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SAMPLE PAPER TEST 07 (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.

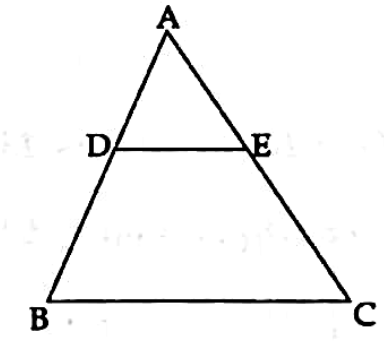
(iv) There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

(v) Use of Calculators is not permitted

SECTION – A

Questions 1 to 6 carry 1 mark each.

1. If adjoining figure, DE || BC and AD = 1 cm, BD = 2 cm. What is the ratio of the area of ΔABC to the area of ΔADE?



2. Does the rational number $\frac{441}{2^2.5^7.7^2}$ has a terminating or a non-terminating decimal representation?

3. If A and B are the points (–6, 7) and (–1, –5) respectively then find the distance 2AB.

4. Express cot 85° + cos 75° in terms of trigonometric ratios of angles between 0° and 45°.

5. Write the nature of roots of the quadratic equation $9x^2 – 6x – 2 = 0$.

6. The nth term of an AP is 7 – 4n. Find its common difference.

SECTION – B

Questions 6 to 12 carry 2 marks each.

7. Cards marked with all 2-digit numbers are placed in a box and are mixed thoroughly. One card is drawn at random. Find the probability that the number on the card is (i) divisible by 10 (ii) a perfect square number.

8. The king, queen and jack of clubs are removed from a deck of 52 playing cards and the remaining cards are shuffled. A card is drawn from the remaining cards. Find the probability of getting a card of (i) hearts (ii) queen.

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

10. Determine the values of m and n, so that the following system of linear equations has infinite number of solutions: $(2m - 1)x + 3y - 5 = 0$; $3x + (n - 1)y - 2 = 0$.

11. What point on the x-axis is equidistant from (7, 6) and (– 3, 4)?

12. Which term of the AP : 121, 117, 113, . . ., is its first negative term?

SECTION – C

Questions 13 to 22 carry 3 marks each.

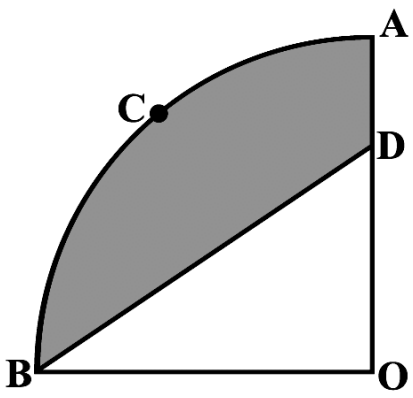
13. Prove that $\sqrt{5}$ is an irrational number.

14. D, E and F are respectively the mid-points of sides AB, BC and CA of Δ ABC. Find the ratio of the areas of Δ DEF and Δ ABC.

OR

In an equilateral triangle ABC, D is a point on side BC such that BD = $\frac{1}{3}$ BC. Prove that $9AD^2 = 7\ AB^2$.

15. In the below figure, OACB is a quadrant of a circle with centre O and radius 3.5 cm. If OD = 2 cm, find the area of the (i) quadrant OACB, (ii) shaded region.



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

OR

If $\sin(A + B) = 1$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$; $0° < A + B \leq 90°$; $A > B$, find A and B.

17. Prove that "The lengths of the two tangents from an external point to a circle are equal."

18. Find the values of k if the points A(k + 1, 2k), B(3k, 2k + 3) and C(5k – 1, 5k) are collinear.

OR

If P(9a – 2, –b) divides the line segment joining A(3a + 1, –3) and B(8a, 5) are in the ratio 3 : 1, find the values of a and b.

19. Show that $\frac{1}{2}$ and $\frac{-3}{2}$ are the zeroes of the polynomial $4x^2 + 4x - 3$ and verify the relationship between zeroes and coefficients of the polynomial.

20. A container shaped like a right circular cylinder having diameter 12 cm and height 15 cm is full of ice cream. The ice cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top. Find the number of such cones which can be filled with ice cream.

OR

A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid are 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4 cm. Find the volume of wood in the entire stand

21. The sum of the numerator and denominator of a fraction is 4 more than twice the numerator. If the numerator and denominator both increased by 3, they are in the ratio 2:3. Determine the fraction.

22. The following distribution shows the number of runs scored by some batsmen of India in one-day cricket matches:

Runs scored	2000-4000	4000-6000	6000-8000	8000-10000	10000-12000
No. of batsmen	9	8	10	2	1

Find the mode for the above data.

SECTION – D

Questions 23 to 30 carry 4 marks each.

23. The angles of elevation of the top of a tower from two points at a distance of 'a' m and 'b' 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 $\sqrt{ab}$.

OR

The angle of elevation of the top of a vertical tower from a point on the ground is 60^0. From another point 10m vertically above the first, its angle of elevation is 45^0. Find the height of the tower.

24. A motor boat whose speed is 20 km/h in still water takes 1 hour more to go 48 km upstream than to return downstream to the same spot. Find the speed of the stream.

OR

A shopkeeper buys some books for Rs. 80. If he has bought 4 more books for the same amount, each book would have cost Rs. 1 less. Find the number of books he bought.

25. Construct a ΔABC in which AC = 6 cm, AB = 5 cm and $\angle BAC = 45^0$, then construct a triangle similar to the given triangle whose sides are $\frac{6}{5}$ of the corresponding sides of the ΔABC.

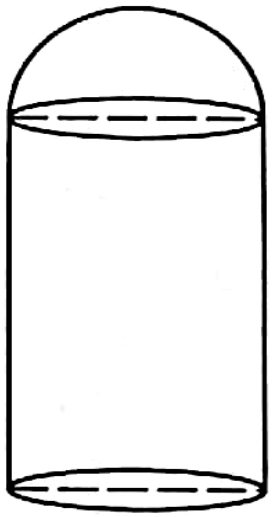
26. Prove that "The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides."

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.

27. A sum of Rs. 1600 is to be used to give 10 cash prize to students of a school for their overall academic performance. If each prize is Rs. 20 less than its preceeding prize, find the value of each of the prizes. What is the importance of an academic prize in students life?

28. A building is in the form of cylinder surmounted by a hemispherical dome (see below figure). The base diameter of the dome is equal to $\frac{2}{3}$ of the total height of the building. Find the height of the building if it contains 67 $\frac{1}{21}$ m^3 of air.



29. Prove that $\frac{\sin A+\cos A}{\sin A-\cos A}+\frac{\sin A-\cos A}{\sin A+\cos A}=\frac{2}{2\sin^2 A-1}=\frac{2}{1-2\cos^2 A}$.

30. The following distribution gives the height of the students:

Height (in cm)	Less than 120	Less than 140	Less than 160	Less than 180	Less than 200
No. of students	12	26	34	40	50

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