EQUATION ASSIGNMENT

1. If $\sec 4\theta - \sec 2\theta = 2$, then the general value of θ is

   (a) $(2n+1)\frac{\pi}{4}$ (b) $(2n+1)\frac{\pi}{10}$ (c) $n\pi + \frac{\pi}{2}$ *or* $\frac{n\pi}{5} + \frac{\pi}{10}$ (d) None of these

2. If $\sin\left(\frac{\pi}{4}\cot\theta\right) = \cos\left(\frac{\pi}{4}\tan\theta\right)$, then θ =

   (a) $n\pi + \frac{\pi}{4}$ (b) $2n\pi \pm \frac{\pi}{4}$ (c) $n\pi - \frac{\pi}{4}$ (d) $2n\pi \pm \frac{\pi}{6}$

3. The general solution of $\sin x - 3\sin 2x + \sin 3x = \cos x - 3\cos 2x + \cos 3x$ is

   (a) $n\pi + \frac{\pi}{8}$ (b) $\frac{n\pi}{2} + \frac{\pi}{8}$ (c) $(-1)^n \frac{n\pi}{2} + \frac{\pi}{8}$ (d) $2n\pi + \cos^{-1}\frac{3}{2}$

4. The solution of the equation $\sec\theta - \operatorname{cosec}\theta = \frac{4}{3}$ is

   (a) $\frac{1}{2}\left[n\pi + (-1)^n \sin^{-1}\left(\frac{3}{4}\right)\right]$ (b) $n\pi + (-1)^n \sin^{-1}\left(\frac{3}{4}\right)$ (c) $\frac{n\pi}{2} + (-1)^n \sin^{-1}\left(\frac{3}{4}\right)$ (d) None of these

5. If $4\sin^4 x + \cos^4 x = 1$, then *x* equal to

   (a) $n\pi$ (b) $n\pi \pm \sin^{-1}\frac{2}{5}$ (c) $n\pi + \frac{\pi}{6}$ (d) None of these

6. If $2(\sin x - \cos 2x) + \sin 2x(1 + 2\sin x) - 2\cos x = 0$, then *x* =

   (a) $(2n \pm 1)\pi$ (b) $(2n \pm 1)\frac{\pi}{6}$ (c) $(n \pm 1)\frac{\pi}{4}$ (d) $(n \pm 1)\frac{\pi}{6}$

7. Expression $2^{\sin\theta} + 2^{-\cos\theta}$ is minimum when $\theta =$ .... and its minimum value is .....

   (a) $2n\pi + \frac{\pi}{4}, n \in I$; 2 (b) $2n\pi + \frac{7\pi}{4}, n \in I$; $2^{1-\left(\frac{1}{\sqrt{2}}\right)}$ (c) $n\pi \pm \frac{\pi}{4}, n \in I$; $2^{1-\left(\frac{1}{\sqrt{2}}\right)}$ (d) None of these

8. The general solution of the equation $2^{\cos 2x} + 1 = 3.2^{-\sin^2 x}$ is

   (a) $n\pi$ (b) $n\pi + \pi$ (c) $n\pi - \pi$ (d) None of these

9. If $\theta = \tan^{-1}(2\tan^2\theta) - \frac{1}{2}\sin^{-1}\left(\frac{3\sin 2\theta}{5 + 4\cos 2\theta}\right)$ then the general value of θ

   (a) $n\pi$ (b) $n\pi + \frac{\pi}{4}$ (c) $n\pi + \tan^{-1}(-2)$ (d) All of these

10. If the expression $\frac{\sin\frac{x}{2} + \cos\frac{x}{2} - i\tan x}{1 + 2i\sin\frac{x}{2}}$ is real, then *x* is equal to

    (a) $2n\pi + \tan^{-1} K, K \in R, n \in Z$ (b) $2n\pi + 2\tan^{-1} K$, where $K \in (0,1), n \in Z$

    (b) $2n\pi + 2\tan^{-1} K$, where $K \in (1,2), n \in Z$ (d) $2n\pi + 2\tan^{-1} K, K \in (2,3), n \in Z$

11. If $\frac{1}{6}\sin x, \cos x, \tan x$ are in G.P., then *x* is equal to

    (a) $n\pi \pm \frac{\pi}{3}, n \in Z$ (b) $2n\pi \pm \frac{\pi}{3}, n \in Z$ (c) $n\pi + (-1)^n \frac{\pi}{3}, n \in Z$ (d) None of these

12. If $32\tan^8\theta = 2\cos^2\alpha - 3\cos\alpha$ and $3\cos 2\theta = 1$, then the general value of α is

    (a) $2n\pi \pm \frac{\pi}{3}$ (b) $2n\pi \pm \cos^{-1} 2$ (c) $2n\pi \pm \frac{2\pi}{3}$ (d) None of these

13. If $\max_{\theta \in R}\{5\sin\theta + 3\sin(\theta - \alpha)\} = 7$, then the set of possible values of α is

    (a) $\left\{x \mid x = 2n\pi \pm \frac{\pi}{3}, n \in Z\right\}$ (b) $\left\{x \mid x = 2n\pi \pm \frac{2\pi}{3}, n \in Z\right\}$ (c) $\left[\frac{\pi}{3}, \frac{2\pi}{3}\right]$ (d) None of these

14. If $|\cos x|^{\sin^2 x-\frac{3}{2}\sin x+\frac{1}{2}}=1$, then possible values of *x* are

(a) $n\pi$ or $n\pi+(-1)^n\frac{\pi}{6}, n\in I$ (b) $n\pi$ or $2n\pi+\frac{\pi}{2}$ or $n\pi+(-1)^n\frac{\pi}{6}, n\in I$

(c) $n\pi+(-1)^n\frac{\pi}{6}, n\in I$ (d) None of these

15. The general solution of $\cos^{50} x-\sin^{50} x=1$ is

(a) $n\pi$ (b) $2n\pi$ (c) $n\pi+\frac{\pi}{2}$ (d) $2n\pi+\frac{\pi}{2}$

16. Let [*x*] = the greatest integer less than or equal to *x* and let $f(x)=\sin x+\cos x$. Then the most general solution of $f(x)=\left[f\left(\frac{\pi}{10}\right)\right]$ are

(a) $2n\pi+\frac{\pi}{2}, n\in Z$ (b) $n\pi, n\in Z$ (c) $2n\pi, n\in Z$ (d) None of these

17. The most general values of *x* for which $\sin x+\cos x=\min_{a\in R}\{1, a^2-4a+6\}$ are given by

(a) $2n\pi$ (b) $2n\pi+\frac{\pi}{2}$ (c) $n\pi+(-1)^n\frac{\pi}{4}-\frac{\pi}{4}$ (d) None of these

18. If *a* is any real number, then the number of roots of $\cot x-\tan x=a$ in the first quadrant are

(a) 2 (b) 0 (c) 1 (d) None of these

19. The number of solutions of the equation $\sin\left(\frac{\pi x}{2\sqrt{3}}\right)=x^2-2\sqrt{3}x+4$

(a) Form an empty set (b) 1 (c) 2 (d) >2

20. The number of all possible triplets (a_1, a_2, a_3) such that $a_1+a_2\cos 2x+a_3\sin^2 x=0$ for all *x* is

(a) Zero (b) 1 (c) 2 (d) Infinite

21. The equation $(\cos p-1)x^2-(\cos p)x+\sin p=0$, where *x* is a variable, has real roots. Then the interval of *p* may be any one of the followings

(a) $(0, 2\pi)$ (b) $(-\pi, 0)$ (c) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ (d) $(0, \pi)$

22. Let *n* be an odd integer if $\sin n\theta=\sum_{r=0}^{n} b_r\sin^r\theta$, for every value of θ, then

(a) $b_0=1, b_1=3$ (b) $b_0=0, b_1=4$ (c) $b_0=0, b_1=n$ (d) $b_0=0, b_1=n^2-n+3$

23. If $3\sin 2\theta=2\sin 3\theta$ and $0<\theta<\pi$, then value of $\sin\theta$ is

(a) $\frac{\sqrt{2}}{3}$ (b) $\frac{\sqrt{3}}{\sqrt{5}}$ (c) $\frac{\sqrt{15}}{4}$ (d) $\frac{\sqrt{2}}{\sqrt{5}}$

24. $2\sin^2 x+\sin^2 2x=2, -\pi<x<\pi$, then *x* =

(a) $\pm\frac{\pi}{6}$ (b) $\pm\frac{\pi}{4}$ (c) $\frac{3\pi}{2}$ (d) None of these

25. If $5\cos 2\theta+2\cos^2\frac{\theta}{2}+1=0, -\pi<\theta<\pi$, then $\theta=$

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{3}, \cos^{-1}\frac{3}{5}$ (c) $\cos^{-1}\frac{3}{5}$ (d) None of these

26. If $\sec x\cos 5x+1=0$, where $0<x<2\pi$, then *x* =

(a) $\frac{\pi}{5}, \frac{\pi}{4}$ (b) $\frac{\pi}{5}$ (c) $\frac{\pi}{4}$ (d) None of these

27. The equation $3^{\sin 2x+2\cos^2 x}+3^{1-\sin 2x+2\sin^2 x}=28$ is satisfied for the values of *x* given by

(a) cos *x* = 0 (b) tan *x* = –1 (c) tan *x* = 1 (d) Both (a) and (b)

28. If $e^{\{(\sin^2 x+\sin^4 x+\sin^6 x+.....\infty)\log_e 2\}}$ satisfies the equation $x^2-9x+8=0$, then the value of $\frac{\cos x}{\cos x+\sin x}$, $0<x<\frac{\pi}{2}$ is

(a) $\frac{1}{2}(\sqrt{3}+1)$ (b) $\frac{1}{2}(\sqrt{3}-1)$ (c) $\frac{1}{2}$ (d) 0

29. The value of θ lying between $\theta=0$ and $\theta=\frac{\pi}{2}$ and satisfying the equation $\begin{vmatrix} 1+\cos^2\theta & \sin^2\theta & 4\sin 4\theta \\ \cos^2\theta & 1+\sin^2\theta & 4\sin 4\theta \\ \cos^2\theta & \sin^2\theta & 1+4\sin 4\theta \end{vmatrix}=0$ is

(a) $\frac{11\pi}{24}$ (b) $\frac{7\pi}{24}$ (c) $\frac{5\pi}{24}$ (d) $\frac{\pi}{24}$

30. The smallest positive value of *x* and *y*, satisfying $x-y=\frac{\pi}{4}$ and $\cot x+\cot y=2$ are

(a) $x=\frac{\pi}{6}, y=\frac{5\pi}{2}$ (b) $x=\frac{5\pi}{12}, y=\frac{\pi}{6}$ (c) $x=\frac{\pi}{3}, y=\frac{7\pi}{12}$ (d) None of these

31. If $(1-\tan\theta)(1+\tan\theta)\sec^2\theta+2^{\tan^2\theta}=0$ then in the interval $\left(\frac{-\pi}{2},\frac{\pi}{2}\right)$, the value of □ is

(a) $\frac{\pi}{4}$ (b) $\frac{-\pi}{4}$ (c) $\frac{\pi}{3}$ (d) $\frac{-\pi}{3}$

32. The period of $\sin x.\cos\left(\frac{\pi}{4}-x\right)$ is

(a) π (b) 2π (c) $\frac{\pi}{2}$ (d) None of these

33. The period of $\frac{7\sin x+5\cos x}{7\sin 2x+11\cos x}$ is

(a) 2π (b) π (c) $\frac{\pi}{2}$ (d) None of these

34. The period of the function $f(x)=3\sin(2x+1)$ in radians is

(a) 2π (b) π (c) $\frac{\pi}{2}$ (d) $-\pi$

35. The function *f* given by $f(x)=\sin\left(\frac{\pi x}{2}\right)+2\cos\left(\frac{\pi x}{3}\right)-\tan\left(\frac{\pi x}{4}\right)$ is periodic with period

(a) 6 (b) 3 (c) 4 (d) 12

36. Period of $\sin\theta\cos\theta$ is

(a) $\frac{\pi}{2}$ (b) π (c) 2π (d) None of these

37. Period of $\tan 3\theta$ is

(a) 2π (b) $\frac{2\pi}{3}$ (c) $\frac{\pi}{3}$ (d) π

38. Period of $\frac{\sin\theta+\sin 2\theta}{\cos\theta+\cos 2\theta}$ is

(a) 2π (a) π (c) $\frac{2\pi}{3}$ (d) $\frac{\pi}{3}$

39. Period of $\cos(7x-5)$ is

(a) $\frac{2\pi-5}{7}$ (b) $2\pi-5$ (c) $\frac{2\pi}{7}$ (d) $\frac{\pi}{7}$

40. Period of $\sin\theta+\cos\theta$ is

(a) π (b) 2π (c) $\frac{\pi}{4}$ (d) None of these

41. Period of $\sin\frac{x}{2}-\cos\frac{x}{3}$ is

(a) 2π (b) 4π (c) 8π (d) 12π

42. Period of $\cot 3x - \cos(4x+3)$ is

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{4}$ (c) π (d) 2π

43. Period of $|2\sin 3\theta + 4\cos 3\theta|$ is

(a) $\frac{2\pi}{3}$ (b) π (c) $\frac{\pi}{2}$ (d) $\frac{\pi}{3}$

44. The period of the function $\sin\left(\frac{\pi x}{2}\right) + \cos\left(\frac{\pi x}{2}\right)$ is

(a) 4 (b) 6 (c) 12 (d) 24

45. The period of the function $|\sin \pi x|$ is

(a) π^2 (b) 2π (c) 2 (d) 1

46. If $r\sin\theta = 3,\ r = 4(1+\sin\theta),\ 0 \le \theta \le 2\pi$, then $\theta =$

(a) $\frac{\pi}{6}, \frac{\pi}{3}$ (b) $\frac{\pi}{6}, \frac{5\pi}{6}$ (c) $\frac{\pi}{3}, \frac{\pi}{4}$ (d) $\frac{\pi}{2}, \pi$

47. If $\tan(\theta + x)\tan(\theta - x) = 1$ for all *x*, then value of θ must be

(a) 0° (b) 30° (c) 45° (d) 60°

48. $\cot\theta = \sin 2\theta$ ($\theta \neq n\pi$, *n* is integer), if θ =

(a) 45^o and 60^o (b) 45^o and 90^o (c) 45^o only (d) 90^o only

49. If $\cos\theta = \frac{-1}{2}$ and $0 < \theta < 360^o$, then the values of θ are

(a) 120^o and 300^o (b) 60^o and 120^o (c) 120^o and 240^o (d) 60^o and 240^o

50. If $\tan(\pi\cos\theta) = \cot(\pi\sin\theta)$, then $\sin\left(\theta + \frac{\pi}{4}\right)$ equals

(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$ (c) $\frac{1}{2\sqrt{2}}$ (d) $\frac{\sqrt{3}}{2}$