Single Correct Answer Type:

1. In a ΔABC such that $\angle A = 45°$ and $\angle B = 75°$ then $a + c\sqrt{2} =$

   (A) 2b (B) 2c (C) b (D) c

2. If in a triangle ABC, $\frac{a^2 - b^2}{a^2 + b^2} = \frac{\sin(A - B)}{\sin(A + B)}$ then the triangle is

   (A) right angled or isosceles (B) right angled and isosceles
   (C) equilateral (D) none of these

3. Which of the following pieces of data do not uniquely determine a triangle ABC (R being the radius of the circumcircle)

   (A) a, sinA, sin B (B) a, b, c (C) a, sin B, R (D) a, sin A, R

4. If p_1, p_2 and p_3 are the altitudes of a triangle ABC from the vertices A,B and C respectively, then $\frac{1}{p_1} + \frac{1}{p_2} + \frac{1}{p_3} =$

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

5. If p_1, p_2 and p_3 are the altitudes of a triangle ABC from the vertices A,B and C respectively, then $\frac{\cos A}{p_1} + \frac{\cos B}{p_2} + \frac{\cos C}{p_3} =$

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

6. If A is the area and s be the semi perimeter of a triangle, then

   (A) $A \le \frac{s^2}{3\sqrt{3}}$ (B) $A \le \frac{s^2}{2}$ (C) $A > \frac{s^2}{3}$ (D) $A > \frac{s^2}{4}$

7. If in a triangle ABC $\frac{\sin A}{\sin C} = \frac{\sin(A - B)}{\sin(B - C)}$ then

   (A) a, b, c in A.P (B) a^2, b^2, c^2 are in A.P
   (C) a,b,c are in H.P (D) a^2, b^2, c^2 are in H.P

8. In ΔABC, $a \ge b \ge c$, if $\frac{a^3 + b^3 + c^3}{\sin^3 A + \sin^3 B + \sin^3 C} = 8$, then the maximum value of a is

   (A) $\frac{1}{2}$ (B) 2 (C) 8 (D) 64

9. In a ΔABC, $a^2 \cos^2 A = b^2 + c^2$, then

   (A) $A < \frac{\pi}{4}$ (B) $\frac{\pi}{4} < A < \frac{\pi}{2}$ (C) $A > \frac{\pi}{2}$ (D) $\frac{\pi}{4} < A < \frac{\pi}{2}$

10. $r_1 + r_2 =$

(A) $c\tan\left(\frac{C}{2}\right)$ (B) $c\cot\left(\frac{C}{2}\right)$ (C) $c\sin\left(\frac{C}{2}\right)$ (D) $c\cos\left(\frac{C}{2}\right)$

11. If $\frac{r}{r_1} = \frac{r_2}{r_3}$, then

(A) $A = 90°$ (B) $B = 90°$ (C) $C = 90°$ (D) None

12. In a triangle ABC, $2ac\sin\left(\frac{A-B+C}{2}\right) =$

(A) $a^2 + b^2 - c^2$ (B) $c^2 + a^2 - b^2$ (C) $b^2 - c^2 - a^2$ (D) $c^2 - a^2 - b^2$

13. In a triangle ABC, let $\angle C = \frac{\pi}{2}$. If r is the in-radius and R is the circum-radius of the triangle, then $2(R + r)$ is equal to

(A) $a + b$ (B) $b + c$ (C) $c + a$ (D) $a + b + c$

14. If the angles A, B, C of a triangle ABC are in arithmetical progression then

(A) $\tan A + \tan C - \sqrt{3}\tan A \tan C = \sqrt{3}$ (B) $\tan A + \tan C + \sqrt{3}\tan A \tan C = \sqrt{3}$

(C) $\tan A + \tan C - \sqrt{3}\tan A \tan C = -\sqrt{3}$ (D) $\tan A + \tan C + \sqrt{3}\tan A \tan C = -\sqrt{3}$

15. The expression $\frac{(a+b+c)(b+c-a)}{(c+a-b)(a+b-c)}$ is equal to

(A) $\cos^2\left(\frac{A}{2}\right)$ (B) $\sin^2\left(\frac{A}{2}\right)$ (C) $\cot^2\left(\frac{A}{2}\right)$ (D) $\tan^2\left(\frac{A}{2}\right)$

16. If $r_1 = 2r_2 = 3r_3$ then a, b, c are in

(A) A.P (B) G.P (C) H.P (D) none of these

17. If ABC is a triangle in which $B=45^0$, $C=120^0$ and a=40, the length of the perpendicular from A on BC produced is

(A) $3+\sqrt{3}$ (B) $20\left(3+\sqrt{3}\right)$ (C) $20\left(3-\sqrt{3}\right)$ (D) $3-\sqrt{3}$

18. If in a ΔABC cos B cos C + sin A sin B sin C = 1 then a : b : c is equal to

(A) $1 : 1 : \sqrt{2}$ (B) $\sqrt{2} : 1 : 1$ (C) $1 : \sqrt{2} : 1$ (D) 1 : 1 : 1

19. The ratio of the radius of circumcircle and incircle of a regular polygon of side n is

(A) cosec π/n : cot π/n (B) sin π/n : cos π/n

(C) tan π/n : cot π/n (D) tan π/n : cos π/n

20. If H is the orthocentre of the triangle ABC, then AH is equal to

(A) 2R cosA (B) 2R sinA (C) a cotA (D) $\frac{2abc}{\Delta}\cos A$

Numerical Based:

21. In any triangle ABC, if $\frac{\cos A}{a}=\frac{\cos B}{b}=\frac{\cos C}{c}$ then the value of $\left(\frac{r_1+r_2+r_3}{r}\right)=$ _____

22. Let T_n denotes the number of triangles which can be formed using the vertices of a regular polygon of n sides. If $T_{n+1} - T_n = 21$ then n equals _____

23. A triangle has base 10 cm long and the base angles are 50° and 70°. If the perimeter of the triangle is $x+y\cos(z^\circ)$ where $z\in(0,90^\circ)$, then the value of $(x+y+z)$ _____

24. The median AD of a triangle ABC is perpendicular to AB. Then $\tan A+2\tan B=$ _____

25. Given that a,b,c and d are the sides of a quadrilateral, if the minimum value of $\left(\frac{a^2+b^2+c^2}{d^2}\right)$ is $\frac{p}{q}$ then $p+q$ is _____

KEY

1.	A	**2.**	B	**3.**	D	**4.**	A	**5.**	B
6.	A	**7.**	B	**8.**	B	**9.**	C	**10.**	B
11.	C	**12.**	B	**13.**	A	**14.**	C	**15.**	C
16.	A	**17.**	B	**18.**	B	**19.**	A	**20.**	A
21.	1	**22.**	7	**23.**	40	**24.**	0	**25.**	4

❇ *Wish You all the Best* ❇