EXERCISE – I SINGLE CORRECT (OBJECTIVE QUESTIONS)

1. In a ΔABC, A : B : C = 3 : 5 : 4. Then $a + b + c\sqrt{2}$ is equal to
(A) 2b (B) 2c (C) 3b (D) 3a

2. If in a ΔABC, $\frac{\cos A}{a} = \frac{\cos B}{b} = \frac{\cos C}{c}$, then the triangle is
(A) right angled (B) isosceles
(C) equilateral (D) obtuse

3. In a ΔABC $\frac{bc\sin^2 A}{\cos A + \cos B\cos C}$ is equal to
(A) $b^2 + c^2$ (B) bc (C) a^2 (D) $a^2 + bc$

4. In a triangle ABC, (a + b + c) (b + c – a) = kbc, if
(A) k < 0 (B) k > 6 (C) 0 < k < 4 (D) k > 4

5. If in a triangle ABC, right angle at B, s – a = 3 and s – c = 2, then
(A) a = 2, c = 3 (B) a = 3, c = 4
(C) a = 4, c = 3 (D) a = 6, c = 8

6. In a ΔABC if b + c = 3a, then $\cot\frac{B}{2} \cdot \cot\frac{C}{2}$ has the value equal to
(A) 4 (B) 3 (C) 2 (D) 1

7. In a ΔABC, A = $\frac{2\pi}{3}$, b – c = $3\sqrt{3}$ cm and

ar(ΔABC) = $\frac{9\sqrt{3}}{2}$ cm^2. Then a is

(A) $6\sqrt{3}$ cm (B) 9 cm (C) 18 cm (D) None of these

8. If in a ΔABC, $\Delta = a^2 - (b - c)^2$, then tan A =
(A) 15/16 (B) 8/15 (C) 8/17 (D) 1/2

9. If R denotes circumradius, then in ΔABC, $\frac{b^2 - c^2}{2aR}$ is equal to
(A) cos (B – C) (B) sin (B – C)
(C) cos B – cos C (D) None of these

10. If a ΔABC, if b = 2 cm, c = $\sqrt{3}$ and $\angle A = \frac{\pi}{6}$, then values of R is equal to

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

11. In a ΔABC, the value of $\frac{a\cos A + b\cos B + c\cos C}{a + b + c}$ is equal to

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

12. If the sides of a triangle are 3 : 7 : 8, then R : r is equal to
(A) 2 : 7 (B) 7 : 2 (C) 3 : 7 (D) 7 : 3

13. In a right angled triangle R is equal to

(A) $\frac{s+r}{2}$ (B) $\frac{s-r}{2}$ (C) s – r (D) $\frac{s+r}{a}$

14. If the area of triangle is 100 sq. cm, r_1 = 10 cm and r_2 = 50 cm, then the value of (b – a) is equal to
(A) 20 (B) 16 (C) 8 (D) 4

15. In a ΔABC, the inradius and three exradii are r, r_1, r_2 and r_3 respectively. In usual notations the value of $r \cdot r_1 \cdot r_2 \cdot r_3$ is equal to

(A) 2Δ (B) Δ^2 (C) $\frac{abc}{4R}$ (D) None of these

16. In a ΔABC if $r_1 > r_2 > r_3$, then
(A) a > b > c (B) a < b < c
(C) a > b and b < c (D) a < b and b > c

17. The product of the arithmetic mean of the lengths of the sides of a triangle and harmonic mean of the lengths of the altitudes of the triangle is equal to
(A) Δ (B) 2Δ (C) 3Δ (D) 4Δ

18. In a ΔABC, if AB = 5 cm, BC = 13 cm and CA = 12 cm, then the distance of vertex A from the side BC is (in cm)

(A) $\frac{25}{13}$ (B) $\frac{60}{13}$ (C) $\frac{65}{12}$ (D) $\frac{144}{13}$

19. If AD, BE and CF are the medians of ΔABC, then $(AD^2 + BE^2 + CF^2) : (BC^2 + CA^2 + AB^2)$ is equal to
(A) 4 : 3 (B) 3 : 2 (C) 3 : 4 (D) 2 : 3

20. In a triangle ABC, right angled at B, the inradius is

(A) $\frac{AB+BC-AC}{2}$ (B) $\frac{AB+AC-BC}{2}$

(C) $\frac{AB+BC+AC}{2}$ (D) None of these

21. If H is the orthocentre of a triangle ABC, then the radii of the circle circumscribing the triangles BHC, CHA and AHB are respectively equal to
(A) R, R, R (B) $\sqrt{2}R, \sqrt{2}R, \sqrt{2}R$
(C) 2R, 2R, 2R (D) $\frac{2}{R}, \frac{2}{R}, \frac{2}{R}$

22. The distance between the middle point of BC and the foot of the perpendicular form A is

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

(C) $\frac{b^2+c^2}{\sqrt{bc}}$ (D) None of these

23. Let f, g, h be the lengths of the perpendiculars from the circumcentre of the ΔABC on the sides a, b and c respectively. If $\frac{a}{f} + \frac{b}{g} + \frac{c}{h} = \lambda\frac{abc}{fgh}$ then the value of λ is
(A) 1/4 (B) 1/2 (C) 1 (D) 2

24. In a triangle ABC, if $\frac{a-b}{b-c} = \frac{s-a}{s-c}$, then r_1, r_2, r_3 are in
(A) A.P. (B) G.P. (C) H.P. (D) None of these

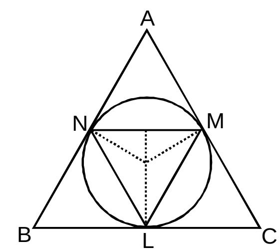
25. A triangle is inscribed in a circle. The vertices of the triangle divide the circle into three arcs of length 3, 4 and 5 units. Then area of the triangle is equal to

(A) $\frac{9\sqrt{3}(1+\sqrt{3})}{\pi^2}$ (B) $\frac{9\sqrt{3}(\sqrt{3}-1)}{\pi^2}$

(C) $\frac{9\sqrt{3}(1+\sqrt{3})}{2\pi^2}$ (D) $\frac{9\sqrt{3}(\sqrt{3}-1)}{2\pi^2}$

26. If in a triangle ABC, the line joining the circumcentre and incentre is parallel to BC, then cos B + cos C is equal to
(A) 0 (B) 1 (C) 2 (D) None of these

27. If the incircle of the Δ ABC touches its sides respectively at L, M and N and if x, y, z be the circumradii of the triangles MIN, NIL and LIM where I is the incentre then the product xyz is equal to



(A) $R r^2$ (B) $r R^2$

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

28. If in a ΔABC, $\frac{r}{r_1} = \frac{1}{2}$, then the value of $\tan\frac{A}{2}\left(\tan\frac{B}{2}+\tan\frac{C}{2}\right)$ is equal to

(A) 2 (B) $\frac{1}{2}$ (C) 1 (D) None of these

29. If in a ΔABC, $\angle A = \frac{\pi}{2}$, then $\tan\frac{C}{2}$ is equal to

(A) $\frac{a-c}{2b}$ (B) $\frac{a-b}{2c}$ (C) $\frac{a-c}{b}$ (D) $\frac{a-b}{c}$

30. In a acute angled triangle ABC, AP is the altitude. Circle drawn with AP as its diameter cuts the sides AB and AC at D and E respectively, then length DE is equal to

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

31. AA_1, BB_1 and CC_1 are the medians of triangle ABC whose centroid is G. If points A, C_1, G and B_1 are concyclic, then
(A) $2b^2 = a^2 + c^2$ (B) $2c^2 = a^2 + b^2$
(C) $2a^2 = b^2 + c^2$ (D) None of these

32. If ℓ is the median from the vertex A to the side BC of a ΔABC, then
(A) $4\ell^2 = b^2\ 4ac \cos B$ (B) $4\ell^2 = a^2 + 4bc \cos A$
(C) $4\ell^2 = c^2 + 4ab \cos C$ (D) $4\ell^2 = b^2 + 2c^2 - 2a^2$

33. In a ΔABC, a = 1 and the perimeter is six times the A.M. of the sines of the angles. Then measure of $\angle A$ is

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{2}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{4}$

34. If the median AD of a triangle ABC divides the angle $\angle BAC$ in the ratio 1 : 2, then $\frac{\sin B}{\sin C}$ is equal to

(A) 2 cos (A/3) (B) (1/2) sec (A/3)
(C) (1/2) sin (A/3) (D) 2 cosec (A/3)s

35. In a triangle ABC, let $\angle C = \pi/2$, if r is the inradius and R is the circumradius of the triangle ABC, then 2(r + R) equals
(A) c + a (B) a + b + c (C) a + b (D) b + c

36. If in a ΔABC, the altitudes from the vertices A, B, C on opposite sides are in HP, then sinA, sinB, sinC are in
(A) HP (B) Arithemetic-Geometric Progression
(C) AP (D) GP

37. The sides of a triangle are $\sin\alpha$, $\cos\alpha$, and $\sqrt{1+\sin\alpha\cos\alpha}$ for some $0 < \alpha < \frac{\pi}{2}$. Then the greatest angle of the triangle is
(A) 60º (B) 90º (C) 120º (D) 150º

38. The sum of the radii of inscribed and circumscribed circle for an n sided regular polygon of side a, is

(A) $a \cot\left(\frac{\pi}{n}\right)$ (B) $\frac{a}{2}\cot\left(\frac{\pi}{2n}\right)$

(C) $a \cot\left(\frac{\pi}{2n}\right)$ (D) $\frac{a}{4}\cot\left(\frac{\pi}{2n}\right)$

39. If in a triangle ABC $a\cos^2\left(\frac{C}{2}\right) + c\cos^2\left(\frac{A}{2}\right) = \frac{3b}{2}$, then the sides a, b and c
(A) are in AP (B) are in GP
(C) are in HP (D) satisfy a + b = c

40. In a triangle ABC, medians AD and BE are drawn. If AD = 4, $\angle DAB = \frac{\pi}{6}$ and $\angle ABE = \frac{\pi}{3}$, then the area of the ΔABC is

(A) $\frac{8}{3}$ (B) $\frac{16}{3}$ (C) $\frac{32}{3\sqrt{3}}$ (D) $\frac{64}{3}$

41. If the radius of the circumcircle of an isosceles triangle PQR is equal to PQ = PR then the angle P is

(A) $\frac{2\pi}{3}$ (B) $\frac{\pi}{2}$ (C) $\frac{\pi}{3}$ (D) $\frac{\pi}{6}$

42. Given an isosceles triangle, whose one angle is 120º and radius of its incircle is $\sqrt{3}$, then the area of the triangle in sq. units is

(A) $7+12\sqrt{3}$ (B) $12+7\sqrt{3}$

(C) $12-7\sqrt{3}$ (D) $4+2\sqrt{3}$

43. The sides a, b, c of a triangle ABC are the roots of $x^3 - 11x^2 + 38x - 40 = 0$, then $\sum \frac{\cos A}{a} =$

(A) $\frac{3}{4}$ (B) 1 (C) $\frac{9}{16}$ (D) None of these

44. In a triangle ABC $\frac{a\sin B + b\sin A}{\sqrt{\sin A\sin B}} = 4$, $\angle C = \frac{\pi}{3}$, then $a^2 + b^2 - c^2 =$
(A) 4 (B) 6 (C) 8 (D) 10

45. In a triangle cot A : cot B : cot C = 30 : 19 : 6, then a : b : c
(A) 5 : 6 : 7 (B) 6 : 7 : 5
(C) 7 : 6 : 5 (D) None of these

46. If twice the square of the diameter of a circle is equal to sum of the squares of the sides of the inscribed triangle ABC, then $\sin^2A + \sin^2B + \sin^2C$ is equal to
(A) 2 (B) 3 (C) 4 (D) 1

47. In a triangle ABC if $\frac{a}{1} = \frac{b}{\sqrt{3}} = \frac{c}{2}$, then
(A) A + B – C = 90º
(B) the triangle is acute angled
(C) A, B, C are in A.P.
(D) the triangle is obtuse angled

48. In a triangle ABC, if s – a, s – b, s – c are in GP, then $\frac{\sin^2 A + \sin^2 C}{\sin A + \sin C} =$

(A) sin B (B) cos B
(C) sin [(A + C)/2] (D) sin [(A – C)/2]

49. If $\cos A = \frac{\sin B}{2\sin C}$, then ΔABC is

(A) equilateral (B) isosceles
(C) right angled (D) None of these

50. In a triangle ABC if $\frac{\cos A}{a} = \frac{\tan C}{c}$, then sin (B+C) is equal to

(A) cos B cos C (B) cos A cos C
(C) cos A cos B (D) sin B sin C

51. In a triangle ABC, 1 – tan (A/2) tan (B/2) is equal to

(A) $\frac{2a}{b+c-a}$ (B) $\frac{2b}{c+a-b}$
(C) $\frac{2c}{a+b-c}$ (D) $\frac{2c}{a+b+c}$

52. The angles of a triangle ABC are in A.P. The largest angle is twice the smallest angle and the median to the largest side divides the angle at the vertex in the ratio 2 : 3. If length of the median in $2\sqrt{3}$ cm, length of the largest side is

(A) 2 sin 32º (B) 2 sin 48º
(C) 8 sin 48º (D) $\sqrt{3}$ sin 40º

53. The vertices angle of a triangle is divided into two parts, such that the tangent of one part is 3 times the tangent of the other and the difference of these parts is 30º, then the triangle is

(A) isosceles (B) right angled
(C) obtuse angled (D) None of these

54. In a triangle ABC, if tan (A/2) = p, tan (B/2) = q, then $\frac{2(p+q)(1-pq)}{(1+p^2)(1+q^2)}$ is equal to

(A) sin A (B) sin B (C) sin C (D) sin A + sin B

55. If I is the incentre of a triangle whose in raidus and circumradius are r and R respectively; $I_1 I_2 I_3$ is its ex-centre triangle, then $II_1 . II_2 . II_3$ is equal to

(A) R^2r (B) $16R^2r$ (C) Rr^2 (D) $16Rr^2$

56. If R is the circumradius of a triangle ABC then the area of its pedal triangle is

(A) (1/2) R^2 sin A sin B sin C
(B) (1/2) R^2 sin 2A sin 2B sin 2C
(C) (1/2) R^2 cos A cos B cos C
(D) (1/2) R^2 cos 2A cos 2B cos 2C

57. In an isosceles triangle with base angle α and lateral side 4, Rr =

(A) 8 cos α (B) $\frac{8\cos\alpha}{1-\cos\alpha}$
(C) $\frac{8\cos\alpha}{1+\cos\alpha}$ (D) 8 cos α (1 – cos α)