

(CODE : 1P)



NARAYANA
IIT-JEE / NEET / FOUNDATIONS

NSAT-2021

Class XI Moving to Class XII (PCB)

PHYSICS, CHEMISTRY, BOTANY & ZOOLOGY

NARAYANA SCHOLASTIC APTITUDE TEST (NSAT)

Time: 1:00 Hr.

Date : 28-11-21

Maximum marks: 180

SET-1

IMPORTANT INSTRUCTIONS:

1. The test Booklet consists of 45 questions. The maximum marks are 180.
2. There are four parts in the question paper of Physics, Chemistry, Botany and Zoology having 45 questions. Each question is allotted 4 (four) marks for each correct response.
3. No Negative Marking.
4. Mark only one correct answer out of four alternatives.
5. Use Blue/Black Ball Point Pen only for writing particulars/markings.
6. Use of Calculator is not allowed.
7. Dark the circle in the space provided only.
8. 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

.....

Signature of the Candidate

I have verified all the information filled in by 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.

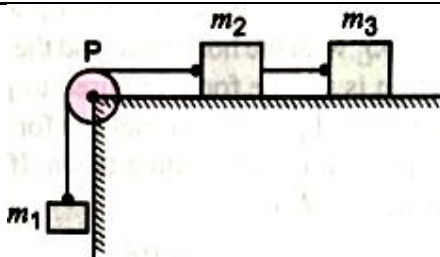
Dr. P. NARAYANA

Founder, Narayana Group

PHYSICS

1. If dimensions of critical velocity v_c of a liquid flowing through a tube are expressed as $\eta^x \rho^y r^z$, where η , ρ and r are the coefficient of viscosity of liquid, density of liquid and radius of the tube respectively, then the values of x , y and z are given by
(A) 1, 1, 1 (B) 1, -1, -1 (C) -1, -1, 1 (D) -1, -1, -1
2. When a copper sphere is heated, maximum percentage change will be observed in
(A) radius (B) area (C) volume (D) None of these
3. The length of seconds hand of a watch is 1 cm. The change in velocity of its tip in 15 seconds in cm/s is $\left(\frac{\pi\sqrt{2}}{30}\right)$
(A) zero (B) $\pi / (30\sqrt{2})$ (C) $\pi / 30$ (D) $2\pi / (30\sqrt{2})$
4. An object, moving with a speed of 6.25 m/s, is decelerated at a rate given by
 $\frac{dv}{dt} = -2.5\sqrt{v}$
Where v is the instantaneous speed. The time taken by the object, to come to rest, would be
(A) 2 s (B) 4 s (C) 8 s (D) 1 s
5. A gun mounted on the top of a moving truck is aimed in the backward direction at an angle of 30° to the vertical. If the muzzle velocity of the bullet fired from the gun is 4ms^{-1} , then the speed of the truck that will make the bullet come out vertically is
(A) 0.5 ms^{-1} (B) 1.0 ms^{-1} (C) 1.5 ms^{-1} (D) 2.0 ms^{-1}
6. A system consists of three masses m_1 , m_2 and m_3 connected by a string passing over a pulley P, in given figure. The mass m_1 hangs freely and m_2 and m_3 are on a rough horizontal table (the coefficient of friction = μ) The pulley is frictionless and of negligible mass. The downward acceleration of mass m_1 is : (Assume $m_1 = m_2 = m_3 = m$)

Space for rough work



- (A) $\frac{g(1-3\mu)}{9}$ (B) $\frac{2g\mu}{3}$ (C) $\frac{g(1-2\mu)}{3}$ (D) $\frac{g(1-2\mu)}{2}$
7. A car of mass m starts from rest and accelerates so that the instantaneous power delivered to the car has a constant magnitude P_0 . The instantaneous velocity of this car is proportional to
 (A) $t^2 P_0$ (B) $t^{1/2}$ (C) $t^{-1/2}$ (D) $\frac{t}{\sqrt{m}}$
8. The centre of mass of a body is moving with a uniform velocity of 10 cm/s. Three forces are applied on the body, which are in equilibrium. The velocity of centre of mass would become
 (A) Zero (B) > 10 cm/s (C) < 10 cm/s (D) 10 cm/s
9. The radius of gyration of a hollow cylinder of mass M and radius R , about the axis of cylinder is
 (A) $K = R$ (B) $K = R/2$ (C) $K = 2R$ (D) None of these
10. A small object of uniform density rolls up a curved surface with an initial velocity ' v '. It reaches upto a maximum height of $\frac{3v^2}{4g}$ with respect to the initial position. The object is
 (A) Circular Disc (B) Ring (C) Solid sphere (D) Hollow sphere
11. Four solid spheres each of diameter $\sqrt{5}$ cm and mass 0.5 kg are placed with their centers at the corners of a square of side 4 cm. The moment of inertia of the system about the diagonal of the square is $N \times 10^{-4} \text{ kg-m}^2$, then N is
 (A) 7 (B) 8 (C) 9 (D) 6
12. A car of mass 1000 kg negotiates a banked curve of radius 90 m on a frictionless road. If the banking angle is 45° , the speed of the car is
 (A) 20 ms^{-1} (B) 30 ms^{-1} (C) 5 ms^{-1} (D) 10 ms^{-1}

Space for rough work

CHEMISTRY

13. The maximum number of molecules is present in
(A) 15 L of H_2 gas S.T.P (B) 5L of N_2 gas at S.T.P
(C) 0.5g of H_2 gas (D) 10g of O_2 gas
14. The percentage of nitrogen in urea is about
(A) 46 (B) 85 (C) 18 (D) 28
15. Which of the following is never true for cathode rays?
(A) They possess kinetic energy (B) They are electromagnetic waves
(C) They produce heat (D) They produce mechanical process
16. The number of electrons plus neutrons in $^{40}_{19}K^+$ is
(A) 38 (B) 59 (C) 39 (D) 40
17. Calculate the energy in joule corresponding to light of wavelength 45nm
(Planck's constant, $h = 6.63 \times 10^{-34}$ Js, speed of light = 3×10^8 ms $^{-1}$)
(A) 6.67×10^{15} (B) 6.67×10^{11} (C) 4.42×10^{-15} (D) 4.42×10^{-18}
18. Which one of the following pairs of ions have the same electronic configuration
(A) Cr^{3+}, Fe^{3+} (B) Fe^{3+}, Mn^{2+} (C) Fe^{3+}, Co^{3+} (D) Sc^{3+}, Cr^{3+}
19. Pair of molecules having identical geometry is
(A) BF_3, NH_3 (B) BF_3, AlF_3 (C) BeF_2, H_2O (D) BCl_3, PCl_3
20. The correct sequence of increasing covalent character is represented by
(A) $BeCl_2 < NaCl < LiCl$ (B) $NaCl < LiCl < BeCl_2$
(C) $BeCl_2 < LiCl < NaCl$ (D) $LiCl < NaCl < BeCl_2$
21. The oxidation number of phosphorus in $Ba(H_2PO_2)_2$ is
(A) +3 (B) +2 (C) +1 (D) -1

Space for rough work

22. In the reaction $\text{H}_2\text{S} + \text{H}_2\text{O}_2 \longrightarrow \text{S} + 2\text{H}_2\text{O}$
- (A) H_2S is an acid and H_2O_2 is a base
(B) H_2S is a base and H_2O_2 is an acid
(C) H_2S is an oxidizing agent and H_2O_2 is a reducing agent
(D) H_2S is reducing agent and H_2O_2 is oxidizing agent
23. Arrange S, P, As in order of increasing ionization energy
- (A) $\text{S} < \text{P} < \text{As}$ (B) $\text{P} < \text{S} < \text{As}$ (C) $\text{As} < \text{S} < \text{P}$ (D) $\text{As} < \text{P} < \text{S}$
24. The outermost electronic configuration of the most electronegative element is
- (A) ns^2np^3 (B) ns^2np^4 (C) ns^2np^5 (D) ns^2np^6
25. With respect to chlorine, hydrogen will be
- (A) electropositive (B) electronegative
(C) neutral (D) none of the above

Space for rough work

BOTANY

26. A living organism is differentiated from a non-living structure on the basis of:-
 (A) Reproduction (B) Growth and movement
 (C) Interaction with environment (D) Responsiveness
27. Which of the following organism do not reproduce?
 (A) Mules (B) Worker bees
 (C) Infertile human couples (D) All of these
28. Study the following table with shows different organisms with their taxonomic categories?

Common name	Family	Order	Class	Phylum/Division
Man	Hominidae	Primata	Mammalia	A
Housefly	Muscidae	Diptera	B	Arthropoda
Mango	C	Sapindales	Dictoyledonae	Angiosperms
Wheat	Poaceae	Poales	D	Angiosperms

Select the correct option A, B, C and D:

- (A) A-Chordata B- Insecta C-Anacardiaceae D-Monocotyledonae
 (B) A-Animalia B- Arachnida C-Anacardiaceae D-Monocotyledonae
 (C) A-Chordata B- Arachnida C-Polygonaceae D-Monocotyledonae
 (D) A-Non-chordata B- Insecta C-Anacardiaceae D-Dicotyledonae
29. Members of kingdom Protista are primarily:-
 (A) Parasite (B) Terrestrial
 (C) Aquatic (D) Photosynthetic

Space for rough work

30. Diatomaceous earth is used for all except:-
(A) Polishing (B) Filtration of oils and syrups
(C) Making sound and fire proof rooms (D) Biogas production
31. Algae are:-
(A) Autotrophic thallophytes (B) Multicellular
(C) Saprotroph (D) Vascular cryptogame
32. Major photosynthetic pigments of green algae are:-
(A) Chl a & chl. b. (B) Chl a, chl. c and fucoxanthin
(C) Chl a, chl d and phycoerythrin (D) Chl a, chl. e and violaxanthin
33. The embryonic development in bryophytes takes place in the :-
(A) Protonema (B) Sporangium (C) Antheridium (D) Archegonium
34. Rearrange the following zones as seen in the root in vertical section and choose the correct option.
A. Root hair zone
B. Zone of meristems
C. Rootcap zone
D. Zone of maturation
E. Zone of elongation
(A) C, B, E, A, D (B) A, B, C, D, E (C) D, E, A, C, B (D) E, D, C, B, A
35. Roots developed from parts of the plant other than radicle are called
(A) Tap roots (B) Fibrous roots
(C) Adventitious roots (D) Nodular roots

Space for rough work

ZOOLOGY

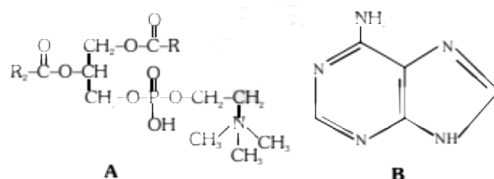
36. Column II below consists of brief description of organisms in Column I. Which of the following is incorrect match between column I and column II?

	Column I	Column II
(A)	Millipede	A terrestrial organism with two pairs of jointed appendages attached to each of its many body segments and respire through trachea.
(B)	<i>Nereis</i>	Numerous setae on lateral appendages called parapodia
(C)	<i>Taenia solium</i>	Body is covered with cuticle, alimentary canal absent.
(D)	Ctenophores	Radially symmetrical, devoid of cnidoblasts, polyp stage present in their life cycle.

37. Obelia is characterized by
- A. Cilated free swimming planula larva
 B. Metagenesis
 C. Acraspedote medusa
 D. Statocysts present in medusoid stage
- (A) A and B (B) B only (C) A, B and D (D) A, B, C & D
38. Cysticereus larva of *Taenia* develops in
- (A) Man (B) Goat (C) Sheep (D) Pig
39. Radula is
- (A) Larval form of coelenterates (cnidarians)
 (B) File like rasping organ of molluscs

Space for rough work

- (C) Larval form of annelids
 (D) Uncovered structure present with echinoderms
40. Correct order of abundance of oxygen, sulphur, magnesium and calcium in the earth crust?
 (A) $O > Ca > Mg > S$ (B) $S > O > Mg > Ca$
 (C) $Ca > O > S > Mg$ (D) $Mg > Ca > S > O$
41. Which one of the following structural formulae of two organic compounds is correctly identified along with its related function?



- (A) B : adenine – a nucleotide that makes up nucleic acids
 (B) A : Triglyceride – major source of energy
 (C) B : Uracil – a component of DNA
 (D) A : Lecithin – a component of cell membrane
42. The cell wall of algae is made up of:-
 (a) Cellulose (b) Galactans (c) $CaCO_3$ (Calcium carbonate)
 (d) Hemicellulose (e) Suberin (f) Mannans
 Choose correct combination:-
 (A) a, e, d, f (B) a, b, c, d (C) a, b, d, e (D) a, b, c, f
43. The telomeres of eukaryotic chromosomes consist of short sequence of-
 (A) Cytosine rich repeats (B) Adenine rich repeats
 (C) Guanine rich repeats (D) Thymine rich repeats

Space for rough work

Assertion and Reason :

Direction (Q 44 and 45): In each of the following questions, a statement of Assertion (A) is given followed by corresponding statement of Reason (R). Of the statements, mark the correct answer as

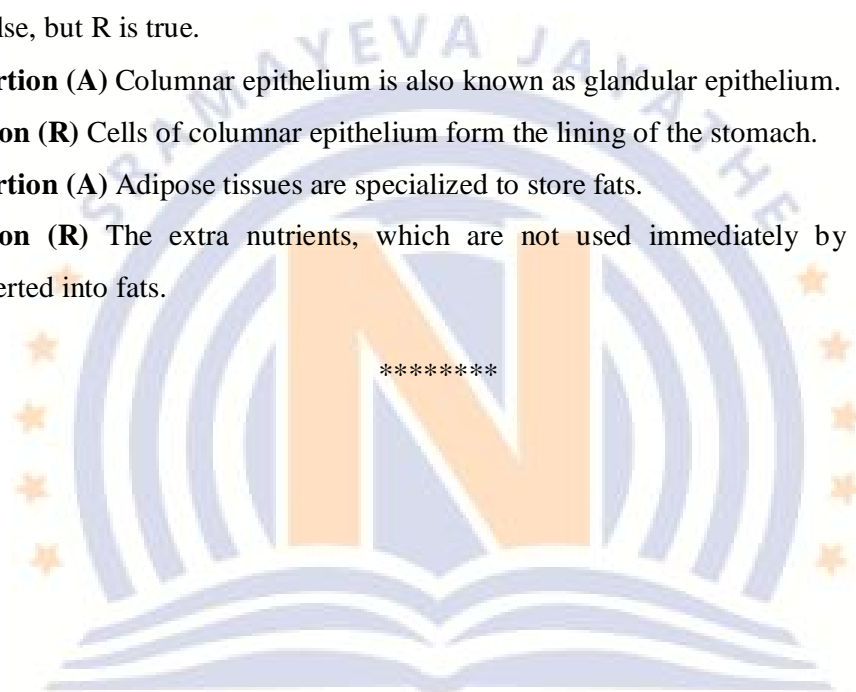
- (a) If both A and R are true and R is the correct explanation of A.
- (b) If both A and R are true, but R is not the correct explanation of A.
- (c) If A is true, but R is false.
- (d) If A is false, but R is true.

44. **Assertion (A)** Columnar epithelium is also known as glandular epithelium.

Reason (R) Cells of columnar epithelium form the lining of the stomach.

45. **Assertion (A)** Adipose tissues are specialized to store fats.

Reason (R) The extra nutrients, which are not used immediately by the body get converted into fats.



Space for rough work

COURSES OFFERED FOR STUDENTS STUDYING IN:

Class 7 th	Class 8 th	Class 9 th	Class 10 th	Class 11 th	Class 12 th
7 th Moving to 8 th	8 th Moving to 9 th	9 th Moving to 10 th	10 th Moving to 11 th	11 th Moving to 12 th	Studying Students
1,3 & 5 Year Integrated Courses	1,2 & 4 Year Integrated Courses	1 & 3 Year Integrated Courses	2 Year Integrated Courses	1 Year Integrated Courses	1 Year Repeater Courses
School / Board Exams, NTSE, Olympiads, NEET / JEE (MAIN & ADVANCED FOUNDATION)			NEET / JEE (MAIN & ADVANCED)		

SENSATIONAL SUCCESS
in JEE ADVANCED-2021

ALL INDIA OPEN CATEGORY



JEE MAIN 2021

ALL INDIA OPEN CATEGORY TOP 10 RANKS

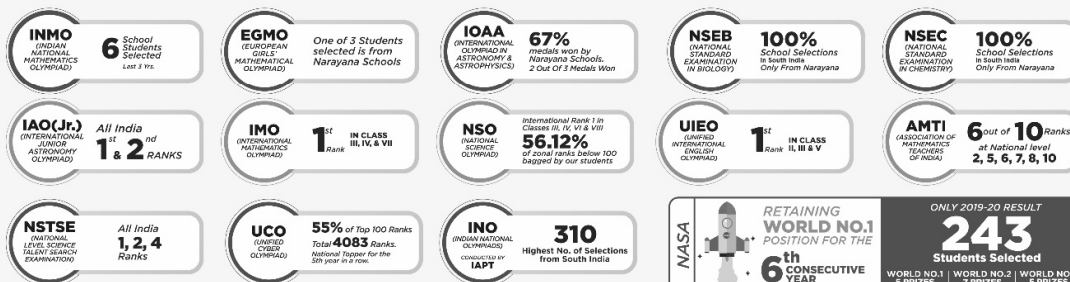


BELOW 100	25 RANKS	NARAYANA STUDENTS WHO SECURED HIGHEST PERCENTILE IN MATHS, PHYSICS & CHEMISTRY	Percentile & Above	In Maths	In Physics	In Chemistry	ALL CATEGORIES ALL INDIA RANKS BELOW 100	109
BELOW 1000	126 RANKS		100	70	48	21	ALL CATEGORIES ALL INDIA RANKS BELOW 1000	564
TOTAL QUALIFIED FOR JEE-ADV.	15146		99	719	532	610	NARAYANA STUDENTS QUALIFIED FOR JEE-ADVANCED	15146

NEET- 2020



Below 10 Ranks Below 100 Ranks Below 200 Ranks Below 300 Ranks

SOLID FOUNDATION GIVEN BY NARAYANA MAKES STUDENTS WORLD CHAMPIONS
IN MATHS, PHYSICS, CHEMISTRY, BIOLOGY, ASTRONOMY, ENGLISH & CYBER OLYMPIADS

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