



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 Jaxhar	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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*cumulative result so far

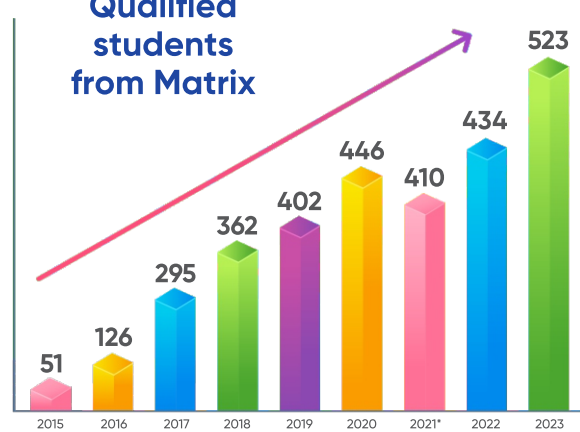
यह परिणाम मैट्रिक्स के केवल Yearlong classroom Program Students का ही है

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JEE Main Qualified students from Matrix



JEE Advanced Qualified students from Matrix



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

2500+

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3500+

selection in NIT/IIITs and other or other Prestigious Universities Highest in Sikar

2023 RESULT

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Mayank Soni

Rank- **34**

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Mayank Soni

AIR- **26** (Gen)

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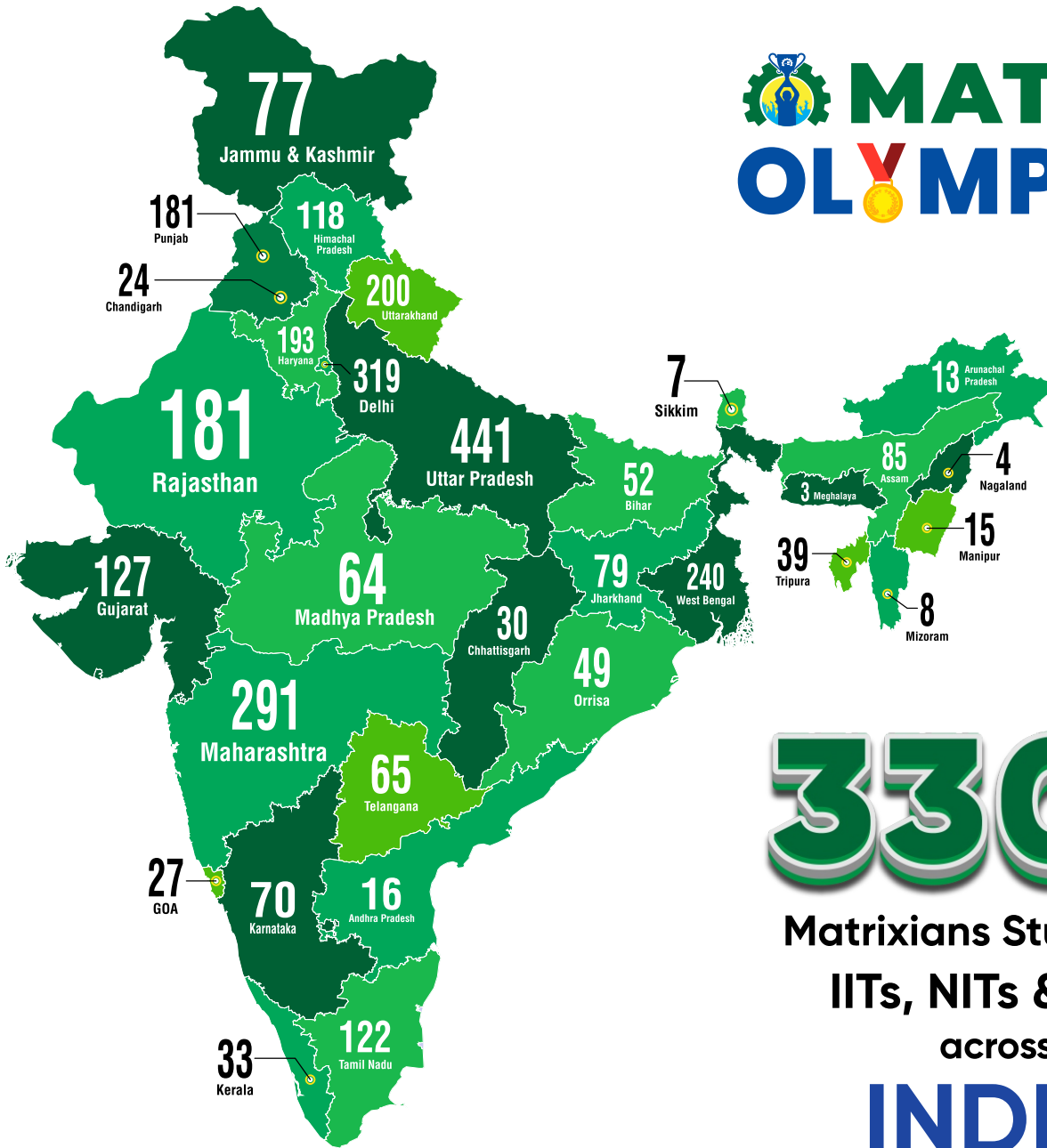
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MATRIX OLYMPIAD



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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.

1. Which of the following activities is easier to perform on a drum of 10 kg ?
 (A) Dragging the drum
 (B) Lifting the drum
 (C) Rolling the drum
 (D) All of the above need the same effort

2. The friction does not depend on :
 (A) Speed of object in the fluid
 (B) Shape of the object
 (C) Colour of the object
 (D) Density of the fluid

3. What is the name of the instrument used to measure atmospheric pressure ?
 (A) Odometer
 (B) Manometer
 (C) Barometer
 (D) Speedometer

4. Which of the following quantity can be measured using a spring balance ?
 (A) Mass of an object
 (B) Weight of an object
 (C) Density of an object
 (D) Volume of an object

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5. Which of the following statement/s is/are **True(T)** or **False(F)** ?
 (i) Friction can be reduced by converting sliding friction into rolling friction.
 (ii) Sliding friction always greater than static friction.
 (iii) Streamline shaped bodies experience less friction.

Code :

(i) (ii) (iii)

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

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

Column – I	Column – II
P. Weightlifting	1. Magnetic force
Q. Making a knot	2. Muscular force
R. Floppy disks & Hard drives	3. Frictional force

Code :

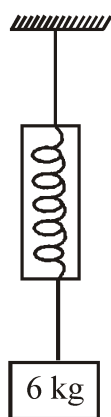
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- (A) 2 3 1
 (B) 1 3 2
 (C) 2 1 3
 (D) 1 2 3

7. Spring balance is a device used for measuring the force acting on an object. It consists of a coiled spring which gets stretched when a force is applied to it. Stretching of the spring is measured by a pointer moving on graduated scale. The reading on the scale gives the magnitude of force.

In the given figure, the reading of spring balance is : ($g = 10 \text{ m/s}^2$).



- (A) 120 N
 (B) 60 N
 (C) 30 N
 (D) 0 N

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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 of the following polymers contains fluorine?

- (A) Neoprene
- (B) PVC
- (C) Teflon
- (D) Polyster

9. Which of the following polymers is chemically least reactive and thermally most stable?

- (A) PVC
- (B) Teflon
- (C) Polythene
- (D) Nylon

10. Which of the following pairs will give displacement reaction?

- (A) NaCl solution and copper metal.
- (B) $MgCl_2$ solution and aluminium metal.
- (C) $FeSO_4$ solution and silver metal.
- (D) $CuSO_4$ solution and zinc metal.

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

- (i) Aluminium appears dull in colour and does not react with water, acids or alkalies.
- (ii) Most of the metals can be beaten into sheets.
- (iii) Bromine is found in liquid state.

Code :

(i) (ii) (iii)

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

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

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

P. A fibre stronger than steel wire

1. Melamine

Q. A fibre known as artificial wool

2. Nylon

R. A fire proof plastic

3. Acrylic

Code :

P Q R

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

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13. It is the tensile strength of a fibre that determines its strength. It is the maximum amount of stress that it can be subjected to before the material ruptures or tears away. Materials from fibres are made in various strengths and degrees of durability. The tensile strength of a polymer depends on the arrangement of molecules that make up the polymer, as well as the orientation of the polymer. Polymers arrange themselves as long chains when pulled lengthwise, these chains can be stretched to a great length before breaking. Which of the following has maximum tensile strength ?
- (A) Wool
 - (B) Silk
 - (C) Cotton
 - (D) Polyester

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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. A disease “Tetanus” is caused by which bacteria :

- (A) Clostridium tetani
- (B) Vibrio Cholerae
- (C) Salmonella typhi
- (D) Mycobacterium tuberculosis

15. What are the important steps in the preparation of soil ?

- (A) Loosening and Sowing
- (B) Loosening and Turning
- (C) Sowing and Turning
- (D) Loosening and Weeding.

16. Respiration and photosynthesis process are part of which cycle-

- (A) Nitrogen cycle
- (B) Phosphorous cycle
- (C) Carbon cycle
- (D) Sulphur cycle

17. What is the full form of FYM ?

- (A) Farm yield manure
- (B) Foreign yard manure
- (C) Farm yard manure
- (D) Full yield manure

18. It is a green algae, which are found in fresh water habitat. It has a cell wall, nucleus and spiral chloroplasts. Identify the given picture ?



- (A) Chlamydomonas
- (B) Filamentous algae
- (C) Paramecium
- (D) Giardia

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

- (i) Wheat is a rabi crop.
- (ii) Tuberculosis disease is caused by a bacteria.
- (iii) Fish production is associated with white revolution.

Code :

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(i) (ii) (iii)

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

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

Column – I	Column – II
P. Fungus	1. Bacteriophage
Q. Virus	2. Lactobacillus
R. Bacteria	3. Rust of wheat

Code :

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

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>21. The reciprocal of a negative rational number :</p> <p>(A) is a positive rational number</p> <p>(B) is a negative rational number</p> <p>(C) can be either negative or positive rational number</p> <p>(D) does not exist</p> <p>22. Solve: $-138 - -243$</p> <p>(A) 105</p> <p>(B) 381</p> <p>(C) -381</p> <p>(D) -105</p> <p>23. Which of the following is/are greater than x, when $x = \frac{9}{11}$?</p> <p>(i) $\frac{1}{x}$ (ii) $\frac{x+1}{x}$</p> <p>(iii) $\frac{x+1}{x-1}$</p> <p>(A) (i) Only</p> <p>(B) (i) and (ii) only</p> <p>(C) (i) and (iii) only</p> <p>(D) (ii) and (iii) only</p> | <p>24. The sum of two numbers is 72. If one number is double the other number, then the numbers are :</p> <p>(A) 24, 48</p> <p>(B) 25, 50</p> <p>(C) 23, 46</p> <p>(D) None of these above</p> <p>25. The digit in the ten's place of a two-digit number is 3 more than the digit in the unit place. If the digit at the unit's place is b, then the number is :</p> <p>(A) $11b + 30$</p> <p>(B) $10b + 30$</p> <p>(C) $11b + 3$</p> <p>(D) $10b + 3$</p> <p>26. Solve for x : $5x - 2(2x - 7) = (3x - 1) + \frac{7}{2}$</p> <p>(A) 2</p> <p>(B) 3</p> <p>(C) $\frac{1}{2}$</p> <p>(D) $\frac{23}{4}$</p> |
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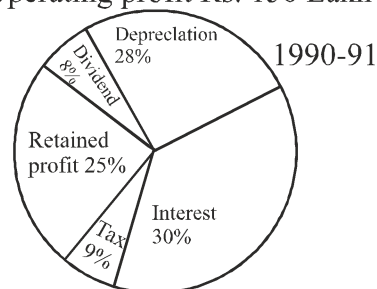
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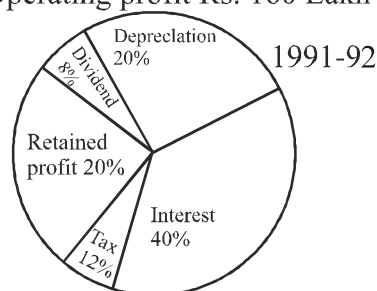
27. In a square ABCD, the diagonals bisect at O. What type of a triangle is AOB ?
 (A) An equilateral triangle
 (B) An isosceles but not a right angled triangle
 (C) A right angled but not an isosceles triangle
 (D) An isosceles right angled triangle
28. ABCD is a parallelogram. The angle bisectors of $\angle A$ and $\angle D$ meet at O. What is the measure of $\angle AOD$?
 (A) 45°
 (B) 90°
 (C) 75°
 (D) 180°
29. ABCD is a rhombus such that $\angle ACB = 40^\circ$, then $\angle ABD$ is equal :
 (A) 40°
 (B) 50°
 (C) 45°
 (D) 20°
30. The number of times an observation occurs in a data is called its :
 (A) Range
 (B) Class interval
 (C) Frequency
 (D) Raw data

31. Study the pie chart and answer the following questions :

Operating profit Rs. 130 Lakh



Operating profit Rs. 160 Lakh



The interest burden in 1991-92 was higher than that in 1990-91 by :

- (A) 50 %
 (B) Rs 25 Lakh
 (C) 90 %
 (D) Rs. 41 Lakh
32. 18 out of 36 people love reading, so reading in the pie chart will be represented by :
 (A) 36 degree sector
 (B) quarter sector
 (C) semi circular sector
 (D) None of these

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Space for rough work

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33. The value of $\sqrt{214 + \sqrt{130 - \sqrt{88 - \sqrt{44 + \sqrt{25}}}}}$ is :
- (A) 14
(B) 15
(C) 16
(D) 17
34. Given $\sqrt{5} = 2.236$, the value of $\sqrt{45} + \sqrt{605} - \sqrt{245}$ correct to 3 decimal places is :
- (A) 15.652
(B) 11.180
(C) 18.652
(D) 16.652
35. Which of the following are pythagorean triplet ?
- (A) (2, 3, 5)
(B) (6, 9, 11)
(C) (5, 7, 9)
(D) (8, 15, 17)
36. If $(504 + p)$ is a perfect cube number, whose cube root is p , then the value of p is :
- (A) 6
(B) 4
(C) 2
(D) 8
37. What is the cube of double of 'a' ?
- (A) $16a^3$
(B) $2a$
(C) $8a^3$
(D) $4a^2$
38. A sum of money compounded annually, yields Rs. 200 and Rs. 220 at the end of first and second year respectively. What is the interest rate ?
- (A) 20 %
(B) 15 %
(C) 10 %
(D) 5 %
39. In what time will Rs. 1000 amount to Rs. 1331 at 10% p.a. compounded annually ?
- (A) 4 years
(B) 3 years
(C) 2 years
(D) 1 year
40. If the ratio of the ages of Maya and Chaya is 6:5 at present and 15 years from now, the ratio will get changed to 9 : 8, then find Maya's present age.
- (A) 24 years
(B) 30 years
(C) 18 years
(D) 33 years

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Space for rough work

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

- (i) 91 is a prime number.
- (ii) There is only one rational number between $\frac{2}{3}$ and $\frac{4}{3}$.
- (iii) The absolute value of zero is zero.

Code :

(i) (ii) (iii)

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

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

- (i) Cube of a number ending with digit 3 ends with digit 9.
- (ii) The sum of two perfect cube is always a perfect cube.

(iii) The cube of $\sqrt[3]{\frac{-8}{27}}$ is $\frac{2}{3}$.

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) Increase of a number from 150 to 162 is equal to an increase of 8%.
- (ii) If a certain sum becomes n times in t years, then the rate of interest compounded

annually is given by $R = 100 \left[n^{\frac{1}{t}} - 1 \right]$.

- (iii) Compound interest charged per annum is always greater than the compound interest charged half yearly for n years if $n \geq 1$.

Code :

(i) (ii) (iii)

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

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Space for rough work

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

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

Q. $\frac{2y}{3} - \frac{y}{6} = \frac{1}{3}$ 2. -3

R. $5(2x-3) - 3$
 $(3x-7) = 7$ 3. 1

Code :

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

When two dices are thrown simultaneously then :

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

P. Probability of getting six as product 1. $\frac{7}{36}$

Q. Probability of getting sum divisible by 5 2. $\frac{1}{12}$

R. Probability of getting sum at least 11 3. $\frac{1}{9}$

Code :

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

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

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

P. A quadrilateral which is equilateral but not equiangular 1. Kite

Q. Lines containing the sides of the polygon that cross the interior of the polygon is 2. Rhombus

R. A quadrilateral with reflection symmetry across one of its diagonal is 3. Non-convex polygon

Space for rough work

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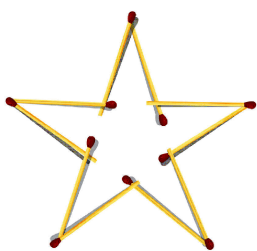
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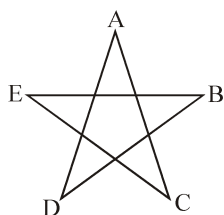
- | | <i>P</i> | <i>Q</i> | <i>R</i> |
|-----|----------|----------|----------|
| (A) | 2 | 3 | 1 |
| (B) | 2 | 1 | 3 |
| (C) | 1 | 2 | 3 |
| (D) | 3 | 2 | 1 |

Paragraph for Questions 47 & 48

Manas made a star using match sticks as shown in figure. Some one asked him to find some angles related to that shape with the hint : “The polygon is a shape made up of some line segments. The sum of exterior angle of any polygon is 360° .”



47. Sum of all the angles at the five vertices of the adjoining star is :



- (A) 180°
- (B) 360°
- (C) 540°
- (D) 720°

48. Which of the following can never be the measure of exterior angle of a regular polygon ?
- (A) 22°
 - (B) 36°
 - (C) 45°
 - (D) 30°

Paragraph for Questions 49 & 50

In class VIII, Mathematics teacher was discussing about the topic “Partnership in businesses”. He explained that when more than one person invest in the same business jointly, the profit or loss is shared in the ratio of the investments made by the partners. The persons who invest money in same business, are called partners.



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Space for rough work

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49. A, B and C started a business by investing Rs. 120000, Rs. 135000 and Rs. 150000 respectively. Find the share of each, out of an annual profit of Rs. 56700.
- (A) Rs. 16800, 18900, 21000
(B) Rs. 18900, 21000, 16900
(C) Rs. 21000, 18900, 16000
(D) None of these
50. Alfred started a business investing Rs. 45,000. After 3 months, Peter joined him with a capital of Rs. 60,000. After another 6 months, Ronald joined them with a capital of Rs. 90,000. At the end of the year, they made a profit of Rs. 16,500. Find the share of each.
- (A) Rs. 3300, Rs. 6600, Rs. 6000
(B) Rs. 6600, Rs. 6600, Rs. 3300
(C) Rs. 6000, Rs. 3300, Rs. 6600
(D) None of these

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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) : Choose the correct alternative that will continue the same pattern and replace the question mark in the given series.

51. $ZA_5, Y_4B, XC_6, W_3D, ?$

- (A) E_7V
- (B) V_2E
- (C) VE_7
- (D) VE_5

52. 3, 4, 7, 8, 11, 12, ?

- (A) 7
- (B) 10
- (C) 14
- (D) 15

53. In the following question, a number of letters are given. There are blanks which can be filled with the help of the letters of the options below. Choose the correct option and complete the series :

 aa ba bb ab aab

- (A) aaabb
- (B) bbaab
- (C) babab
- (D) bbbaa

Direction (54-55) : Point B is 25m South of point A. Point C is 30 m East of point B. Point D is 15 m North of point C. Point E is 10 m West of point D.

54. If point X is 30 m East of point A, then point D is how far and in which direction from point X?

- (A) 10m, North
- (B) 5m, North
- (C) 15m, South
- (D) 10m, South

55. What is the direction of point A with respect to point E?

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

56. Five persons P, Q, R, S and T scored different marks in an examination. If Q scored more marks than S and T only while R does not score the highest marks. Then who among the following has the second highest marks?

- (A) P
- (B) Q
- (C) R
- (D) S

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Space for rough work

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57. In this question, if the given interchanges are made in signs and numbers, which one of the four equations would be correct?

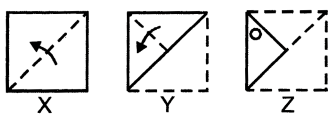
Given interchanges : Signs + and – and number 4 and 8.

- (A) $4 \div 8 - 12 = 16$
- (B) $4 - 8 + 12 = 0$
- (C) $8 \div 4 - 12 = 24$
- (D) $8 - 4 \div 12 = 8$

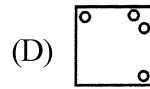
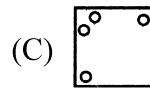
58. If \div implies $=$, \times implies $<$, $+$ implies $>$, $-$ implies \times , $>$ implies \div , $<$ implies $+$, $=$ implies $-$, identify the correct expression.

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

59. The sequence of folding a piece of paper and the manner in which the folded paper has been cut in shown in the following question figures. How would this paper look (in the respective options) when unfolded ?



- (A)
- (B)



60. Choose the alternative which is closely resembles the mirror-image of the given combination :

DL9CG4728

- (A) DГθCG†∟∟8
- (B) DГθCG†∟28
- (C) 8∟74θCθ∟D
- (D) 8∟74θCθ∟D

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Space for rough work

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