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SAMPLE PAPER TEST 01

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. Which term of the AP : 21, 18, 15, . . . is -81?

2. Check whether 6^n can end with the digit 0 for any natural number n.

3. A ladder 10 m long reaches a window 8 m above the ground. Find the distance of the foot of the ladder from base of the wall.

4. If the mid-point of the line segment joining the points P(3, b + 2) and Q(1, 4) is (2, -3), find the value of b.

5. In Δ ABC, right-angled at B, AB = 5 cm and $\angle$ ACB = 30°. Determine the lengths of the sides BC

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

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

7. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double that of a red ball, determine the number of blue balls in the bag.

8. A piggy bank contains hundred 50p coins, fifty Re 1 coins, twenty Rs 2 coins and ten Rs 5 coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, what is the probability that the coin (i) will be a 50 p coin ? (ii) will not be a Rs 5 coin?

9. For which value of k will the following pair of linear equations have no solution?
   3x + y = 1
   (2k – 1) x + (k – 1) y = 2k + 1

10. Prove that $3 + 5\sqrt{2}$ is an irrational number.

11. Find the coordinates of the point which divides the join of (–1, 7) and (4, –3) in the ratio 2 : 3.

12. How many terms of the AP : 24, 21, 18, . . . must be taken so that their sum is 78?

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

13. Use Euclid's division lemma to show that the square of any positive integer is either of the form 3m or 3m + 1 for some integer m.

14. Verify that a median of a triangle divides it into two triangles of equal areas for Δ ABC whose vertices are A(4, − 6), B(3, −2) and C(5, 2).

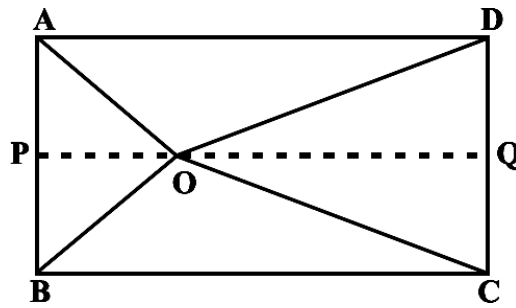**OR**

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

15. Obtain all other zeroes of $3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeroes are $\sqrt{\dfrac{5}{3}}$ and $-\sqrt{\dfrac{5}{3}}$.

16. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle\, PTQ = 2\, \angle\, OPQ$.

17. O is any point inside a rectangle ABCD (see below figure). Prove that $OB^2 + OD^2 = OA^2 + OC^2$.
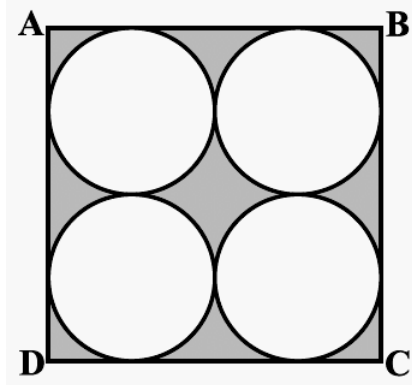

OR

Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that Δ ABC ~ Δ PQR.

18. If sin 3A = cos (A − 26°), where 3A is an acute angle, find the value of A.

OR

Evaluate: $\dfrac{\sin 18^0}{\cos 72^0} + \sqrt{3}\left(\tan 10^0 \tan 30^0 \tan 40^0 \tan 50^0 \tan 80^0\right)$

19. Find the area of the shaded region in below figure, where ABCD is a square of side 14 cm.

20. Ritu can row downstream 20 km in 2 hours, and upstream 4 km in 2 hours. Find her speed of rowing in still water and the speed of the current.

21. A hemispherical tank full of water is emptied by a pipe at the rate of $3\frac{4}{7}$ litres per second. How much time will it take to empty half the tank, if it is 3m in diameter? (Take $\pi = \frac{22}{7}$)

OR

A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 2 cm and the diameter of the base is 4 cm. Determine the volume of the toy. If a right circular cylinder circumscribes the toy, find the difference of the volumes of the cylinder and the toy. (Take $\pi = 3.14$)

22. The following data gives the information on the observed lifetimes (in hours) of 225 electrical components :

Lifetimes (in hours)	0 – 20	20 – 40	40 – 60	60 – 80	80 –100	100 – 120
Frequency	10	35	52	61	38	29

Determine the modal lifetimes of the components.

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

23. A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60°. After some time, the angle of elevation reduces to 30°. Find the distance travelled by the balloon during the interval.

24. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the actual speed of the train.

OR

In a class test, the sum of Shefali's marks in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product of their marks would have been 210. Find her marks in the two subjects.

25. Prove that "If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio."

OR

Prove that "If in a triangle, square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle."

26. Pradeep repays the total loan of 1,18,000 by paying every month starting with the first instalment of 1000. He increases the instalment by 100 every month.
(a) What amount will he pay as the last instalment of loan?
(b) On 5th of every month the amount of instalment is directly transferred from his bank account. Therefore, Pradeep ensures sufficient funds in his bank account before 5th of every month. What 'values' are depicted by Pradeep in this act?

27. Prove that $\dfrac{\tan\square}{1-\cot\square} + \dfrac{\cot\square}{1-\tan\square} = 1 + \sec\square\cos ec\square$

28. A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter $\frac{1}{16}$ cm, find the length of the wire.

29. Draw a triangle ABC with side BC = 7 cm, $\angle$B = 45°, $\angle$A = 105°. Then, construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of $\triangle$ ABC.

30. The lengths of 40 leaves of a plant are measured correct to the nearest millimetre, and the data obtained is represented in the following table :

Length (in mm)	118-126	127-135	136-144	145-153	154-162	163-171	172-180
No. of leaves	3	5	9	12	5	4	2

Find the median length of the leaves.

OR

The following distribution gives the daily income of 50 workers of a factory.

Daily income (in Rs)	100 – 120	120 – 140	140 – 160	160 – 180	180 – 200
Number of workers	12	14	8	6	10

Convert the distribution above to a less than type cumulative frequency distribution, and draw its ogive.