KENDRIYA VIDYALAYA GACHIBOWLI, GPRA CAMPUS, HYD–32
SAMPLE PAPER TEST 02 (2017–18)

SUBJECT: MATHEMATICS **MAX. MARKS : 80**
CLASS : X **DURATION : 3 HRS**

General Instruction:
 (i) **All** questions are compulsory.
(ii) This question paper contains **30** questions divided into four Sections A, B, C and D.
(iii) **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.
(iv) There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
(v) Use of Calculators is not permitted

SECTION – A
Questions 1 to 6 carry 1 mark each.

1. In ΔABC, D and E are points on sides AB and AC respectively such that DE || BC and AD : DB = 3 : 1. If AE = 6.6 cm then find EC.

2. If the mid-point of the line segment joining the points P(6, b – 2) and Q(– 2, 4) is (2, – 3), find the value of b.

3. If $\tan \theta = \cot (30° + \theta)$, find the value of θ.

4. For what value of k, are the roots of the quadratic equation $3x^2 + 2kx + 27 = 0$ real and equal.

5. The HCF of two numbers is 145 and their LCM is 2175. If one number is 725, then find the other number.

6. For what value of p, are 2p + 1, 13, 5p – 3 three consecutive terms of an AP?

SECTION – B
Questions 6 to 12 carry 2 marks each.

7. A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) red ? (ii) not green?

8. A lot consists of 144 ball pens of which 20 are defective and the others are good. Nuri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that (i) She will buy it ? (ii) She will not buy it ?

9. Use Euclid's division algorithm to find the HCF of 504 and 980.

10. For what values of k will the following pair of linear equations have infinitely many solutions?
    kx + 3y – (k – 3) = 0
    12x + ky – k = 0

11. If (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find x and y.

12. If the sum of the first 14 terms of an AP is 1050 and its first term is 10, find the 20th term.

SECTION – C
Questions 13 to 22 carry 3 marks each.

13. Prove that $\sqrt{5}$ is an irrational number.

14. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

15. Find the area of the quadrilateral whose vertices, taken in order, are $(-4, -2)$, $(-3, -5)$, $(3, -2)$ and $(2, 3)$.

OR

The vertices of a Δ ABC are A(4, 6), B(1, 5) and C(7, 2). A line is drawn to intersect sides AB and AC at D and E respectively, such that $\dfrac{AD}{AB} = \dfrac{AE}{AC} = \dfrac{1}{4}$. Calculate the area of the Δ ADE and compare it with the area of Δ ABC.

16. D and E are points on the sides CA and CB respectively of a triangle ABC right angled at C. Prove that $AE^2 + BD^2 = AB^2 + DE^2$.

OR

In the below figure, the line segment XY is parallel to side AC of Δ ABC and it divides the triangle into two parts of equal areas. Find the ratio $\dfrac{AX}{AB}$.
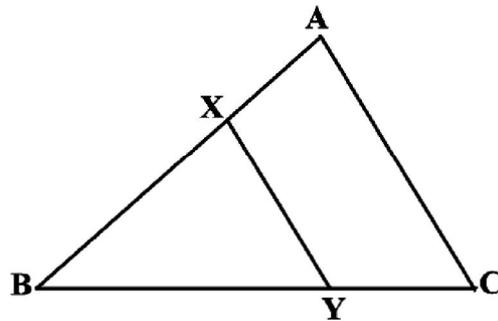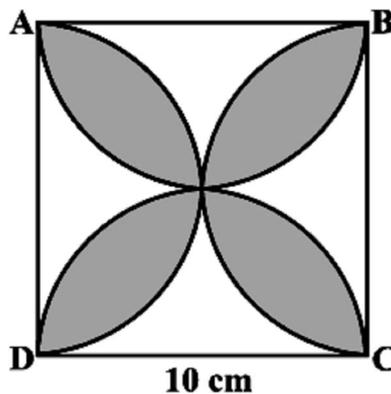

17. If A, B and C are interior angles of a triangle ABC, then show that $\tan\left(\dfrac{A+B}{2}\right) = \dfrac{C}{2}$

OR

If $\sin (A - B) = \dfrac{1}{2}$, $\cos (A + B) = \dfrac{1}{2}$, $0° < A + B \leq 90°$, $A > B$, find A and B.

18. Find the area of the shaded design in below figure, where ABCD is a square of side 10 cm and semicircles are drawn with each side of the square as diameter. (Use $\pi = 3.14$)

19. A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank in her field, which is 10 m in diameter and 2 m deep. If water flows through the pipe at the rate of 3 km/h, in how much time will the tank be filled?

OR

A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm.

20. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$, the quotient and remainder were $x - 2$ and $-2x + 4$, respectively. Find $g(x)$.

21. Draw the graphs of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.

22. Find the mean age of the patients from the following distribution:

Age(in years)	5-14	15-24	25-34	35-44	45-54	55-64
No. of patients	6	11	21	23	14	5

SECTION – D
Questions 23 to 30 carry 4 marks each.

23. A fire in a building B is reported on telephone to two fire stations P and Q, 20 km apart from each other on a straight road. P observes that the fire is at an angle of 60° to the road and Q observes that it is at an angle of 45° to the road.
(a) Which station should send its team and how much will this team have to travel?
(b) What according to you, are the values displayed by the teams at fire stations P and Q.

24. Two water taps together can fill a tank in $9\dfrac{3}{8}$ 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.

OR

A rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 square metres more than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and of altitude 12 m. Find its length and breadth.

25. Prove that "The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides."

OR

Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

26. An open metal bucket is in the shape of a frustum of a cone, mounted on a hollow cylindrical base made of the same metallic sheet. The diameters of the two circular ends of the bucket are 45 cm and 25 cm, the total vertical height of the bucket is 40 cm and that of the cylindrical base is 6 cm. Find the area of the metallic sheet used to make the bucket, where we do not take into account the handle of the bucket. Also, find the volume of water the bucket can hold.

27. The sum of the third and the seventh terms of an AP is 6 and their product is 8. Find the sum of first sixteen terms of the AP.

28. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and $\angle$ABC = 60°. Then construct a triangle whose sides are 3/4 of the corresponding sides of the triangle ABC.

29. Prove that $\dfrac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \sec\theta + \tan\theta$

30. The median of the following data is 525. Find the values of x and y, if the total frequency is 100.

C.I	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
F	2	5	x	12	17	20	y	9	7	4

OR

The table given below shows the frequency distribution of the cores obtained by 200 candidates in a BCA examination.

Score	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600
No. of students	30	15	45	20	25	40	10	15

Draw cumulative frequency curves by using (i) less than type and (ii) more than type. Hence find median