

5. UNITS OF MEASUREMENTS OF ANGLES

①

Class: VII, Mathematics.
IIT FOUNDATION

TEACHING TASK

01. $40^\circ 20' = 40^\circ + 20'$

$$40^\circ = 40 \times \frac{\pi}{180} = \frac{2\pi}{9}$$

$$20' = \left(20 \times \frac{1}{60}\right)^\circ = \frac{1}{3}^\circ = \frac{1}{3} \times \frac{\pi}{180} = \frac{\pi}{540}$$

$$\begin{aligned} 40^\circ 20' &= \frac{2\pi}{9} + \frac{\pi}{540} \\ &= \frac{121\pi}{540} \end{aligned}$$

Ans: A

02 one minute $\rightarrow$ 360 revolutions

60 sec $\rightarrow$ 360 rev.

1 sec $\rightarrow$ 6 rev.

1 rev $\rightarrow$ 360° or 2π

6 rev $\rightarrow$ $6 \times 2\pi = 12\pi$

Ans: A

03

$$\begin{aligned}
 45^\circ 20' 10'' &= 45^\circ + 20' + 10'' \\
 &= 45^\circ + \left(\frac{20}{60}\right)^\circ + \left(\frac{10}{3600}\right)^\circ \\
 &= \left(\frac{16321}{360}\right)^\circ \\
 &= \left(\frac{16321}{360}\right)^\circ = \frac{16321}{360} \times \frac{10}{9} \text{ grades.}
 \end{aligned}$$

$$= 45.336111\pi$$

We know $1 \text{ degree} = \frac{100}{90} \text{ grades}$
 $= \frac{10}{9} \text{ grades}$

$$45.336111 \times \frac{10}{9} \approx 50.373450$$

$$= 50^\circ 37' 34''$$

Ans: B

$$04. \left(\frac{16321}{360}\right)^\circ = \frac{16321}{360} \times \frac{\pi}{180}$$

$$= \frac{16321}{64800} \pi$$

$$= 0.251824 \times \pi$$

$$= 0.791057$$

$$= 0.79 \text{ radians}$$

05

$$1.2^{\circ} = 1.2 \times 1^{\circ}$$

$$= 1.2 \times \frac{180}{\pi}$$

$$= 68.754^{\circ}$$

Ans: A

06

$$72^{\circ} = 72 \times 1^{\circ}$$

$$= 72 \times \frac{\pi}{180} = \frac{2\pi}{5}$$

Ans: B

07

$$\frac{\pi}{3} = \frac{1}{3} \times 180^{\circ} = 60^{\circ}$$

08

$$\frac{D}{90} = \frac{9}{100}$$

$$\frac{D}{90} = \frac{180}{100}$$

$$\Rightarrow D = 162^{\circ}$$

Ans: B

09

$$18^{\circ} 30' 42''$$

$$= 18^{\circ} + 30' + 42''$$

$$= 18^{\circ} + \left(\frac{30}{60}\right)^{\circ} + \left(\frac{42}{3600}\right)^{\circ}$$

$$= 18^{\circ} + 0.5^{\circ} + 0.0116667^{\circ}$$

$$= 18.5116667^{\circ}$$

Ans: A

10. $3.25^\circ = 3^\circ + 0.25^\circ$ (4)

$$= 3^\circ + \left(\frac{25}{100} \times 60 \right)$$

$$= 3^\circ + 15'$$

$$= 3^\circ 15'$$

Ans: B

ADVANCED

11. $230^\circ = 230 \times \frac{\pi}{180}$

$$= 1.28 \pi \text{ radians (or)}$$

$$= 4.01 \text{ radian}$$

$\pi = 3.14$

Ans: A, B

12. $\frac{63\pi}{11} = \frac{63}{11} \times 180^\circ$

$$= 1031^\circ$$

Ans: B

13. Statement I:

$$11 \times \frac{\pi}{6} \times \frac{180}{\pi} \text{ radian}$$

$$= 11 \times 30^\circ = 330^\circ \text{ (TRUE)}$$

Ans: A

Statement II: Conceptual (TRUE)

Ans: A

14

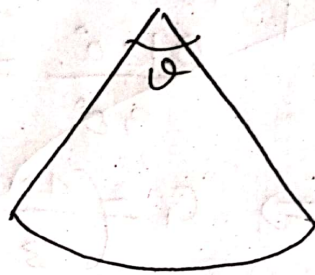
Statement I
 $-270 = -\frac{3\pi}{2}$ radians (False)

(5)

Statement II: Conceptual (True)

(AD)

17



$$r = 9 \text{ cm}$$

$$\text{Perimeter} = 36.850$$

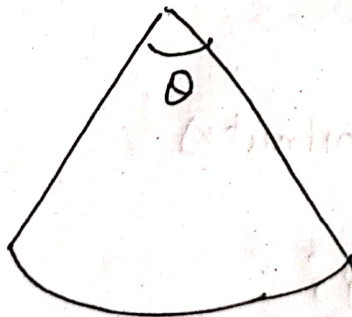
$$2r + \text{arc length} = 36.850$$

$$2r + r\theta = 36.850$$

$$\Rightarrow 2 \times 9 + 9 \times \theta = 36.850$$

$$\Rightarrow \theta = 2.094 \text{ radians} \quad \text{Ans: B}$$

18



$$r = 9 \text{ cm}$$

$$\text{Perimeter} = 36.850$$

$$\theta = 2.094 \text{ radians}$$

$$= 2.094 \times \frac{180}{\pi} \text{ degree}$$

$$= 119.78^\circ = 120^\circ \text{ (approx)}$$

Ans: C

21

$$\frac{\pi}{12} \times \frac{180}{\pi} = 15^\circ$$

Ans: 15° (6)

22

$$\frac{\pi}{5} \text{ radians} = \frac{\pi}{5} \times \frac{180^\circ}{\pi} = 36^\circ$$

Ans: 36°

23

a) $1^\circ = 0.175 \text{ radians}$

b) $\frac{D}{90} = \frac{G}{100}$

$\Rightarrow \frac{120}{90} = \frac{G}{100} \Rightarrow G = \left(\frac{400}{3}\right)^\circ$

c) $1 \text{ grade} = 100 \text{ minutes}$

d) $100 \text{ grades} = 90^\circ$

Ans: S, P, Q, R

$$a) 60^\circ = \frac{\pi}{3}$$

(7)

$$b) 30^\circ = \frac{\pi}{6}$$

$$c) 45^\circ = \frac{\pi}{4}$$

$$d) 90^\circ = \frac{\pi}{2}$$

Ans: q, p, s, r

LEARNER'S TASK

Ques

01. arm

Ans: A

02. π radians = $\frac{1}{2}$ right angle.

Ans: C

03. $1195^\circ = 3 \times 360^\circ + 115^\circ$, $115^\circ \in Q_2$
 $\therefore 1195^\circ \in Q_2$

Ans: B

04. Conceptual

Ans: A

05. Conceptual

Ans: B

06. Conceptual

Ans: B

07. $\frac{H}{8} = \frac{180^\circ}{8} = \frac{45}{2} = 22.5^\circ$

Ans: D

$$08 \quad \frac{C}{\frac{\pi}{2}} = \frac{G}{100}$$

$$\Rightarrow \frac{\frac{\pi}{8}}{\frac{\pi}{2}} = \frac{G}{100}$$

$$\Rightarrow \frac{1}{4} = \frac{G}{100}$$

$$G = \frac{100}{4}$$

$$G = 25$$

Ans: B

$$10. \quad \frac{C}{\frac{\pi}{2}} = \frac{D}{90} \quad \left| \quad D = \frac{0.9 \times 90 \times 2}{3.14} \right.$$

$$\Rightarrow \frac{0.9}{\left(\frac{\pi}{2}\right)} = \frac{D}{90} \quad \left| \quad D = 51.6^\circ \text{ (approx)} \right.$$

Ans: B

JEE MAINS LEVEL

$$01. \quad \frac{9}{5} \pi = \frac{9}{5} \times 180^\circ = 324^\circ \quad \text{Ans: A}$$

$$02. \quad -300^\circ = -300 \times \frac{\pi}{180} = -\frac{5\pi}{3} \quad \text{Ans: B}$$

$$03. \quad 43^\circ + 6' + 9''$$

$$= 43^\circ + \left(\frac{6}{60}\right)^\circ + \left(\frac{9}{3600}\right)^\circ$$

$$= 43^\circ + \left(\frac{1}{10}\right)^\circ + \left(\frac{1}{400}\right)^\circ$$

$$= \frac{17200 + 40 + 1}{400}$$

$$= \frac{17241}{400}$$

$$= 43.1025^\circ$$

$$= 43.1025 \times \frac{\pi}{180}$$

$$= 0.752 \text{ rad}$$

Ans: A

$$05) 3\pi = 3 \times 180^\circ \\ = 540^\circ$$

9

Ans: B

$$05) \frac{7\pi}{6} + \frac{12\pi}{6} = \frac{19\pi}{6} \quad \Rightarrow G = \frac{19}{3} \times 100 \\ \frac{C}{\frac{\pi}{2}} = \frac{G}{100} \quad G = 633.33^\circ \\ \Rightarrow \frac{(\frac{19\pi}{6})}{(\frac{\pi}{2})} = \frac{G}{100}$$

$$06) \frac{D}{90} = \frac{G}{100} \quad G = 300^\circ \\ \frac{270}{90} = \frac{G}{100}$$

Ans: D

$$07) \frac{C}{\frac{\pi}{2}} = \frac{G}{100} \quad C = \frac{360}{100} \times \frac{\pi}{2} \\ \Rightarrow \frac{C}{\frac{\pi}{2}} = \frac{360}{100} \quad C = \frac{9\pi}{5} \quad \text{Ans: B}$$

$$08) G - D = \frac{200C}{\pi} - \frac{180C}{\pi} = \frac{20C}{\pi}$$

Ans: A

$$09) \frac{C}{\frac{\pi}{2}} = \frac{D}{90} \quad C = \frac{135^\circ}{90} \times \frac{\pi}{2} \\ \Rightarrow \frac{C}{\frac{\pi}{2}} = \frac{135^\circ}{90} \quad C = \frac{3\pi}{4} \quad \text{Ans: C}$$

$$10) 60^\circ = 60 \times \frac{\pi}{180} \\ = 0.3\pi \text{ rad.}$$

Ans: B

11.

$$90^\circ = \frac{\pi}{2} \text{ or } 1.571 \text{ rad}$$

Ans: C, D

13.

Statement I: $100^\circ = \frac{\pi}{2}^c$ (True)

Statement II: Conceptual (True)

Ans: A

17

$$\pi^c = 180^\circ$$

Ans: D

21

$$1 \text{ grade} = 100 \text{ minutes}$$

Ans: 100

23

a) $144^\circ = 160^g$

b) $100^g = \frac{\pi}{2}^c$

c) $3^c = \frac{3}{\pi} \times 200^g$

d) $1 \text{ radian} = \frac{2}{\pi}$ of a right angle Ans: s, p, q, r

Teaching Task (Units of Measurements of Angles)

15.	<u>Assertion:</u> Conceptual (True) <u>Reason:</u> Conceptual (True)	Ans. A
16.	<u>Assertion:</u> $1^{\circ} = \frac{9}{10} \text{ degree} = 0.9^{\circ}$ (True) <u>Reason:</u> $200^{\circ} = 180^{\circ}$ (True)	Ans. B
19/20	Conceptual	Ans. B
20	Conceptual	Ans. B

Learners Task (CUE'S)

09	$\frac{\pi^{\circ}}{8} = \frac{180^{\circ}}{8} = 22\frac{1}{2}^{\circ}$	Ans D
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JEE MAINS

12	Conceptual	Ans. A, B,
14	<u>Statement I:</u> Conceptual (False) <u>Statement II:</u> Conceptual (True)	Ans. D
15	<u>Assertion:</u> Conceptual (True) <u>Reason:</u> Conceptual (True)	Ans. A
16.	<u>Assertion:</u> Conceptual (True) <u>Reason:</u> Conceptual (True)	Ans. A
18	$r = 6 \text{ cm}, \theta = 60^{\circ} = \frac{\pi}{3} \text{ radians}$ $l = r\theta = 6 \times \frac{\pi}{3} = 2\pi \text{ radians}$	Ans. A
19.	Conceptual	Ans. A
20	Conceptual	Ans. D

22. 1 Complete revolution = 2π
3 Complete revolution = 6π

Ans. 6

24 a) $57^{\circ}16'$ (Approximately) (s)

b) 200 grades (P)

c) 400 grades (Q)

d) 100 grades (S)

Ans: s, P, Q, S

$\Rightarrow$ THE END $\in$