ICSE QUESTION PAPER

2024

ICSE SUDY MATERIAL

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MATHEMATICS

Maximum Marks: 80

Time allowed: Two and half hours

Answers to this Paper must be written on the paper provided separately.

*You will **not** be allowed to write during first **15** minutes.*

This time is to be spent in reading the question paper.

The time given at the head of this Paper is the time allowed for writing the answers.

*Attempt **all** questions from **Section A** and **any four** questions from **Section B**.*

All working, including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer.

Omission of essential working will result in loss of marks.

The intended marks for questions or parts of questions are given in brackets [ ]

***Mathematical tables and graph papers are to be provided by the school**.*

SECTION A (40 Marks)

*(Attempt **all** questions from this **Section**.)*

Question 1

Choose the correct answers to the questions from the given options. [15]

(Do not copy the questions, write the correct answers only.)

(i) For an Intra-state sale, the CGST paid by a dealer to the Central government is **` 120**. If the marked price of the article is **` 2000**, the rate of **GST** is:

(a) 6%

(b) 10%

(c) 12%

(d) 16.67%

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(ii) What must be subtracted from the polynomial $x^3 + x^2 - 2x + 1$, so that the result is exactly divisible by $(x - 3)$?

(a) – 31

(b) – 30

(c) 30

(d) 31

(iii) The roots of the quadratic equation $px^2 - qx + r = 0$ are real and equal if:

(a) $p^2 = 4qr$

(b) $q^2 = 4pr$

(c) $-q^2 = 4pr$

(d) $p^2 > 4qr$

(iv) If matrix $A = \begin{bmatrix} 2 & 2 \\ 0 & 2 \end{bmatrix}$ and $A^2 = \begin{bmatrix} 4 & x \\ 0 & 4 \end{bmatrix}$, then the value of x is:

(a) 2

(b) 4

(c) 8

(d) 10

(v) The median of the following observations arranged in ascending order is **64**. Find the value of x:

27, 31, 46, 52, x, $x + 4$, 71, 79, 85, 90

(a) 60

(b) 61

(c) 62

(d) 66

(vi) Points **A** (x, y), **B** $(3, -2)$ and **C** $(4, -5)$ are collinear. The value of y in terms of x is:

(a) $3x - 11$

(b) $11 - 3x$

(c) $3x - 7$

(d) $7 - 3x$

(vii) The given table shows the distance covered and the time taken by a train moving at a uniform speed along a straight track.

Distance (in m)	60	90	y
Time (in sec)	2	x	5

The values of $\boldsymbol{x}$ and $\boldsymbol{y}$ are:

(a) $x = 4, y = 150$

(b) $x = 3, y = 100$

(c) $x = 4, y = 100$

(d) $x = 3, y = 150$

(viii) The 7^{th} term of the given Arithmetic Progression (A.P.):

$$\frac{1}{a}, \left(\frac{1}{a}+1\right), \left(\frac{1}{a}+2\right) \text{ ... is:}$$

(a) $\left(\frac{1}{a}+6\right)$

(b) $\left(\frac{1}{a}+7\right)$

(c) $\left(\frac{1}{a}+8\right)$

(d) $\left(\frac{1}{a}+7^7\right)$

(ix) The sum invested to purchase **15** shares of a company of nominal value **` 75** available at a discount of **20%** is:

(a) ` 60

(b) ` 90

(c) ` 1350

(d) ` 900

(x) The circumcentre of a triangle is the point which is:

(a) at equal distance from the three sides of the triangle.

(b) at equal distance from the three vertices of the triangle.

(c) the point of intersection of the three medians.

(d) the point of intersection of the three altitudes of the triangle.

(xi) Statement 1: $\sin^2\theta + \cos^2\theta = 1$

Statement 2: $\text{cosec}^2\theta + \cot^2\theta = 1$

Which of the following is valid?

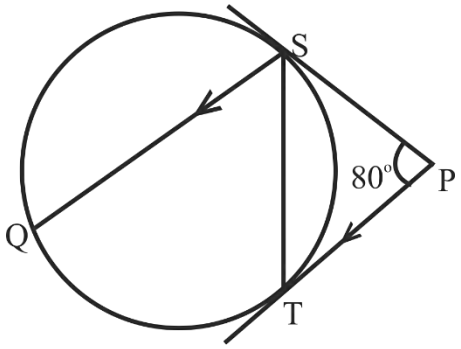
(a) only 1

(b) only 2

(c) both 1 and 2

(d) neither 1 nor 2

(xii) In the given diagram, PS and PT are the tangents to the circle. SQ || PT and **∠SPT = 80°**. The value of ∠QST is:



(a) 140°

(b) 90°

(c) 80°

(d) 50°

(xiii) **Assertion (A):** A die is thrown once and the probability of getting an even number is $\frac{2}{3}$.

Reason (R): The sample space for even numbers on a die is **{2, 4, 6}**

(a) A is true, R is false.

(b) A is false, R is true.

(c) Both A and R are true.

(d) Both A and R and false.

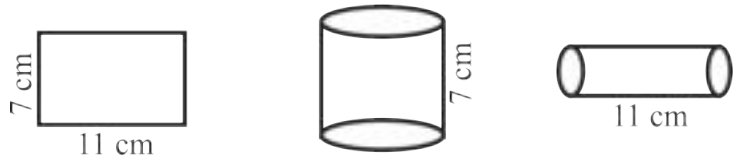
(xiv) A rectangular sheet of paper of size 11 cm x 7 cm is first rotated about the side **11 cm** and then about the side **7 cm** to form a cylinder, as shown in the diagram. The ratio of their curved surface areas is:

(a) 1 : 1

(b) 7 : 11

(c) 11 : 7

(d) $\frac{11\pi}{7} : \frac{7\pi}{11}$



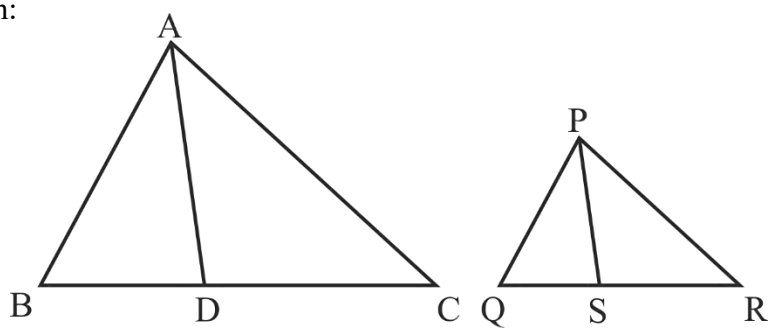
(xv) In the given diagram, **ΔABC ~ ΔPQR**. If AD and PS are bisectors of ∠**BAC** and ∠**QPR** respectively then:

(a) ΔABC ~ ΔPQS

(b) ΔABD ~ ΔPQS

(c) ΔABD ~ ΔPSR

(d) ΔABC ~ ΔPSR



Question 2

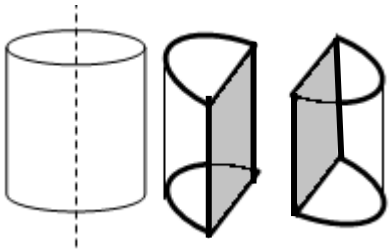
(i) $A = \begin{bmatrix} x & 0 \\ 1 & 1 \end{bmatrix}, B = \begin{bmatrix} 4 & 0 \\ y & 1 \end{bmatrix}$ *and* $C = \begin{bmatrix} 4 & 0 \\ x & 1 \end{bmatrix}$ [4]

Find the values of ***x*** and ***y,*** if **AB = C**.

(ii) A solid metallic cylinder is cut into two identical halves along its height (as shown in the diagram). The diameter of the cylinder is **7 cm** and the height is **10 cm**. Find: [4]

(a) The total surface area (both the halves).

(b) The total cost of painting the two halves at the rate of ` **30** per cm^2 $\left(\boldsymbol{Use\ \pi = \frac{22}{7}}\right)$



(iii) 15, 30, 60, 120… are in **G.P.** (Geometric Progression). [4]

(a) Find the **n^{th}** term of this **G.P.** in terms of ***n***.

(b) How many terms of the above **G.P.** will give the sum **945**?

Question 3

(i) Factorize: $sin^3\theta + cos^3\theta$ [4]

Hence, prove the following identity:

$$\frac{sin^3\theta + \cos^3\theta}{\sin\theta + \cos\theta} + \sin\theta cos\theta = 1$$

(ii) In the given diagram, O is the centre of the circle. PR and PT are two tangents drawn from the external point P and touching the circle at Q and S respectively. MN is a diameter of the circle. Given ∠PQM = 42° and ∠PSM = 25°. [4]

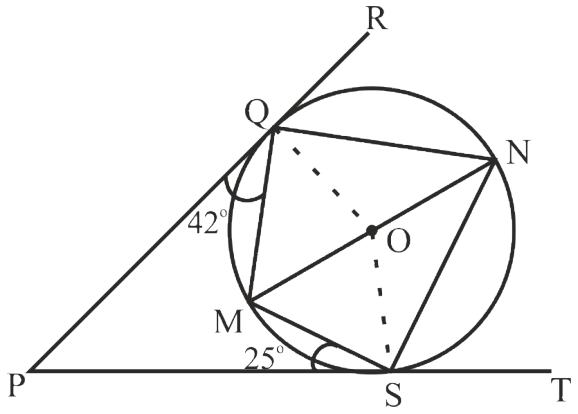
Find:

(a) ∠OQM

(b) ∠QNS

(c) ∠QOS

(d) ∠QMS



(iii) Use graph sheet for this question. Take 2 cm = 1 unit along the axes. [5]

(a) Plot A(0, 3), B(2, 1) and C(4, -1).

(b) Reflect point B and C in ***y*-axis** and name their images as B' and C' respectively. Plot and write coordinates of the points B' and C'.

(c) Reflect point A in the line BB' and name its images as A'.

(d) Plot and write coordinates of point A'.

(e) Join the points ABA'B' and give the geometrical name of the closed figure so formed.

SECTION B (40 Marks)

*(Attempt **any four** questions from this Section.)*

Question 4

(i) Suresh has a recurring deposit account in a bank. He deposits ` 2000 per month and the bank pays interest at the rate of 8% per annum. If he gets ` 1040 as interest at the time of maturity, find in years total time for which the account was held. [3]

(ii) The following table gives the duration of movies in minutes. [3]

Duration (in minutes)	100 – 110	110 – 120	120 – 130	130 – 140	140 – 150	150 – 160
No. of movies	5	10	17	8	6	4

Using step – deviation method, find the mean duration of the movies.

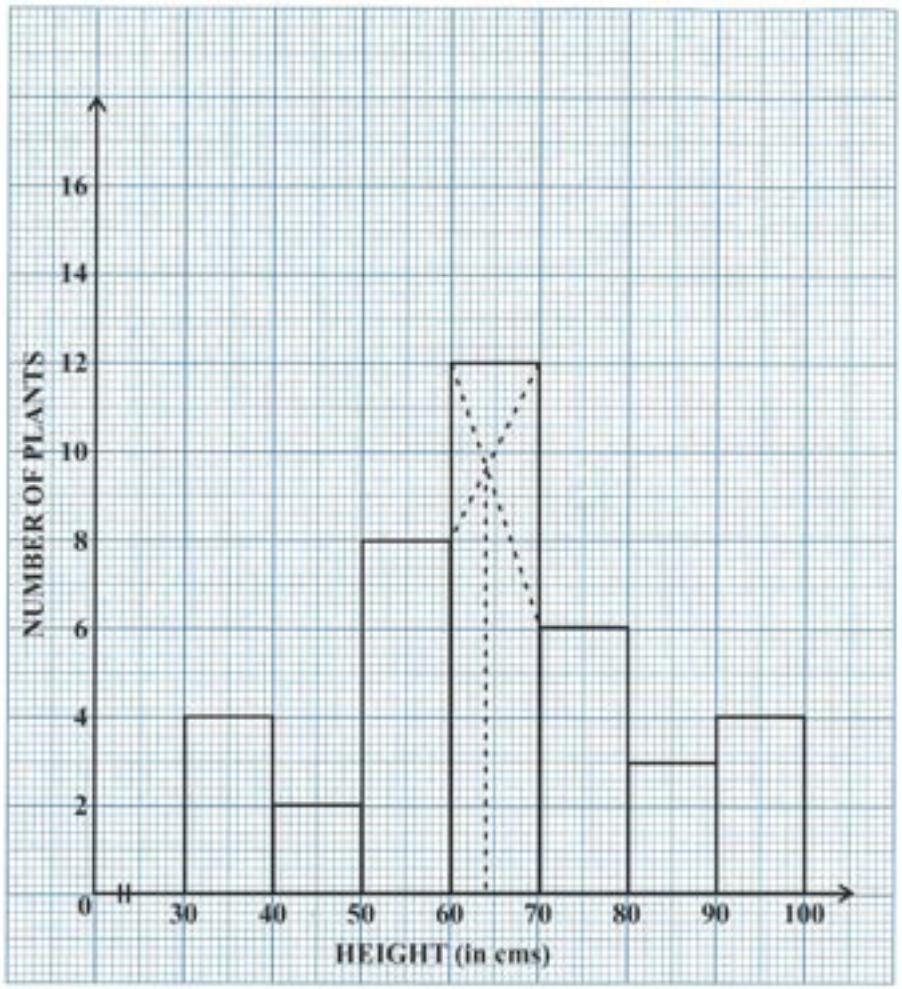
(iii) $If\ \frac{(a+b)^3}{(a-b)^3} = \frac{64}{27}$ [4]

(a) Find $\frac{a+b}{a-b}$

(b) Hence using properties of proportion, find $a : b$.

Question 5

(i) The given graph with a histogram represents the number of plants of different heights grown in a school campus. Study the graph carefully and answer the following questions: [5]



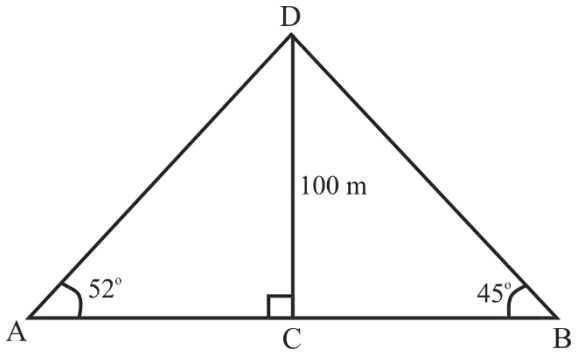
(a) Make a frequency table with respect to the class boundaries and their corresponding frequencies.

(b) State the modal class.

(c) Identify and note down the mode of the distribution.

(d) Find the number of plants whose height range is between 80 cm to 90 cm.

(ii) The angle of elevation of the top of a 100 m high tree from two points A and B on the opposite side of the tree are 52° and 45° respectively. Find the distance AB, to the nearest metre. [5]



Question 6

(i) Solve the following quadratic equation for x and give your answer correct to three significant figures: $2x^2 - 10x + 5 = 0$ [3]

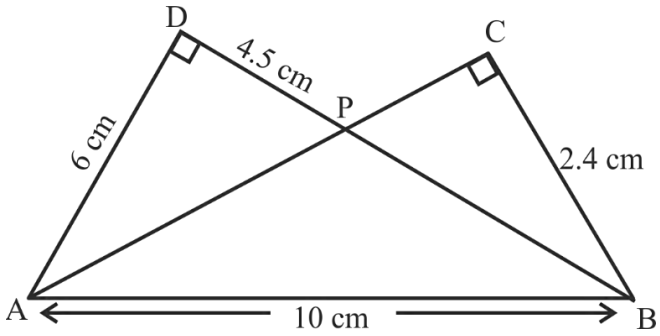
(Use mathematical tables if necessary)

(ii) The n^{th} term of an Arithmetic Progression **(A.P.)** is given by the relation $T_n = 6(7 - n)$. Find: [3]

(a) its first term and common difference

(b) sum of its first **25** terms

(iii) In the given diagram ΔADB and ΔACB are two right angled triangles with ∠ADB = ∠BCA = 90°. If AB = 10 cm, AD = 6 cm, BC = 2.4 cm and DP = 4.5 cm [4]



(a) Prove that ΔAPD ~ ΔBPC

(b) Find the length of BD and PB

(c) Hence, find the length of PA

(d) Find area ΔAPD : area ΔBPC

Question 7

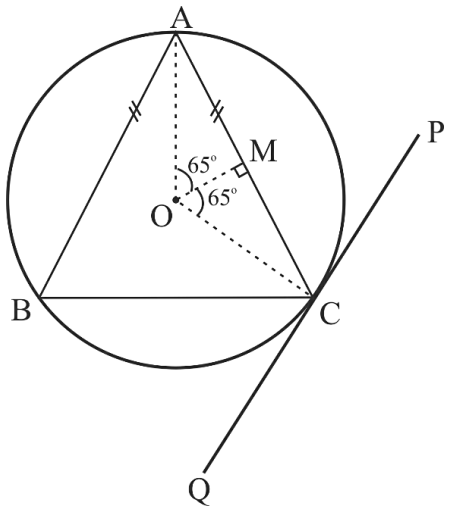
(i) In the given diagram, an isosceles ΔABC is inscribed in a circle with centre O. PQ is a tangent to the circle at C. OM is perpendicular to chord AC and ∠COM = 65°. [3]

Find:

(a) ∠ABC

(b) ∠BAC

(c) ∠BCQ



(ii) Solve the following inequation, write down the solution set and represent it on the real number line. [3]

$$-3 + x \leq \frac{7x}{2} + 2 < 8 + 2x, x \in I$$

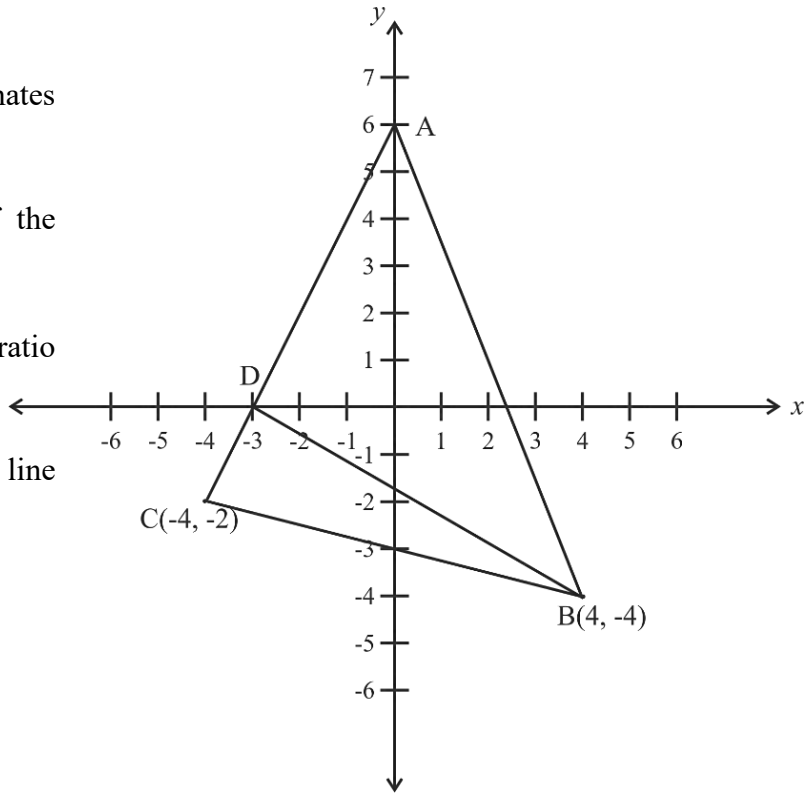
(iii) In the given diagram, ABC is a triangle, where B(4,– 4) and C(– 4, – 2). D is a point on AC. [4]

(a) Write down the coordinates of A and D.

(b) Find the coordinates of the centroid of ΔABC.

(c) If D divides AC in the ratio ***k* : 1**, find the value of ***k***.

(d) Find the equation of the line BD.



Question 8

(i) The polynomial $3x^3 + 8x^2 - 15x + k$ has $(x - 1)$ as a factor. Find the value of k. Hence factorize the resulting polynomial completely. [3]

(ii) The following letters **A, D, M, N, O, S, U, Y** of the English alphabet are written on separate cards and put in a box. The cards are well shuffled and one card is drawn at random. What is the probability that the card drawn is a letter of the word, [3]

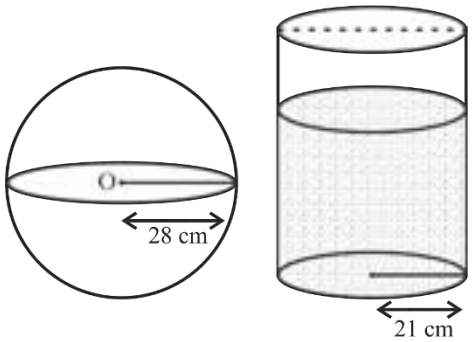
(a) MONDAY?

(b) which does not appear in MONDAY?

(c) which appears both in SUNDAY and MONDAY?

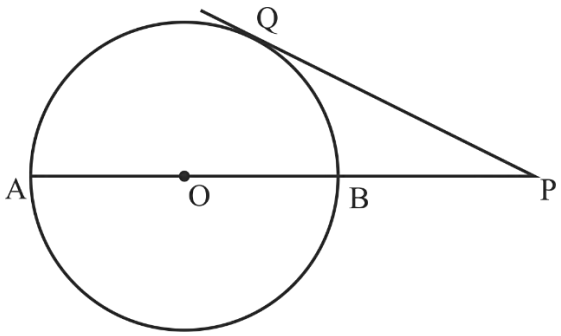
(iii) Oil is stored in a spherical vessel occupying **3/4** of its full capacity. Radius of this spherical vessel is **28 cm**. This oil is then poured into a cylindrical vessel with a radius of **21 cm**. Find the height of the oil in the cylindrical vessel **(correct to the nearest cm).** [4]

$\boldsymbol{Take\ \pi = \frac{22}{7}}$



Question 9

(i) The figure shows a circle of radius 9 cm with O as the centre. The diameter AB produced meets the tangent PQ at P. If PA = 24 cm, find the length of tangent PQ. [3]



(ii) Mr. Gupta invested ` 33000 in buying ` 100 shares of a company at 10% premium. The dividend declared by the company is 12%. Find: [3]

(a) the number of shares purchased by him.

(b) his annual dividend.

(iii) A life insurance agent found the following data for distribution of ages of 100 policy holders: [4]

Age in years	Policy Holders (frequency)	Cumulative frequency
20 – 25	2	2
25 – 30	4	6
30 – 35	12	18
35 – 40	20	38
40 – 45	28	66
45 – 50	22	88
50 – 55	8	96
55 – 60	4	100

On a graph sheet draw an ogive using the given data. Take 2 cm = 5 years along one axis and 2 cm = 10 policy holders along the other axis. Use your graph to find:



(a) The median age.

(b) Number of policy holders whose age is above 52 years.

Question 10

(i) Rohan bought the following eatables for his friends : [3]

Soham Sweet Mart : Bill				
S. No.	**Item**	**Price**	**Quantity**	**Rate of GST**
1	Laddu	` 500 per kg	2 kg	5%
2	Pastries	` 100 per piece	12 pieces	18%

Calculate :

(a) Total GST paid.

(b) Total bill amount including GST.

(ii) (a) If the lines $\boldsymbol{kx - y + 4 = 0}$ and $\boldsymbol{2y = 6x + 7}$ are perpendicular to each other, find the value of $\boldsymbol{k}$. [3]

(b) Find the equation of a line parallel to $\boldsymbol{2y = 6x + 7}$ and passing through (–1, 1)

(iii) Use ruler and compass to answer this question. Construct ∠ABC = 90°, where AB = 6 cm, BC = 8 cm. [4]

(a) Construct the locus of points equidistant from B and C.

(b) Construct the locus of points equidistant from A and B.

(c) Mark the point which satisfies both the conditions (a) and (b) as O. Construct the locus of points keeping a fixed distance OA from the fixed point O.

(d) Construct the locus of points which are equidistant from BA and BC.



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1 Time Table
2 Result
3 Syllabus

OTHER RESOURCES
Maps of India, Maps of World
Writing Skill Formats
Periodic Table

CLASS	STUDY MATERIAL
9	Specimen Paper
10	Specimen Paper
11	Specimen Paper
12	Specimen Paper
10	Question Paper
12	Question Paper
9/10	Lab Manuals
11/12	Lab Manuals

BOOKS

- ICSE Class 10 Prescribed Books
- ISC Class 12 Prescribed Books
- ISC Class 12 Project Work

ENTRANCE EXAMS

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JEE Advanced	NEET UG	Fashion & Design