

Marks: 80

Duration: 3 Hours

**General Instructions:**

- (i) All questions are compulsory.
- (ii) The question paper consists of 30 questions divided into four sections A, B, C and D.
- (iii) 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.
- (iv) There is no overall choice. However, an internal choice has been provided in four questions of 3 mark each and three questions of 4 mark each. You have to attempt only one of the alternatives in all such questions.
- (v) Use of calculators is not permitted.

**Section A**

Question1: Find the HCF of the numbers 232 and 272 by prime factorization. Use that to find the LCM of the same numbers.

Question2: For what maximum integer value of  $c$ , the quadratic equation  $2x^2 - 5x + c = 0$  will have real roots?

Question 3: In an arithmetic series the sum of first 12 terms is 348, the sum of first 11 terms is 341 and the sum of first 10 terms is 330, find the first term.

Question 4: Find the shortest length between x-axis and the point (-3, -7).

Question 5: Find the ratio of area of triangle ABC to the area of triangle DEF, if the two triangles are similar. Given that AB and DE are corresponding sides and measure of DE is twice that of AB.

Question 6: If  $\tan A = \frac{3}{4}$ , find the value of  $(\sin A + \cos A)$

### Section B

Question 7: For a school annual day function 306 boys and 126 girls are paraded one group behind another separately. The teachers want to line up the students in a number of tracks such that the number of students in each track is same and minimum. What is the maximum number of tracks required?

Question 8: Find the sum of all the multiples of 6 between 200 and 400.

Question 9: For what value of  $k$  the following system of equations will have  
a) Infinite solutions? b) No solution?

$$x + 4y = 14 \text{ and } k^2 + 16y = 54 + k$$

Question 10: Points C and D lie on a line segment AB, such that  $AC = CD = DB$ . If the coordinates of A and B are (4,-4) and (-14, 8) respectively, find the coordinates of P and Q.

Question 11: From a standard pack of well shuffled cards, one card is drawn at random. What is the probability that the card is, a) A red colour even number? b) A black colour prime number?

Question 12: A box contains red colour and black colour marbles. The total number is 50. If 10 black colour marbles are added and mixed, the probability of drawing a red colour marble is  $\frac{7}{12}$ . What was the original number of black marbles?

### Section C

Question 13: Prove that  $(\sqrt{5} - 2)$  is irrational.

Question 14: Find the quadratic polynomial whose zeroes are 3, -2, the graph of

which passes through  $(0, 6)$ .

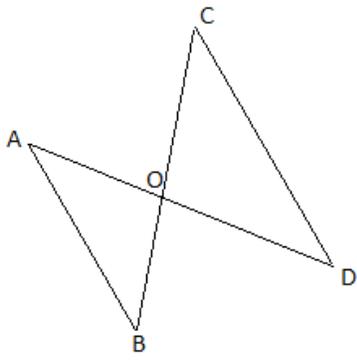
Question 15: The denominator of a fraction is 3 times the numerator. If 2 is added to the numerator and 3 is added to the denominator, then the denominator of the new fraction becomes 2 times the numerator. Find the original fraction.

Question 16: Show that the points  $(-6, 4)$ ,  $(-2, 2)$  and  $(4, -1)$  are collinear.

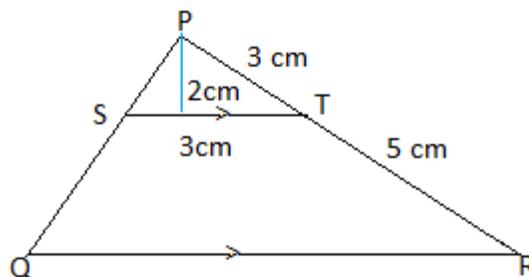
OR

Show that the triangle with vertices at  $(-1, -1)$ ,  $(5, 1)$ ,  $(4, 4)$  is a right angle triangle.

Question 17: In the following diagram, if triangles AOB and COD are similar, prove that AB is parallel to CD.



OR



Find the area of the triangle PQR.

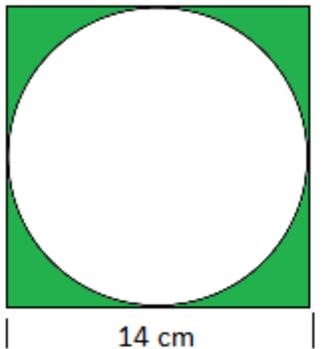
Question 18: Prove that the lengths of tangents drawn from an external point to any circle are equal.

Question 19: Show that  $\operatorname{cosec}^2(\theta) = 1 + \cot^2(\theta)$

OR

Evaluate:  $\frac{(1 + \tan^2 40)}{\operatorname{cosec}^2 50} + \frac{\sec 23}{\operatorname{cosec} 67}$

Question 20: Find the area of the shaded part in the following diagram. (Consider the approximate value of  $\pi$  as  $\frac{22}{7}$ .)



OR

Construct a triangle ABC with AB = 10 cm, AC = 8 cm and  $\angle BAC = 60^\circ$ . Construct another triangle similar to triangle ABC but  $\frac{3}{5}$  of its size.

Question 21: A cube of 4 cm edge is carved out from a conical wooden block of 10 cm diameter and 8 cm height. Find the total surface area that is left out.

Question 22: The following table describes the marks obtained by students of a class.

Marks scored	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
Number of students	6	10	11	8	5

Find the mean and median of the above data.

## Section D

Question23: Determine the nature of roots of the equation  $2x^2 + 4x - 3 = 0$  and find them by the method of completing square.

OR

A boat takes 12 minutes less when rowing downstream then when rowing upstream in a river between two points on a river. Find the speed of the boat in still water and the speed of the current of the river.

Question24: The first two terms of an arithmetic sequence is 30 and 24. If  $S_n = 84$ , find the possible values of  $n$ . Explain your answer.

Question25: 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

State and prove AAA criterion of similarity of two triangles.

Question26: Construct a pair of tangents to a circle of 5 cm radius from a point 13 cm away from the centre. Measure the length of each tangent.

Question27: Prove that  $\frac{\cos \theta + \sin \theta - 1}{\cos \theta - \sin \theta + 1} = \operatorname{cosec} \theta - \cot \theta$

Question28: The angle of elevation to the top of a tower observed by a person is  $45^\circ$ . If he walks 50 meters towards the tower he finds the angle of elevation increase to  $60^\circ$ . How far the person is away from the tower at this position and what is the height of the tower. Round off the answers to the nearest meter.

Question29: A solid metal sphere of 5 cm radius is melted and drawn into wire of 1.6 mm diameter. How many meters of wire can be drawn?  
(Round off to the nearest whole meter)

Question30: The following table gives the hourly pay for the workers in a factory.

Rupees	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80
Number of workers	2	8	12	24	38	15

Change the distribution to a more than type distribution, and draw its ogive.

OR

Two dice are rolled simultaneously. What is the probability of the following events?

- The sum of the numbers rolled is 7.
- The sum of the numbers rolled is 11.