CLASS XI – MATHEMATICS (041)
CHAPTER 3 : TRIGONOMETRIC FUNCTIONS
PRACTICE PAPER (SESSION 2026–27)

Maximum Marks: 40 **Time Allowed: 1½ Hours**

General Instructions:

Read the following instructions very carefully and strictly follow them:

1. This question paper contains 23 questions. All questions are compulsory.
2. This question paper is divided into five Sections – A, B, C, D and E.
3. In Section A, Questions 1 to 12 are Multiple Choice Questions (MCQs) and Questions 13 and 14 are Assertion–Reason based questions of 1 mark each.
4. In Section B, Questions 15 to 18 are Very Short Answer (VSA) type questions, carrying 2 marks each.
5. In Section C, Questions 19 to 21 are Short Answer (SA) type questions, carrying 3 marks each.
6. In Section D, Question 22 is a Long Answer (LA) type question, carrying 5 marks.
7. In Section E, Question 23 is a case study based question, carrying 4 marks.
8. There is no overall choice. However, an internal choice has been provided in 2 questions of Section B (Q17, Q18), 2 questions of Section C (Q20, Q21), in Q22 of Section D and in one sub-part of Q23 of Section E.
9. Draw neat and clean figures wherever required. Use of calculators is not allowed. Take π = 22/7 wherever a numerical value of π is required.

SECTION – A **(14 × 1 = 14)**

This section comprises of 12 multiple choice questions (Q1–Q12) and 2 assertion–reason based questions (Q13–Q14) of 1 mark each.

No.	Questions	Marks
Q1.	In Fig. 1, the point P(−3/5, 4/5) lies on the unit circle and ∠AOP = x radians. The value of tan x is	**1**

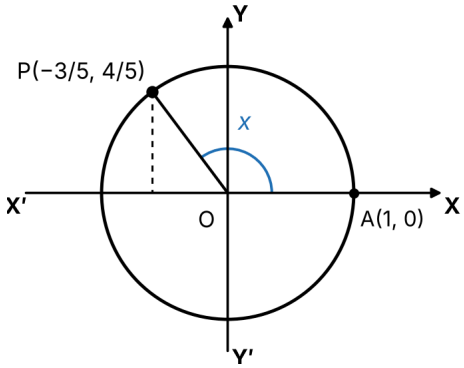


Fig. 1

(A) 4/3 (B) −4/3

(C) 3/4 (D) −3/4

Q2. The graph of a function y = f(x) is shown in Fig. 2. Then f(x) is equal to **1**

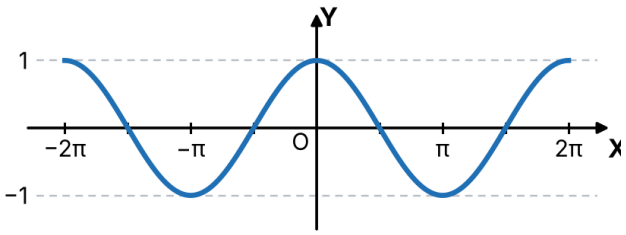


Fig. 2

(A) $\sin(\pi - x)$ (B) $\cos(\pi - x)$

(C) $\sin(\pi/2 + x)$ (D) $\sin(2\pi - x)$

Q3. The radian measure of the angle 37°30′ is **1**

(A) $5\pi/24$ (B) $5\pi/12$

(C) $3\pi/16$ (D) $7\pi/24$

Q4. In a circle of radius 6 cm, an arc of length 9 cm subtends an angle θ at the centre. The value of θ (in radians) is **1**

(A) 2/3 (B) 54

(C) 3π/2 (D) 3/2

Q5. The value of $\cos(-1590°)$ is **1**

(A) $-\sqrt{3}/2$ (B) $\sqrt{3}/2$

(C) $-1/2$ (D) 1/2

Q6. If $\tan x > 0$ and $\cos x < 0$, then the angle x lies in the **1**

(A) first quadrant (B) second quadrant

(C) third quadrant (D) fourth quadrant

Q7. The value of $\sec^2(\pi/4) + \operatorname{cosec}^2(\pi/6) - \cot^2(\pi/4)$ is **1**

(A) 3 (B) 4

(C) 6 (D) 5

Q8. In Fig. 3, the terminal side OB is obtained by rotating the initial side OA through 150° as shown by the arrow. The radian measure of the angle so formed is **1**

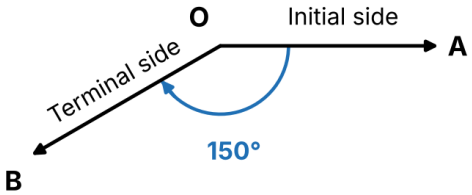


Fig. 3

(A) $5\pi/6$ (B) $-5\pi/6$

(C) $7\pi/6$ (D) $-7\pi/6$

Q9. The range of the function y = cosec x is **1**

(A) $(-\infty, -1] \cup [1, \infty)$ (B) $[-1, 1]$

(C) R (D) $R - \{0\}$

Q10. The value of $\sin 40° \cos 20° + \cos 40° \sin 20°$ is **1**

(A) 1/2 (B) $\sqrt{3}/2$

(C) $1/\sqrt{2}$ (D) 1

Q11. If $\tan x = 1/3$, then the value of $\tan 2x$ is **1**

(A) 2/3 (B) 4/3

(C) 3/4 (D) 1/2

Q12. The value of $\cos 75° - \cos 15°$ is **1**

(A) $1/\sqrt{2}$ (B) $\sqrt{3}/2$

(C) $-\sqrt{3}/2$ (D) $-1/\sqrt{2}$

Assertion–Reason Based Questions

Directions: Question numbers 13 and 14 are Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer from the options (A), (B), (C) and (D) as given below:
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

Q13. **Assertion (A):** The domain of the function $y = \tan x$ is the set R of all real numbers. **1**
Reason (R): $\tan x = \sin x / \cos x$, and $\cos x = 0$ when x is an odd multiple of $\pi/2$.

Q14. **Assertion (A):** $\sin 120° = \sin 60°$. **1**
Reason (R): $\sin^2 x + \cos^2 x = 1$ for every real number x.

SECTION – B (4 × 2 = 8)

This section comprises of 4 very short answer (VSA) type questions of 2 marks each.

Q15. Fig. 4 shows a sector OAB of a circle of radius 21 cm with central angle $\angle AOB = 120°$. **2**

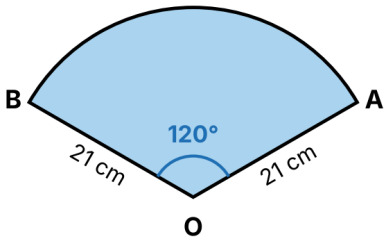


Fig. 4

(i) Express $\angle AOB$ in radians. **[1]**
(ii) Find the length of the arc AB. (Use $\pi = 22/7$) **[1]**

Q16. If $\cos x = -5/13$ and x lies in the third quadrant, find the values of $\sin x$ and $\tan x$. **2**

Q17. **(A)** Find the value of $\cos 15°$. **2**

OR

(B) Find the value of $\sin(-1125°)$.

Q18. **(A)** Prove that $(1 + \cos 2x) / \sin 2x = \cot x$. **2**

OR

(B) Prove that $(\sin x + \cos x)^2 = 1 + \sin 2x$.

SECTION – C (3 × 3 = 9)

This section comprises of 3 short answer (SA) type questions of 3 marks each.

Q19. Fig. 5 shows the graph of f(x) = tan x for $-\pi/2 < x < \pi/2$. The dashed vertical lines are the lines $x = -\pi/2$ and $x = \pi/2$. **3**

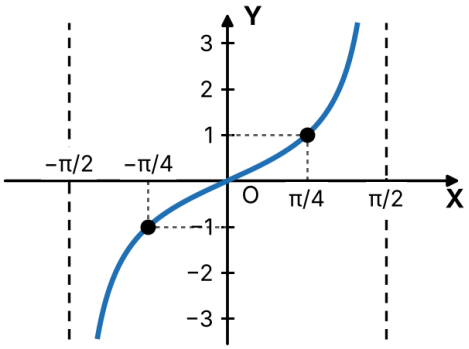


Fig. 5

(i) From the graph, write the values of tan(π/4) and tan(−π/4). **[1]**

(ii) State whether tan x increases or decreases as x increases from $-\pi/2$ to $\pi/2$. Also write the range of tan x. **[1]**

(iii) Using the formula for tan(x + y), find the value of tan 75°. **[1]**

Q20. **(A)** Prove that $(\cos 2x + \cos 6x) / (\sin 6x - \sin 2x) = \cot 2x$. **3**

OR

(B) Prove that $(1 + \sin 2x - \cos 2x) / (1 + \sin 2x + \cos 2x) = \tan x$.

Q21. **(A)** If sin x = 8/17 with x in the second quadrant, and cos y = 3/5 with y in the fourth quadrant, find the value of cos(x − y). **3**

OR

(B) If tan x = −5/12 and x lies in the second quadrant, find the values of sin 2x and cos 2x.

SECTION – D (1 × 5 = 5)

This section comprises of 1 long answer (LA) type question of 5 marks.

Q22. **(A)** Prove that $\cos^3 x \sin 3x + \sin^3 x \cos 3x = (3/4) \sin 4x$. **5**

OR

(B) If cos x = −7/25 and $\pi < x < 3\pi/2$, find the values of sin(x/2), cos(x/2) and tan(x/2).

SECTION – E (1 × 4 = 4)

This section comprises of 1 case study based question of 4 marks with sub-parts (i), (ii), (iii) of marks 1, 1, 2 respectively.

Q23. **Case Study:** A pendulum clock has a pendulum of length OB = OC = 84 cm hanging from a fixed point O. While ticking, the tip of the pendulum swings from the position B to the position C along an arc, as shown in Fig. 6. The length of the arc BC is 22 cm and the angle swept at O is θ. (Use π = 22/7) **4**

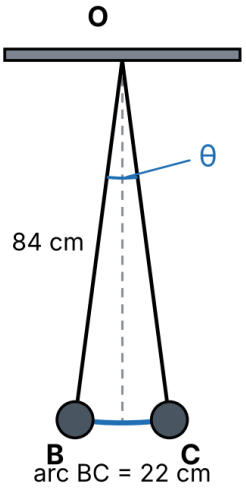


Fig. 6

Based on the given information, answer the following questions:

(i) Find the angle θ in radians. **[1]**

(ii) Express θ in degrees. **[1]**

(iii) **(a)** If the pendulum is made to swing through 45° instead, find the length of the arc described by its tip. **[2]**

OR

(b) Using the value of θ found in part (ii), find the value of sin θ. **[2]**

— End of Question Paper —