JEE MAIN : CHAPTER WISE TEST-3

SUBJECT :- MATHEMATICS DATE.....

CLASS :- 11th NAME.....

CHAPTER :- TRIGONOMETRY SECTION.....

(SECTION A)

1. If $a\sin^2 x + b\cos^2 x = c,\quad b\sin^2 y + a\cos^2 y = d$ and $a\tan x = b\tan y$, then $\frac{a^2}{b^2}$ is equal to

(A) $\frac{(b-c)(d-b)}{(a-d)(c-a)}$ (B) $\frac{(a-d)(c-a)}{(b-c)(d-b)}$

(C) $\frac{(d-a)(c-a)}{(b-c)(d-b)}$ (D) $\frac{(b-c)(b-d)}{(a-c)(a-d)}$

2. $\left(\frac{\cos A+\cos B}{\sin A-\sin B}\right)^n + \left(\frac{\sin A+\sin B}{\cos A-\cos B}\right)^n$ (n even or odd) =

(A) $2\tan^n\frac{A-B}{2}$ (B) $2\cot^n\frac{A-B}{2}$

(C) 1 (D) None of these

3. If $\sin\alpha = 1/\sqrt{5}$ and $\sin\beta = 3/5$, then $\beta-\alpha$ lies in the interval

(A) $[0,\pi/2]$ (B) $[\pi/2, 3\pi/4]$

(C) $[3\pi/4,\pi]$ (D) $[\pi, 5\pi/4]$

4. If $2\sec 2\alpha = \tan\beta + \cot\beta$, then one of the values of $\alpha+\beta$ is

(A) $\frac{\pi}{4}$ (B) $\frac{\pi}{2}$

(C) π (D) 2π

5. If $\frac{x}{\cos\theta} = \frac{y}{\cos\left(\theta-\frac{2\pi}{3}\right)} = \frac{z}{\cos\left(\theta+\frac{2\pi}{3}\right)}$, then $x+y+z =$

(A) 1 (B) 0

(C) -1 (D) None of these

6. If $\sin 6\theta = 32\cos^5\theta\sin\theta - 32\cos^3\theta\sin\theta + 3x$, then $x =$

(A) $\cos\theta$ (B) $\cos 2\theta$

(C) $\sin\theta$ (D) $\sin 2\theta$

7. $\sin^4\frac{\pi}{4} + \sin^4\frac{3\pi}{8} + \sin^4\frac{5\pi}{8} + \sin^4\frac{7\pi}{8} =$

(A) $\frac{1}{2}$ (B) $\frac{1}{4}$ (C) $\frac{3}{2}$ (D) $\frac{3}{4}$

8. $\left(1+\cos\frac{\pi}{8}\right)\left(1+\cos\frac{3\pi}{8}\right)\left(1+\cos\frac{5\pi}{8}\right)\left(1+\cos\frac{7\pi}{8}\right) =$

(A) $\frac{1}{2}$ (B) $\frac{1}{4}$

(C) $\frac{1}{8}$ (D) $\frac{1}{16}$

9. If A lies in the third quadrant and $3\tan A - 4 = 0$, then $5\sin 2A + 3\sin A + 4\cos A =$

(A) 0 (B) $\frac{-24}{5}$

(C) $\frac{24}{5}$ (D) $\frac{48}{5}$

10. $\sqrt{2}+\sqrt{3}+\sqrt{4}+\sqrt{6}$ is equal to

(A) $\cot 7\frac{1^o}{2}$ (B) $\sin 7\frac{1^o}{2}$

(C) $\sin 15^o$ (D) $\cos 15^o$

11. If $\tan(A+B) = p,\ \tan(A-B) = q,$ then the value of $\tan 2A$ in terms of p and q is

(A) $\frac{p+q}{p-q}$ (B) $\frac{p-q}{1+pq}$

(C) $\frac{p+q}{1-pq}$ (D) $\frac{1+pq}{1-p}$

12. $2\sin^2\beta + 4\cos(\alpha+\beta)\sin\alpha\sin\beta + \cos 2(\alpha+\beta) =$

(A) $\sin 2\alpha$ (B) $\cos 2\beta$

(C) $\cos 2\alpha$ (D) $\sin 2\beta$

13. The value of $\sin\theta + \cos\theta$ will be greatest when

(A) $\theta = 30^o$ (B) $\theta = 45^o$

(C) $\theta = 60^o$ (D) $\theta = 90^o$

14. If $f(x) = \cos^2 x + \sec^2 x$, then

(A) $f(x) < 1$ (B) $f(x) = 1$

(C) $1 < f(x) < 2$ (D) $f(x) \geq 2$

15. The value of $\frac{\tan x}{\tan 3x}$ whenever defined never lie between

(A) 1/3 and 3 (B) 1/4 and 4

(C) 1/5 and 5 (D) 5 and 6

16. $\cos 2\theta + 2\cos\theta$ is always

(A) Greater than $-\frac{3}{2}$

(B) Less than or equal to $\frac{3}{2}$

(C) Greater than or equal to $-\frac{3}{2}$ and less than or equal to 3

(D) None of these

17. Let *A*, *B* and *C* are the angles of a plain triangle and $\tan\frac{A}{2}=\frac{1}{3}, \tan\frac{B}{2}=\frac{2}{3}$. Then $\tan\frac{C}{2}$ is equal to

(A) 7/9 (B) 2/9
(C) 1/3 (D) 2/3

18. If $A+B+C=\pi$ and $\cos A=\cos B\cos C$, then $\tan B\ \tan C$ is equal to

(A) $\frac{1}{2}$ (B) 2
(C) 1 (D) $-\frac{1}{2}$

19. If $A+C=B$, then $\tan A\tan B\tan C=$

(A) $\tan A\tan B+\tan C$
(B) $\tan B-\tan C-\tan A$
(C) $\tan A+\tan C-\tan B$
(D) $-(\tan A\tan B+\tan C)$

20. If $\left|\cos\theta\left\{\sin\theta+\sqrt{\sin^2\theta+\sin^2\alpha}\right\}\right|\le k$, then the value of *k* is

(A) $\sqrt{1+\cos^2\alpha}$ (B) $\sqrt{1+\sin^2\alpha}$
(C) $\sqrt{2+\sin^2\alpha}$ (D) $\sqrt{2+\cos^2\alpha}$

(SECTION B)

21. If $\sin A,\cos A$ and $\tan A$ are in G.P., then $\cos^3 A+\cos^2 A$ is equal to

22. If $\sin\theta+\cos\theta=1$, then $\sin\theta\cos\theta=$

23. $\sin^6\theta+\cos^6\theta+3\sin^2\theta\cos^2\theta=$

24. The value of $2(\sin^6\theta+\cos^6\theta)-3(\sin^4\theta+\cos^4\theta)+1$ is

25. If $y=(1+\tan A)(1-\tan B)$ where $A-B=\frac{\pi}{4}$, then $(y+1)^{y+1}$ is equal to

26. $\frac{\cos 12^\circ-\sin 12^\circ}{\cos 12^\circ+\sin 12^\circ}+\frac{\sin 147^\circ}{\cos 147^\circ}=$

27. $\tan 20^\circ\tan 40^\circ\tan 60^\circ\tan 80^\circ=$

28. If $\cos A=\frac{3}{4}$, then $32\sin\left(\frac{A}{2}\right)\sin\left(\frac{5A}{2}\right)=$

29. The maximum value of $3\cos\theta-4\sin\theta$ is

30. The maximum value of $4\sin^2 x+3\cos^2 x$ is