10. $\sin A = \dfrac{3}{5}$ হলে নীচের কোন্‌টি $\sin 3A$-র মান?

(A) $\dfrac{17}{25}$ (B) $\dfrac{117}{125}$ (C) $\dfrac{24}{25}$ (D) $\dfrac{119}{125}$

11. $\cos A = \dfrac{\sqrt 3}{2}$ হলে নীচের কোন্‌টি $\cos 3A$-র মান?

(A) $\dfrac{3\sqrt 3}{8}$ (B) $-\dfrac{3\sqrt 3}{8}$ (C) 0 (D) -1

12. $\tan x = \dfrac{b}{a}$ হলে নীচের কোন্‌টি $(a^2+b^2)\sin 2x$-এর সমান?

(A) ab (B) $2ab$ (C) $\dfrac{a}{b}$ (D) $\dfrac{2a}{b}$

13. যদি $a = \sin x + \cos x$ হয়, তবে $\dfrac{1}{2}(1 + 2a^2 - a^4) =$

(A) $\sin^8 x + \cos^8 x$ (B) $\sin 4x + \cos 4x$
(C) $\sin^4 x + \cos^4 x$ (D) এদের কোনোটিই নয়

14. $\dfrac{\sin\alpha + \cos\alpha}{\cos\alpha - \sin\alpha} =$

(A) $\tan 2\alpha + \sec 2\alpha$ (B) $\tan 2\alpha - \sec 2\alpha$
(C) $\tan\alpha + \sec\alpha$ (D) $\tan\alpha - \sec\alpha$

15. $\dfrac{96\sin 65^\circ \sin 35^\circ \sin 80^\circ}{\sin 20^\circ + 2\sin 80^\circ \cos 30^\circ} =$

(A) 48 (B) 32 (C) 24 (D) 16

16. $\tan\theta + 2\tan 2\theta + 4\cot 4\theta =$

(A) $2\tan\theta$ (B) $2\cot\theta$
(C) $\cot\theta$ (D) এদের কোনোটিই নয়

17. $\cos^2(\theta + \phi) - \sin^2(\theta - \phi) =$

(A) $\cos 2\theta \cos 2\phi$ (B) $\cos 2\theta \sin 2\phi$
(C) $\sin 2\theta \sin 2\phi$ (D) $\cos 2\theta \sin 2\theta$

18. $\dfrac{\sec 8\alpha - 1}{\sec 4\alpha - 1} =$

(A) $\dfrac{\tan 8\alpha}{\tan 2\alpha}$ (B) $\dfrac{\cot 8\alpha}{\cot 2\alpha}$ (C) $\dfrac{\tan 8\alpha}{\cot 2\alpha}$ (D) $\dfrac{\cot 8\alpha}{\tan 2\alpha}$

19. $\dfrac{1}{3}(\cos^3\alpha \sin 3\alpha + \sin^3\alpha \cos 3\alpha) =$

(A) $\dfrac{1}{4}\sin 4\alpha$ (B) $\dfrac{1}{2}\sin 4\alpha$
(C) $\dfrac{1}{4}\cos 4\alpha$ (D) $\dfrac{1}{2}\cos 4\alpha$

20. যদি $\tan^2\alpha = 1 + 2\tan^2\beta$ এবং $\cos 2\beta = 1 + a\cos 2\alpha$ হয়, তবে a-এর মান হবে—

(A) 1 (B) 2 (C) 3 (D) -2

21. $\tan\theta = \dfrac{\sin\alpha - \cos\alpha}{\sin\alpha + \cos\alpha}$ হলে, $2\cos^2\theta =$

(A) $1 + \sin 2\alpha$ (B) $1 - \sin 2\alpha$
(C) $\sin 2\alpha$ (D) এদের কোনোটিই নয়

22. $\tan^2\theta = 1 + 2\tan^2\phi$ হলে, $\cos 2\theta + \sin^2\phi =$

(A) 1 (B) 0
(C) -1 (D) এদের কোনোটিই নয়

23. $\dfrac{2}{\sqrt{2 + \sqrt{2 + 2\cos 4x}}} =$

(A) $\mathrm{cosec}\, x$ (B) $\tan x$ (C) $\cot x$ (D) $\sec x$

24. যদি $\tan(\alpha + \beta) = a + b$ এবং $\tan(\alpha - \beta) = a - b$ হয় তবে $a\tan\alpha - b\tan\beta =$

(A) $a^2 - b^2$ (B) $a^3 - b^3$ (C) $a^2 + b^2$ (D) $a^3 + b^3$

25. $2\sin^2\beta + 4\cos(\alpha + \beta)\sin\alpha\sin\beta + \cos 2(\alpha + \beta) =$

(A) $\cos 2\alpha$ (B) $2\cos 2\alpha$ (C) $\sin 2\alpha$ (D) $2\sin 2\alpha$

26. যদি $\cot(\theta + 15^\circ) - \tan(\theta - 15^\circ) = \dfrac{4k}{1 + 2\sin 2\theta}$ হয়, তবে $k =$

(A) $\sin 2\theta$ (B) $\cos 2\theta$ (C) $\sin\theta$ (D) $\cos\theta$

27. $\cos^3\theta \cos 3\theta + \sin^3\theta \sin 3\theta =$

(A) $\cos^3 2\theta$ (B) $\sin^3 2\theta$ (C) $4\cos^3 2\theta$ (D) $4\sin^3 2\theta$

28. $\tan\theta \tan\left(\dfrac{\pi}{3} + \theta\right)\tan\left(\dfrac{\pi}{3} - \theta\right) =$

(A) $\tan 3\theta$ (B) $\cot 3\theta$
(C) $3\tan 3\theta$ (D) এদের কোনোটিই নয়

29. $\tan\theta + 2\tan 2\theta + 4\tan 4\theta + 8\cot 8\theta =$

(A) $16\cot\theta$ (B) $16\tan\theta$
(C) $\cot\theta$ (D) এদের কোনোটিই নয়

30. $n\tan\alpha = (n + 1)\tan\beta$ হলে, $\tan(\alpha - \beta) = \dfrac{\sin 2\beta}{2n + 1 + k}$ হয়, যেখানে k-এর মান হবে—

(A) $\cos 2\beta$ (B) $\sin 2\beta$ (C) $-\cos 2\beta$ (D) $-\sin 2\beta$

31. $\tan\theta = \cos 2\alpha \tan\phi$ হলে, $\tan(\phi - \theta) =$

(A) $\dfrac{2\tan^2\alpha \sin 2\phi}{1 + \tan^2\alpha \cos 2\phi}$ (B) $\dfrac{\tan^2\alpha \sin 2\phi}{1 + \tan^2\alpha \cos 2\phi}$
(C) $\dfrac{\tan\alpha \sin 2\phi}{1 + \tan^2\alpha \cos 2\phi}$ (D) এদের কোনোটিই নয়

32. যদি $(2\cos\theta - 1)(2\cos 2\theta - 1)(2\cos 2^2\theta - 1)$
$\cdots(2\cos 2^{n-1}\theta - 1) = \dfrac{k + 1}{2\cos\theta + 1}$ হয়, তবে $k =$

(A) $4\cos 2^n\theta$ (B) $2\sin 2^n\theta$
(C) $2\cos 2^n\theta$ (D) এদের কোনোটিই নয়

33. $(x\tan\alpha + y\cot\alpha)(x\cot\alpha + y\tan\alpha) =$

(A) $(x+y)^2 + 2xy\cos^2 2\alpha$ (B) $(x+y)^2 + 4xy\cot^2 2\alpha$
(C) $(x+y)^2 + 4xy\tan^2 2\alpha$ (D) এদের কোনোটিই নয়

34. মনে করো, $u = (1 + \cos\theta)(1 + \cos 2\theta) - \sin\theta \sin 2\theta$

এবং $v = \sin\theta(1 + \cos 2\theta) + \sin 2\theta(1 + \cos\theta)$;

$u^2 + v^2 = P(1 + \cos\theta)(1 + \cos 2\theta)$ হলে, P-এর মান হবে—

Ⓐ 1   Ⓑ 2   Ⓒ 3   Ⓓ 4

35. যদি $\tan x = \dfrac{a}{b}$ হয়, তবে $b\cos 2x + a\sin 2x =$

Ⓐ a Ⓑ b Ⓒ $\dfrac{a}{b}$ Ⓓ $\dfrac{b}{a}$

[HS Model Question '24]

Analytical/Skill Based Type

😄 Fill in the Blanks

1. $\dfrac{1 + \cos 2\alpha + \sin 2\alpha}{1 - \cos 2\alpha + \sin 2\alpha} =$ _____ ।

Ⓐ $\tan\alpha$ Ⓑ $\cot\alpha$ Ⓒ $\sin\alpha$ Ⓓ $\tan 2\alpha$

2. $\cos^6 A + \sin^6 A =$ _____ $\times (1 + 3\cos^2 2A)$ ।

Ⓐ $\dfrac{1}{4}$ Ⓑ 1   Ⓒ $\dfrac{1}{2}$ Ⓓ $\dfrac{1}{8}$

3. $\dfrac{1 + \sin 2\theta - \cos 2\theta}{\sin\theta + \cos\theta} =$ _____ $\sin\theta$ ।

Ⓐ 1   Ⓑ -1 Ⓒ 2   Ⓓ -2

4. $\dfrac{1 + \cos A + \cos 2A}{\sin A + \sin 2A} =$ _____ ।

Ⓐ $\operatorname{cosec} A$ Ⓑ $\sin A$ Ⓒ $\tan A$ Ⓓ $\cot A$

5. $\dfrac{\tan 5A + \tan 3A}{\tan 5A - \tan 3A} =$ _____ $\cos 4A \cos 2A$ ।

Ⓐ 4   Ⓑ 2   Ⓒ 8   Ⓓ 1

6. $\dfrac{\cos 30° - \sin 20°}{\cos 40° + \cos 20°} =$ _____ $\cos 40° \cos 80°$ ।

Ⓐ 1   Ⓑ $\dfrac{2}{\sqrt{3}}$ Ⓒ 4   Ⓓ $\dfrac{4}{\sqrt{3}}$

7. $\dfrac{\sqrt{3}}{\sin 20°} - \dfrac{1}{\cos 20°} =$ _____ ।

Ⓐ 2   Ⓑ -4 Ⓒ 1   Ⓓ 4

8. $16\cos\dfrac{\pi}{15} \cos\dfrac{2\pi}{15} \cos\dfrac{4\pi}{15} \cos\dfrac{8\pi}{15} =$ _____ ।

Ⓐ 1   Ⓑ -1

Ⓒ 0   Ⓓ এদের কোনোটিই নয়

9. $\tan\left(\dfrac{\pi}{4} + \theta\right) + \tan\left(\dfrac{\pi}{4} - \theta\right) =$ _____ $\sec 2\theta$ ।

Ⓐ 1   Ⓑ -2 Ⓒ 2   Ⓓ -1

10. $\tan 70° - \tan 50° + \tan 10° =$ _____ ।

Ⓐ 0   Ⓑ 1   Ⓒ -1 Ⓓ $\sqrt{3}$

11. $\cos\dfrac{\pi}{11} \cos\dfrac{2\pi}{11} \cos\dfrac{3\pi}{11} \cos\dfrac{4\pi}{11} \cos\dfrac{5\pi}{11} =$ _____ ।

Ⓐ $\dfrac{1}{16}$ Ⓑ $\dfrac{1}{32}$ Ⓒ $\dfrac{1}{64}$ Ⓓ $\dfrac{1}{8}$

12. $\theta = \dfrac{2\pi}{7}$ হলে, $\sec\theta + \sec 2\theta + \sec 4\theta =$ _____ ।

Ⓐ 4   Ⓑ 2   Ⓒ 0   Ⓓ -4

13. $8\sin^4\theta = 3 - 4\cos 2\theta +$ _____ ।

Ⓐ $\sin 4\theta$ Ⓑ $\cos 8\theta$ Ⓒ $\cos 4\theta$ Ⓓ $-\cos 4\theta$

14. যদি $\dfrac{\tan x}{\tan y} = \dfrac{1 + \cos^2 x}{1 + \sin^2 x}$ হয়, তবে

$\sin(3x + y) =$ _____ $\times \sin(x - y)$ ।

Ⓐ 5   Ⓑ 3   Ⓒ 7   Ⓓ 9

15. যদি $\theta = \dfrac{\pi}{2^n + 1}$ হয়, তবে

$2^n\cos\theta \cos 2\theta \cos 2^2\theta \cos 2^3\theta \cdots \cos 2^{n-1}\theta =$ _____ ।

Ⓐ 0   Ⓑ 1

Ⓒ -1 Ⓓ এদের কোনোটিই নয়

😈 Column Matching

1. স্তম্ভ A-এর সাথে স্তম্ভ B মেলাও।

স্তম্ভ A	স্তম্ভ B
[i] যদি $\dfrac{\pi}{2} < \theta < \pi$ এবং $\sin\theta = \dfrac{3}{5}$ হয়, তবে $\sin 2\theta$-র মান	[a] $\pm\dfrac{1}{2}$
[ii] $\tan 2A = \dfrac{3}{4}$ হলে, $\tan A$-র মান $\left(\dfrac{\pi}{2} < A < \dfrac{3\pi}{4}\right)$	[b] $\dfrac{1}{\sqrt{5}}$
[iii] $\cos 2\theta = -\dfrac{1}{2}$-হলে, $\cos\theta$-র মান	[c] -3
[iv] $\sin 2A = \dfrac{4}{5}$-হলে, $\sin A$-র মান $\left(0 < A < \dfrac{\pi}{4}\right)$	[d] $-\dfrac{24}{25}$

Ⓐ [i]—[d], [ii]—[c], [iii]—[a], [iv]—[b]

Ⓑ [i]—[b], [ii]—[c], [iii]—[d], [iv]—[a]

Ⓒ [i]—[c], [ii]—[b], [iii]—[d], [iv]—[a]

Ⓓ [i]—[d], [ii]—[c], [iii]—[b], [iv]—[a]