

FIITJEE

Maharashtra Science Talent Search Examination - 2023 (only for Maharashtra State Students) for students presently in Class VIII

SAMPLE PAPER

Time: 180 minute (10:00 am - 01:00 pm)

Maximum Marks: 270

Please read the instructions carefully. Additional 30 minutes (09:30 am - 10:00 am) will be provided for Reading the Examination Instructions and filling up the information on the ORS Sheet.

INSTRUCTIONS

A: General :

1. Please immediately fill in the particulars on this page of the Test Booklet with Blue/Black Ball point pen.
2. Blank papers, clipboards, log tables, slide rules, calculators, cellular phones, pagers and electronic gadgets in any form are not allowed.
3. The answer sheet, a machine-gradable Objective Response Sheet (ORS) is provided separately.
4. Do not Tamper/mutilate the **ORS** or this booklet.
5. No additional sheets will be provided for rough work.
6. On completion of this test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall. **However, the candidates are allowed to take away this Test Booklet with them.**

B: Questions paper format & Marking Schema:

1. The question paper consists of **THREE Parts: PART I (IQ), II (Science), III (Mathematics)**.
2. **PART-I** contains **30** multiple choice single correct type questions. Each question has four choices (A), (B), (C) and (D) out of which one and only one is correct.
3. **PART-II** has **THREE Sections**:
 - a. **SECTION A** contains **13** multiple choice single correct type questions in **Physics**. Each question has four choices (A), (B), (C) and (D) out of which one and only one is correct.
 - b. **SECTION B** contains **13** multiple choice single correct type questions in **Chemistry**. Each question has four choices (A), (B), (C) and (D) out of which one and only one is correct, and
 - c. **SECTION C** contains **4** multiple choice single correct type questions in **Biology**. Each question has four choices (A), (B), (C) and (D) out of which one and only one is correct.
4. **PART-III** contains **30** multiple choice single correct type questions in **Mathematics**. Each question has four choices (A), (B), (C) and (D) out of which one and only one is correct
5. **You are advised to devote 1 hour on PART-I and 2 hours on PART-II & III.**
6. For each question, in all three **PARTs**, you will be awarded **3 marks** if you darken the bubble corresponding to the correct answer **ONLY** and **zero (0) marks** if no bubbles are darkened. In all other cases, **minus one (-1) mark** will be awarded.

Registration No. :

Name of Candidate : _____

Test Centre: _____

PART - I**I.Q.**





This section contains 30 Multiple Choice Questions number 1 to 30. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.

1. In the following question, select the related word pair from given alternatives
Square : Four :: ? : ?
(A) Triangle : Five (B) Rectangle : Four
(C) Octagon : Seven (D) Circle : Five
2. In the following question, select the related number pair from given alternatives
18 : 11 :: ? : ?
(A) 33 : 29 (B) 36 : 29
(C) 41 : 33 (D) 49 : 41
3. In the following question, select the related letter/letters from given alternatives
MPR : LOQ :: KST : ?
(A) JPQ (B) LRS
(C) JPT (D) JRS
4. In the following question, select the odd word from given alternatives
(A) Lungs (B) Nose
(C) Heart (D) Kidney
5. Select the odd one out from given alternatives
(A) 13 - 26 (B) 15 - 30
(C) 17 - 34 (D) 19 - 31

Space for Rough Work

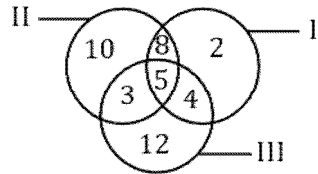
6. Arrange the given words in the sequence in which they occur in the dictionary
- | | |
|------------|--------------|
| 1. Attempt | 2. Alert |
| 3. Attach | 4. Assistant |
| 5. Assume | |
- (A) 13452 (B) 24531
(C) 42531 (D) 53412
7. If first day of leap year is Friday which day will be the last day of same year.
(A) Friday (B) Saturday
(C) Sunday (D) Monday
8. How many odd days are in first 100 year?
(A) 5 (B) 6
(C) 4 (D) 3
9. What angle is made by the second hand in one minute?
(A) 6° (B) 360°
(C) 240° (D) 340°
10. In the following question, select the missing number from given series:
13, 17, 26, 42, 67, ?
(A) 99 (B) 90
(C) 103 (D) 94
11. A series is given with one term missing. Select the correct alternative from given ones that will complete the series:
FN, KL, PJ, ?, ZF
(A) SH (B) RG
(C) VG (D) UH

Space for Rough Work

12. In a row, Mohini is at 23rd from left and 37th from right. How many girls are there in row?
(A) 60 (B) 61
(C) 59 (D) 58
13. From the given alternatives, select the word which cannot be formed using the letters of the given word
GRANDFATHER
(A) RAND (B) AND
(C) GRADE (D) FAITH
14. What time is shown by the mirror if the real time is 4 : 40
(A) 5 : 20 (B) 3 : 20
(C) 7 : 20 (D) 8 : 20
15. Find out which of the diagram as given in the alternatives. Correctly represents the relationship in the question.
GOLD, IRON, COPPER
- (A)  (B) 
- (C)  (D) 

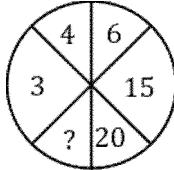
Space for Rough Work

16. In the given figure how many people like at least two news paper



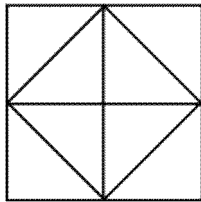
- (A) 8 (B) 7
(C) 15 (D) 20

17. Find the missing term in given circle



- (A) 30 (B) 25
(C) 28 (D) 35

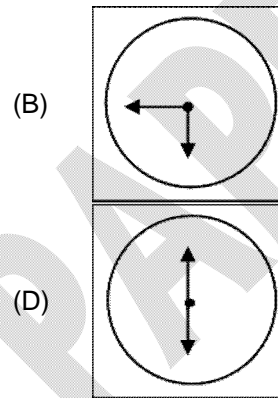
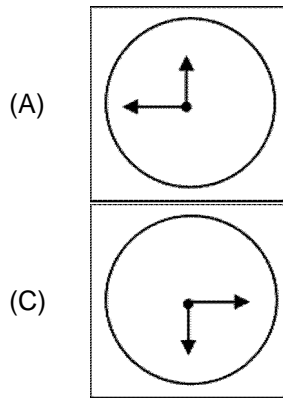
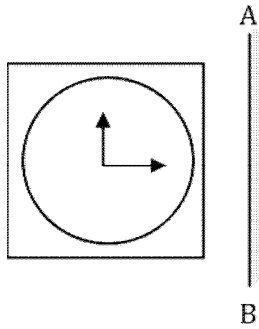
18. Find the total number of triangle in the given figure.



- (A) 9 (B) 13
(C) 11 (D) 12

Space for Rough Work

19. Select the correct mirror image of the given figure when the mirror is placed to its right side.



20. If $3 * 4 = 12$, $5 * 4 = 20$ and $6 * 0 = 0$ find the value of $-2 * -4 = ?$
- (A) -8 (B) 8
 (C) 6 (D) 4

Space for Rough Work

21. In the following question some statements are given, followed by some conclusion based on those statements. Taking the given statements to be true even if they seem to be at variance. From commonly known facts.
Read all the conclusions and then divide which of the given conclusion logically follows the given statements.
- Statements:**
I. No P is Q
II. All Q are P
- Conclusion:**
I. Some R are Q
II. Some Q are P
III. Some P are R
- (A) All conclusion follow (B) Only conclusion I follow
(C) Only conclusion II follow (D) Only conclusion III follow
22. Pointing towards a photo of a lady 'Navneet said, "she is sister of my sister's mother". How that lady is related to Navneet?
(A) Mother (B) Grand mother
(C) Maternal aunt (D) Mother-in-law
23. Which two numbers (not digits) should be interchanged to make the equation correct.
 $8 \times 6 + 12 \div 2 - 4 = 14$
(A) 8 and 6 (B) 2 and 4
(C) 2 and 6 (D) 12 and 14
24. In a certain code language "BE" is coded "10" and "OF" is coded "90". What is the code for "BAT" in that code language?
(A) 4 (B) 40
(C) 60 (D) 38

Space for Rough Work

25. J, A, G, E, V and F are sitting around a round table facing the centre. F is to the immediate left of G, who is opposite A, V is between A and J. Who is the left of E.
(A) V (B) G
(C) A (D) F
26. V, X, Y, Z are playing cards. X is to the left of Y and V is to the right of Z. If X is facing West. Which direction is V facing?
(A) North (B) South
(C) West (D) East

Directions (27-30): Study the following information carefully and answer the question given below:

P, Q, R, S, T and V are six students. Studying in a class. Each one of them has different height and weight the one who is tallest is not the heaviest. T is taller than only P and lighter than R. Q is taller than S and P and is heavier than only T and V. P is lighter than only S. T is heavier than V. S is taller than V and Q is not the tallest.

27. How many are taller than T?
(A) 2 (B) 3
(C) 4 (D) 5
28. How many are shorter than Q?
(A) 4 (B) 5
(C) 3 (D) 1
29. Who is the tallest?
(A) Q (B) R
(C) S (D) V
30. Who is the lightest of them?
(A) P (B) S
(C) R (D) V

Space for Rough Work

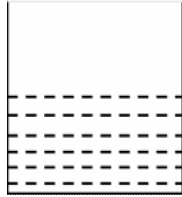
PART – II : SCIENCE**SECTION - A****PHYSICS**

This part contains 13 Multiple Choice Questions number 31 to 43. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.

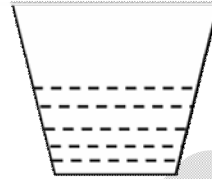
31. Friction is a/an _____
(A) Evil (B) Foe
(C) Both (A) and (B) (D) None
32. The strength of force is expressed by its
(A) Weight (B) Mass
(C) Magnitude (D) Longitudinal force
33. When a given force is applied on a larger area the pressure exerted by it
(A) Increases (B) Decreases
(C) Does not change (D) None of these
34. The tendency of a body to maintain its state of rest or uniform motion is called
(A) Gravity (B) Inertia
(C) Weight (D) Acceleration
35. Muscular force is also called _____ force.
(A) Non-contact (B) Contact
(C) Gravitational (D) Magnetic
36. If μ_k and μ_l are coefficients of sliding and limiting friction then
(A) $\mu_k < \mu_l$ (B) $\mu_l = \mu_k$
(C) $\mu_l < \mu_k$ (D) None of these

Space for Rough Work

37. When a body is stationary
(A) there is no force acting on it
(B) the force acting on it is not in contact with it
(C) the combination of forces acting on it balance each other
(D) the body is in vacuum
38. Two vessels with equal base have water filled to the same height. The force at the base of the vessels is

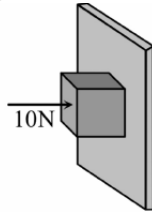


A



B

- (A) Force doesn't depend on such factors
(B) Equal
(C) Varies with time
(D) Unequal
39. The maximum value of static friction when the body is at the verge of starting motion is known as
(A) Static friction
(B) Limiting friction
(C) Impending motion
(D) Angle of repose
40. A horizontal force of 10 N is necessary to just hold a block stationary against a wall. The coefficient of friction between the block and the wall is 0.2, the weight of the block is



- (A) 2 N
(B) 20 N
(C) 50 N
(D) 100 N

Space for Rough Work

41. An open glass tube is immersed in mercury in such a way that a length of 8 cm extends above the mercury level. The open end of the tube is then closed and sealed and the tube is raised vertically up by additional 46 cm. What will be the length of the air column above mercury in the tube now?

(Atmospheric pressure = 76 cm of Hg)

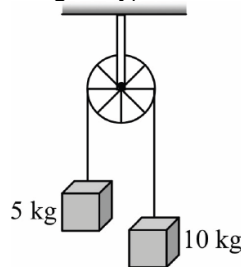
- (A) 16 (B) 22
(C) 38 (D) 6

42. The tension in the spring is



- (A) zero (B) 2.5 N
(C) 5 N (D) 10 N

43. Two masses of 5 kg and 10 kg are connected to a pulley as shown. What will be the acceleration of the system (g = acceleration due to gravity)



- (A) g (B) $\frac{g}{2}$
(C) $\frac{g}{3}$ (D) $\frac{g}{4}$

Space for Rough Work

SECTION - A**CHEMISTRY**

This part contains 13 Multiple Choice Questions number 44 to 56. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.

44. Which of the following can be beaten into thin sheets?
(A) Zinc (B) Phosphorus
(C) Sulphur (D) Oxygen
45. Metalloids possess the properties of
(A) metals (B) non-metals
(C) both metals and non-metals (D) none of these
46. Which substance is used for making pencil lead?
(A) sulphur (B) silicon
(C) graphite (D) aluminium
47. Which non-metal is used in making glass?
(A) graphite (B) sulphur
(C) silica (D) none of these
48. Which one of the following is a good conductor of electricity?
(A) Iron (B) Plastic
(C) Wood (D) Glass
49. Alumina is chief ore of which of the following metal?
(A) Na (B) K
(C) Ca (D) Al
50. Brass is an alloy of
(A) Cu and Sn (B) Cu and Zn
(C) Zn and Sn (D) Pb and Sn

Space for Rough Work

51. Gypsum is an ore of
(A) Magnesium (B) Calcium
(C) Sodium (D) Aluminium
52. Which of the following reaction is not possible?
(A) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$ (B) $Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$
(C) $Cu + FeSO_4 \rightarrow CuSO_4 + Fe$ (D) $Mg + FeSO_4 \rightarrow MgSO_4 + Fe$
53. Na_2F posses
(A) Metallic bond (B) Ionic bond
(C) Covalent bond (D) Co-ordinate bond
54. Arrange the metals A, B and C in order of decreasing reactivity keeping in view the following reactions
 $A + BSO_4 = ASO_4 + B$
 $B + 2CNO_3 = B(NO_3)_2 + 2C$
 $A + C_2O = AO + 2C$
(A) $B > C > A$ (B) $B > A > C$
(C) $A > C < B$ (D) $A > B > C$
55. Calcination occurs
(A) In presence of air (B) In absence of air
(C) Both (A) and (B) (D) None
56. Bauxite is the most important ore of
(A) Aluminium (B) Iron
(C) Copper (D) Lead

Space for Rough Work

SECTION - A**BIOLOGY**

This part contains 4 Multiple Choice Questions number 57 to 60. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.

57. Food grains are stored naturally by using
(A) Mango leaves (B) Tulsi leaves
(C) Peepal leaves (D) Neem leaves
58. Acetic acid (Vinegar) is prepared by using which of the following
(A) Algae (B) Azatobacter
(C) Virus (D) Acetobacter
59. Fertilizers are superior to manures in all of the following aspects except following
(A) Water soluble (B) Nutrient specific
(C) Organic matter replenishing (D) Compact
60. Jaundice is a disease of
(A) Pancreases (B) Liver
(C) Kidney (D) Intestine

Space for Rough Work

PART - III**MATHEMATICS**

This section contains 30 Multiple Choice Questions number 61 to 90. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.

61. A ribbon of length $5\frac{1}{4}$ m is cut into small pieces each of length $\frac{3}{4}$ m number of pieces will be
 (A) 5 (B) 6
 (C) 7 (D) 8
62. $\frac{1}{8}$ of a number equals $\frac{2}{5} + \frac{1}{20}$. The number is
 (A) 1 (B) 25
 (C) 64 (D) 8
63. $\frac{4}{5}$ of 5 kg apples were used on Monday. The next day $\frac{1}{3}$ of the remaining were used. Weight (in kg) of apples left now is
 (A) $\frac{2}{3}$ (B) $\frac{1}{14}$
 (C) $\frac{2}{3}$ (D) $\frac{4}{21}$
64. If $x = \frac{2}{3}$ and $y = \frac{3}{2}$ then find the value of $\frac{x+y}{x-y}$
 (A) $\frac{5}{13}$ (B) $-\frac{13}{5}$
 (C) $\frac{13}{5}$ (D) $-\frac{5}{13}$
65. The sum of additive inverse and multiplicative inverse of $\frac{1}{5}$ is
 (A) $\frac{24}{5}$ (B) $-\frac{24}{5}$
 (C) 25 (D) -25

Space for Rough Work

66. Mrs. Meetu earns Rs. 1,80,000 per month. She spends $\frac{7}{12}$ on household items and $\frac{4}{25}$ of the remaining invests in stock market. The money saved by her (in rupees) is
 (A) zero (B) 60,000
 (C) 63,000 (D) 50,500
67. $3^{x+1} = 9^{x-3}$ then the value of 2^{x-3} equals
 (A) 8 (B) 16
 (C) 32 (D) 4
68. If $\frac{9^m \cdot 3^2 \cdot 3^n - (27)^n}{(3^m \times 2)^3} = 3^{-3}$ then the value of $m - n$ equals
 (A) 1 (B) -1
 (C) zero (D) mn
69. Two cubes have volume in the ratio $\frac{8}{27}$. The ratio of their respective surface areas will be
 (A) $\frac{2}{3}$ (B) $\frac{4}{9}$
 (C) $\frac{4}{9}$ (D) $\frac{2}{3}$
70. The value of $\sqrt[3]{-2744} \div \sqrt[3]{0.008}$ equals
 (A) 70 (B) 14
 (C) -70 (D) -14

Space for Rough Work

71. If $(a^m)^n = a^m \cdot a^n$
find the value of $m(n-1) - (n-1)$
(A) zero (B) 1
(C) -1 (D) $2mn$
72. Atul made a cuboid of plasticine. Length, breadth and height of the cuboid are 25 cm, 25 cm and 50 cm respectively. How many minimum such cuboids he needs to make a perfect cube?
(A) 2 (B) 4
(C) 6 (D) 8
73. Find the length of the side of a square whose area is 441 m^2
(A) 31 m (B) 21 m
(C) 11 m (D) 41 m
74. There are 500 children in a PT drill. They have to stand in such a manner that the number of rows is equal to the number of columns. How many children would be left out?
(A) 29 (B) 16
(C) 24 (D) zero
75. Find the value of $\sqrt{\frac{101+103+105+\dots+199}{1+3+5+\dots+99}}$
(A) 3 (B) $\sqrt{3}$
(C) $\sqrt{\frac{1}{3}}$ (D) $\sqrt{5}$

Space for Rough Work

76. $a^2 + b^2 = 25$; $ab = 5$ find the value of $a - b$
(A) 15 (B) $\sqrt{15}$
(C) $\sqrt{10}$ (D) 10
77. The base of a parallelogram is $2x + 3$ and corresponding height is $2x - 3$ units. If the area of the parallelogram is 391 sq. units then the value of x is
(A) 5 units (B) 10 units
(C) 15 units (D) 20 units
78. The area of a circle is given by $\pi x^2 + 6\pi x + 9\pi$. If the radius of circle is 6 cm. Find x
(A) 3 cm (B) 4 cm
(C) 5 cm (D) 6 cm
79. Interest obtained on a sum of Rs. 5,000 for 3 years is Rs. 1,500. Find the rate of Simple interest.
(A) 5% (B) 10%
(C) 15% (D) 20%
80. What is the SI on a sum of Rs. 700 if the rate of interest for first three years is 8% and last two years is 10%?
(A) Rs. 290 (B) Rs. 300
(C) Rs. 308 (D) Rs. 320

Space for Rough Work

81. Two equal sums were borrowed at 8% simple rate of interest for 2 years and 3 years respectively. The difference in the interest was Rs. 56. The total sum borrowed was
(A) Rs. 1400 (B) Rs. 1500
(C) Rs. 1600 (D) Rs. 1700
82. If the length of the side of a right triangular field is 91 m and 60 m. Find the length of longest side (in m)
(A) 101 m (B) 109 m
(C) 111 m (D) 129 m
83. Find the area of square whose diagonal is $5\sqrt{2}$ units
(A) 144 sq. units (B) 25 sq. units
(C) 50 sq. units (D) 100 sq. units
84. $ABCD$ is a rectangle whose sides are 3 cm and 4 cm. If we draw a square on diagonal, BD then the area of the square formed is
(A) 25 cm^2 (B) 9 cm^2
(C) 16 cm^2 (D) 49 cm^2
85. Solve for x
$$\frac{3x-2}{4} - \frac{2x+3}{3} = \frac{2}{3} - x$$

(A) 2 (B) -2
(C) $\frac{26}{11}$ (D) $-\frac{26}{11}$

Space for Rough Work

86. The numerator of a fraction is 5 less than its denominator. If 3 is added to the numerator and denominator both, the fraction becomes $\frac{11}{24}$. The original fraction is
- (A) $\frac{5}{12}$ (B) $\frac{4}{9}$
 (C) $\frac{3}{8}$ (D) $\frac{7}{12}$
87. A man's age is three times that of his son and in twelve years, he will be twice as old as his son would be. What is the difference of their present ages (in years)?
- (A) 12 (B) 24
 (C) 36 (D) 8
88. Find the value of x
- $$x = \frac{\sqrt{25 \sqrt{25 \sqrt{25 \sqrt{25 \dots}}}}}{1+3+5+7+9}$$
- (A) 5 (B) 25
 (C) 1 (D) $\frac{1}{5}$
89. If $x^2 + \frac{1}{x^2} = 11$ then $x^3 - \frac{1}{x^3}$ equals
- (A) 27 (B) 8
 (C) 36 (D) 24
90. If $ab = 1$ then $\frac{1}{1+a^{-1}} + \frac{1}{1+b^{-1}}$ equals
- (A) $a + b$ (B) $a - b$
 (C) 1 (D) zero

Space for Rough Work

FIITJEE

Maharashtra Science Talent Search Examination - 2023

(only for Maharashtra State Students)

for students presently in **Class VIII**

SAMPLE PAPER

ANSWER KEYS (SAMPLE PAPER)

1	B	2	B	3	D	4	B
5	D	6	B	7	B	8	A
9	B	10	C	11	D	12	C
13	D	14	C	15	B	16	D
17	A	18	D	19	A	20	B
21	B	22	C	23	C	24	B
25	C	26	A	27	C	28	A
29	B	30	D	31	C	32	C
33	B	34	B	35	B	36	A
37	C	38	B	39	B	40	A
41	A	42	C	43	C	44	A
45	C	46	C	47	C	48	A
49	D	50	B	51	B	52	C
53	B	54	D	55	B	56	A
57	D	58	D	59	C	60	B
61	C	62	C	63	C	64	B
65	A	66	C	67	B	68	A
69	C	70	C	71	B	72	B
73	B	74	B	75	B	76	B
77	B	78	A	79	B	80	C
81	A	82	B	83	B	84	A
85	C	86	D	87	B	88	C
89	C	90	C				