IIT ASHRAM BRINGS...

SCIENCE APTITUDE TEST (2016-17)
SAMPLE PAPER

CLASS 8

Time : 3 Hours

M.M. : 300

KH◯J

A Hunt for
Young Scientists..!

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

IMPORTANT INSTRUCTIONS

A. General:

1. This booklet consists of 100 questions.
2. Blank papers, clipboards, log tables, slide rules, calculators, cellular phones, and electronic gadgets in any form are not allowed to be carried inside the examination hall.
3. The answer sheet, a machine–readable Objective Response Sheet (OMR), is provided separately.
4. DO NOT TAMPER WITH / MUTILATE THE OMR OR THE BOOKLET.
5. Write Name and Address in capital letters of OMR sheet.
6. **Submit the OMR Sheet back to Invigilator after examination before leaving the examination hall.**

B. Question paper format:

7. The question paper consists of **4 Sections.**
   - **(I)** **Mental Ability (20 Questions)**
   - **(II)** **Mathematics (30 Questions)**
   - **(III)** **Physics & Chemistry (34 Questions)**
   - **(IV)** **Biology (16 Questions)**

C. Marking Scheme :

8. For each question in **Section I, II, III and IV** you will be **awarded 3 marks** if you have darkened only the bubble corresponding to the correct answer and zero mark if no bubble is darkened. In all other cases where the answer marked is not correct, **minus one (–1) mark** will be awarded.

Name of the Candidate	Class	Roll Number

I have read all the instructions and shall abide by them

....
Signature of the Candidate

I have verified all the informations filled by the candidate.

....
Signature of the Invigilator

UG–1 & 2, Concorde Complex, Above OBC Bank. R.C. Dutt Road., Alkapuri Vadodara-390007

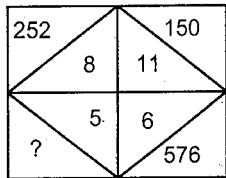# MENTAL ABILITY

1. 17, 19, 23, 29, 31, 37,_____
    (a) 41   (b) 43
    (c) 40   (d) 42

2. 12, 14, 15, 16, 18, 20_____
    (a) 22   (b) 25
    (c) 21   (d) 23

3. 225, 196, 169,_____. 121, 100, 81
    (a) 156   (b) 144
    (d) 139   (d) 125
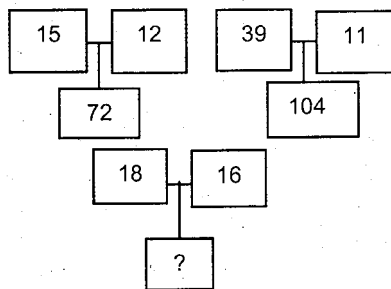
4.

    (a) 100   (b) 200
    (c) 82   (d) 142

5.

    (a) 1000   (b) 1452
    (c) 1131   (d) none

6. E, A_____, O, I
    (a) E   (b) U
    (c) X   (d) V

7. D, F, G, H, J, K, L, M N,_____
    (a) O   (b) Q
    (c) P   (d) R

8. TCFK, RADI, OXAF, JSVA,_____
    (a) DMPU   (b) DMOT
    (c) CMOT   (d) CLOT

9. SUWY : LPTX :: PRTV
    (a) INRU   (b) INQU
    (c) IMRU   (d) IMQU

10. BCDE : DFHH :: FGHI : _____
    (a) LJPL   (b) LKPL
    (c) JKPJ   (d) IKPL

11. Find the odd one among the following.
    (a) CFD   (b) GJH
    (c) KNM   (d) JMK

12. Socks : Feet : ____ : Hands
    (a) Arms   (b) Shirt
    (c) Gloves   (d) Fingers

13. 112 : 448 :: 241 : _____
    (a) 1500   (b) 1687
    (c) 1568   (d) 1600

14. 45 : 41 :: 66 :
    (a) 64   (b) 61
   (c) 72   (d) 66

15. TAP : SUZBOQ :: RED :____
    (a) QTDGDE   (b) PSDEDF
    (c) QSDFCE   (d) QRDGBE

16. How is my grandmother's only child's husband's mother related to me?
    (a) Mother   (b) Grandmother
    (c) Aunt   (d) Sister

17. How is Ramu's mother-in-law's only daughter's son related to Ramu?
    (a) Nephew   (b) Brother
    (c) Son   (d) Uncle

18. If 8th February 1995 was a Wednesday, then 8th Feb. 1994 was on which day?
    (a) Wednesday
    (b) Thursday
    (c) Tuesday
    (d) Monday

19. Two different views of a dice, whose six faces are marked a, b, c, d, e and f are given below. Find the letter on the face opposite 'd'?
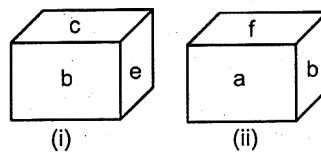
    (a) c   (b) e
    (c) a   (d) b

20. Among the four given figures, three figures follow the same pattern and one figure is different from these three. Mark the figure (which is different from the other three) as your answer.
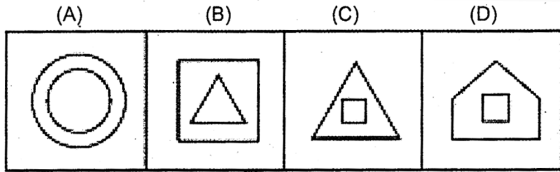
MATHEMTICS

1. Express the following as a rational number of the form $\frac{p}{q}$: $\left(\frac{-2}{7}\right)^{-4} \times \left(\frac{-7}{5}\right)^{2}$

(a) $\frac{335}{77}$

(b) $\frac{117649}{400}$

(c) $\frac{117648}{300}$

(d) $\frac{17648}{350}$

2. What will come in place of question mark in the following questions?

$\sqrt{86.49} + \sqrt{5+(?)^2} = 12.3$

(a) 5   (b) 7
(c) 2   (d) 11

3. Simplify :

$\sqrt{[(12.1)^2 - (8.1)^2] \div [(0.25)^2 + (0.25)(19.95)]}$

(a) 7   (b) 4
(c) 5   (d) 6

4. By what least number 4320 be multiplied to obtain a number which is a perfect cube?
(a) 70   (b) 11
(c) 50   (d) 55

5. Multiply :

$\frac{4}{9}a^5b^2$, $10a^3b$ and 6

(a) $\frac{17}{13}$

(b) $\frac{80}{3}a^8b^3$

(c) $\frac{80}{3}a^7b^6$

(d) $\frac{17}{13}a^7b^6$

6. The product of the following monomials:

$\frac{3}{4}x^2yz^2$, $0.5xy^2z^2$, $1.16x^2yz^3$, $2xyz$

(a) $\frac{55}{13}x^7y^3z$

(b) $\frac{85}{14}x^5y^2z$

(c) $\frac{87}{100}x^6y^5z^8$

(d) None of these

7. Find the value of $(5a^6) \times (-10ab^2) \times (-2.1a^2b^3)$ for $a = 1$ and $b = \frac{1}{2}$.

(a) $\frac{100}{7}$

(b) $\frac{105}{32}$

(c) $\frac{113}{32}$

(d) $\frac{150}{11}$

8. Solve : $\frac{17(2-x)-5(x+12)}{1-7x} = 8$

(a) 1   (b) 2
(c) 0   (d) 3

9. Solve : $\frac{1}{x+1} + \frac{1}{x+2} = \frac{2}{x+10}$

(a) $-\frac{26}{17}$

(b) $-\frac{35}{17}$

(c) $-\frac{35}{11}$

(d) $\frac{26}{5}$

10. In rhombus ABCD, AB = 7.5 cm, and AC = 12 cm. Find the area of the rhombus.
(a) 55 cm^2 (b) 54 cm^2
(c) 65 cm^2 (d) 60 cm^2

11. In the trapezium PQRS, $\angle P = \angle S = 90°$, PQ = QR = 13 cm, PS = 12 cm and SR = 18 cm. Find the area of the trapezium.
(a) 180 cm^2 (b) 185 cm^2
(c) 186 cm^2 (d) 200 cm^2

12. In a quadrilateral ABCD, AC = 15 cm, The perpendiculars drawn from B and D respectively to $\overline{AC}$ measure 8.2 cm and 9.1 cm. Find the area of the quadrilateral.
(a) 129.75 cm^2 (b) 130.75 cm^2
(c) 120.75 cm^2 (d) 135.2 cm^2

13. What percent of Rs. 2650 is Rs. 1987.50 ?
(a) 60%   (b) 75%
(c) 80%   (d) 90%

14. A housewife saved Rs. 2.50 in buying an item on sale. If she spent Rs. 25 for the item, approximately how much percent she saved in the transaction ?
(a) 8%   (b) 9%
(c) 10%   (d) 11%

15. 5% of (25% of Rs. 1600) is -
(a) Rs. 5   (b) Rs. 17.50
(c) Rs. 20   (d) Rs. 25

16. When a commodity is sold for Rs. 34.80, there is a loss of 20%. What is the cost price of the commodity ?
(a) Rs. 26.10   (b) Rs. 43.50
(c) Rs. 43.20   (d) Rs. 46.40

17. If selling price of an article is $\dfrac{4}{3}$ of its costs price, the profit in the transaction is :
(a) $16\dfrac{2}{3}\%$ (b) $20\dfrac{1}{2}\%$
(c) $25\dfrac{1}{2}\%$ (d) $33\dfrac{1}{3}\%$

18. If A : B = 2 : 3, B : C = 4 : 5 and C : D = 6 : 7, then A : B : C : D is.....
(a) 16 : 22 : 30 : 35   (b) 16 : 24 : 15 : 35
(c) 16 : 24 : 30 : 35   (d) 18 : 24 : 30 : 35

19. The salaries of A, B and C are in the ratio 2 : 3 : 5. If the increments of 15%, 10% and 20% are allowed respectively in their salaries, then what will be the new ratio of their salaries ?
(a) 3 : 3 : 10   (b) 10 : 11 : 20
(c) 23 : 33 : 60
(d) Cannot be determined

20. A man can do a job in 15 days. His father takes 20 days and his son finishes it in 25 days. How long will they take to complete the job if they all work together ?
(a) Less than 6 days
(b) Exactly 6 days
(c) Approximately 6.4 days
(d) More than 10 days

21. The mean proportional between 234 and 104 is :
(a) 12   (b) 39
(c) 54   (d) None of these

22. A can lay railway track between two given stations in 16 days and B can do the same job in 12 days. With the help of C, they did the job in 4 days only. Then, C alone can do the job in:
(a) $9\dfrac{1}{5}$ days   (b) $9\dfrac{2}{5}$ days
(c) $9\dfrac{3}{5}$ days   (d) 10 days

23. Find the average of first 20 multiples of 7
(a) 70   (b) 73.5
(c) 72.5   (d) 78

24. The average of 25 results is 18. The average of first twelve of them is 14 and that of last twelve is 17. Find the thirteenth result.
(a) 76   (b) 77
(c) 78   (d) 80

25. The average age of a class of 39 students is 15 years. If the age of the teacher be included, then the average increases by 3 months. Find the age of the teacher.
(a) 30   (b) 25
(c) 27   (d) 28

26. There were 35 students in a hostel. Due to the admission of 7 new students, the expenses of the mess were increased by Rs. 42 per day while the average expenditure per head diminished by Re 1. What was the original expenditure of the mess?
(a) Rs. 400   (b) Rs. 500
(c) Rs. 420   (d) Rs. 520

27. The area of a rectangle is 460 square metres. If the length is 15% more than the breadth. What is the breadth of the rectangular field?
(a) 15 metres
(b) 26 metres
(c) Cannot be determined
(d) None of these

28. A large field of 700 hectares is divided into two parts. The difference of the areas of the two parts is one-fifth of the average of the two areas. What is the area of the smaller part in hectares?

(a) 225   (b) 280

(c) 300   (d) 315

29. The wheel of a motorcycle, 70 cm in diameter, makes 40 revolutions in every 10 seconds. What is the speed of the motorcycle in km/hr?

(a) 22.32   (b) 27.68

(c) 31.68   (d) 36.24

30. The areas of two circular fields are in the ratio 16 : 49. If the radius of the latter is 14 m, then what is the radius of the former?

(a) 4 m   (b) 8 m

(c) 18 m   (d) 32 m

PHYSICS/CHEMISTRY

1. On a Fahrenheit scale:

(a) boiling point of water is 212ºF
(b) the temperature reading will be equal to that on the Celsius scale at –40ºC
(c) the difference between the upper fixed point and the lower fixed point is divided into 180 equal parts
(d) all the above

2. Plane mirrors are arranged parallel to each other to get :

(a) a single image
(b) two images
(c) a large number of reflected images
(d) no image

3. Which of these would be the best conductor of electricity?

(a) hydrogen   (b) copper

(c) chloride   (d) neon

4. The transfer of thermal energy between materials by the collision of particles.

(a) Conduction
(b) Thermal Conductor
(c) Convection   (d) Specific Heat

5. The amount of electricity that is flowing around a circuit is measured by _____ .

(a) ammeter   (b) battery

(c) current   (d) altitude

6. A virtual image is formed by concave mirror when the object is placed:

(a) at the focus
(b) between the focus and the pole
(c) between the focus and the centre of curvature
(d) beyond the centre of curvature

7. When a cell is connected in an electric circuit,

(A) current flows from negative to positive electrode outside the cell.

(B) current flows from positive to negative electrode inside the cell.

(a) A and B both are correct.
(b) A and B both are wrong.
(c) A is correct but B is wrong.
(d) B is correct but A is wrong.

8. At a speed of 7.5 m/s, how far can you run in 40 seconds?

(a) 53m   (b) 1875m

(c) 300m   (d) 475m

9. Study the circuit shown here. Which switch, if opened, will cause the light bulb to stop glowing?
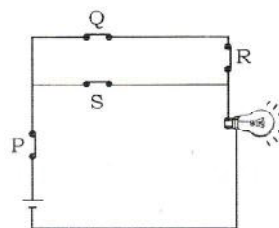
(a) P   (b) Q
(c) R   (d) S

10. What is the unit for work?

(a) joule   (b) joule per second

(c) newton   (d) watt

11. Fluid pressure is always directed

(a) up.   (b) down.

(c) sideways.   (d) in all directions.

12. Electricity is the movement of

(a) Molecules   (b) Electrons

(c) Atoms   (d) Neutrons

13. We are able to walk because of which force?

(a) Friction   (b) Gravitation

(c) Normal   (d) Tension

14. The pressure exerted by air around us is known as

(a) Hydrostatic pressure

(b) Atmoshperic pressure

(c) High pressure

(d) Low pressure

15. The smallest time measured by a wrist watch accurately is :

(a) 1 milli second   (b) 60 seconds

(c) 1 second   (d) 1 hour

16. Above how many decibels, sound becomes physically painful to hear?

(a) 60 dB   (b) 50 dB

(c) 80 dB   (d) 40 dB

17. Which one of the following regarding a rainbow is correct ?

(a) It is always seen as a circle

(b) The order of colours is (from the top to bottom as seen from the ground) violet, indigo, yellow, green, blue, orange, red

(c) Its order of colours is (From the top to bottom as seen from the ground) red, organe, yellow, green, blue, indigo, violet

(d) The order of colours can be either violet to red or red to violet depending upon the time of the day

18. The automatic darkening property of photochromatic glass is because of the presence of :

(a) sodium chloride

(b) lead oxide

(c) calcium oxide   (d) silver iodide

19. Which of the following is called a polyamide?

(a) Rayon   (b) Nylon

(c) Orlon   (d) Terylene

20. Which of the following is similar to cotton?

(a) Nylon   (b) Dacron

(c) Rayon   (d) Terelyene

21. The metal present in Brass, Bronze and German silver is

(a) Zn   (b) Mg

(c) Cu   (d) Al

22. When a strip of copper is dipped in $AgNO_3$ solution it becomes blue due to formation of:

(a) silver   (b) copper nitrate

(c) copper oxide   (d) silver oxide

23. Which of the following burns with an explosion in contact with water and air?

(a) Na   (b) Ca

(c) Mg   (d) Zn

24. Ozone is a/an:

(a) element   (b) mixture

(c) allotrope

(d) none of the above

25. Which of the following is neither an element nor a compound?

(a) Air   (b) Water

(c) Mercury   (d) Sodium chloride

26. Which of the following is not a matter?

(a) Glass   (b) Wood

(c) Air   (d) Light

27. Divide a piece of ice into half. Divide it further and keep on dividing it many times. The smallest piece of ice that you can get by this division is:

(a) an atom   (b) a molecule

(c) a particle   (d) a crystal

28. The set of numerical co-efficients that balances the chemical equation:

$K_2CrO_4 + HCl \rightarrow K_2Cr_2O_7 + KCl + H_2O$

(a) 1, 1, 2, 2, 1   (b) 2, 2, 1, 1, 1

(c) 2, 1, 1, 2, 1   (d) 2, 2, 1, 2, 1

29. Common name of H_2SO_4 is:

(a) oil of vitriol   (b) muriatic acid

(c) blue vitriol   (d) green vitriol

30. When magnesium is burnt to air. It produces magnesium oxide. The correct chemical reaction is:
  (a) $Mg + O_2 \rightarrow MgO$
  (b) $2Mg + O_2 \rightarrow 2MgO$
  (c) $2Mg + 2O \rightarrow 2MgO$
  (d) $Mg_2 + O_2 \rightarrow 2MgO$

31. Raghav categorised the following household items into acids and bases.

  Acids   Bases
  1. Lemon   4. Baking soda
  2. Antacid   5. Vinegar
  3. Tea   6. Curd

  Which of them is placed under the wrong category?
 (a) 3 and 5   (b) 2 and 6
  (c) 3, 4 and 5   (d) 2, 5 and 6

32. Kanav took two test tubes marked as I and II. In test tube I, he put calcium carbonate and hydrochloric acid while in test tube II, he put zinc granules and hydrochloric acid. He passed the gas coming out from both the test tubes in lime water. What are his observations?
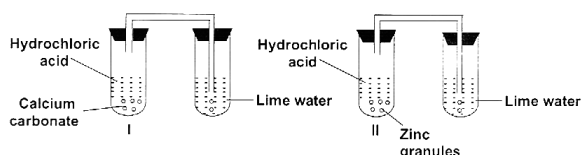
  (a) The gas coming out from test tube I turns lime water milky.
  (b) The gas coming out from test tube II turns lime water milky.
  (c) The gases coming out from both the test tubes turn lime water milky.
  (d) None of these.

33. Kunal took few iron turnings and mixed them well with sulphur powder. He could separate the iron turnings with the help of a magnet. He heated the mixture for some time and tried to separate the iron turnings with the magnet but he could not. Why?

  (a) On heating, a chemical change takes place and a new compound is formed.
  (b) On heating, the nature of iron changes hence it is not attracted by magnet.
  (c) On heating, a physical change takes place hence iron and sulphur gets mixed up.
  (d) On heating, iron evaporates and only sulphur is left behind.

34. Shobha took two liquids (coconut oil and water) in a separating funnel kept on a stand as shown in the figure. What would she observe after some time?
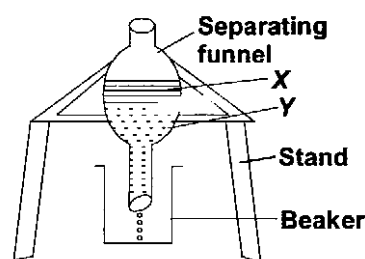

  (a) Layer X is coconut oil, Y is water and two distinct layers are formed.
  (b) Layer X is water, Y is coconut oil and two distinct layers are formed.
  (c) Layers X and Y are miscible to some extent, hence do not form distinct layers.
  (d) Coconut oil is first collected in the beaker.

BIOLOGY

1. Muscle cramps occurs due to accumulation of
  (a) Lactic acid   (b) Acetic acid
  (c) Alcohol   (d) Malice acid

2. Name the muscular sheet which separates the abdomen from the chest cavity.
  (a) Diaphram   (b) Ribs
  (c) Spiracles   (d) Tracheae

3. Some animals like the water spider and water beetle can stay underwater for a long time to hunt and feed because they _____.
  (a) have air tubes for breathing
  (b) have gills to breathe underwater
  (c) can trap air with their body parts for breathing
  (d) can breathe through their special nostrils

4. Which one of the following adaptations enables the camel to live in the desert?

    (a) The hump stores water.

    (b) The long lashes protect the eyes from the sand.

    (c) The bristles under the feet prevent it from sinking into the sand.

    (d) The thin skin on the knees allows heat to escape rapidly.

5. Many plants like eucalyptus, pine and rubber tree produce substances such as rubber and resin. These products are _____ for these plants.

    (a) Stored food   (b) Toxic wastes

    (c) Water reserve   (d) Nutrients

6. "COLOSTOMY" is a process in which

    (a) IT is a surgical procedure to divert one end of the large intestine (colon) through an opening in the abdominal wall (tummy).

    (b) it is a permanent way of birth control and sterilization for women.

    (c) Diseases of the colon and rectum.

    (d) A name of bacteria

7. Identify the diagram

    (a) DNA   (b) C-DNA
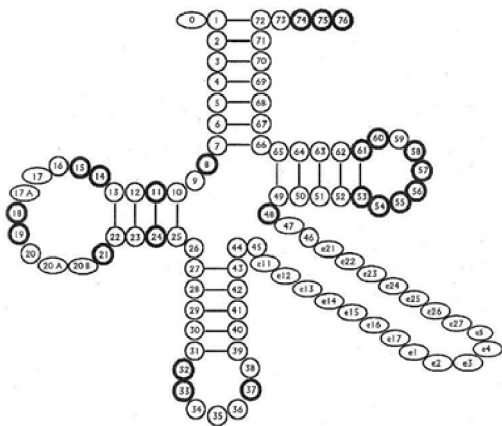
    (c) M-RNA   (d) t-RNA

8. Which of the following is not vector born disease?

    (a) Common cold   (b) malaria

    (c) dengue

    (d) sleeping sickness

9. Choose odd option from the following

    (a) Pitcher plant   (b) sundew plant

    (c) protozoan   (d) Venus fly trap

Comprehension for (Q.No.10 &b Q. No. 11)

In any cell, nucleus controls cellular activity and ribosome's are the sites of protein synthesis. Mitochondria are called power house or ATP mills as they are sites for ATP formation which is used in various metabolic activities or functions of cell. Lysosomes are bags of digestive enzymes which destroy worn out cells and foreign material.

10. Which cell are likely to posses the highest number of mitochondria ?

    (a) hair cell   (b) skin surface cell

    (c) red blood cell   (d) muscle cell

11. Consider the following statements

    1. lysosomes are called as suicide bag of cell

    2. The fold of inner membrane of mitochondria increase the area for ATP generating chemicals reactions

    3. Ribosomes helps in formation of plasma membrane

    Which of the following is / are correct :-

    (a) 1 & 2   (b) 2 & 3

    (c) 1 only   (d) 1,2 & 3

12. Select the correct statement from the following

    (a) Yellow fever is transmitted by tse-tse fly

    (b) Night blindness is a result of deficiency to vitamin B

    (c) Filariasis is transmitted by culax mosquito

    (d) Excessive consumption of mercury causes itai-itai

13. Algal scum floats on the surface of water because –

(a) The density of cells is lesser than that of water

(b) Oxygen accumulates in it

(c) Carbon dioxide accumulates in it

(d) It generates methane gas

14. Which of the following animals has exoskeleton but no endoskeleton ?

(a) Lizard   (b) Frog

(c) Sponge   (d) Cockroach

15. Alveoli are structures present in

(a) Lungs   (b) Bronchi

(c) Gills   (d) All of these

16. Most commonly grown cereal crop is/are :-

(a) rice   (b) maize

(c) wheat   (d) all the above

ANSWER KEY

MENTAL ABILITY		MATHEMATICS			PHYSICS & CHEMISTRY			BIOLOGY
1. A	1. B	21. **D**		1. D	21. C		1. A
2. C	2. C	22. C		2. C	22. B		2. A
3. B	3. B	23. B		3. B	23. A		3. C
4. D	4. C	24. C		4. A	24. A		4. B
5. B	5. B	25. B		5. A	25. A		5. B
6. B	6. C	26. C		6. B	26. D		6. A
7. C	7. B	27. D		7. B	27. B		7. D
8. D	8. A	28. D		8. C	28. D		8. A
9. D	9. A	29. C		9. A	29. A		9. C
10. A	10. B	30. B		10. A	30. B		10. D
11. C	11. C			11. D	31. D		11. A
12. C	12. A			12. B	32. A		12. C
13. B	13. B			13. A	33. A		13. B
14. C	14. C			14. B	34. A		14. D
15. C	15. C			15. C			15. A
16. B	16. B			16. C			16. A
17. C	17. D			17. C			
18. C	18. C			18. D			
19. D	19. C			19. B			
20. **A**	20. C			20. C			

DETAILED SOLUTION AVAILABLE ON

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