

COUNCIL OF CBSE AFFILIATED SCHOOLS IN THE GULF

18TH GULF MATHEMATICS OLYMPIAD- JAN. 2011.

Organizing School: INTERNATIONAL INDIAN SCHOOL- DAMMAM (KSA)

INTERMEDIATE LEVEL (GRADE- X)

DATE: MONDAY, 24TH JANUARY-2011.

TIME: 2 Hrs. (10.30 am TO 12.30 pm)IST.

M. MARKS: 50

"This booklet has 07 printed pages including answer coding sheet"

Instructions to the candidates:

- Write your Roll number only in the space provided on the top of the answer coding sheet.
- The question paper contains 50 multiple choice questions, each of which is provided with four alternative answers.
- Choose the answer you consider the best and indicate your choice on the answer coding sheet provided by marking "X" inside the appropriate box for each answer using a Blue/Black ball point pen.
- There is no negative marking for any wrong answer.
- Detach the answer coding sheet and hand over the same to the invigilator at the end of the session.
- Use of calculator is not permitted.
- More than one answer indicated against a question will be deemed as incorrect.
- Use the sheet attached at the end for any rough work.
- Please avoid overwriting.

1. Two concentric circles are of radii 13cm and 5 cm. The length of the chord of larger circle which touches the smaller circle is
(a) 12cm (b) 20cm (c) 24cm (d) 26cm
2. A quadrilateral ABCD is drawn to circumscribe a circle. If $AB = 12\text{cm}$, $BC = 15\text{cm}$ and $CD = 14\text{cm}$, then AD is equal to
(a) 10cm (b) 11cm (c) 12cm (d) 14cm
3. A quadrilateral ABCD circumscribing a circle whose center is at O. If the $\angle AOB = 125^\circ$ then $\angle COD$ is
(a) 62.5° (b) 45° (c) 35° (d) 55°
4. To construct a triangle similar to a given triangle ABC with its sides $7/5^{\text{th}}$ of the corresponding sides of triangle ABC, draw a ray BX such that $\angle CBX$ is an acute angle and X is on the opposite side of A with respect to BC. The minimum number of points to be located at equal distances on the ray BX is
(a) 5 (b) 7 (c) 12 (d) 2
5. To draw a pair of tangents to a circle which are inclined to each other at an angle of 50° , it is required to draw tangents at the end points of the two radii of the circle, the angle between radii should be
(a) 40° (b) 50 (c) 130° (d) 140°
6. From top of a cliff 25m high, the angle of elevation of the top of a tower is found to be equal to the angle of depression of the foot of the tower. The height of the tower is
(a) 40m (b) 50m (c) 60m (d) 75m
7. The shadow of a tower, standing on a level ground, is found to be 40m longer when sun's altitude is 30° than when it was 60° . Then the height of the tower is
(a) 20m (b) $10\sqrt{3}\text{m}$ (c) 10m (d) $20\sqrt{3}\text{m}$
8. S is a point on X-axis at a distance of 4 units from Y-axis to its right. The coordinate of S are,
(a) (4, 0) (b) (0, 4) (c) (4, 4) (d) (-4, 4)
9. (-1, 2), (2, -1) and (3, 1) are three vertices of a parallelogram. The coordinates of the fourth vertex are
(a) (2, 0) (b) (-2, 0) (c) (0, 4) (d) (6, 2)
10. If the angles of elevation of the top of a tower from two points distant a and b from the base and in the same straight line with it, are complementary, then the height of the tower is
(a) ab (b) a/b (c) \sqrt{ab} (d) $\sqrt{a/b}$
11. The ratio of the length of a rod and its shadow is $1 : \sqrt{3}$. The altitude of the sun is
(a) 30° (b) 45° (c) 60° (d) 90°

12. The tops of two towers of height 20 m and 14 m are connected by a wire. If the wire makes an angle of 30° with the horizontal, then the length of the wire is
 (a) 12 m (b) 10 m (c) 8 m (d) 6 m
13. A pole subtends an angle of 30° at a point on the same level as its foot. At a second point h meters above the first, the depression of the foot of the pole is 60° . The height of the pole is
 (a) $h/2$ m (b) $\sqrt{3}h$ m (c) $h/3$ m (d) $h/\sqrt{3}$ m
14. Two persons are 'a' meters apart and the height of one is double that of the other. If from the middle point of the line joining their feet, an observer finds the angular elevation of their top to be complementary, then the height of the short person is
 (a) $a/4$ m (b) $a/\sqrt{2}$ m (c) $a\sqrt{2}$ m (d) $a/2\sqrt{2}$ m
15. For an event E, the correct inequality is
 (a) $0 < P(E) < 1$ (b) $0 < P(E) \leq 1$ (c) $0 \leq P(E) < 1$ (d) $0 \leq P(E) \leq 1$.
16. PT is a tangent from an external point T to the circle with center O, such that $OT = 4$ cm and $\angle OTP = 30^\circ$ then PT is equal to
 (a) $4\sqrt{3}$ cm (b) $2\sqrt{3}$ cm (c) 2 cm (d) 4 cm
17. Tangents to a circle drawn from a point P outside the circle are perpendicular to each other and length of each tangent is 6 cm, the radius of the circle is
 (a) 3 cm (b) 6 cm (c) 4.5 cm (d) 7.5 cm
18. If the roots of the quadratic equation $px^2 - qx - r = 0$ are reciprocal of one another then which of the following is true ?
 (a) r is divisible by q (b) $q = r$ (c) $p = r$ (d) q is divisible by p
19. The value of x satisfying $x = \sqrt{6 + \sqrt{6 + \sqrt{6 + \sqrt{6 + \dots}}}}$
 (a) 3, -2 (b) -2 (c) 3 (d) none of these.
20. If $px^2 - qx - r = 0$ has equal roots, then $r = ?$
 (a) $-\frac{q}{2p}$ (b) $\frac{q}{2p}$ (c) $-\frac{q^2}{4p}$ (d) $\frac{q^2}{4p}$
21. The roots of the equation $(a + b)x^2 - 2ax + (a - b) = 0$ are
 (a) not real (b) real (c) real and equal (d) equal

22. If 5 times the 5th term of an A P is equal to 12 times the 12th term, then its 17th term is
 (a) 5 (b) 0 (c) 12 (d) 7
23. If the numbers a, b, c, d, e form an A P, then the value of $a - 4b + 6c - 4d + e$ is
 (a) 1 (b) 2 (c) 0 (d) none of these
24. Which term of the sequence $20, 19\frac{1}{4}, 18\frac{1}{2}, 17\frac{3}{4}, \dots$ is the first negative term
 (a) 27th (b) 29th (c) 28th (d) 30th
25. The common difference of an A P whose n th term is $(6n + 2)$ is
 (a) 8 (b) 6 (c) 2 (d) 4
26. If a wire of 440 m length is moulded in the form of a circle and a square turn by turn. Then the ratio of the area of the circle to that of the square is
 (a) 11:11 (b) 11:12 (c) 14:11 (d) 14:12
27. The radii of two circles are 8 cm and 6 cm respectively. The radius of the circle having area is equal to the sum of the areas of the two circles is
 (a) 5 cm (b) 14 cm (c) 2 cm (d) 10 cm
28. The minute hand of a clock is 10 cm long. The area swept by the minute hand between 7.00 am and 7.35 am is
 (a) $\frac{154}{21} \text{ cm}^2$ (b) $\frac{1100}{3} \text{ cm}^2$ (c) $\frac{1100}{6} \text{ cm}^2$ (d) $\frac{1540}{3} \text{ cm}^2$
29. The difference between circumference and diameter of a circle is 135 cm. Then the radius of the circle is
 (a) 32.1 cm (b) 31.5 cm (c) 30.2 cm (d) 60.3 cm
30. A rectangular paper is 44 cm long and 20 cm wide. A cylinder is formed by rolling the paper along its length. The volume of the cylinder is
 (a) 3800 cm^3 (b) 3080 cm^3 (c) 1056 cm^3 (d) 380 cm^3
31. The perimeter of a sector of a circle of radius 9 cm is 33 cm. Then the area of this sector is
 (a) 57.6 cm^2 (b) 61.25 cm^2 (c) 67.5 cm^2 (d) 70 cm^2
32. A right circular cylinder of radius 'r' cm and height 'h' cm ($h > 2r$) just encloses a sphere of diameter
 (a) r cm (b) 2r cm (c) h cm (d) 2h cm

33. Three cubes each volume 216 cu m are joined end to end. The surface area of the resulting solid is
 (a) 216 sq.m (b) 480sq.m (c) 432sq.m (d) 504sq.m
34. A sphere of radius 3 cm is melted and drawn into a long wire of uniform circular cross section. If the length of wire is 36 m , radius will be
 (a) 100m (b) 0.1cm (c) 0.01cm (d) 100cm
35. The perimeter of a triangle is 30 cm and circumference of its incircle is 88 cm . The area of triangle is
 (a) 70 sq. cm (b) 140 sq. cm (c) 210 sq. cm (d) 420 sq. cm
36. If a pair of dice is thrown then probability of getting 7 as the sum of the numbers appearing on the dice is
 (a) $\frac{4}{9}$ (b) $\frac{3}{4}$ (c) $\frac{1}{6}$ (d) $\frac{5}{6}$
37. My garden has an area of 200 m^2 . It consists of a lawn of area 168 m^2 and a pond of area 32 m^2 . If a wild duck lands in my garden at random, what is the probability that it will land on the lawn?
 (a) $21/25$ (b) $23/25$ (c) $8/25$ (d) $22/25$
38. Rekha and Reshma are friends. What is the probability that both will have different birthdays? (ignoring a leap year)
 (a) $1/365$ (b) $364/365$ (c) $317/365$ (d) $362/365$.
39. A piggy bank contains eighty 50 p coins, thirty $\text{Rs. } 2$ coins and fifteen $\text{Rs. } 5$ coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, what is the probability that this will not be a $\text{Rs. } 5$ coin?
 (a) $22/25$ (b) $11/12$ (c) $11/25$ (d) $7/10$
40. The mid point of the line segment joining the points $P(6, b-2)$ and $Q(-2, 4)$ is $(2, -3)$. Then the value of b is
 (a) -4 (b) -8 (c) 8 (d) 4
41. The coordinates of the points of trisection of the line segment joining the points $(5, -3)$ and $(2, -9)$ are
 (a) $(4, 5), (3, 7)$ (b) $(4, -5), (3, -7)$ (c) $(4, -5), (3, 7)$ (d) $(4, 5), (3, -7)$
42. If the points $(-1, 3)$, $(1, -1)$ and $(5, 1)$ are the vertices of a triangle, then the length of the median through the first vertex is
 (a) 7 units (b) 5 units (c) 10 units (d) 25 units

43. The radii of two cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 3. Then the ratio of their volumes is
 (a) 3 : 4 (b) 5 : 3 (c) 27 : 20 (d) 20 : 27
44. A cone, a hemisphere and a cylinder stand on equal bases and have the same height. The ratio of their volume is
 (a) 1 : 2 : 3 (b) 3 : 2 : 1 (c) 1 : 3 : 2 (d) 2 : 3 : 1
45. The ratio of the volume of a cube to that of a sphere which will fit inside the cube is
 (a) $4 : \pi$ (b) $5 : \pi$ (c) $6 : \pi$ (d) $2 : \pi$
46. Ramesh and Ibraheem solve a quadratic equation. In solving Ramesh commits a mistake in constant term and finds the roots 8 and 2. Ibraheem commits a mistake in the coefficient of x and finds the roots -9 and -1, then the correct roots of the equation are
 (a) -8, -1 (b) -9, 2 (c) 8, 1 (d) 9, 1
47. If α and β are the roots of the equation $x^2 - 2x + 3 = 0$, the equation whose roots are $\alpha + 2$ and $\beta + 2$ is
 (a) $x^2 - 6x - 11 = 0$ (b) $x^2 - 5x - 10 = 0$ (c) $x^2 - 10x - 5 = 0$ (d) $x^2 - 6x - 11 = 0$.
48. If the sum of first n even natural numbers is equal to k times the sum of first n odd natural numbers, then k is equal to
 (a) $\frac{n-1}{n}$ (b) $\frac{n-1}{2n}$ (c) $\frac{n-1}{n}$ (d) $\frac{1}{n}$
49. In an A.P. the sum of terms equidistant from the beginning and end is equal to
 (a) first term (b) last term (c) sum of first and last term (d) none of these.
50. The roots of $(x^2 - 1)^2 - x^2 = 0$ are
 (a) 1 & -1 (b) 0 & 0 (c) $\frac{1}{2}$ & $-\frac{1}{2}$ (d) $\frac{1}{\sqrt{2}}$ and $-\frac{1}{\sqrt{2}}$
