# INDIAN SCHOOL SOHAR Summative Assessment – II Class-X (2016–17) Mathematics

# Time Allowed: 3 Hours

### Max. Marks: 90

Date :

**General Instructions:** 

1. All questions are compulsory.

2. The question paper consists of 31 questions divided into four sections A, B, C and D.

- 3. Section A contains 4 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 11questions of 4 marks each.
- 4. Use of calculators is not permitted.

## SECTION – A

### (Question numbers 1 to 4 carry 1 mark each)

- 1. If two towers of height  $h_1$  and  $h_2$  subtend angles of  $60 \cdot$  and  $30 \cdot$  respectively at the mid-point of the line joining their feet, then find  $h_1 : h_2$
- 2. Find the tenth term of  $\sqrt{2}$ ,  $\sqrt{8}$ ,  $\sqrt{18}$ .....
- 3. Out of 200 bulbs, 12 bulbs are defective. One bulb is taken out at random from the box. What is the probability that the drawn bulb is not defective ?
- 4. In fig, two equal circles touch each other at T, if QP = 4.5 cm, find QR



### SECTION – B (Question numbers 5 to 10 carry 2 marks each)

- 5. If the equation  $kx^2 2kx + 6 = 0$  has equal roots, find k
- 6. Find the middle most term of the A.P. -11, -7, -3, ......, 45.
- 7. In given figure, a circle touches the side QR of  $\triangle$  PQR at A and sides PQ and PR on producing at S and T respectively. If PS = 8 cm, find the perimeter of  $\triangle$  PQR.



8. Find the relation between x and y such that P(x,y) is equidistant for points A(-5,3) and B(7,2)

9. ABC is an isosceles triangle in which AB = AC which is circumscribed about a circle as shown in the figure. Show that BC is bisected at the point of contact



10. Find the distance between the points  $P\left(\frac{\sin\theta}{2}, 0\right)$  and  $Q\left(0, \frac{\cos\theta}{2}\right)$ 

#### SECTION C

- 11. Solve  $\frac{1}{(a+b+x)} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$ ,  $a+b \neq 0$
- 12. If 7 times the 7th term of an A.P. is equal to 11 times its 11th term, show that the its 18th term is zero.
- 13. The minute hand of a clock is 12 cm. long. Find the area of the face of the clock described by the minute hand between 9.A.M. and 9:35 A.M .
- 14. A semicircular sheet of metal of diameter 28 cm is bent into an open conical cup. Find the depth and capacity of the cup.
- 15. In the given figure, ABC is a right angled triangle right angled at A. Semi circles are drawn on AB, AC and BC as diameters. Find the area of the shaded region.



- 16. A number is selected from the numbers 1, 2, 3, 4 and a second number is selected from the numbers 1, 5, 6, 12. Find the probability that the product of two numbers selected is less than 12 ?
- 17. A circus tent is cylindrical upto a height of 3 m and conical above it. If the diameter of the base of cone and cylinder is 105 m and the slant height of the conical part is 53 m, find the total canvas used in making the tent.
- 18. Point P divides the line segment joining the points A (-1, 3) and B (9, 8) such that  $\frac{AP}{PB} = \frac{k}{1}$

If P also lies on the line x - y + 2 = 0, find the value of k.

- 19. From a point P on the ground, the angles of elevation of the top of a 20m tall building and of a helicopter, hovering at some height above the top of the building are 30 · and 60 · respectively. Find the height at which the helicopter is hovering (above the ground)
- 20. The perimeter of the ends of the frustum a cone are 207.24cm and 69.56cm. If the height of the frustum is 8cm, find the total surface area of the frustum. ( use  $\pi = 3.14$  )

#### **SECTION D**

- 21. A two digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchanges their places. Find the number.
- 22. A spiral is made up of successive semi-circles with centres alternately at A and B starting with A, of radii 1 cm, 2 cm, 3 cm, ..... as shown in the figure. What is the total length of spiral made up of eleven consecutive semicircles ? (Use  $\pi = 3.14$ )



- 23. Prove that the lengths of the tangents drawn from an external point to a circle are equal. Using the above theorem, prove that AB + CD = AD + BC, if a quadrilateral ABCD is drawn to circumscribe a circle.
- 24. Draw a pair of tangents inclined to each other at a angle of 60 to a circle of radius 3cm
- 25. The angle of elevation of a jet aircraft from a point P on the ground is 60. After a flight of 15 seconds, the angle of elevation becomes half of the previous angle. If the jet is flying at speed
  - of 720 km/hr, find the constant height at which the jet is flying. ( Use  $\sqrt{3} = 1.73$ )

- 26. A bag contains 12 marbles out of which *y* are white. (i) If one marble is drawn at random from the box, what is the probability that it will be white marble. (ii) If 6 more white marbles are put in the bag, the probability of drawing a white marble will double than that in (i) find *y*.
- 27. A vessel is in the form of an inverted cone. Its height is 8 cm. It is fill with water up to brim. When 100 lead shots each of which is a solid sphere of radius 0.5 cm are dropped in the vessel, one fourth of water flows out. Find the diameter of its top.
- 28. ABC is an isosceles triangle with AB = AC and vertex A is on y-axis. If the coordinates of vertex B and C are (-5, -2) and (3, 2) respectively, then find the coordinates of vertex A. Also find the length of median AD.
- 29. A hemispherical tank of radius  $\frac{7}{4}$  m is full of water. It is connected by a cylindrical pipe which empties it at 7 litres per second. Find the time it will take to empty the whole tank.
- 30. Three eighth of the students of a class opted for visiting an old age home. Sixteen students opted for having a nature walk. Square root of total number of students in the class opted for tree plantation in the school. The number of students who visited an old age home is same as the number of students who went for a nature walk and did tree plantation. Find the total number of students. What values are inculcated in students through such activities?
- 31. The radius of the in-circle of a triangle is 4 cm and the segments into which one side is divided by the point of contact are 6 cm and 8 cm. Determine the other two sides of the triangle.