Trigonometry & properties of triangle I   **Marks:- 120**

1) The general solution of $\cot\theta = \tan 6\theta$ a) $\left(n+\dfrac{1}{2}\right)\dfrac{\pi}{7}$ b) $\left(n+\dfrac{1}{2}\right)\dfrac{\pi}{7}$ c) $\left(n+\dfrac{1}{2}\right)\dfrac{\pi}{3}$ d) $\left(n+\dfrac{1}{2}\right)\dfrac{\pi}{6}$

2) If $\tan^{-1}\dfrac{2}{11}+\tan^{-1}\dfrac{7}{24}=\tan^{-1}\alpha$, then $\alpha =$ a) $\dfrac{1}{2}$ b) $\dfrac{1}{3}$ c) $\dfrac{1}{4}$ d) $\dfrac{3}{4}$

3) The simplest form of $\tan^{-1}\left(\dfrac{\sqrt{1+x^2}-1}{x}\right)$ is: a) $\tan^{-1}\dfrac{1}{x}$ b) $\tan^{-1}\dfrac{x}{2}$ c) $\dfrac{1}{2}\tan^{-1}x$ d) $\tan^{-1}x$

4) The value of $\sin 130^0 \cos 140^0 + \cos 130^0 \sin 140^0$ is   a) 1   b) – 1   c) 0   d) none

5) In $\triangle ABC\ \dfrac{\cos C+\cos A}{c+a}+\dfrac{\cos B}{b}=$ a) $\dfrac{1}{a}$ b) $\dfrac{1}{b}$ c) $\dfrac{1}{c}$ d) $\dfrac{c+a}{b}$

6) The principal values for $\tan x = -\sqrt{3}$ are: a) $\dfrac{\pi}{3},\dfrac{2\pi}{3}$ b) $\dfrac{\pi}{3},\dfrac{5\pi}{3}$ c) $\dfrac{2\pi}{3},\dfrac{5\pi}{3}$ d) $\dfrac{2\pi}{3},\dfrac{7\pi}{3}$

7) If $2\cos^{-1}\dfrac{2}{9}=\tan^{-1}a$, then $a=$ a) $\dfrac{-\sqrt{77}}{73}$ b) $\dfrac{4\sqrt{77}}{73}$ c) $\dfrac{4}{7}$ d) $\dfrac{-4\sqrt{77}}{73}$

8) The perimeter of a certain sector of a circle is equal to the length of the arc of a semi-circle having the same radius. Then the angle of the sector in degrees, minutes and seconds is   a) $65^0\,24'\,30''$ b) $65^0\,30'\,24''$ c) $60^0\,30'\,24''$ d) none of these

9) If the angles A, B, C of a $\triangle ABC$ are in A.P. and $\angle A=30^0, c=5$, then the values of a and b respectively are: a) $\dfrac{\sqrt{3}}{2},4$ b) $\dfrac{5}{2},\dfrac{5\sqrt{3}}{2}$ c) $\dfrac{3}{2},\sqrt{2}$ d) $\dfrac{5}{2},2$

10) $1+\cos A=$ a) $\dfrac{\left(b^2+c-a\right)}{2bc}$ b) $\dfrac{(b+c+a)(b+c+a)}{2bc}$ c) $\dfrac{(b+c-a)}{bc}$ d) $\dfrac{(b+c+a)(b+c-a)}{2bc}$

11) If $\sin\left(\sin^{-1}\dfrac{2}{5}+\cos^{-1}x\right)=1$ then $x=$ a) $\dfrac{2}{5}$ b) $\dfrac{1}{5}$ c) $\dfrac{3}{5}$ d) $\dfrac{4}{5}$

12) The value of $\cos\left[\cos^{-1}\left(-\dfrac{1}{2}\right)+\dfrac{\pi}{3}\right]$ is   a) 2   b) - 2   c) 1   d) - 1

13) In $\triangle ABC$, $a=3, b=1, \cos(A-B)=\dfrac{2}{3}$, then c = a) $4\sqrt{\dfrac{2}{3}}$ b) $2\sqrt{\dfrac{2}{3}}$ c) $\sqrt{\dfrac{2}{3}}$ d) $\dfrac{2}{3}$

14) If $\tan x + \tan\left(x+\dfrac{\pi}{3}\right)+\tan\left(x+\dfrac{2\pi}{3}\right)=3$, then most general value of x is

a) $x=\dfrac{n\pi}{3}+\dfrac{\pi}{4}$ b) $x=\dfrac{n\pi}{3}+\dfrac{\pi}{6}$ c) $x=\dfrac{n\pi}{3}+\dfrac{\pi}{12}$ d) $x=\dfrac{n\pi}{3}+\dfrac{\pi}{8}$

15) $(b-c)\sin A+(c-a)\sin B+(a-b)\sin C=$ a) 0   b) 2   c) 1   d) 4

16) $\dfrac{\cos 2A}{a^2}-\dfrac{\cos 2B}{b^2}=$ a) $\dfrac{1}{c^3}-\dfrac{1}{b^2}$ b) $\dfrac{2}{a^2}-\dfrac{a^2}{1}$ c) $\dfrac{1}{a}+\dfrac{1}{b}$ d) $\dfrac{1}{a^2}-\dfrac{1}{b^2}$

17) The value of $\cos A\cos 2A\cos 2^2 A\cos 2^3 A....\cos 2^{n-1} A$ is equal to

a) $\dfrac{\cos 2^n A}{2^n \cos A}$ b) $\dfrac{\sin 2^n A}{2^n \sin A}$ c) $\dfrac{\sin 2^n A}{2^n \cos A}$ d) $\dfrac{\cos 2^n A}{2^n \sin A}$

18) $ac\cos B-bc\cos A=$ a) $a+b$ b) b^2+c^2 c) a^2-b^2 d) a^3+b^1

19) In $\triangle ABC\,\dfrac{a}{b^2-c^2}+\dfrac{c}{b^2-a^2}=0$ then B = a)$\dfrac{\pi}{2}$ b)$\dfrac{\pi}{4}$ c)$\dfrac{2\pi}{3}$ d)$\dfrac{\pi}{3}$

20) If $\cos^2 A+\cos^2 B+\cos^2+C=1$, then the triangle
a) equilateral   b) right angled   c) isosceles   d) none

21) In $\triangle ABC$ $(b^2-c^2)\cos 2A+(c^2-a^2)\cos 2B+(a^2-b^2)\cos 2C=$
a) 2   b) 0   c) 1   d) 5

22) If in a $\triangle ABC,\angle C=90^0$, then the maximum value of sin A sin B is a)$\dfrac{1}{2}$ b) 1   c) 2   d) 0

23) $\dfrac{\cot B+\cot C}{\cot C+\cot A}=$ a) $\dfrac{a}{b}$ b) $\dfrac{a^{-2}}{b}$ c) $\dfrac{a^2}{b^2}$ d) $\dfrac{a^3}{b^{-1}}$

24) If $\cos A+\cos B+\cos C=3/2$, then the triangle is
a) isosceles   b) equilateral   c) right angled   d) none

25) The value of $\tan\left[2\tan^{-1}\left(\dfrac{\sqrt5-1}{2}\right)\right]=$ a) 4   b) 2   c) 3   d) 7

26) The value of $\tan^{-1}\left(\dfrac{m}{n}\right)-\tan^{-1}\left(\dfrac{m-n}{m+n}\right)$ is   a) $\pi/2$ b) $\pi/3$ c) $\pi/4$ d) $\pi/-2$

27) The maximum value of $\sin(\cos x)=$ a) $\sin 1$ b) 1   c) $\sin\left(\dfrac{1}{\sqrt2}\right)$ d) $\sin\left(\dfrac{\sqrt3}{2}\right)$

28) The value of $\dfrac{\cos\theta}{1+\sin\theta}$ is equal to a) $\tan\left(\dfrac{\theta}{2}-\dfrac{\pi}{4}\right)$ b) $\tan\left(-\dfrac{\pi}{4}-\dfrac{\theta}{2}\right)$ c) $\tan\left(\dfrac{\pi}{4}-\dfrac{\theta}{2}\right)$ d) $\tan\left(\dfrac{\pi}{4}+\dfrac{\theta}{2}\right)$

29) If $\cot\dfrac{A}{2}=\dfrac{b+c}{a}$, then the triangle is a) isosceles   b) equilateral c) right angled d) none

30) If $\tan^{-1}x+\tan^{-1}y+\tan^{-1}z=\dfrac{\pi}{2}$ then $1-xy-yz-zx=$ a) 1   b) 0   c) - 1   d) 2

31) $\tan 9^0 - \tan 27^0 - \tan 63^0 + \tan 81^0 =$ a) 4   b) 3   c) 2   d) 1

32) If $A + C = 2B$, then $\dfrac{\cos C - \cos A}{\sin A - \sin C} =$ a) $\cot B$ b) $\cot 2B$ c) $\tan 2B$ d) $\tan B$

33) $\dfrac{\sin 70^0 + \cos 40^0}{\cos 70^0 + \sin 40^0} =$ a) $\dfrac{1}{\sqrt{2}}$ b) $\sqrt{3}$ c) $\dfrac{1}{2}$ d) 1

34) If $\tan A = \dfrac{a}{a+1}$ and $\tan B = \dfrac{1}{2a+1}$ then the value of A + B is a) 0 b) $\dfrac{\pi}{2}$ c) $\dfrac{\pi}{3}$ d) $\dfrac{\pi}{4}$

35) If $\tan A - \tan B = x$ and $\cot B - \cot A = y$ then $\cot(A-B) =$

a) $\dfrac{1}{x} - \dfrac{1}{y}$ b) $\dfrac{1}{y} - \dfrac{1}{x}$ c) $\dfrac{1}{x} - \dfrac{2}{y}$ d) $\dfrac{1}{x} + \dfrac{1}{y}$

36) If $\tan \alpha, \tan \beta$ are the roots of the equation $x^2 + px + q = 0 \, (p \neq 0)$ then
a) $\cos(\alpha + \beta) = 1 - q$ b) $\sin(\alpha + \beta) = -p$ c) $\tan(\alpha + \beta) = p/(q-1)$ d) none

37) If $A = 2\sin^2 \theta - \cos 2\theta$, then a) $-1 \leq A \leq 3$ b) $1 \leq A \leq 2$ c) $-2 \leq A \leq 4$ d) none

38) If $\cos^6 \theta + \sin^6 \theta + k\sin^2 2\theta = 1$, then k =   a) 3/2   b) 3/4   c) 1/4   d) none

39) The value of the expression $\sqrt{3} \cos ec\, 20^0 - \sec 20^0$ is equal to
a) 2   b) $2\sin 20^0 / \sin 40^0$ c) 4   d) $4\sin 20^0 / \sin 40^0$

40) $2\cos \theta - \cos 3\theta - \cos 5\theta - 16\cos^3 \theta \sin^2 \theta =$ a) 2   b) 1   c) 0   d) -1

41) $\dfrac{\sin 7\theta + 6\sin 5\theta + 17\sin 3\theta + 12\sin \theta}{\sin 6\theta + 5\sin 4\theta + 12\sin 2\theta}$ is equal to a) $2\cos \theta$ b) $\cos \theta$ c) $2\sin \theta$ d) $\sin \theta$

42) If $\cos A\cos B + \sin A\sin B\sin C = 1$ then the triangle is
a) equilateral   b) right angled   c) isosceles   d) right angles isosceles

43) The value of $\dfrac{\cos 3\theta}{2\cos 2\theta - 1}$ is equal to a) $\cos \theta$ b) $\sin \theta$ c) $\tan \theta$ d) none

44) The value of $\sin 12^0 \sin 48^0 \sin 54^0$ is equal to a)1/4   b) 1/2   c) 1/8   d) none

45) The value of $\tan 2\alpha - \tan \alpha(1 + \sec 2\alpha)$ is equal to a) $\sin \alpha$ b) $\cos \alpha$ c) 0 d) none

46) In $\triangle ABC, A > B$, A and B satisfy the equation 3 sin x − 4 sin³ x − k = 0, 0< k < 1 then C =
a) $\dfrac{\pi}{2}$ b) $3\dfrac{\pi}{4}$ c) $2\dfrac{\pi}{3}$ d) $\dfrac{5\pi}{6}$

47) The value of $\cos^{-1}\left[\cos(7\pi/6)\right]$ is equal to a) $\dfrac{7\pi}{6}$ b) $\dfrac{\pi}{6}$ c) $\dfrac{5\pi}{6}$ d) none

48) The value of $\tan^{-1}5+\tan^{-1}3-\cot^{-1}(4/7)$ is   a) $\dfrac{\pi}{4}$ b) $\dfrac{\pi}{3}$ c) $\dfrac{\pi}{2}$ d) none

49) If a, b, c are in A.P., then $\cos\left(\dfrac{A-C}{2}\right)\cos ec\left(\dfrac{B}{2}\right)=$ a) 1/2   b) 2   c) 1/3   d) 3

50) $\sin\left[\cos^{-1}(3/5)+\tan^{-1}2\right]=$ a) $\dfrac{2}{\left(5\sqrt{5}\right)}$ b) $\dfrac{-2}{5\sqrt{5}}$ c) $\dfrac{3}{5\sqrt{5}}$ d) $\dfrac{-3}{5\sqrt{5}}$

51) If $\tan^{-1}x=\dfrac{\pi}{4}-\tan^{-1}\left(\dfrac{1}{3}\right)$, then $x=$ a) $\dfrac{1}{4}$ b) $\dfrac{1}{2}$ c) $\dfrac{1}{6}$ d) none

52) If $a=2, B=120^{0}, C=30^{0}$ then the area of the triangle is   a) $2\sqrt{3}$ b) $\sqrt{3}$ c) $\dfrac{\sqrt{3}}{2}$ d) $4\sqrt{3}$

53) If the two sides of a triangle are $5,5\sqrt{3}$ and the angle between them is $\pi/6$, then the third side is $=$ a) 3   b) 5   c) $5\sqrt{3}$ d) $3\sqrt{3}$

54) If $\sin^{2}A+\sin^{2}B=\sin^{2}C,$ then C $=$ a) 30^{0} b) 45^{0} c) 60^{0} d) 90^{0}

55) If the angles of a triangle are in the ratio 1 : 1 : 2, the corresponding sides are in the ratio   a) 1 : 2 : 3   b) 3 : 2 : 1   c) 1: $\sqrt{3}$: 2   d) 1 : 1 : $\sqrt{2}$

1) $\dfrac{\cos^2 A - \cos^2 B}{a+b} + \dfrac{\cos^2 B - \cos^2 C}{b+c} + \dfrac{\cos^2 C - \cos^2 A}{c+a} =$ a) -3   b) 1   c) 0   d) 2

2) In $a^2 \sin 2B + b^2 \sin 2A =$ a) $\dfrac{-abc}{R}$ b) $\dfrac{abc}{R}$ c) 1   d) 0

3) If $\sin \alpha, \sin \beta$ and $\cos \alpha$ are in G.P. then roots of the equation $x^2 + 2x\cot \beta + 1 = 0$ are
always   a) equal   b) real   c) imaginary   d) greater than 1

4) $a^2 \left(\cos^2 B - \cos^2 C\right) + b^2 \left(\cos^2 C - \cos^2 A\right) + c^2 \left(\cos^2 A - \cos^2 B\right) =$
a) 2   b) 1   c) 4   d) 0

5) The value of $\sin A \sin(60° - A)\sin(60° + A) =$ a) $\dfrac{1}{4}\sin 3A$ b) $\dfrac{1}{2}\sin 3A$ c) $\dfrac{1}{4}\sin 2A$ d) none

6) $ab\sin\left(A+B\right)\sin\left(A-B\right)$ a) $\left(a^2 + b^2\right)\sin A$ b) $\left(a^2 - b^2\right)\sin B$
                                    c) $\left(a^2 - b^2\right)\sin A \sin B$ d) $\left(b+a\right)\sin A \sin B$

7) $a^2 \sin 2C + c^2 \sin 2A =$ a) $2ac\sin B$ b) $2\sin B$ c) $2ca\sin A$ d) $2ac + \sin B$

8) $c\cos\left(A-\theta\right) + a\cos\left(C+\theta\right) =$ a) $b\cos\theta$ b) $b\tan\theta$ c) $b\sin\theta$ d) $ab\cos\theta$

9) $b^2 \sin(C - A) =$ a) $\sin A$ b) 0   c) $(c^2 + a^2)\sin B$ d) $(c^2 - a^2)\sin B$

10) If $4\sin x\cos x = \sqrt{3}$, then x =   a) $n\pi + \left(-1\right)^n \cdot \dfrac{\pi}{3}, n \in Z$ b) $n\pi + \left(-1\right)^n \cdot \dfrac{\pi}{6}, n \in Z$

                                    c) $\dfrac{n\pi}{2} + \left(-1\right)^n \cdot \dfrac{\pi}{3}, n \in Z$ d) $\dfrac{n\pi}{2} + \left(-1\right)^n \cdot \dfrac{\pi}{6}, n \in Z$

11) $\dfrac{\cos B + \cos C}{1 - \cos A} =$ a) $\dfrac{c}{a}$ b) $\dfrac{b-c}{a+b}$ c) $\dfrac{b-c}{a}$ d) $\dfrac{b+c}{a}$

12) The value of $\cot^{-1} 9 + \cos ec^{-1}\left(\sqrt{41}/4\right)$ is a) $\dfrac{\pi}{2}$ b) $\dfrac{\pi}{4}$ c) $\dfrac{\pi}{3}$ d) π

13) If the sum of the angles $\tan^{-1} x$ and $\tan^{-1}\dfrac{1}{2}$ is 45^0, then the value of x is equal to

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

14) If $A + B + C = \pi$, then $\sin 2A + \sin 2B - \sin 2C =$
a) $4\sin A\sin B\sin C$ b) $4\cos A\cos B\sin C$ c) $4\cos A\cos B\cos C$ d) none

15) Find the value of $\sin\left(\dfrac{1}{4}\sin^{-1}\dfrac{\sqrt{63}}{8}\right)$ a) $\dfrac{1}{\sqrt{2}}$ b) $\dfrac{1}{2}$ c) $\dfrac{1}{2\sqrt{2}}$ d) $\dfrac{1}{3\sqrt{2}}$

16) The general solution of the trigonometric equation $\tan\theta = \cot\alpha$

a) $\theta = n\pi + \dfrac{\pi}{2} - \alpha$ b) $\theta = n\pi - \dfrac{\pi}{2} + \alpha$ c) $\theta = n\pi + \dfrac{\pi}{2} + \alpha$ d) $\theta = n\pi - \dfrac{\pi}{2} - \alpha$

17) The value of $\tan\left[(1/2)\cos^{-1}\left(\sqrt{5}/3\right)\right]$ is   a) $\dfrac{3+\sqrt{5}}{2}$ b) $\dfrac{3-\sqrt{5}}{2}$ c) $\dfrac{4+\sqrt{5}}{2}$ d) $\dfrac{4-\sqrt{5}}{2}$

18) The value of $\sin\left[\cot^{-1}\left\{\tan\left(\cos^{-1}x\right)\right\}\right]$ is   a) 2x   b) x   c) 3x   d) none

19) A solution of the equation $\tan^{-1}(1+x)+\tan^{-1}(1-x)=\pi/2$ is

a) $x=1$ b) $x=-1$ c) $x=0$ d) $x=\pi$

20) If a, b are positive and $\tan^{-1}\left(\dfrac{a}{x}\right)+\tan^{-1}\left(\dfrac{b}{x}\right)=\dfrac{\pi}{2}$ then x =

a) $\sqrt{ab}$ b) $2\sqrt{ab}$ c) $\sqrt{a/b}$ d) $\sqrt{b/a}$

21) $\sin^{-1}\left(\dfrac{3}{x}\right)+\sin^{-1}\left(\dfrac{4}{x}\right)=\dfrac{\pi}{2}$ then x =   a) -5 b) 5   c) 3   d) -3

22) If $\sin^{-1}x+\sin^{-1}y=\dfrac{2\pi}{3}$ then $\cos^{-1}x+\cos^{-1}y=$ a) $\dfrac{\pi}{4}$ b) $\dfrac{\pi}{3}$ c) $\dfrac{\pi}{6}$ d) $\dfrac{\pi}{2}$

23) If $\tan^{-1}(\sec x+\tan x)=\dfrac{\pi}{4}+2kx$ then k =   a) 1   b) $\dfrac{1}{2}$ c) $\dfrac{1}{4}$ d) none

24) $\dfrac{1}{2}\le x\le 1$ then $\cos^{-1}x+\cos^{-1}\left[\dfrac{x}{2}+\dfrac{\sqrt{3-3x^2}}{2}\right]=$ a) $\dfrac{\pi}{2}$ b) $\dfrac{\pi}{4}$ c) $\dfrac{\pi}{3}$ d) $2\cos^{-1}x-\dfrac{\pi}{3}$

25) The value of $c\,\cos^2(A/2)+a\cos^2(C/2)=$ a) 2s   b) 3s   c) 4s   d) s

26) If $A+B=225^0$ then $\dfrac{\cot A}{1+\cot A}\cdot\dfrac{\cot B}{1+\cot B}=$ a) 1   b) $\dfrac{1}{2}$ c) 2   d) 0

27) The maximum value of $5\cos\theta+3\cos\left(\theta+\dfrac{\pi}{3}\right)+3$ is   a) 5   b) 10   c) 11   d) -1

28) If $\tan\left(\dfrac{\pi}{4}+\theta\right)+\tan\left(\dfrac{\pi}{4}-\theta\right)=a$ then $\tan^2\left(\dfrac{\pi}{4}+\theta\right)+\tan^2\left(\dfrac{\pi}{4}-\theta\right)=$

a) a^2+1 b) a^2+2 c) a^2-2 d) a^2-1

29) If the angles of a triangle are 30^0, 45^0 and the included sides is $\left(\sqrt{3}+1\right)$ cm, then the area of the triangle is a) $\left(\sqrt{3}-1\right)/2$ sq.cm   b) $\left(\sqrt{3}+1\right)/2$ sq.cm   c) $\left(\sqrt{3}-1\right)$ sq.cm   d) none

30) $2\left(1-2\sin^2 7\theta\right)\sin 3\theta=$

a) $\sin 17\theta-\sin 11\theta$ b) $\sin 11\theta-\sin 17\theta$ c) $\cos 17\theta-\cos 11\theta$ d) $\cos 17\theta+\cos 11\theta$

31) If $\tan A=18/17$ and $\tan B=1/35$, the value of $A-B$ is   a) $\pi/4$ b) $\pi/2$ c) $\pi/3$ d) none

32) The value of $\sin^2 52\dfrac{1}{2}-\sin^2 22\dfrac{1}{2}$ is   a) $\dfrac{1}{2}$ b) $\dfrac{\sqrt{3}+1}{4\sqrt{2}}$ c) $\dfrac{\sqrt{3}-1}{4\sqrt{2}}$ d) none

33) The value of $\sin^2\theta + \sin^2(\theta+60^0) + \sin^2(\theta-60^0) =$ a) 1/2   b) 0   c) 3/2   d) none

34) If $\tan\alpha = \dfrac{m}{m+1}$ and $\tan\beta = \dfrac{1}{2m+1}$,then $\alpha + \beta =$ a) $\pi/3$ b) $\pi/2$ c) $\pi/4$ d) none

35) In a $\triangle ABC$ if $B=90^0$, then $\tan^2(A/2)=$ a) $\dfrac{b+c}{b-c}$ b) $\dfrac{b-c}{b+c}$ c) $(b+c)(b-c)$ d) none

36) The value of $\sin^2\left(\dfrac{\pi}{8}+\dfrac{A}{2}\right) - \sin^2\left(\dfrac{\pi}{8}-\dfrac{A}{2}\right)$ is   a) $\sqrt{2}\sin A$ b) $2\sin\dfrac{A}{2}$ c) $\dfrac{1}{\sqrt{2}}\sin A$ d) 1

37) If A, B, C are acute angles of triangle such that $\cot A \cot B \cot C = k$ then

a) $k \le \dfrac{1}{3\sqrt{3}}$ b) $k \ge \dfrac{1}{3\sqrt{3}}$ c) $k < \dfrac{1}{9}$ d) $k > \dfrac{1}{3}$

38) $\tan 75^0 - \tan 30^0 - \tan 75^0 \tan 30^0 =$ a) 1   b) -1 c) 2   d) $\sqrt{3}$

39) In a $\triangle ABC$, $b^2\sin 2C + c^2\sin 2B$ is equal to   a) 2Δ b) Δ c) 3Δ d) 4Δ

40) $\tan 83^0 - \tan 38^0 - \tan 83^0 \tan 38^0$ a) 1   b) 0   c) -1 d) 2

41) If $\dfrac{x}{\cos\theta} = \dfrac{y}{\cos(\theta+120^0)} = \dfrac{z}{\cos(\theta+240^0)}$ then x + y + z =   a) xyz   b) 1   c) 0   d) none

42) In $\triangle$ ABC If $\cos A \cos B \cos C = \dfrac{1}{3}$ then the value of tan A tan B + tan B tan C + tan C

tan A =   a) 1   b) $\dfrac{4}{3}$ c) 4   d) 3

43) If A, B are Acute angles such that A + B, and A − B satisfy the question

$\tan^2\theta - 4\tan\theta + 1 = 0$ then; a) $A = \dfrac{\pi}{3} B = \dfrac{\pi}{12}$ b) $A = \dfrac{\pi}{4} B = \dfrac{\pi}{6}$ c) $A = \dfrac{\pi}{6} B = \dfrac{\pi}{4}$ d) $A = \dfrac{\pi}{6} B = \dfrac{\pi}{12}$

44) $(\sin 3A + \sin A)\sin A + (\cos 3A - \cos A)\cos A =$.... a) 0   b) 1   c) cos 2A   d) sin 2A

45) $4\cos 20^0 - \sqrt{3}\cot 20^0 =$ a) 1   b) -1 c) 0   d) $\sqrt{3}$

46) If $c\cos^2\dfrac{A}{2} + a\cos^2\dfrac{C}{2}$ in terms of s is   a) s   b) (s − b)   c) a/c   d) 0

47) If $\tan\left(\dfrac{C-A}{2}\right) = k\cot\dfrac{B}{2}$, then k =   a) $\dfrac{c-a}{c+a}$ b) $\dfrac{b+a}{b-a}$ c) $\dfrac{b-c}{b+c}$ d) $\dfrac{c-a}{b+a}$

48) In a triangle ABC, if $\sin A\cos B = 1/4$ and $3\tan A = \tan B$, the triangle is right angled at

a) A   b) B   c) C   d) not right angled

49) If $\tan A, \tan B, \tan C$ are in H.P., then a^2, b^2, c^2 are in   a) H.P.   b) G.P.   c) A.P   d) none

50) If $\dfrac{a+b}{1-ab}, b, \dfrac{b+c}{1-bc}$ are in A.P. then a, 1/b, c are in   a) A.P.   b) G.P.   c) H.P.   d) none

51) If $\dfrac{a}{b+c} + \dfrac{b}{c+a} = 1$ then   a) A = 60^0 b) B = 60^0 c) C = 60^0 d) none

52) If $a:b:c = 3:3:7$, then $\cos A : \cos B : \cos C =$
a) 13: 11 : 7   b) 13 : 11 : - 7   c) 7 : 13 : 11   d) none

53) If $\cos A = 3/5, \cos B = 5/13$, then $a:b:c =$
a) 3 : 5 : 13   b) 13 : 14 : 15   c) 13 : 15 : 14   d) none

54) If $A = 45^0$ and $B = 75^0$, then $a + c\sqrt{2} =$ a) b   b) 3b   c) 2b   d) none of these