Series RMT

Code No. **RSPL/2**

Roll No. | 4 | 3 | 4 | 5 | 2 | 0 | 8 |

Candidates must write the Code on the title page of the answer-book.

- Please check that this question paper contains **7** printed pages.

- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.

- Please check that this question paper contains **31** questions.

- **Please write down the Serial Number of the question before attempting it.**

- **15** minutes time has been allotted to read this question paper.

SUMMATIVE ASSESSMENT – II
MATHEMATICS

Time allowed : 3 hours   *Maximum Marks : 90*

General Instructions :

(i)   All questions are compulsory.

(ii)   The question paper consists of **31** questions divided into four sections — A, B, C and D.

(iii) 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 and Section D contains **11** questions of **4** marks each.

(iv)   Use of calculators is not permitted.

Question numbers 1 to 4 carry 1 mark each.

SECTION - B

1. The sum of the ages of brother and sister is 20. Four years ago the product of their ages in years was 32. Is it possible to determine their present ages?

2. Cards are marked with numbers 3, 4, 5, ... 30 are placed in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the card drawn is a prime number.

3. An observer 1.7 m tall, is $20\sqrt{3}$ m away from a tower. Find the angle of elevation from the eye of the observer to the top of the tower, if the height of the tower is 21.7 m.

4. Is it possible to say, that tangents drawn at the ends of a diameter are parallel? If possible, give reason.

SECTION – B

Question numbers 5 to 10 carry 2 marks each.

5. In fig. 1, two concentric circles with centre O and of radii 5 cm and 3 cm are drawn as shown. Tangents PA and PB are drawn to the circle from an external point P. If BP = 14 cm, find AP.
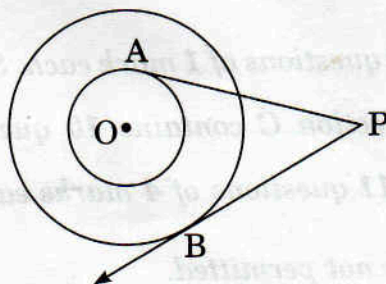

Figure 1

6. k + 9, 2k − 1, 2k + 7 forms an AP. Determine k and nth term of the given AP.

7. Determine k, where point P lies on x-axis divides line segment joining points A(2, −k) and B(−7, 4) in the ratio 1 : 2.

8. Find the number of all multiples of 7 lying between 109 and 993.

9. In fig. 2, two circles touch each other at point C. Prove that common tangent to the circles at C, bisects the common tangent PQ at R.
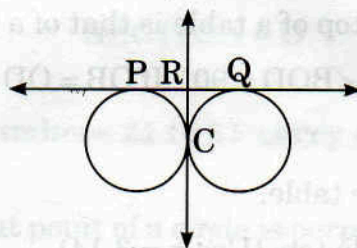

Figure 2

10. A(6, 1), B(8, 2) and C(9, 4) are the three vertices of a parallelogram ABCD. Determine the coordinates of the point D.
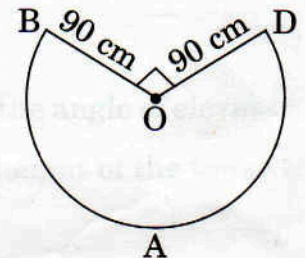
SECTION – C

Question numbers 11 to 20 carry 3 marks each.

11. A hemispherical bowl of internal diameter 60 cm contains some liquid. This liquid is to be emptied into cylindrical bottles each of diameter 10 cm and height 12 cm. Find the number of bottles required to empty the bowl.

12. A solid cone of base radius 30 cm is cut into two parts through the mid-point of its height by a plane parallel to its base. Find the ratio of the volumes of the two parts of the cone.

13. The probability of getting a non-defective pen from a lot of 1000 pens is $\frac{24}{25}$. Find the number of defective pens in the lot. Also, find the probability of drawing the defective pen from the lot.

14. From a window 60 m high above the ground of a house in a street, the angles of depression of the bottom and top of another house on opposite side of the street are 60° and 45° respectively. Show that the house of the opposite house is $\frac{60(\sqrt{3}-1)}{\sqrt{3}}$ m.

15. In fig. 3, the shape of the top of a table is that of a sector of a circle with centre O and $\angle BOD = 90°$. If OB = OD = 90 cm. Find

    (i) area of the top of the table.

    (ii) perimeter of the table top. (Use $\pi = 3.14$)

Figure 3

16. Point P divides the line segment joining the points A(−1, 3) and B(9, 8) such that AP : PB = k : 1. If point P lies on the line x − y + 2 = 0, find the value of k.

17. The area of the base of the cone is 154 cm^2 and the curved surface area is 814 cm^2. Find the height of the cone.

18. A spiral is made up of successive semicircles, with centres alternately at A and B, starting with centre at A, of radii 0.5 cm, 1.0 cm, 1.5 cm and 2.0 cm... as shown in fig. 4. What is the total length of the spiral made up to fifteen consecutive semicircles? $\left(\text{Use } \pi = \frac{22}{7}\right)$
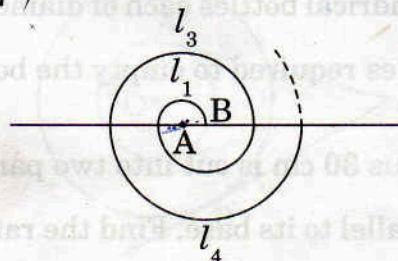
Figure 4

19. A bucket is raised from a well by means of a rope, which is bound around a wheel of radius 77 cm. If bucket ascends in 2 mins 56 seconds with a uniform speed of 2.2 m/s. Then calculate the number of complete revolutions the wheel makes in raising the bucket. $\left(\text{Use } \pi = \dfrac{22}{7}\right)$

20. At t minutes past 2 p.m, the time needed by the minutes hand of a clock to show 3 p.m was found to be 3 minutes less than $\dfrac{t^2}{4}$ minutes. Find t.

SECTION – D

Question numbers 21 to 31 carry 4 marks each.

21. Prove that the tangent at point of a circle is perpendicular to the radius through the point of contact.

22. In fig. 5, QR is tangent to circle at point Q. PR || AQ, Point P is centre of the circle and AB is diameter of the circle. Prove that BR is tangent to the circle at B.
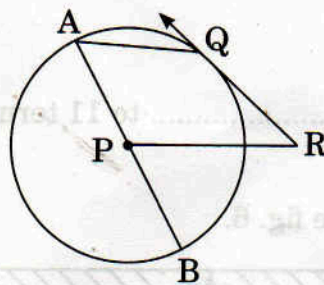

Figure 5

23. The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary , prove that the height of the tower is 6 m.

*24. A milk container made of metal sheet is in the form of a frustum of a cone of height 16 cm and radii of its lower and upper ends are 8 cm and 20 cm respectively. Find the cost of milk which the container can hold when completely filled at rate of ₹ 25 per litre and cost of the metal sheet in making the container at the rate of ₹ 10 per 100 cm² (use π = 3.14). If the milkman uses plastic sheet instead of metal sheet at the rate of ₹ 5 per 100 cm² to reduce his cost, is his act justified? What value is he lacking?

25. Draw a pair of tangents to a circle of radius 4 cm, which are inclined to each other at an angle of 135°.

26. Solve for x.

$$\frac{1}{x+1} + \frac{2}{x+2} = \frac{5}{x+4}, x \neq -1, -2, -4$$

27. Find the area of triangle DEF formed by joining the mid-points of the sides of the triangle ABC whose vertices are (0, –1), (2, 1) and (0, 3). Find the ratio of area of ∆DEF to the area of the triangle ABC. D, E and F are mid-points of sides AB, BC, CA of ∆ABC.

28. Find the sum of given AP

$$\frac{a-b}{a+b} + \frac{3a-2b}{a+b} + \frac{5a-3b}{a+b} \dots\dots\dots\dots\dots \text{ to 11 terms.}$$

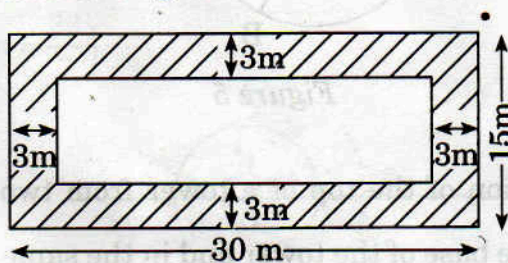**29.** Find the shaded area in the fig. 6.

Figure 6

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*Value-based Question

30. Two dice are thrown at the same time. Now complete the following table

Event (sum of numbers on 2 dice)	9	10	11	12
Probability of event				

31. Students of class X collected ₹ 9000. They wanted to divide it equally among certain number of students residing in slum area. When they started distributing the amount, 20 more students from nearby slum also joined. Now, each students got ₹ 160 less, find the original number of students living in the slum.