V & C Patel English School
Yearly Exam

Max.Marks: 80
Std: IX
Date: 06-03-2018
Subject: Mathematics
Time: 3 hrs.

General Instructions:

1. All questions are **compulsory**.
2. The question paper consists of 30 questions divided into **four sections A, B, C and D**. **Section-A** comprises of **6** 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 **8** questions of **4 marks** each.
3. There is no overall choice in this question paper.
4. Use of calculator is not permitted.

Section-A

Question numbers 1 to 6 carry 1 mark each.

1. Without actually calculating the cubes, find the value of $(-12)^3 + (7)^3 + (5)^3$.
2. What is the name of horizontal and vertical lines drawn to determine the position of any point in the Cartesian plane?
3. How would you rewrite Euclid's fifth postulate so that it would be easier to understand?
4. What is the longest pole that can be put in a room of dimensions l = 10 cm, b = 10 cm and h = 5 cm?
5. The points A, B and C are on the circle such that AB is perpendicular to BC. AB = 12 cm, BC = 16 cm and AC is a diameter. Find the radius of the circle passing through the points A, B and C.
6. Check whether $\frac{8}{7}$ can be empirical probability or not. Give reason.

Section-B

Question numbers 7 to 12 carry 2 marks each.

7. Show that $1.272727\ldots = 1.\overline{27}$ can be expressed in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.
8. Find the remainder when $x^3 - ax^2 + 6x - a$ is divided by $x - a$.
9. If a point C lies between two points A and B such that AC = BC, then prove that $AC = \frac{1}{2}AB$. Explain by drawing the figure.
10. Shivani had to make a model of a cylindrical kaleidoscope for her science project. She wanted to use chart paper to make the curved surface of the kaleidoscope. What would be the area of chart paper required by her, if she wanted to make a kaleidoscope of length 25 cm with a 3.5 cm radius? (Take $\pi = \frac{22}{7}$)

11. The mean of 16 items was found to be 30. On rechecking, it was found that two items were wrongly taken as 22 and 18 instead of 32 and 28, respectively. Find the correct mean.
12. Prove that equal chords of a circle subtend equal angles at the centre.

Section-C

Question numbers 13 to 22 carry 3 marks each.

13. If $x = (2 + \sqrt{5})$ then find the value of $x^2 + \frac{1}{x^2}$
14. Factorise: $9a^2 - 9b^2 + 6a + 1$
15. Represent $\sqrt{7.3}$ on the number line. Mention the steps also.
16. Draw a quadrilateral whose vertices are the points having coordinates as: (-3,3), (3,3), (3,-3) and (-3,-3). What is the special name of the quadrilateral so obtained?
17. Tanya has a piece of land which is in the shape of a rhombus. She wants her one daughter and one son to work on the land and produce different crops. She divided the land in two equal parts. If the perimeter of the land is 400 m and one of the diagonals is 160 m, how much area each of them will get for their crops?
18. The diameter of the moon is approximately one-fourth of the diameter of the earth. What fraction of the volume of the earth is the volume of the moon?
19. (i) Find the value of k, if $x = 2$, $y = 1$ is a solution of the equation $2x + 3y = k$.
    (ii) Express $2x + 3y = 9.3\bar{5}$ in the form $ax + by + c = 0$ and indicate the values of a, b and c.
20. An insurance company selected 2000 drivers at random (i.e., without any preference of one driver over another) in a particular city to find a relationship between age and accidents. The data obtained are given in the following table:

Age of drivers (in years)	Accidents in one year				
	0	1	2	3	Over 3
18-29	440	160	110	61	35
30-50	505	125	60	22	18
Above 50	360	45	35	15	9

Find the probabilities of the following events for a driver chosen at random from the city:

(i) being 18-29 years of age and having exactly 3 accidents in one year.
(ii) being 30-50 years of age and having one or more accidents in a year.
(iii) having no accidents in one year.

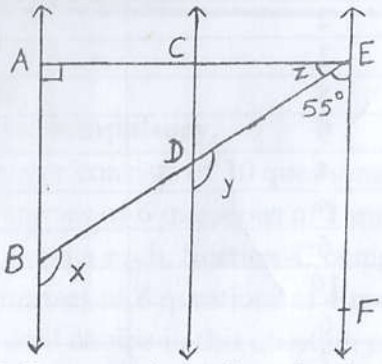
21. Diagonals AC and BD of a trapezium ABCD with AB || DC intersect each other at O. Prove that ar (AOD) = ar (BOC)
22. ABC is a triangle right angled at C. A line through the mid-point M of hypotenuse AB and parallel to BC intersects AC at D. Show that

(i) D is the mid-point of AC
(ii) MD is perpendicular to AC
(iii) CM = MA = ½ AB

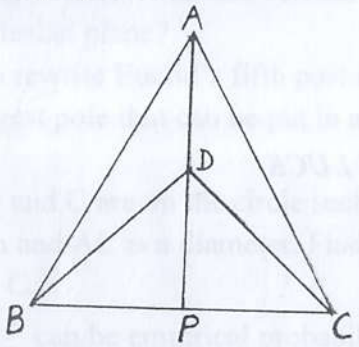
Section-D

Question numbers 23 to 30 carry 4 marks each.

23. In the figure given below, AB || CD and CD || EF. Also EA is perpendicular to AB. If $\angle BEF = 55^\circ$, find the values of x, y and z.



24. ΔABC and ΔDBC are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC as shown in the figure. If AD is extended to intersect BC at P, show that
    (i) $\Delta ABD \cong \Delta ACD$
    (ii) $\Delta ABP \cong \Delta ACP$
    (iii) AP bisects $\angle A$ as well as $\angle D$.
    (iv) AP is the perpendicular bisector of BC.



25. Sonia distributed chocolates in an orphanage. On her birthday, she gave 5 chocolates to each child and 20 chocolates to adults. Taking number of children as x and total chocolates distributed as y.
    (i) Form a linear equation
    (ii) If she distributed 145 chocolates then how many children are there in the orphanage?
    (iii) If there are 20 children then find the required number of chocolates?
    (iv) Write the value depicted here by Sonia.
26. A sector of a circle of radius 9 cm and central angle of 120°. It is rolled up so that the two bounding radii are joined together to form a cone. Find
    (i) the slant height of the cone.
    (ii) the radius of the base of the cone.
    (iii) the volume of the cone.
    (iv) the total surface area of the cone.

27. Solve the equation $2x + 1 = x - 3$ and represent the solution(s) on
    (i) the number line
    (ii) the Cartesian plane
28. The runs scored by two teams A and B on the first 60 balls in a cricket match are given below:

Number of balls	Team A	Team B
1-6	2	5
7-12	1	6
13-18	8	2
19-24	9	10
25-30	4	5
31-36	5	6
37-42	6	3
43-48	10	4
49-54	6	8
55-60	2	10

    Represent the data of both the teams on the same graph by frequency polygons.
29. Construct a triangle ABC in which BC = 8 cm, $\angle B = 45^\circ$ and AB−AC = 3.5 cm. Also mention the steps.
30. If diagonals of a cyclic quadrilateral are diameters of the circle through the vertices of the quadrilateral, prove that it is a rectangle.

BEST OF LUCK