



Set 2

STD. 10
18-01-2018

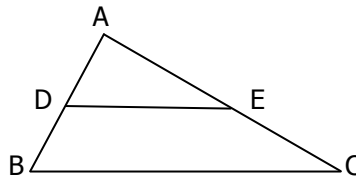
MAX. MARKS : 80
TIME : 3 HRS.

General Instructions:

- All questions are compulsory.
- The question paper consists of 30 questions divided into four sections A, B, C and D.
- Section A contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 8 questions of 4 marks each.
- 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.
- Use of calculators is not permitted.

SECTION - A

- If $a = 2^2 \times 3^3 \times 5^4$ and $b = 2^3 \times 3^2 \times 5$ then find the HCF (a, b).
- If the roots of the quadratic equation $x^2 + px + 16 = 0$ are equal then find the value of p.
- Which term of the A.P. 5, 9, 13, 17.....is 81?
- Find the coordinates of the point on x-axis which is nearest to the point (-5, -8).
- In $\triangle ABC$, it is given that $DE \parallel BC$.
If $AD = 3\text{cm}$, $DB = 2\text{cm}$ and $DE = 6\text{cm}$.
Find BC.



- If $\sec 4A = \operatorname{cosec} (A - 20)$, where $4A$ is an acute angle, find the value of A.

SECTION - B

- If $\frac{241}{4000} = \frac{241}{2^m \times 5^n}$ find the values of m and n where m and n are non-negative integers.
Hence write its decimal expansion without actual division.
- Find the values of k for which the system of equations
 $kx - y = 1$
 $6x - 2y = 3$ has no solution.
- The sum of three numbers in an A. P. is 27 and their product is 405. Find the numbers.
- If the point P(x, y) is equidistant from the point A (3, 6) and B (-3, 4), prove that $3x + y - 5 = 0$.
- Find the probability of getting 53 Sundays in a leap year.
- Three coins are tossed simultaneously. Write the sample space. Find the probability

of getting

a) Almost 2 head

b) Exactly 1 tail.

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MATHEMATICS (Set - 2)

SECTION - C

13. Prove that $\sqrt{7}$ is irrational.

14. If the polynomial $6x^4 + 8x^3 + 17x^2 + 21x + 7$ is divided by another polynomial $3x^2 + 4x + 1$, the remainder comes out to be $ax + b$, find a and b .

15. Points A and B are 70km apart on a highway. A car starts from A and another car starts from B simultaneously. If they travel in same direction, they meet in 7 hours, but if they travel towards each other, they meet in 1hour. Find the speed of the two cars.

16. In what ratio does the x -axis divide the line segment joining the points $(2, -3)$ and $(5, 6)$? Also, find the coordinates of the point of intersection.

(OR)

The three vertices of a triangle are $A(10, -6)$, $B(2, 5)$ and $C(-1, 3)$. Find the height of the triangle taking AB as the base.

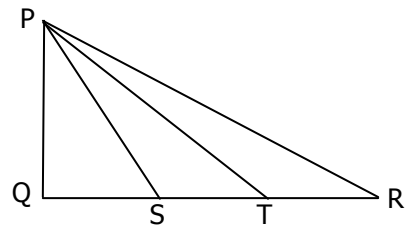
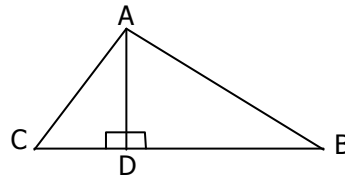
17. The perpendicular from A on side BC of a $\triangle ABC$ intersect BC at D such that $DB = 3 CD$.

Prove that $2AB^2 = 2AC^2 + BC^2$.

(OR)

In the figure given below, $\triangle PQR$ is right angled at Q and the points S and T trisect the side QR .

Prove that $8PT^2 = 3PR^2 + 5PS^2$



18. Prove that the parallelogram circumscribing a circle is a rhombus.

19. Without using trigonometric tables, evaluate

$$\frac{\sec 39}{\cos \text{ec} 51} + \frac{2}{\sqrt{3}} \tan 17 \tan 38 \tan 60 \tan 52 \tan 73 - 3(\sin^2 31 + \sin^2 59)$$

(OR)

If $\sin \theta + \cos \theta = p$ and $\sec \theta + \text{cosec} \theta = q$ prove that $q(p^2 - 1) = 2p$.

20. A hollow cone is cut by a plane parallel to the base and the upper portion is removed.

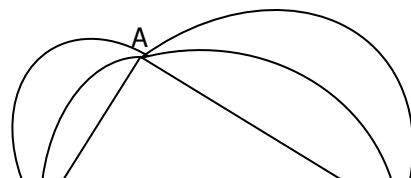
If the curved surface of the remainder is $\frac{8}{9}$ of the curved surface of the whole cone,

find the ratio of the line segment into which the cone's altitude is divided by the plane.

(OR)

A tent is in the form of a cylinder of diameter 4.2m and height 4m, surmounted by a cone of equal base and height 2.8m. Find the capacity of the tent and the cost of canvas for making the tent at Rs. 100 per square meter.

21. In the given figure, ABC is right angled triangle



in which $\angle A = 90^\circ$, $AB = 21\text{cm}$ and $AC = 28\text{cm}$.
Semicircles are described on AB , BC and AC as diameters. Find the area of the shaded region.

22. Find the mean of the following:

Class	0 - 30	30 - 60	60 - 90	90 - 120	120 - 150	150 - 180
Frequency	12	21	34	52	20	11

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MATHEMATICS (Set - 2)

SECTION - D

23. Out of a group of swans, $\frac{7}{2}$ times the square root of the number are playing on the shore of a tank. The two remaining are playing, with amorous fight, in water. What is the total number of swans?

(OR)

If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ find the value of p . Also find the other root by completing the square method.

24. How many terms are there in the A.P. whose first and fifth terms are -14 and 2 respectively and the sum of the terms is 40 ?

25. State and prove Pythagoras theorem.

(OR)

In a triangle, if square of one side is equal to the sum of the squares of the other two sides, then the angle opposite to the first side is a right angle. Prove it.

26. Draw a triangle ABC with side $BC = 7\text{cm}$, $\angle B = 45^\circ$, $\angle A = 105^\circ$. Then construct another triangle whose sides are $\frac{7}{5}$ times the corresponding sides of $\triangle ABC$.

27. Prove that $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \cos \text{ec} \theta$.

28. The shadow of a tower, when the angle of elevation of the sun is 45° , is found to be 10 meters longer than when the angle of elevation is 60° . Find the height of the tower. (given $\sqrt{3} = 1.732$)

29. A dealer involved 10 children in colouring playing top which is shaped like a cone surmounted by a hemisphere. The entire top is 15.5 cm in height and the radius of the top is 3.5cm . Find the area each child has to paint daily if 550 playing tops are given to them daily. By involving children in his factory, what value does the dealer lack?

30. If the median of the given distribution is 24 , find the missing frequency.

Age in years	0-10	10-20	20-30	30-40	40-50
No. of persons	5	25	?	18	7

(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
No. of workers	12	14	8	6	10

Draw a less than cumulative frequency curve and hence find its median.