

Answer Ex-I**SINGLE CORRECT (OBJECTIVE QUESTIONS)**

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|-------|-------|-------|-------|-------|-------|-------|
| 1. B | 2. D | 3. D | 4. B | 5. C | 6. A | 7. D |
| 8. B | 9. C | 10. B | 11. B | 12. C | 13. A | 14. B |
| 15. C | 16. C | 17. D | 18. A | 19. A | 20. D | 21. A |
| 22. C | 23. D | 24. B | 25. D | 26. D | 27. D | 28. B |
| 29. B | | | | | | |

Answer Ex-II**MULTIPLE CORRECT (OBJECTIVE QUESTIONS)**

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|---------|---------|-------|--------|--------|--------|
| 1. ABCD | 2. AD | 3. BD | 4. ABC | 5. AC | 6. BCD |
| 7. ABCD | 8. ABCD | 9. AC | 10. CD | 11. BC | |

Answer Ex-III**SUBJECTIVE QUESTIONS**

- (a) $n\pi + (-1)^n \frac{\pi}{4}, n \in I$ (b) $n\pi + \frac{\pi}{3} + 1, n \in I$ (c) $n\pi - \frac{\pi}{4}, n \in I$

(d) $n\pi + (-1)^n \frac{\pi}{3}, n \in I$ (e) $n\pi \pm \frac{\pi}{4}, n \in I$
- $\frac{m\pi}{4}, m \in I$ or $\frac{(2m+1)\pi}{10}, m \in I$
- $2n\pi \pm \frac{\pi}{3}, n \in I$
- $\left(2n + \frac{1}{2}\right)\frac{\pi}{5}, n \in I$ or $2n\pi - \frac{\pi}{2}, n \in I$
- $\left(n + \frac{1}{2}\right)\frac{\pi}{9}, n \in I$
- $n\pi + \frac{\pi}{3}, n \in I$ or $n\pi + \frac{\pi}{4}, n \in I$
- 45° and 60°
- $n\pi + (-1)^n \frac{\pi}{10}, n \in I$ or $n\pi - (-1)^n \frac{3\pi}{10}, n \in I$
- $\left(n + \frac{1}{4}\right)\frac{\pi}{2}, n \in I$
- $\frac{n\pi}{3}, n \in I$ or $\left(n \pm \frac{1}{3}\right)\pi, n \in I$
- $2n\pi, n \in I$ or $\frac{2n\pi}{3} + \frac{\pi}{6}, n \in I$
- $30^\circ, 45^\circ, 90^\circ, 135^\circ, 150^\circ$
- $x = (2n + 1)\frac{\pi}{4}, n \in I$ or $x = (2n + 1)\frac{\pi}{2}, n \in I$ or $x = n\pi \pm \frac{\pi}{6}, n \in I$
- $m\pi, m \in I$ or $\frac{m\pi}{n-1}, m \in I$ or $\left(m + \frac{1}{2}\right)\frac{\pi}{n}, m \in I$
- $n\pi + \frac{\pi}{6} + (-1)^n \frac{\pi}{4}, n \in I$
- $2n\pi + \frac{2\pi}{3}, n \in I$
- $2n\pi + \frac{\pi}{2}, n \in I$ or $2n\pi + 2\alpha$ where $\alpha = \tan^{-1} \frac{3}{7}, n \in I$
- $n\pi \pm \frac{\pi}{6}, n \in I$
- $\left(n + \frac{1}{3}\right)\frac{\pi}{3}, n \in I$
- $x = \frac{n\pi}{3} - \frac{\pi}{9}, n \in I$

21. $\theta = n\pi + \frac{\pi}{4}, \phi = n\pi + (-1)^n \frac{\pi}{6}, n \in I$

24. $\theta = \frac{7\pi}{12}, \frac{19\pi}{12}$

26. ϕ

28. $x = 2n\pi + \frac{\pi}{6}, n \in I$

30. $x = \frac{n\pi}{7} - \frac{\pi}{84}$ or $x = \frac{n\pi}{4} - \frac{5\pi}{48}, n \in I$

32. $x = 2n\pi \pm \frac{2\pi}{3}, n \in I$

34. $x = \pi/6$ only

36. $A = 15^\circ, B = 30^\circ$

25. $x = 2n\pi - \frac{\pi}{2}, n \in I$

27. $30^\circ, 150^\circ, 210^\circ, 330^\circ$

29. $0, \frac{\pi}{6}, \frac{\pi}{3}, \frac{2\pi}{3}, \frac{5\pi}{6}$ & π

31. $\frac{\pi}{8}, \frac{\pi}{3}, \frac{3\pi}{8}, \frac{5\pi}{8}, \frac{2\pi}{3}, \frac{7\pi}{8}$

33. $\alpha - 2\pi; \alpha - \pi, \alpha, \alpha + \pi$, where $\tan \alpha = \frac{2}{3}$

35. $x = \pi/16$

Answer Ex-IV**ADVANCED SUBJECTIVE QUESTIONS**

1. $\frac{90^\circ}{7}, 30^\circ, \frac{450^\circ}{7}, \frac{810^\circ}{7}, 150^\circ, \frac{1170^\circ}{7}$

2. $x = -\frac{5\pi}{3}$

3. $\theta = 2n\pi$ or $2n\pi + \frac{\pi}{2}; n \in I$

4. $x = n - \frac{1}{4}, n \in I; \text{sum} = 5025$

5. $\frac{\pm\pi}{3}, \frac{-\pi}{2}, \pm\pi$

6. $-\sqrt{2} \leq y \leq \sqrt{2}; \frac{\pi}{2}, \pi$

7. $n\pi + \frac{\pi}{4}$ or $(2n+1)\pi - \tan^{-1} 2, n \in I$

8. $x = -1, y = n\pi \pm \frac{\pi}{4} + 1$

10. $\theta = \frac{2n\pi}{5} \pm \frac{\pi}{10}$ or $2n\pi \pm \frac{\pi}{2}, n \in I$

11. (a) $-\frac{3}{2}$ (b) $k \in \left[-1, -\frac{1}{2}\right]$ (c) $x = \frac{n\pi}{2} \pm \frac{\pi}{6}$

12. $x = 2n\pi \pm \pi$ or $2n\pi \pm \frac{\pi}{3}, n \in I$

13. $\frac{n\pi}{2} \pm \frac{\pi}{4}$

14. $n\pi; n\pi + (-1)^n \frac{\pi}{10}$ or $n\pi + (-1)^n \left(-\frac{3\pi}{10}\right)$

16. $x = 2n\pi$ or $x = n\pi + (-1)^n \left(-\frac{\pi}{2}\right)$ or $x = n\pi + (-1)^n \frac{\pi}{6}$

17. $n\pi + \frac{\pi}{8} < x < n\pi + \frac{\pi}{4}$

18. $\frac{\pi}{7}, \frac{5\pi}{7}, \pi, \frac{9\pi}{7}, \frac{13\pi}{7}$

19. $n\pi \pm \frac{\pi}{3}$

20. $n\pi + \frac{\pi}{4}, n \in I$

21. $\frac{1}{2} [n\pi + (-1)^n \sin^{-1}(1 - \sqrt{2a+3})]$ where $n \in I$ and $a \in \left[-\frac{3}{2}, \frac{1}{2}\right]$

22. $x = \frac{n\pi}{4} + (-1)^n \frac{\pi}{8}$ or $\frac{n\pi}{4} + (-1)^{n+1} \frac{\pi}{24}$

23. $n\pi \pm \frac{1}{2} \cos^{-1}(2 - \sqrt{5})$

24. $\frac{(2n+1)\pi}{4}, k\pi$, where $n, k \in I$

25. $x = \frac{n\pi}{4} + \frac{\pi}{8}, n \in I$

26. $x = 2n\pi + \frac{3\pi}{4}, n \in I$

27. $\frac{765\pi^2}{4}, \frac{55\pi}{2}$. All the roots of the $\cos \sqrt{x} = 0$ are not the same as those of $\sin \sqrt{x} = -1$

28. $x = \left(4n\pi - \frac{\pi}{2}\right)^2$ or $x = \left(\frac{4n\pi}{3} + \frac{\pi}{2}\right)^2$ where $n \in W$

29. $x = \frac{2}{6n\pi + 3\pi - 4}$ or $\frac{2}{3n\pi + 3(-1)^n \sin^{-1} \frac{3}{4} - 2}$ where $n \in I$

30. $x = n\pi$ or $x = n\pi \pm \frac{\pi}{6}$

31. $x = \pm 5\sqrt{5}$ & $y = n\pi + \tan^{-1} \frac{1}{2}, n \in I$

32. $x = \frac{\pi}{8} + \frac{K\pi}{2}$ or $x = \frac{3\pi}{4} + K\pi$ $K \in I$

Answer Ex-V**JEE PROBLEMS**

1. Min. value = 3^{-5} for $x = (4n-1)\frac{\pi}{4} - \frac{1}{2} \tan^{-1} \frac{3}{4}, n \in I$;

max. value = 3^5 for $x = (4n+1)\frac{\pi}{4} - \frac{1}{2} \tan^{-1} \frac{3}{4}, n \in I$

2. $x = n\pi + (-1)^n \frac{\pi}{6}$ and $y = m\pi \pm \frac{\pi}{6}$ where m & n are integers.

3. B

4. D

5. A

6. C

7. C,D

8. 3

9. 3

10. D