Guess Paper – 2014
Class – X
Subject –MATHEMATICS

TIME: 3HRS   **MARKS: 90**

General Instructions:

(i) All questions are compulsory.

(ii) The question paper contains 34 questions divided into four sections A, B, C and D. Section – A comprises of 8 questions of 1 mark each; Section – B comprises of 6 questions of 2 marks each; Section – C comprises of 10 questions of 3 marks each and Section – D comprises of 10 questions of 4 marks each.

(iii)Question number 1 to 8 in Section – A are multiple choice questions where you are required to select one correct option out of the given four.

(iv)There is no overall choice. However, internal choices have been provided in 1 question of two marks, 3 questions of three marks each and 2 questions of four marks each. You have to attempt only one of the alternatives in all such questions.

SECTION A
(Each question carries 1 mark)

Choose the correct answer.

1. An A.P. whose first term is 10 and common difference is 3, is :
    a. 10, 13, 16, 19, ...   b. 5, 7, 9, 11, ...   c. 8, 12, 16, 20, ...   d. all of these

2. If the numbers a, b, c are in A.P., then :
    a. $b - a = c - b$ b. $b + a = c + b$ c. $a - b = b - c$ d. none of these

3. The roots of the equation $ax^2 + x + b = 0$ are equal if -

    a. $b^2 = 4a$ b. $b^2 < 4a$ c. $b^2 > 4a$ d. $ab = \dfrac{1}{4}$

4. PQ and PT are tangents drawn from a point P to a circle with centre O such that $\angle QPT = 120°$, then $\angle QOT$ is equal to
    a. 60°   b. 30°   c. 90°   d. 120°

5. If the height and length of the shadow of a man are the same, then the angle of elevation of the sun is :
    a. 30^0 b. 60^0 c. 45^0 d. 15^0

6. Which of the following cannot be a probability of any event?
    a. $\dfrac{1}{3}$ b. 0.2   c. 4%   d. $\dfrac{17}{15}$

7. If the points (0, 0), (1, 2) and (x, y) are collinear then:
    a. $x = y$ b. $2x = y$ c. $x = 2y$ d. $2x = -y$

8. A right circular cylinder of radius r cm and height h ($h > 2r$) just encloses a sphere of diameter
   a. r cm   b. $2r$ cm   c. h cm   d. $2h$ cm

SECTION B
(Each question carries 2 marks)

9. If 8th term of an A.P. is 31 and 15th term is 16 more than 11th term, find the A.P.

10. Solve the following equations by factorization method , $y^2 + \frac{1}{2}y - 1 = 0$

OR

Solve the following equations by completing the squares, $a^2x^2 - 3abx + 2b^2 = 0$

11. If one of the roots of the equation $3a^2x^2 + 8abx + 4b^2 = 0$ is $-\frac{2b}{a}$, find the other root.

12. A pair of tangents PA and PB are drawn from an external point P to a circle with centre O. If ∠APB = 90° and PA= 6 cm, find the radius of the circle.

13. Find the area of the shaded region, if PQ = 24 cm, PR = 7 cm and O is the centre of the circle.
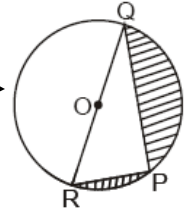
14. A cone and a sphere have equal radii and equal volume. What is the ratio of the diameter of the sphere to the height of the cone?

SECTION C
(Each question carries 3 marks)

15. A sailor can row a boat 8 km downstream and return back to the starting point in 1 hour 40 minutes. If the speed of the stream is 2 km/hr, find the speed of the boat in still water.

OR

A plane left 30 minutes later than the schedule time and in order to reach its destination 1500 km away in time, it has to increase its speed by 250 km/hr from its usual speed. Find its usual speed.

16. A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact are of lengths
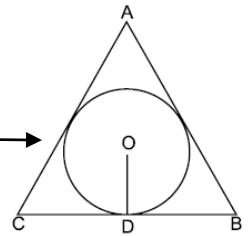
17. A sum of Rs 2700 is to be used to give eight cash prizes to students of a school for their overall academic performance. If each prize is Rs 25 more than its preceding prize, find the value of each of the prizes.

18. PAQ is a tangent to the circle with centre O at a point A as shown in the figure. If ∠OBA = 35°, find the value of ∠BAQ and ∠ACB.
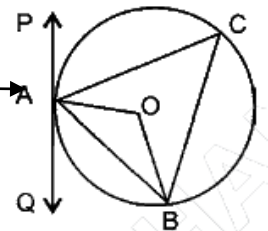
19. Construct a tangent to a circle of radius 4 cm from a point which is at a distance of 6 cm from its centre.

OR

Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle and measure their lengths.

20. The radii of the circular ends of a bucket of height 15 cm are 14 cm and r cm (r < 14 cm). If the volume of bucket is 5390 cm3. Find the value of r .

21. From a point P on the ground, the angles of elevation of the top of a 20 m tall building and of a helicopter, hovering at some height above the top of the building are 300 and 60° respectively. Find the height at which the helicopter is hovering (above the ground).

OR

From the top of a building 60 m high the angles of depression of the top and the bottom of a tower are observed to be 30° and 60°. Find the height of the tower.

22. As shown in the figure, D divides the side BC of a $\triangle ABC$ in the ratio 1: 2. Find the length of AD.

OR

The area of a triangle is 5 square units. Two of its vertices are (2k, 1) and (3, —2). The third vertex lies on y — x + 3 = 0. Find the third vertex.

A (0, 3)
B (−1, −2)   D   C (4, 2)
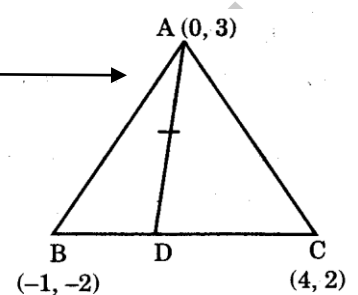
23. All the three face cards of spades are removed from a well shuffled pack of 52 cards. A card is then drawn at random from the remaining pack. Find the probability of getting;
   a.   Black face card   b. A queen   c. A black card.

24. Water in a canal, 6 m wide and 1.5 m deep, is flowing with a speed of 10 km/h. How much area will it irrigate in 30 minutes, if 8 m of standing water is needed?

SECTION D

(Each question carries 4 marks)

25. The sum of the first *n* terms of an A.P. is given by $S_n = 3n^2 – n$. Determine the A.P. and its 25th term.

26. Two taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

27. A circle touches the sides of a quadrilateral ABCD at P, Q R, S respectively. Show that angle subtended at the centre by pairs of opposite sides is supplementary.

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28. Decorative block is made of two solids — a cube and a hemisphere. The base of the block is the cube with edge of 7 cm and the hemisphere attached on the top has a diameter of 4.9 cm. If the block is to be painted, find the total area to be painted.

29. A turks cap is shaped like a frustum of a cone. If its radius on the open side is 10 cm radius at the upper base is 4 cm and its slant height is 15 cm, find the area of the material used for making it.

30. If the points A (1, 2), B (4, q), C (p, 6) and D (3, 5), are the vertices of a parallelogram ABCD, find the values ofp and q.

31. Find the centre of a circle passing through the points (6, –6), (3, –7) and (3, 3).

32. In the figure, ABC is a right-angled triangle, $\angle B=90°$, AB = 28 cm and BC = 21 cm. With AC as diameter, a semi-circle is drawn and with BC as radius a quarter circle is drawn. Find the area of the shaded region.

28 cm
21 cm
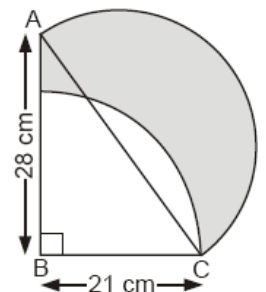
33. A well with 7 m inside diameter is dug 22 m deep, earth taken out of it has been spread all round it to a width of 10.5 m to form an embankment. Find the height of the embankment so formed.

<div align="center">OR</div>

A right triangle, whose sides other than hypotenuse, are 3 cm and 4 cm is made to revolve about its hypotenuse. Find the volume of the double cone so formed.

34. Solid spheres of diameter 6 cm each are dropped into a cylindrical beaker containing some water and are fully submerged. The water in the beaker rises by 40 cm. Find the number of solid spheres dropped into the beaker if the diameter of the beaker is 18 cm.

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