \; 64} = \frac{360}{11} \text{ minutes}$$

$= \mathbf{32\frac{8}{11}}$ minutes

31. (b) Total loses in 66 minutes is

$= 66 - 65\frac{5}{11} = 66 - \frac{720}{11}$

$= \frac{726-720}{11} = \frac{6}{11}$

In 1 minutes

$= \frac{6}{11' 66}$

In 24 × 60 Minute

24 × 60

$= \frac{6' 24' 60}{11' 66} = \frac{1440}{121}$

$= \mathbf{11\frac{109}{121}}$ minutes loss

32. (c) Total hours form 8 a.m. Sunday to 9 p.m. following sunday = 181 hours

24 hours + 8 minutes

$24 + \frac{8}{60} = 24 + \frac{2}{15} = \frac{360+2}{15}$

$= \frac{362}{15}$ hours

$\frac{362}{12}$ hours of this clock

Þ 24 hours of correct clock

1 hours of this clock = 24 × $\frac{15}{362}$ hour of correct clock

181 hour of this clock

$= \frac{24' 15' 181}{362}$

= 180 hours of correct clock

The correct time would be

= 9 p.m – 1 hour = **8 p.m**

33. (d) Total hours of clock from 10 A.M Sunday to 9 P.M on following Sunday = 179 hours

24 hour – 8 minutes = 23 hour 52 minutes

$23 + \frac{52}{60} = \frac{345+13}{15} = \frac{358}{15}$ hr.

$\frac{358}{15}$ hours of this clock = 24 hour of correct clock

1 hour of this clock = $24 \times \frac{15}{358}$ hour of correct clock

179 hour of this clock

$= \frac{24' 15' 179}{358}$

= 180 hour of correct clock.

The correct time would be = 9 p.m. + 1 hour = **10 p.m.**

34. (c) Sunday 9 A.M

Upcoming Friday 9 P.M

– 4 minute 4 Minute 15 sec.

Total gains = 8 min. 15 sec

$= 8 + \frac{15}{60} = 8 + \frac{1}{4} = \frac{33}{4}$ min.

Total hours = 5 days + 12 hr.

= 120 + 12 = 132 hours

$\frac{33}{4}$ min. gains in = 132 hour

1 minute gains in = $\frac{132}{33} \times 4$

4 minute gain in

$= \frac{132}{33} \times 4 \times 4 = 64$ hour

9 A.M Sunday + 64 hours

9 A.M Sunday + 2 days 16 hours

= **1 A.M Wednesday**

35. (c) 6 A.M Thursday 5 P.M upcoming Wednesday +3 minutes – (3 minutes + 12 sec.)

Total loses = 6 min. + 12 sec

$= 6 + \frac{12}{60} = 6 + \frac{1}{5} = \frac{31}{5}$ min.

Total hour = 6 days + 11 hour

= 24 × 6 + 11 = 144 + 11 = 155 hour

$\frac{31}{5}$ minutes lose in = 155 hr.

1 minutes lose in = $\frac{155}{31} \times 5$

3 minutes lose in = $\frac{155}{31} \times 5 \times 3 = 75$ hour

75 hour = 3 day + 3 hour

Thursday 6 A.M + (3 day + 3 hour) = **Sunday 9 A.M**

SOLUTION EXERCISE – II

1. (b) Because the time 6 : 30 lies between 1 : 00 to 11 : 00, hence we substruct that time from 11 : 60

11 : 60 – 6 : 30 = **5 : 30**

2. (c) Opposite direction means in 180° Angle 180°

By unique formula H = 9, Angle = 180°

$9 : \left(9' 5 \pm \frac{180}{6}\right), \frac{12}{11}$

$9 : (45 \pm 30) \times \frac{12}{11}$

$9 : (45+30) \times \frac{12}{11}, 9 : (45-30) \times \frac{12}{11}$

$9 : (75) \times \frac{12}{11}$, $9 : (15) \times \frac{12}{11}$

Not Possible $9 : \frac{180}{11}$

$\mathbf{9 : 16\frac{4}{11}}$

3. (a) Together = 0° Angle

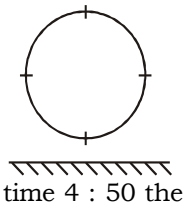
By unique formula H = 6

$6 : \left(6' 5 \pm \frac{0}{6}\right), \frac{12}{11}$

$6 : (30 \pm 0) \times \frac{12}{11}$

$6 : \frac{360}{11} = \mathbf{6 : 32\frac{8}{11}}$

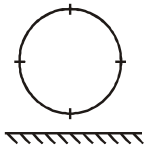
4. (b) Here the reflection works as a water image.



In this time 4 : 50 the hour hand is between 12 : 00 to 6 : 00 and the minute hand is between 6 : 00 to 12 : 00 clockwise. Hence we subtract that time from 5 : 90

5 : 90 – 4 : 50 = **1 : 40**

5. (a) Here the reflection works as a water image



In this time 10 : 20, the hour hand is between 6 : 00 to 12 : 00 and the minute hand is between 12 : 00 to 6 : 00 clockwise. Hence we subtract that time from

17 : 30

17 : 30 – 10 : 20 = **7 : 10**

6. (b) It goes a low In 1 hour = 5 mts then in 6 hour = 5 × 6 = 30 minutes

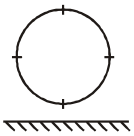
Then after 6 hour the time will be = **5 : 30 a.m.**

7. (c) Every hour it is double fast of given minutes

In 8 minute fast = In 4th hour
(×2
16 minute fast = In 5th hour
(×2
32 minute fast = In 6th hour
(×2
64 minute fast = **In 7th hour**

64 minute is just over 60 minutes

8. (b) In this question reflection works as water image



In this time 9 : 50 the both hand of clock are lies between 6 to 12 clockwise. Hence we subtract that time from 17 : 90

17 : 90 – 9 : 50 = **8 : 40**

9. (c) In this time 6 : 10 the hour hand lies between 6 : 00 to 12 : 00 clockwise and hour hand lies between 12 : 00 to 600. Hence we subtract that time from 17 : 30

17 : 30 – 6 : 10 = **11 : 20**

10. (c) In this time 12 : 30 we subtract that time from

17 : 90 – 12 : 30 = 5 : 60 = 6 : 00

11. (b) **10 : 10 a.m.**

12. (c) before 50 minutes its 4 : 45 means now times = 4 : 45 + 50 minutes = 5 : 35