1. If tanA and tanB are the roots of the equation $x^2-ax+b=0$ then the value of $sin^2(A+B)$ is

   (a) $\frac{a^2}{a^2+(1-b)^2}$

   (b) $\frac{a^2}{a^2+b^2}$

   (c) $\frac{a^2}{(b+a)^2}$

   (d) $\frac{a^2}{b^2(1-a)^2}$

2. If a,b,c are distinct positive reals in G.P then $log_a n, log_b n, log_c n (n>0, n\neq 1)$ are in

   (a) A.P
   (b) G.P
   (c) H.P
   (d) none of these

3. If A =340° then $2sin\frac{A}{2}$ is identical to

   (a) $\sqrt{1+sinA}+\sqrt{1-sinA}$
   (b) $-\sqrt{1+sinA}-\sqrt{1-sinA}$
   (c) $\sqrt{1+sinA}-\sqrt{1-sinA}$
   (d) $-\sqrt{1+sinA}+\sqrt{1-sinA}$

4. The value of $(0.2)^{log_{\sqrt{5}}(1/4+1/8+1/16+\cdots+\infty)}$ is equal to

   (a) 4
   (b) 6
   (c) 8
   (d) 2

5. The set of angles between 0 and $2\pi$ satisfying equation $4cos^2\theta-2\sqrt{2}cos\theta-1=0$ is

   (a) $\{\frac{\pi}{12},\frac{5\pi}{12},\frac{19\pi}{12},\frac{23\pi}{12}\}$
   (b) $\{\frac{\pi}{12},\frac{7\pi}{12},\frac{19\pi}{12},\frac{23\pi}{12}\}$
   (c) $\{\frac{5\pi}{12},\frac{13\pi}{12},\frac{19\pi}{12}\}$
   (d) $\{\frac{\pi}{12},\frac{7\pi}{12},\frac{17\pi}{12},\frac{23\pi}{12}\}$

6. Let $x=\frac{1}{1.4}+\frac{1}{4.7}+\frac{1}{7.10}+\cdots\infty$ and $y=\frac{1}{1.2}+\frac{1}{2.3}+\frac{1}{3.4}+\cdots\infty$ then

   (a) y = 3x
   (b) y =2x
   (c) x+y=1
   (d) x+y= 3/2

7. If x AM's are inserted between $x^2$ and 1 then the value of the $x^{th}$ arithemtic mean is

   (a) 1-x
   (b) 1+x
   (c) $x^2-x+1$
   (d) $x$

8. A regular hexagon and a aregular dodecagon are inscribed in the same circle. If the side of the dodecagon is $(\sqrt{3}-1)$ , then the side of the hexagon is

   (a) 1
   (b) 2

(c) $\sqrt{2}$
(d) $2\sqrt{2}$

9. If $3+\frac{1}{4}(3+d)+\frac{1}{4^2}(3+2d)+\cdots+$ utpo $\infty=8$ then the value of d is
(a) 9
(b) 5
(c) 1
(d) none of these

10. If in a $\Delta$ ABC, $sin^3 A+sin^3 B+sin^3 C=3sinA.sinB.sinC$ then
(a) $\Delta$ ABC may be a scalene triangle
(b) $\Delta$ ABC is a right angled
(c) $\Delta$ ABC is an obtuse angled triangle
(d) $\Delta$ ABC is an equilateral triangle

11. If $acos^3\alpha+3acos\alpha\ sin^2\alpha=m$ and $asin^3\alpha+3a\ cos^2\alpha\ sin\alpha=n$ Then $(m+n)^{2/3}+(m-n)^{2/3}$ is equal to
(a) $2a^2$
(b) $2a^{1/3}$
(c) $2a^{2/3}$
(d) $2a^3$

12. Consider the A.P $a_1,a_2,\cdots,a_n\cdots$; the G.P $b_1,b_2,\cdots,b_n,\cdots$ such that $a_1=b_1=1; a_9=b_9$ and $\sum_{r=1}^{9} a_r=369$ then
(a) $b_6=27$
(b) $b_7=27$
(c) $b_8=81$
(d) $b_9=18$

13. If $cos\alpha=\frac{2cos\beta-1}{2-cos\beta}$ then $tan\frac{\alpha}{2}\ cot\frac{\beta}{2}$ has the value equal to , where $(0<\alpha<\pi)$ and $0<\beta<\pi)$
(a) 2
(b) $\sqrt{2}$
(c) 3
(d) $\sqrt{3}$

14. $2^{1/4}.4^{1/8}.8^{1/16}.16^{1/32}.32^{1/64}\cdots\infty$ is equal to
(a) 2
(b) 1
(c) 1/2
(d) 1/4

15. If $xsin\theta=ysin(\theta+\frac{2\pi}{3})=zsin(\theta+\frac{4\pi}{3})$ then
(a) x+y+z=0
(b) xy+yz+zx=0
(c) xyz+x+y+z=1
(d) none

16. Consider a decreasing G.P $g_1,g_2,g_3\cdots g_n\cdots$ such that $g_1+g_2+g_3=13$ and $g_1^2+g_2^2+g_3^2=91$ then which of the following does not holds ?
(a) the greatest term of the G.P is 9
(b) $3g_4=g_3$
(c) $g_1=1$
(d) $g_2=3$

17. Number of roots of the equation $cos^2x+\frac{\sqrt{3}+1}{2}sinx-\frac{\sqrt{3}}{4}-1=0$ which lie in the interval $[-\pi,\pi]$ is
    (a) 2
    (b) 4
    (c) 6
    (d) 8

18. The sum of the first three terms in an increasing G.P is 21 and the sum of their squares is 189. then the sum of its first n terms is
    (a) $3(2^n-1)$
    (b) $12(1-\frac{1}{2^n})$
    (c) $6(1-\frac{1}{2^n})$
    (d) $6(2^n-1)$

19. If $sin(\theta+\alpha)=a$ and $sin(\theta+\beta)=b(0<\alpha,\beta,\theta<\frac{\pi}{2})$ then $cos2(\alpha-\beta)-4abcos(\alpha-\beta)=$
    (a) $1-a^2-b^2$
    (b) $1-2a^2-2b^2$
    (c) $2+a^2+b^2$
    (d) $2-a^2-b^2$

20. If $S_n=\frac{1}{1^3}+\frac{1+2}{1^3+2^3}+\cdots+\frac{1+2+3+\cdots+n}{1^3+2^3+3^3+\cdots+n^3}, n=1,2,3,\cdots$ Then $S_n$ is not greater than
    (a) 1/2
    (b) 1
    (c) 2
    (d) 4

21. The exact value of $cos^2 73^\circ+cos^2 47^\circ+(cos73^\circ.cos47^\circ)$ is
    (a) 1/4
    (b) 1/2
    (c) 3/4
    (d) 1

22. Let $S_1,S_2,S_3$ be the sums of the first n, 2n,3n terms of an A.P respectively. If $S_3=C(S_2-S_1)$ then , $C$ is equal to
    (a) 4
    (b) 3
    (c) 2
    (d) 1

23. Maximum value of the expression $cos\theta.sin(\theta-\frac{\pi}{6})\forall\ \theta\in R$ is
    (a) 1/2
    (b) $\sqrt{3}/4$
    (c) 1/4
    (d) 1

24. The value of the expression $(sinx+cosecx)^2+(cosx+secx)^2-(tanx-cotx)^2$ wherever defined is equal to
    (a) 0
    (b) 5
    (c) 7
    (d) 9

25. The roots of the equation $2+cotx=cosec\ x$ always lie in the quadrant number
    (a) I only
    (b) I and II
    (c) II and IV
    (d) II only