

"Very Important"

If we want to convert degree into Minute, we ~~not~~ multiple with 60

If we want to convert degree into second, we multiple with 3600

If we want to convert minute into second, we multiple with 60

If we want to convert minute into degree, we ~~not~~ multiple with $1/60$

If we want to convert second into degree, we multiple with $1/3600$

If we want to convert degree into radian, we multiple with π over 180

If we want to convert radian into degree, we multiple with 180 over π

Unit 6

Ex 6.1

Q1 Convert In seconds:

i) 5°

$$\begin{aligned} &= (5 \times 3600)'' \\ &= 18000'' \text{ Ans} \end{aligned}$$

Convert In second

ii) $30'$

$$\begin{aligned} &= (30 \times 60)'' \\ &= (1800)'' \text{ Ans} \end{aligned}$$

iii) $10^{\circ} 30'$

$$\begin{aligned} &= 10^{\circ} + 30' \\ &= (10 \times 3600)'' + (30 \times 60)'' \\ &= 36000'' + 1800'' \\ &= 37800'' \text{ Ans} \end{aligned}$$

$20^{\circ} 20' 20''$

$$20^{\circ} + 20' + 20''$$

$$\begin{aligned} &= (20 \times 3600)'' + (20 \times 60)'' + 20'' \\ &= 72000'' + 1200'' + 20'' \\ &= 73220'' \text{ Ans} \end{aligned}$$

Convert In minutes:

i) 75°

$$\begin{aligned} &= (75 \times 60)' \\ &= 4500' \text{ Ans} \end{aligned}$$

ii) $120''$

$$\begin{aligned} &= \left(\frac{120}{60} \right)' \\ &= 2' \text{ Ans} \end{aligned}$$

iii) $50^{\circ} 40'$

$$\begin{aligned} &= (50 \times 60)' + 40' \\ &= 3000' + 40' \\ &= 3040' \text{ Ans} \end{aligned}$$

iv)

iii) $30^{\circ} 30' 30''$

$$\begin{aligned} &= (30 \times 60)' + 30' + \left(\frac{30}{60} \right)' \\ &= 1800' + 30' + 0.5' \\ &= 1830.5' \text{ Ans} \end{aligned}$$

Q3 i) 135'

$$\left[\frac{135}{60} \right]^\circ$$

2.25° Ans

ii) 150''

$$\left[\frac{150}{3600} \right]^\circ$$

0.0416 Ans

iii) 60° 60'

$$60^\circ + \left[\frac{60}{60} \right]^\circ$$

$$60^\circ + 1^\circ = 61^\circ \text{ Ans}$$

iv) 45° 45' 45''

$$= 45^\circ + \left[\frac{45}{60} \right]^\circ + \left[\frac{45}{3600} \right]^\circ$$

$$= 45^\circ + 0.75^\circ + 0.0125^\circ$$

$$= 45.7625^\circ \text{ Ans}$$

Q4 i) 60.125°

$$\begin{aligned} & \cancel{60^\circ + 0.125^\circ} \\ & \cancel{(60^\circ \times 60)' + 0.} \\ & 60^\circ + (0.125 \times 60)' \end{aligned}$$

$$= 60^\circ + 0.125^\circ$$

$$= 60^\circ + (0.125 \times 60)'$$

$$= 60^\circ + 7.5'$$

$$= 60^\circ + 7' + 0.5''$$

$$= 60^\circ + 7' + (0.5 \times 60)''$$

$$= 60^\circ + 7' + 30''$$

$$= 60^\circ 7' 30'' \text{ Ans}$$

ii) 135.375''

$$\frac{135.375''}{60} = 2.25625'$$

$$(135.375)'' = 2.25625'$$

$$= 2' + 0.25625'$$

$$= 2' + (0.25625 \times 60)''$$

$$= 2' + 15''$$

$$= 2^\circ 15'' \text{ Ans}$$

iii) 60.85'

$$\cancel{60' + 0.85''}$$

$$60' + (0.85 \times 60)''$$

$$60' + 51''$$

$$60' + (0.85'')$$

$$\left[\frac{60}{60} \right]^\circ + (0.85 \times 60)''$$

$$1^\circ + 51''$$

$$= 1^\circ 0' 51'' \text{ Ans}$$

$$\text{iv) } 255.45^\circ$$

$$= 255^\circ + 0.45^\circ$$

$$= 255^\circ + (0.45 \times 60)'$$

$$= 255^\circ + 27'$$

$$= 255^\circ + 27' 0'' \text{ Ans}$$

$$\text{Q5 i) } 45^\circ$$

$$= 45^\circ \times \frac{\pi}{180}$$

$$= \left[\frac{45 \times \pi}{180} \right]$$

rad.

$$= \frac{\pi}{4} \text{ Ans}$$

$$150^\circ$$

$$150^\circ \times \frac{\pi}{180}$$

$$= \left[\frac{150 \times \pi}{180} \right]$$

$$5 \times \frac{\pi}{6}$$

$$\frac{5\pi}{6} \text{ Ans}$$

$$60^\circ 30'$$

$$= 60^\circ + \left(\frac{30}{60} \right)^\circ$$

$$= 60^\circ + 0.5^\circ$$

$$= 60.5^\circ$$

$$= \left[\frac{60.5 \times \pi}{180} \right] \text{ rad}$$

$$= \frac{121}{180} \times \frac{\pi}{2}$$

$$= \frac{60.5}{180} \times \pi$$

$$\left[\frac{121\pi}{360} \right] \text{ rad}$$

$$120^\circ$$

$$120^\circ \times \frac{\pi}{180}$$

$$= \left[\frac{120 \times \pi}{180} \right] \text{ rad}$$

$$\left[\frac{2\pi}{3} \right] \text{ rad}$$

Q6 Convert the following in radians

$$\text{i) } 270^\circ$$

$$= \left[\frac{270 \times \pi}{180} \right] \text{ rad}$$

$$270 \times \frac{3.1416}{180} = 4.71 \text{ rad}$$

$$\text{ii) } 60^\circ$$

$$60 \times \frac{\pi}{180}$$

$$60 \times \frac{3.1416}{180} = 1.05 \text{ rad}$$

$$\text{iii) } 180^\circ 45'$$

$$= 180^\circ + \left(\frac{45}{60} \right)^\circ$$

$$= 180^\circ + 0.75^\circ$$

$$= 180.75^\circ$$

$$180.75 \times \frac{\pi}{180}$$

$$180.75 \times \frac{3.1416}{180} = 3.15 \text{ rad Ans}$$

In radian

$$(iv) 75^\circ 30' 45''$$

$$= 75^\circ + \left[\frac{30}{60} \right]^\circ + \left[\frac{45}{3600} \right]^\circ$$

$$= 75^\circ + 0.5^\circ + 0.0125^\circ$$

$$= 75.5125^\circ$$

$$= \left[\frac{75.5125 \times \pi}{180} \right] \text{rad}$$

$$= \frac{75.5125 \times 3.1416}{180} = \frac{4.347}{180} \text{ Ans } 1.32 \text{ Ans.}$$

Q7

$$i) \frac{\pi}{4} \text{ rad}$$

$$= \left(\frac{\pi}{4} \times \frac{180}{\pi} \right)^\circ = 45^\circ$$

$$= 45^\circ 0' 0''$$

$$ii) \frac{5\pi}{6} \text{ rad}$$

$$= \left(\frac{5\pi}{6} \times \frac{180}{\pi} \right)^\circ = 150^\circ$$

$$= 150^\circ 0' 0'' \text{ Ans.}$$

$$iii) \frac{\pi}{12}$$

$$12$$

$$= \left(\frac{\pi}{12} \times \frac{180}{\pi} \right)^\circ = 15^\circ$$

$$= 15^\circ 0' 0'' \text{ Ans.}$$

$$iv) \frac{7\pi}{40}$$

$$40$$

$$= \left(\frac{7\pi}{40} \times \frac{180}{\pi} \right)^\circ = 31.5^\circ$$

$$= 31^\circ + 0.5^\circ$$

$$= 31^\circ + \left[\frac{0.5}{60} \right] (0.5 \times 60)'$$

$$= 31^\circ + 30'$$

$$= 31^\circ + 30' + 0''$$

$$= 31^\circ 30' + 0'' \text{ Ans}$$

vi) 1 rad

$$\left[\frac{1 \times 180}{\pi} \right]^\circ = \left[\frac{1 \times 180}{3.1416} \right]^\circ$$

$$= 57.2958^\circ$$

$$57^\circ + 0.2958^\circ \times$$

$$57^\circ + (0.2958 \times 60)$$

$$57^\circ + (17.748)'$$

$$57^\circ + 17' + 0.748''$$

$$57^\circ + 17' + (0.748 \times 60)$$

$$57^\circ + 17' + 44.88''$$

$$57^\circ 17' 45''$$

$$57^\circ 17' 45'' \text{ Ans.}$$

viii) 5 rad.

$$= \left[\frac{5 \times 180}{\pi} \right]^\circ$$

$$= \left[\frac{5 \times 180}{3.1416} \right]^\circ = 286.4789^\circ$$

$$= 286^\circ + (0.4789 \times 60)'$$

$$= 286^\circ + 28.734'$$

$$= 286^\circ + 28' + (0.734 \times 60)''$$

$$= 286^\circ + 28' + 44.04''$$

$$286^\circ + 28' + 44''$$

$$286^\circ 28' 44'' \text{ Ans.}$$

vii) 3.1416 rad.

$$\left[\frac{3.1416 \times 180}{\pi} \right]^\circ$$

$$\left[\frac{3.1416 \times 180}{3.1416} \right]^\circ = 180^\circ$$

$$= 180^\circ 0' 0'' \text{ Ans.}$$

vii) 12π rad.

$$= \left[\frac{12\pi \times 180}{\pi} \right]^\circ = 2160^\circ$$

$$= 2160^\circ 0' 0'' \text{ Ans.}$$