NARAYANA
IIT-JEE / NEET / FOUNDATIONS
(A Unit of NSPIRA Management Services Pvt. Ltd.)

NSAT
NARAYANA SCHOLASTIC APTITUDE TEST
ASPIRE • ASSESS • ACHIEVE

NSAT-2024

CLASS – IX (Mental Ability, Mathematics & Science)
(Class IX Moving to X)

NARAYANA SCHOLASTIC APTITUDE TEST (NSAT)

SAMPLE PAPER

Time: 1:00 Hr. ***Maximum marks: 160***

IMPORTANT INSTRUCTIONS:

1. The test Booklet consists of 40 questions. The maximum marks are 160.
2. There are five parts in the question paper of MAT (Q. No. 1 to 8) Mathematics (Q. No. 9 to 19), Physics (Q. No. 20 to 26), Chemistry (Q. No. 27 to 33) & Biology (Q. No. 34 to 40) having 40 questions. Each question is allotted +4 (four) marks for each correct response & -1 for each incorrect answer
3. Mark only one correct answer out of four alternatives.
4. Use Blue/Black Ball Point Pen only for writing particulars/marking.
5. Use of Calculator is not allowed.
6. Dark the circle in the space provided only.
7. Use of white fluid or any other material which damage the answer sheet, is not permissible on the Answer Sheet.

TO BE FILLED IN CAPITAL LETTERS

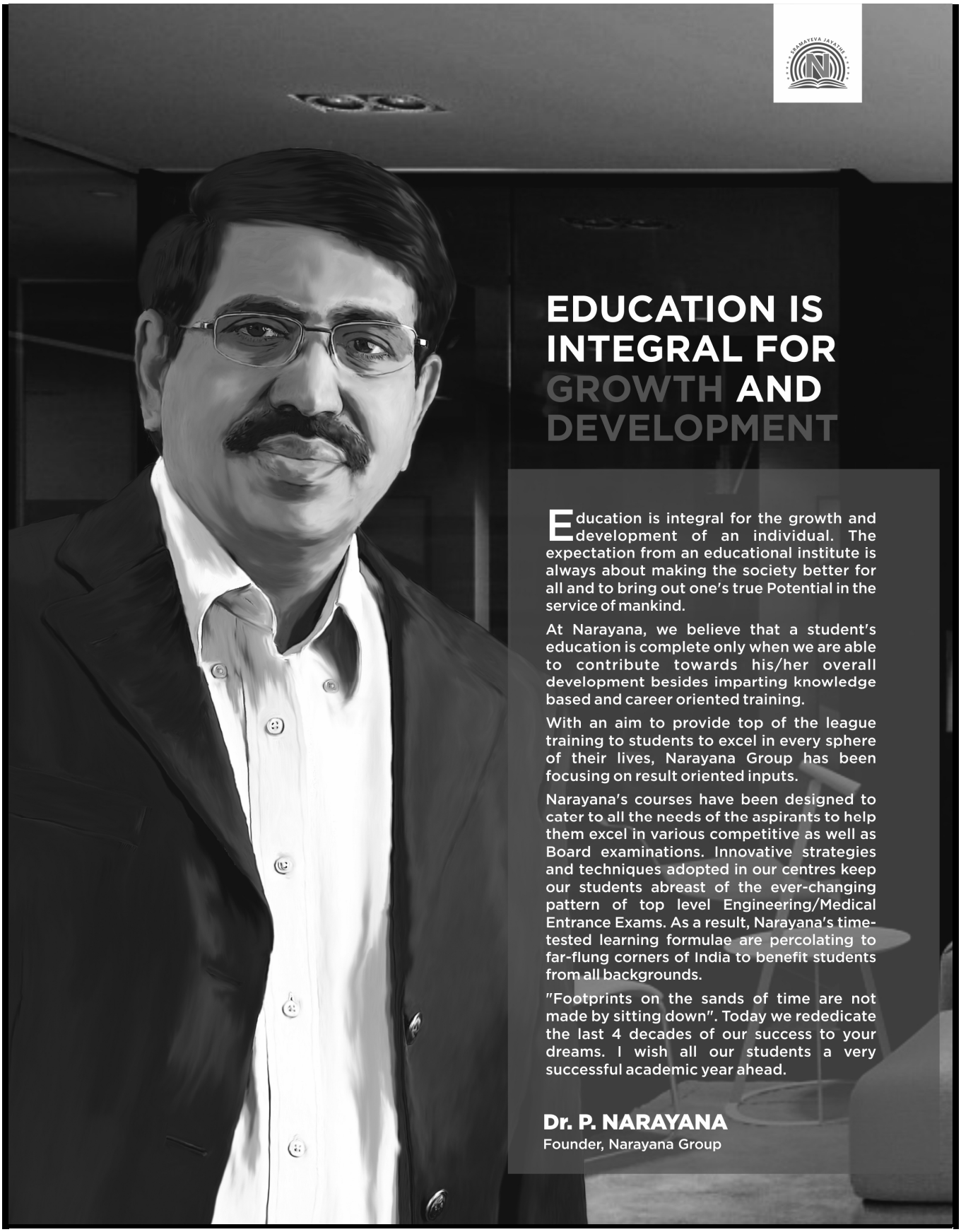
NAME OF THE STUDENT : _____

FATHER'S NAME : _____

CONTACT NUMBERS:_____SCHOOL NAME : _____

ROLL NO. :_____TEST CENTRE : _____

I have read all the instructions and shall abide by them	I have verified all the information filled in by the Candidate
……..……	……
Signature of the Candidate	Signature of the Invigilator



EDUCATION IS INTEGRAL FOR GROWTH AND DEVELOPMENT

Education is integral for the growth and development of an individual. The expectation from an educational institute is always about making the society better for all and to bring out one's true Potential in the service of mankind.

At Narayana, we believe that a student's education is complete only when we are able to contribute towards his/her overall development besides imparting knowledge based and career oriented training.

With an aim to provide top of the league training to students to excel in every sphere of their lives, Narayana Group has been focusing on result oriented inputs.

Narayana's courses have been designed to cater to all the needs of the aspirants to help them excel in various competitive as well as Board examinations. Innovative strategies and techniques adopted in our centres keep our students abreast of the ever-changing pattern of top level Engineering/Medical Entrance Exams. As a result, Narayana's time-tested learning formulae are percolating to far-flung corners of India to benefit students from all backgrounds.

"Footprints on the sands of time are not made by sitting down". Today we rededicate the last 4 decades of our success to your dreams. I wish all our students a very successful academic year ahead.

Dr. P. NARAYANA
Founder, Narayana Group

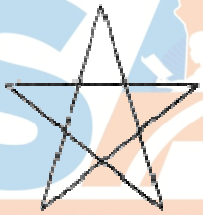
MENTAL ABILITY

Direction: (Question no. 1) In each of the questions given below, two statements 1 and 2 are followed by two conclusions numbered 1 and 2. Read the conclusion and then decide which of the given conclusions logically follows from the two given statements. Give answer

(A) If only conclusion 1 follows
(B) If only conclusion 2 follows
(C) If neither conclusion 1 nor 2 follows
(D) If both conclusions 1 and 2 follow

1. Statement: 1. All grasses are trees.
   2. No tree is shrub.
   Conclusions: 1. No grasses are shrubs.
   2. Some shrubs are grasses.

2. The number of triangles in the given figure is/are

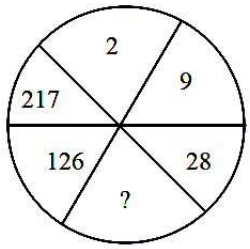


(A) 5 (B) 6 (C) 8 (D) 10

3. Choose the correct analogous word for
   Newspaper : Press :: Cloth : ?
   (A) Taiba (B) Textile (C) Fibre (D) Mill

4. 1, 64, 343, …… ? , 2197
   (A) 512 (B) 1000 (C) 729 (D) None of these

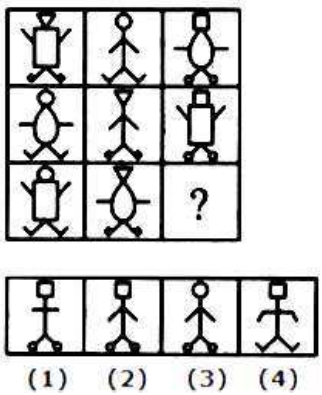
5.



(A) 63 (B) 64 (C) 65 (D) 66

Space for rough work

6. Select a suitable figure from the four alternatives that would complete the figure matrix.



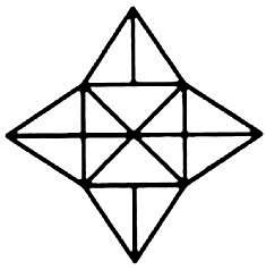
(A) 1 (B) 2 (C) 3 (D) 4

7. Find the missing number from the options, if a certain rule is followed either row-wise or column-wise.

16	210	14
14	156	12
12	?	10

(A) 90 (B) 100 (C) 110 (D) 120

8. Find the number of triangles in the given figure



(A) 18 (B) 20 (C) 28 (D) 34

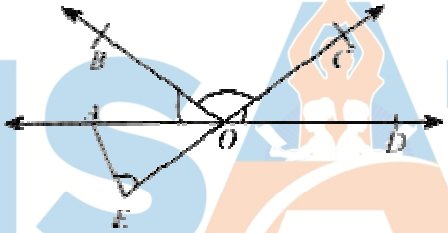
Space for rough work

MATHEMATICS

9. The equation $\frac{24x^2+25x-47}{ax-2}=-8x-3-\frac{53}{ax-2}$ is true for all value of $x\neq\frac{2}{a}$ where a is a constant. What is the value of a?

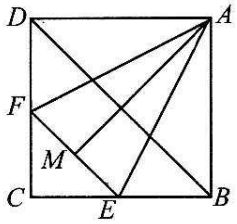
(A) –16 (B) –3 (C) 3 (D) 16

10. In the given figure, if $\angle AOB=\frac{a}{2},\angle BOC=5\left(\frac{a}{2}-10^0\right)$ *and* $\angle COD=a+9^0$, then find $\angle$ AEO+EAO.



(A) 127.75^0 (B) 130.75^0 (C) 129.75^0 (D) 115.75^0.

11. In the given figure, if ABCD is a square and EF is parallel to diagonal BD and EM = FM, then which of the following is correct?



(i) DF = BE
(ii) AM bisects $\angle$ BAD
(A) Only (i) (B) Only (ii)
(C) Both (i) and (ii) (D) Neither (i) nor (ii)

12. Find the value of a and b if $a+b\sqrt{3}=\frac{\sqrt{19+8\sqrt{3}}}{\sqrt{19-8\sqrt{3}}}$ where a and b are rational number.

(A) 25, 8 (B) -25, 8 (C) -8, 25 (D) None of these

Space for rough work

13. Given that equation 2b (x + 6) = 4x + 1 has no solution b = ?
(A) –1 (B) 2 (C) 3 (D) 4

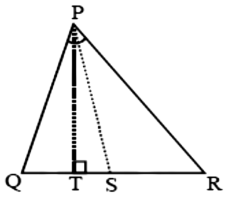
14. Which of the following rational numbers have terminating decimal expansion?
(i) $\frac{17}{8}$ (ii) $\frac{64}{455}$ (iii) $\frac{15}{1600}$
(iv) $\frac{13}{3125}$ (v) $\frac{129}{2^2 \times 5^2 \times 7^{17}}$ (vi) $\frac{987}{10500}$
(A) only iv and vi (B) only ii and v
(C) only i, iii, iv and vi (D) only i, iii and iv

15. If $\frac{x}{y+z}=a;\frac{y}{z+x}=b;\frac{z}{x+y}=c;then\frac{1}{1+a}+\frac{1}{1+b}+\frac{1}{1+c}$ is equal to
(a) a + b + c (B) 3 (C) 2 (D) 1

16. What is the value of $\frac{a^{x(y-z)}}{a^{y(x-z)}} \div \left(\frac{a^y}{a^x}\right)^z$
(A) 1 (B) a^x (C) a^{xy} (D) a^{xyz}.

17. The value of $\frac{6^n \times 2^{2n} \times 3^{3n}}{30^n \times 3^{2n} \times 2^{3n}}$ is equal to
(A) 1 (B) 35^n (C) $(0.3)^n$ (D) 3^5.

18. In figure. PS is the bisector of ∠QPR and PT ⊥ QR. Here ∠PQR = 70^0 and ∠PRQ = 20^0. Then ∠TPS is equal to



(A) 20^0 (B) 25^0 (C) 15^0 (D) 30^0.

19. Solve the following system of equations $\frac{1}{2x}-\frac{1}{y}=-1$ *and* $\frac{1}{x}+\frac{1}{2y}=8$, x ≠ 0, y ≠ 0

(A) $x=\frac{1}{6},y=\frac{1}{4}$ (B) $x=\frac{3}{4},y=\frac{1}{7}$ (C) $x=\frac{2}{3},y=\frac{3}{2}$ (D) $x=\frac{9}{7},y=\frac{7}{5}$

Space for rough work

PHYSICS

20. A ball is thrown upwards. It returns to ground describing a parabolic path. Which of the following remains constant?
(A) speed of the ball
(B) kinetic energy of the ball
(C) vertical component of velocity
(D) horizontal component of velocity.

21. A body starts from rest and is uniformly accelerated for 30 s. The distance travelled in the first 10s is x_1, next 10 s is x_2 and the last 10 s is x_3. Then $x_1 : x_2 : x_3$ is the same as
(A) 1 : 2 : 4 (B) 1 : 2 : 5
(C) 1 : 3 : 5 (D) 1 : 3 : 9

22. The ratio of SI units to CGs units of G is
(A) 10^3 (B) 10^2
(C) 10^{-2} (D) 10^{-3}

23. If a net force of 7 N was constantly applied on 400 g object at rest, how long will it take to raise its velocity to 80 m/s?
(A) 0 s (B) 2.23 s
(C) 3.47 s (D) 4.57 s

24. A car moving along a straight road with a uniform acceleration. It passes through two points P and Q separated by a distance with velocity 30 km/hr and 40 km/hr respectively. The velocity of the car midway between P and Q is
(A) 33.3 Km/hr (B) $20\sqrt{3}$ km / hr (C) $25\sqrt{2}$ km / hr (D) 35 km/hr

25. A cricket ball of mass of 150 g is moving with a velocity of 12 m/s and is hit by a bat so that the ball is turned back with a velocity of 20 m/s. If the duration of contact between the ball and bat is 0.01 s, find the average force exerted on the ball by the bat.
(A) 480 N (B) 280 N (C) 400 N (D) 460 N

26. The force of gravitational between two bodies can be zero if the separation between the bodies becomes.
(A) 1 (B) 0 (C) -1 (D) Infinity

Space for rough work

CHEMISTRY

27. Temperature at which Fahrenheit scale shows - 40^0 F?
(A) 4.44^0C (B) 40^0C (C) – 4 $.44^0$C (D) – 40^0C

28. What is the total charge if 2.8 gm sample of Nitride ion is taken.
(A) 28905.6 coulomb (B) 115622.4 coulomb
(C) 57811.2 coulomb (D) 86716.8 coulomb

29. A sample of sea water is taken which contain 5.85% NaCl, 19% $MgCl_2$ and 22.35% KCl. What will be mol per litre concentration of Cl^- ion if density of sample is 2 gm/ml.
(A) 32 (B) 12 (C) 20 (D) 16

30. One mole of CO_2 means :
(A) 44 g of CO_2 (B) 6.022×10^{23} molecules of CO_2.
(C) 22.4 L at STP (D) All of these

31. 1.5 moles of oxygen atoms are present in _____.
(A) 0.5 moles of $BaCO_3$ (B) 1 mole of $BaCO_3$
(C) 2 moles of $BaCO_3$ (D) 0.25 moles of $BaCO_3$.

32. Which of the following is the correct set of apparatus for fractional distillation?
(A) Round bottomed flask, thermometer, water condenser and beaker
(B) Round bottomed flask, thermometer, air condenser and beaker
(C) Round bottomed flask, thermometer, fractionating column, water condenser and flask
(D) Round bottomed flask, thermometer, fractionating column, air condenser and flask.

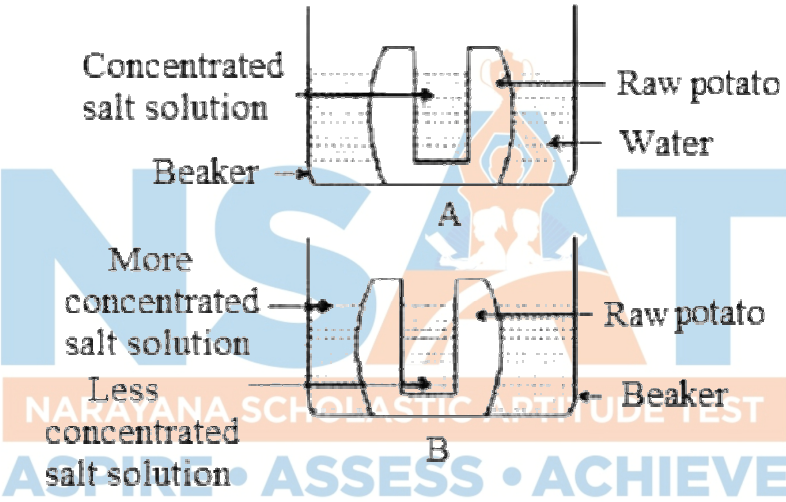
33. Using magnetic separation we can separate mixture of
(A) Ni and Pb (B) NaCl and sand
(C) Sulphur and sand (D) KNO_3 and NaCl

Space for rough work

BIOLOGY

34. Match the above given experimental set-ups A and B with their following probable outcomes and choose the correct option.

(i) Water level in potato trough will remain the same.
(ii) Water level in potato trough will increase due to the movement of water from beaker to potato trough.
(iii) Water level in potato trough will decrease as water will move from potato trough to the beaker.



(A) A(ii), B(i) (B) A(i), B(ii) (C) A(ii), B(iii) (D) A(i), B(iii)

35. Match the column-I with column –II and choose the correct option.

Column-I	Column-II
a. Blood	(i) It covers bone surfaces at joints
b. Bone	(ii) It transports gases
c. Cartilage	(iii) It has limited flexibility with great strength
d. Tendon	(iv) It is strong and non-flexible tissue

(A) a (ii), b(iv), c (iii), d(i) (B) a(ii), b(iii), c (i), d(iv)
(C) a (i), b(ii), c (iv), d(iii) (D) a(ii), b(iv), c (i), d(iii)

36. Which of the following combinations of tissues fundamentally enables most animals to move rapidly in response to stimuli ?
(A) Nervous tissue and muscular tissue
(B) Adipose tissue and muscular tissue

Space for rough work

(C) Cuboidal epithelial tissue and connective tissue
(D) Connective tissue and columnar epithelial tissue

37. Which of these options are not the function of ribosomes?

(i) Protein synthesis

(ii) Enzyme synthesis

(iii) Hormone synthesis

(iv) Starch synthesis

(A) i and ii (B) ii and iii (C) iii and iv (D) iv and i

38. Which of the following is not covered by any membrane?

(A) Mitochondria (B) Vacuole (C) Lysosome (D) Centrosome

39. The undefined nuclear region of prokaryotes is also known as

(A) Nucleus (B) Nucleolus (C) Nucleic acid (D) Nucleoid

40. Organelles other than nucleus containing DNA is

(A) Endoplasmic reticulum (B) Golgi apparatus

(C) Mitochondria (D) Lysosomes

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