



MATRIX OLYMPIAD

CSR Initiative of Matrix Education, Sikar to motivate and reward young talent.

✓ Total Questions : 60

✓ Maximum Marks : 240

✓ Duration : 2 Hrs.

PAPER PATTERN

Part	(I) Physics	(II) Chemistry	(III) Biology	(IV) Mathematics	(V) Logical Reasoning & IQ
Number of Questions	7	6	7	30	10

Marking Scheme: +4 For Each Correct Answer (There is no negative for wrong answer)

Instructions :

1. This Booklet is your **Question Paper**. DO NOT **break seal** of Booklet until the invigilator instructs to do so.
2. The Answer Sheet is provided to you separately which is a machine readable Optical Response Sheet (ORS). You have to mark your answer in the ORS by darkening bubble, as per your answer choice , by using **Black /Blue** ball point pen only.
3. If you are found involved in **cheating** or disturbing others then your ORS will be cancelled.
4. Do not **damage** the ORS sheet in any manner. If ORS is damaged or not completed properly, your results will not be prepared.
5. If you have any **confusion** in filling-up ORS sheet, please **contact** your invigilator. Incomplete ORS will be not be evaluated.
6. You can take the question paper home once the ORS is submitted.





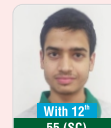





Answer Key and Video Solutions Kindly Scan QR Code and subscribe Matrix youtube channel

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JEE ADVANCED TOPPERS

 With XII Mayank Soni	AIR 26 (Gen.)	 With XII Priyanshu Meel	AIR 154 (Gen.)	 With XII Nagendra Singh	AIR 220 (Gen.)	 With XII Mohit Modi	AIR 296 (Gen.)	 With XII Aman Nehra	AIR 356 (Gen.)	 With XII Himanshu Rewar	AIR 358 (Gen.)	 With XII Aarish	AIR 415 (Gen.)	 With XII Uttam Paharia	AIR 421 (Gen.)
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JEE MAIN TOPPERS

100 %tile  With XII Mayank Soni	AIR 34 (Gen.)	99.99 %tile  With 12 th 15 (OBC) Nagendra Singh	AIR 123 (Gen.)	99.97 %tile  With 12 th 55 (SC) Shailesh Saini	AIR 354 (Gen.)	99.98 %tile  With XII Mohit Modi	AIR 213 (Gen.)	99.97 %tile  With XII Aman Nehra	AIR 393 (Gen.)	99.97 %tile  With 12 th Satyam Sharma	AIR 426 (Gen.)	99.96 %tile  With XII Anupam Jakhhar	AIR 478 (Gen.)	99.95 %tile  With XII Uttam Paharia	AIR 509 (Gen.)
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NEET (UG) Toppers

Marks-680  Rekha Nitharwal	AIR 1665	Marks-670  Narendra Farroda	AIR 2905	Marks-667  Mahendra Yadav	AIR 3263	Marks-666  Ankit Kumar Chahar	AIR 3378	Marks-665  Deepika Soni	AIR 3545	Marks-665  Lokesh Goyal	AIR 3621	Marks-665  Mohit Haritwal	AIR 3661
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KVPY TOPPERS

 Manas Jajodia	AIR 6 (Gen.) Stream- SB	 Ishu	AIR 8 (Gen.) Stream- SB	 Lakshya	AIR 13 (Gen.) Stream- SB	 Akshay Choudhary	AIR 17 (Gen.) Stream- SB	 Chirag Indoria	AIR 37 (Gen.) Stream- SB
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STSE TOPPERS

 Aman Nehra	1 st State Rank Class 12 th	 Aman Nehra	2 nd State Rank Class 12 th	 Dinesh Kumar	2 nd State Rank Class 12 th	 Pranshu Bharia	2 nd State Rank Class 10 th	 Shrishti	2 nd State Rank Class 10 th	 Rohit Yadav	2 nd State Rank Class 10 th	 Dev Kumar	3 rd State Rank Class 10 th	 Mohd. Farhan	3 rd State Rank Class 10 th
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OUR BOARD TOPPERS

99.20%  Pinakin Choudhary	98.80%  Aradhya Raina	98.20%  Laxmi	98.00%  Vishal Choudhary	97.80%  Preksha Singh	97.80%  Piyush Sagatani	97.60%  Khushee Binwal	97.60%  Reena	97.60%  Siddhant Lalpuria	97.40%  Rohit Yadav
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NTSE TOPPERS

 Aditya Jhajhria	1 st State Rank	 Nayan Godara	1 st State Rank	 Aman Nehra	1 st State Rank	 Aaditya Pratap	2 nd State Rank	 Mayank Soni	2 nd State Rank	 Aditya Bijarniya	4 th State Rank	 Pragati	5 th State Rank
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Authenticity of result, promise of Matrix!

*cumulative result so far

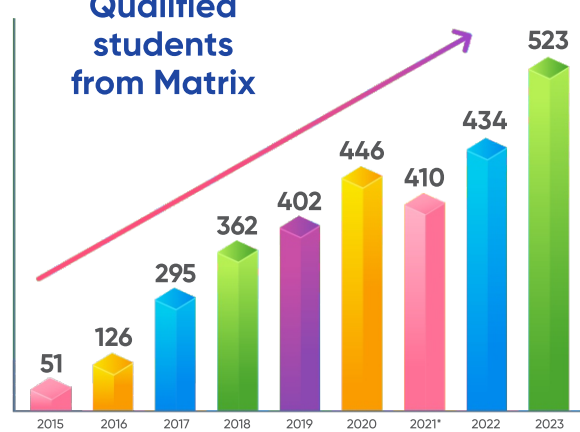
यह परिणाम मैट्रिक्स के केवल Yearlong classroom Program Students का ही है

Remarkable result growth in both JEE Main & Advanced on a consistent basis

JEE Main Qualified students from Matrix



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Note : All results are from Matrix year long classroom program at Sikar only.

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6700+

students have been qualified in JEE main from matrix till date.

2500+

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2000+

final admissions in various top IITs over last 5 years – Highest in Sikar

3500+

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2023 RESULT

Top score in JEE Main 2023
Mayank Soni

Rank- **34**

Top scorer JEE Advanced 2023
Mayank Soni

AIR- **26** (Gen)

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MANAS JAJODIA

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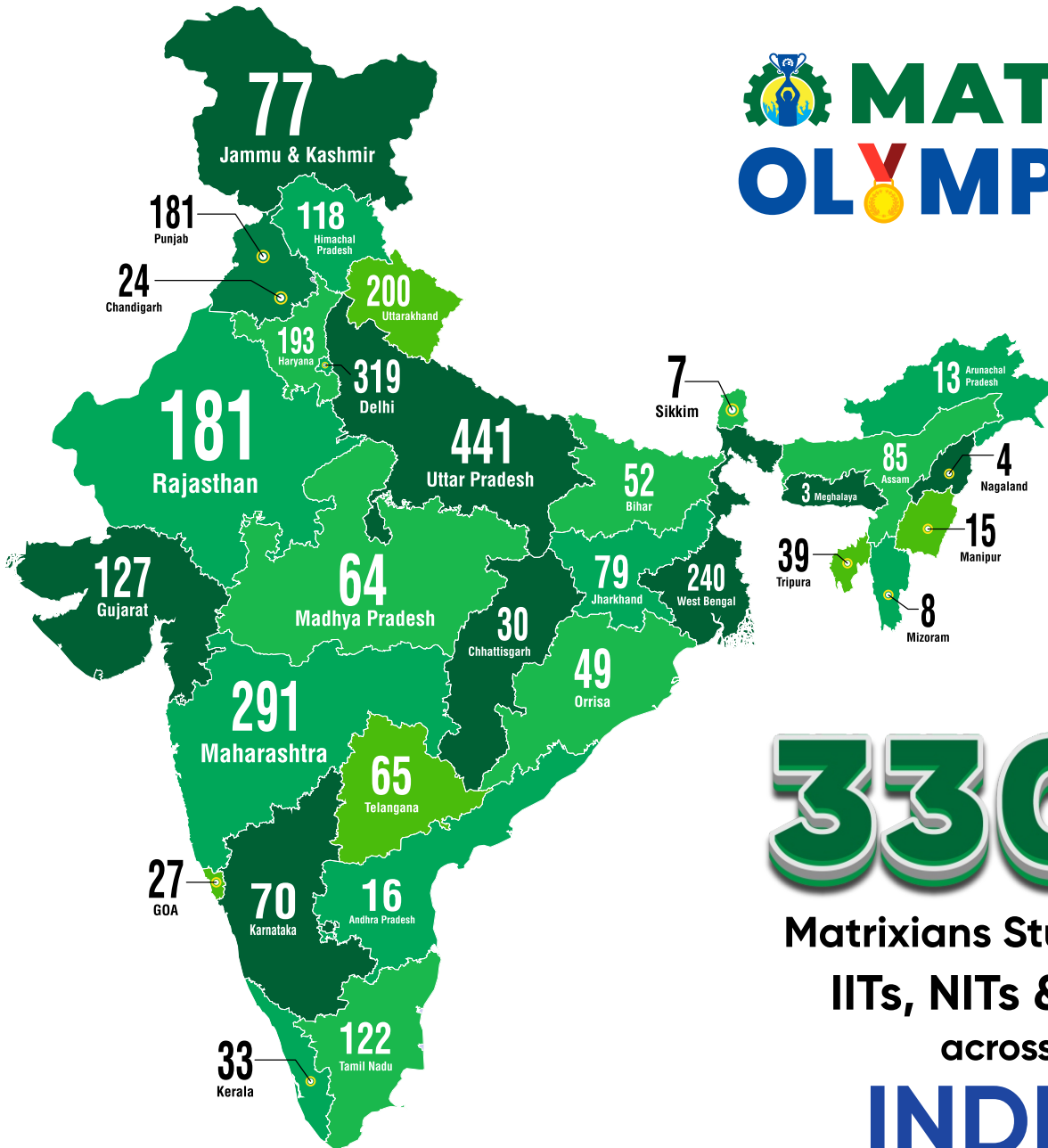
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MATRIX OLYMPIAD



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PART I : PHYSICS

This section contains **07 Multiple Choice Questions (Q : 01 to Q : 07)**. Each question has four choices **(A), (B), (C) and (D)** out of which **ONLY ONE** is correct.

- | | | |
|--|-----------------------------|---|
| <p>1. A force of 16 N is distributed uniformly over a surface of a cube of side 8 cm. The pressure applied by this force on the surface is :</p> <p>(A) 3500 Pa
(B) 2500 Pa
(C) 4500 Pa
(D) 5500 Pa</p> <p>2. Rohan starts running towards north direction during a race competition. Then the direction of friction force applied by ground on his feet will be -</p> <p>(A) North direction
(B) South direction
(C) East direction
(D) West direction</p> <p>3. The force applied on an object cannot -</p> <p>(A) Change the mass of an object
(B) Change the shape of an object
(C) Change the position of an object
(D) Change the direction of movement of an object</p> | *****
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***** | <p>4. A 5 kg mass block resting on a horizontal surface. The coefficient of friction between surface and block is 0.2. Then value of friction force will be :</p> <p>(A) 10 N
(B) 15 N
(C) 20 N
(D) 0 N</p> <p>5. Which of the following statement/s is/are True(T) or False(F) ?</p> <p>(i) Friction is always undesirable.
(ii) Friction depends on normal reaction between two contact surfaces.
(iii) Without friction we can walk very easily.</p> <p>Code :</p> <p>(i) (ii) (iii)</p> <p>(A) T F F
(B) T T T
(C) F F T
(D) F T F</p> |
|--|-----------------------------|---|

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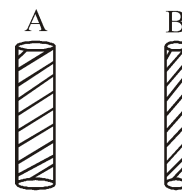
6. Match **Column – I** with **Column – II** and select the correct answer using the codes given below.

Column – I	Column – II
P. Manometer	1. Atmospheric pressure
Q. Spring balance	2. A device used for measuring liquid pressure
R. Barometer	3. Device used to measuring weight

Code :

	P	Q	R
(A)	1	2	3
(B)	3	2	1
(C)	2	1	3
(D)	2	3	1

7. Pressure is defined as the force acting per unit area. Two rods (rod A and B) have the same weight and length but different thicknesses. Rod B is thinner while Rod A is thicker. They are held vertically on the surface of the soft sand. Which of the following statements is/are TRUE about their position ?



- Rod B will sink more because it has a small contact area with the surface.
 - Rod A and Rod B will sink equally because pressure do not depend on the contact.
 - Rod A will sink less because it has a bigger area of contact with the surface.
- (A) 1, 2, & 3
(B) Only 2
(C) Only 1
(D) 1 and 3

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PART II : CHEMISTRY

This section contains **06 Multiple Choice Questions (Q : 08 to Q : 13)**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

8. Which is the strongest fibre amongst the following ?

- (A) Rayon
- (B) Nylon
- (C) Acrylic
- (D) Cotton

9. The additive use of PVC (a flexible plastic) is called :

- (A) Filler
- (B) Stabilizer
- (C) Antioxidant
- (D) Plasticizer

10. Which of the following is not a property of a non metal ?

- (A) Forms anions
- (B) Forms acidic oxides
- (C) High tensile strength
- (D) Low density

11. Which of the following statement/s is/are **True(T)** or **False(F)** ?

- (i) Coal is made up of carbon which is malleable in nature.
- (ii) Nylon is also known as artificial silk.
- (iii) Synthetic fibre do not generate electric charge.

Code :

(i) (ii) (iii)

- (A) T F F
- (B) T T T
- (C) F F T
- (D) F F F

12. Match **Column – I** with **Column – II** and select the correct answer using the codes given below.

Column – I	Column – II
P. $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	1. Light green
Q. $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$	2. Colourless
R. $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$	3. Blue

Code :

P Q R

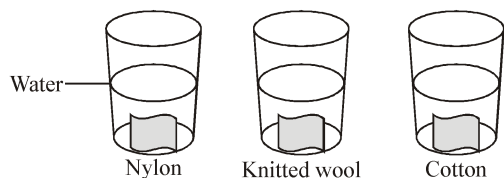
- (A) 2 3 1
- (B) 3 2 1
- (C) 3 1 2
- (D) 1 2 3

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13. Rahul performs an experiment. He cuts out equal sized squares from each of the three fabrics - nylon, knitted wool and cotton and weighs them. He then places each fabric square into a beaker containing 500 mL of water.



After 10 minutes Rahul removes the fabric squares from the water, weighs them and records his observations in a tabular form. Which of the observations made by him is incorrect ?

Fabric	Mass before soaking (g)	Mass after soaking (g)
Nylon	30	43
Knitted wool	40	50
Cotton	35	70

- (A) Nylon
- (B) Knitted wool
- (C) Cotton
- (D) None of these

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PART III : BIOLOGY

This section contains **07 Multiple Choice Questions (Q : 14 to Q : 20)**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

14. Which preservatives, prevent the spoilage of food leaves for a long time from microbial infection we used in kitchen ?

- (A) Vinegar
- (B) Common salt
- (C) Oil
- (D) All of the above

15. The instrument seed drill is used to :

- (A) Sowing seed
- (B) Remove the weeds
- (C) Remove the pest
- (D) Mix manure in the soil

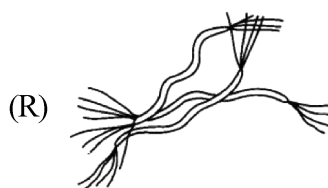
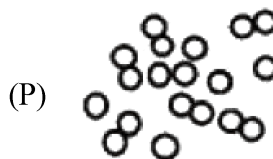
16. Name the process by which amount of nitrogen remain same in the atmosphere is known as :

- (A) Fermentation
- (B) Carbon cycle
- (C) Nitrogen cycle
- (D) Photosynthesis

17. A good quality seed in agriculture means a seed with.

- (A) It has higher germination power
- (B) It has high yielding capacity
- (C) It has higher resistant power to pests and adverse climate
- (D) All of the above

18. Bacteria have been grouped into four different types based on their shapes. Identify the different types and select the correct statement regarding it.



- (A) Vibrio cholerae is an example of type S, which causes cholera.
- (B) Mycobacterium is an example of type S, which causes leprosy.
- (C) Type R bacteria are rod-shaped and are called as bacilli bacteria.
- (D) Streptococcus is an example of type P bacteria that causes ringworm.

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19. Which of the following statement/s is/are **True(T)** or **False(F)** ?

- (i) Lactobacillus is a fungus present in curd.
- (ii) Louis pasteur discovered the process fermentation.
- (iii) The first Antibiotic was discovered by Alexander Fleming.

Code :

(i) (ii) (iii)

(A) T F F

(B) T T T

(C) F F T

(D) F T T

20. Match **Column – I** with **Column – II** and select the correct answer using the codes given below.

Column – I	Column – II
P. Fishes	1. Green Revolution
Q. Crops	2. White Revolution
R. Milk	3. Blue Revolution

Code :

P Q R

(A) 1 2 3

(B) 1 3 2

(C) 3 1 2

(D) 3 2 1

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PART IV : MATHEMATICS

This section contains 30 Multiple Choice Questions (Q : 21 to Q : 50). Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

21. How many rational numbers are there in between any two given rational numbers ?

- (A) Only one
- (B) Only two
- (C) Infinite
- (D) Nothing can be said

22. Which property is used in the equation given below ?

$$12(x + 4) = 12x + 48$$

- (A) Associative property of addition
- (B) Commutative property of addition
- (C) Distributive property
- (D) Reflexive property

23. Which of the following options is true ?

- (A) $\frac{5}{7} < \frac{7}{9} < \frac{9}{11} < \frac{11}{13}$
- (B) $\frac{11}{13} < \frac{9}{11} < \frac{7}{9} < \frac{5}{7}$
- (C) $\frac{5}{7} < \frac{11}{13} < \frac{7}{9} < \frac{9}{11}$
- (D) $\frac{5}{7} < \frac{9}{11} < \frac{11}{13} < \frac{7}{9}$

24. The value of x for which the expression $3x - 4$ and $2x + 1$ becomes equal is :

- (A) -3
- (B) 0
- (C) 5
- (D) 1

25. Find the value of x :

$$\frac{9x+7}{2} - \left[x - \left(\frac{x-2}{7} \right) \right] = 36$$

- (A) 9
- (B) 18
- (C) 5
- (D) 4

26. In an examination, a student was asked to find

$\frac{3}{14}$ of a certain number. By mistake, he found $\frac{3}{4}$ of that number, his answer was 150 more than the correct answer. The number is :

- (A) 180
- (B) 240
- (C) 280
- (D) 290

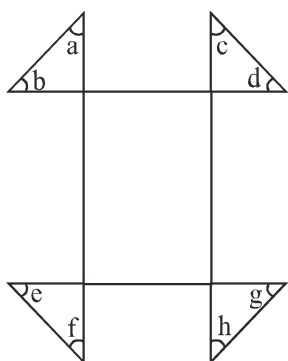
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27. If the sum of three consecutive natural numbers is 288, then the largest number among them is :
- (A) 95
(B) 97
(C) 98
(D) 96

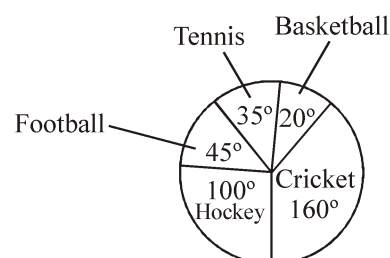
28. Find the sum of angles a, b, c, d, e, f, g and h.



- (A) 720°
(B) 360°
(C) 540°
(D) 180°
29. If the ratio of interior angle to exterior angle of a regular polygon is $7 : 2$, then the number of sides of polygon are :
- (A) 8
(B) 9
(C) 10
(D) 11

30. If ABCD is a rhombus, then which of the following statement is correct ?
- (A) $AB = AD$
(B) $AB = DC$
(C) Both (A) and (B)
(D) None of these above

31. The following pie chart represents the amount spent on different sports by a school administration in a calender year. If the money spent on football is Rs 9000 then what is the total amount spent on sports ?



- (A) Rs. 68,000
(B) Rs. 70,000
(C) Rs. 72,000
(D) Rs. 81,000
32. Which of the following cannot be the empirical probability of an event ?
- (A) $\frac{2}{3}$
(B) $\frac{3}{2}$
(C) 0
(D) 1

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33. Which of the following is a square number ?
 (A) 1057
 (B) 7928
 (C) 23453
 (D) 221841
34. How many natural numbers lie between 9^2 and 10^2 ?
 (A) 17
 (B) 18
 (C) 19
 (D) 20
35. The value of the expression $\sqrt{1 + 23\sqrt{1 + 24\sqrt{1 + 25\sqrt{26 \times 28 + 1}}}}$ is equal to
 (A) 24
 (B) 25
 (C) 26
 (D) None of these
36. The cube root of 29791 is :
 (A) 31
 (B) 41
 (C) 29
 (D) 19
37. The smallest numbers by which 6561 must be multiplied so that product will be a perfect cube is :
 (A) 3
 (B) 7
 (C) 9
 (D) 11
38. Jack's monthly salary is Rs. 78,000. He spends 20% on fooding and 10 % on house rent. From the remaining, he spends 30% on his only son's education and donates 10% of the rest to charity. His monthly savings is :
 (A) Rs. 35498
 (B) Rs. 34498
 (C) Rs. 34389
 (D) Rs. 34398
39. 200 kg of sugar was purchased at the rate of Rs. 15 per kg and sold at a profit of 5%. Compute the selling price per kg.
 (A) Rs. 18.25
 (B) Rs. 13.85
 (C) Rs. 15.75
 (D) Rs. 31.50

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40. If x is 25% of y, then what percent of x is y ?

- (A) 75%
- (B) 120%
- (C) 100%
- (D) 400%

41. Which of the following statement/s is/are **True(T)** or **False(F)** ?

(i) $\left(-\frac{6}{5} \div \frac{8}{9}\right) \div \frac{7}{10} \neq -\frac{6}{5} \div \left(\frac{8}{9} \div \frac{7}{10}\right)$

(ii) The reciprocal of positive rational number is always negative.

(iii) The absolute value of zero is zero.

Code :

(i) (ii) (iii)

- (A) T F F
- (B) T T T
- (C) T F T
- (D) F T F

42. Which of the following statement/s is/are **True(T)** or **False(F)** ?

(i) The sum of first n odd number is $(2n + 1)$.

(ii) The difference of two perfect cube is always a perfect cube.

(iii) The cube of two digits number may have more than seven digits.

Code :

(i) (ii) (iii)

- (A) T F F
- (B) T T T
- (C) F F F
- (D) F T F

43. Which of the following statement/s is/are **True(T)** or **False(F)** ?

(i) If principal ' P ' becomes ' n ' times of itself in ' T ' years at $R\%$ rate per-annum with simple interest, then $RT = (n - 1)P \times 100$.

(ii) If ' A ' is $x\%$ of ' C ' and ' B ' is $y\%$ of C then

$$A = \frac{x}{y} \times 100\% \text{ of } B.$$

(iii) If $a : b = 3 : 4$, then $a + b : b$ will be $3 : 7$.

Code :

(i) (ii) (iii)

- (A) T F F
- (B) T T T
- (C) F F T
- (D) F T F

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44. Match **Column – I (Algebraic equation)** with **Column – II (Respective solution)** and select the correct answer using the codes given below.

Column – I	Column – II
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P. $\frac{5}{4}x + \frac{3}{2} = \frac{1}{2}$

1. 0

Q. $\frac{3}{x} + 1 = 10$

2. $\frac{1}{3}$

R. $x^2 + 4x = x(x + 1)$

3. $\frac{-4}{5}$

Code :

- | | P | Q | R |
|-----|---|---|---|
| (A) | 2 | 3 | 1 |
| (B) | 1 | 2 | 3 |
| (C) | 3 | 2 | 1 |
| (D) | 2 | 1 | 3 |

45. Match **Column – I** with **Column – II** and select the correct answer using the codes given below.

Column – I	Column – II
------------	-------------

P. Value which occurs most often in a set of data is called

1. Frequency

Q. The most middle value when the set of the data is arranged in ascending or descending is called

2. Mode

R. The number of times a particular observation occurs is called

3. Median

Code :

- | | P | Q | R |
|-----|---|---|---|
| (A) | 2 | 3 | 1 |
| (B) | 3 | 1 | 2 |
| (C) | 1 | 2 | 3 |
| (D) | 2 | 1 | 3 |

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46. Match **Column – I** with **Column – II** and select the correct answer using the codes given below.

Column – I	Column – II
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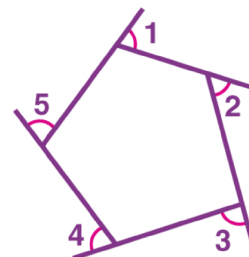
- | | |
|--|---------------|
| P. The smallest number with which 5400 may be multiplied so that product is a perfect square. | 1. 131 |
| Q. The least number that must be subtracted from 5607 so as to get perfect square | 2. 21 |
| R. Length of the side (in cm) of a square whose area is 441 cm ² | 3. 6 |

Code :

- | | <i>P</i> | <i>Q</i> | <i>R</i> |
|-----|----------|----------|----------|
| (A) | 2 | 3 | 1 |
| (B) | 3 | 2 | 1 |
| (C) | 3 | 1 | 2 |
| (D) | 2 | 1 | 3 |

Paragraph for Questions 47 & 48

Raghav was discussing the chapter related to Polygon. Teacher explained him, “A polygon is a shape made up of some line segment. The sum of exterior angle of any polygon is 360°.”



47. The number of sides in a regular polygon is 15, then measure of each exterior angle is :
- (A) 24°
(B) 36°
(C) 20°
(D) 18°
48. The measure of each exterior angle of a regular hexagon is :
- (A) 120°
(B) 80°
(C) 100°
(D) 60°

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Paragraph for Questions 49 & 50

The amount 'A' is due after 't' years, when a principal 'P' is given on compound interest at the rate R% per annum is given by

$A = P \left(1 + \frac{R}{100} \right)^t$. In general if the interest is compounded 'n' times a year then rate and time become $\frac{1}{n}$ and 'n' time respectively.

49. Find the compound interest on Rs. 1000 at 40% per annum compounded quarterly for 1 year.
- (A) Rs. 450
(B) Rs. 464.10
(C) Rs. 460.15
(D) None of these
50. Find the final amount after 3 months on Rs. 4000 at 24% per annum, compounded monthly.
- (A) Rs. 244.83
(B) Rs. 257.35
(C) Rs. 4244.83
(D) Rs. 4257.35

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Space for rough work

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PART V : LOGICAL REASONING & IQ

This section contains 10 Multiple Choice Questions (Q : 51 to Q : 60). Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Direction (51 – 52) : Find the next term :

51. 0, 2, 24, 252, ?

- (A) 620
- (B) 1040
- (C) 3120
- (D) 5430

52. AYBZC, DWEXF, GUHVI, JSKTL, ?

- (A) MQNOR
- (B) MQORN
- (C) MQNRO
- (D) MQRRO

53. Which sequence of letters when placed at the blanks one after the other will complete the given letter series ?

_yz_zx_xyx_z_zxzxy

- (A) xyzyy
- (B) yyyzz
- (C) yxzyx
- (D) xyyzz

54. One morning, Udai and Vishal were talking to each other face to face at a crossing. If Vishal's shadow was exactly to the left of Udai, which direction was Udai facing ?

- (A) East
- (B) West
- (C) North
- (D) South

55. Sahil and Gaurav are standing in a row of boys. Sahil is 12th place from left side and Gaurav is 18th place from the right side of the row. If they interchange their positions then Sahil becomes 25th from left side. What is the total number of boys standing in the row ?

- (A) 43
- (B) 36
- (C) 42
- (D) 41

56. In a class of 40 students, Rohan rank is 21st from the bottom and Arun is 2nd rank below Rohan, then what is the rank of Arun from the top ?

- (A) 21st
- (B) 22nd
- (C) 19th
- (D) 23rd

57. If \div implies $=$, \times implies $<$, $+$ implies $>$, $-$ implies \times , $>$ implies \div , $<$ implies $+$, $=$ implies $-$, identify the correct expression-

- (A) $1 - 3 > 2 + 1 - 5 = 3 - 1 < 2$
- (B) $1 - 3 > 2 + 1 \times 5 = 3 \times 1 > 2$
- (C) $1 \times 3 > 2 + 1 \times 5 \times 3 - 1 > 2$
- (D) $1 - 3 > 2 + 1 \times 5 + 3 - 1 > 2$

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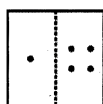
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58. If Q means 'add to', J means 'multiply by', T means 'subtract from' and K means 'divided by', then $26K2Q3J6T4 = ?$

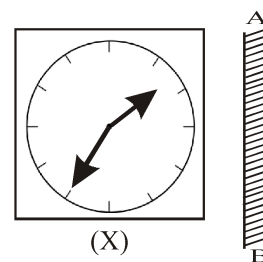
- (A) 10
- (B) 20
- (C) 30
- (D) 27

59. A square transparent sheet with a pattern is folded along the dotted line. Which of the following answer figure is formed after folding the transparent sheet?



- (A)
- (B)
- (C)
- (D)

60. In this question, choose the correct mirror image of the given figure (X) from alternatives where AB denotes the position of mirror :



- (A)
- (B)
- (C)
- (D)

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