(CODE : 1P)

NARAYANA
IIT-JEE / NEET / FOUNDATIONS

NSAT-2021

Class XII Moving to Class XII Pass (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/marking.**
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

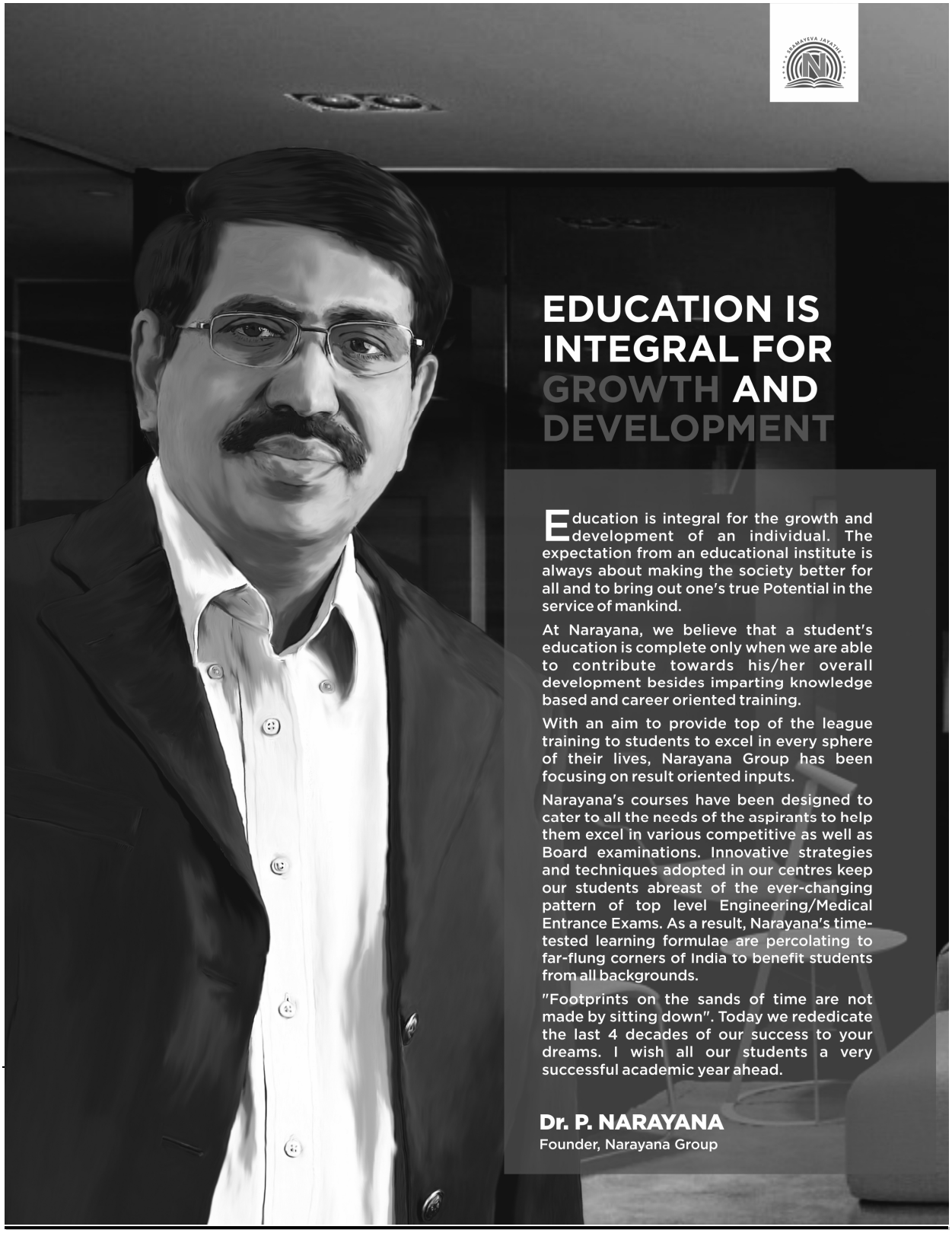
NAME OF THE STUDENT : _____

FATHER'S NAME : _____

CONTACT NUMBERS:_____ **SCHOOL NAME :** _____

ROLL NO. :_____ **TEST CENTRE :** _____

I have read all the instructions and shall abide by them	**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

PHYSICS

1. For a varying current $I = I_1 \cos \omega t + I_2 \sin \omega t$ the R.M.S. value of current will be

A) $\frac{1}{\sqrt{2}}(I_1 + I_2)$ B) $\frac{1}{\sqrt{2}}(I_1 + I_2)^2$ C) $\frac{1}{\sqrt{2}}\left(I_1^2 + I_2^2\right)^{1/2}$ D) $\frac{1}{2}\left(I_1^2 + I_2^2\right)^{1/2}$

2. In an LCR series ac circuit the voltage across L,C and R is 10 V each. If the inductor is short circuited, the voltage across the capacitor would become

A)10V B) $\frac{20}{\sqrt{2}}V$ C) $20\sqrt{2}V$ D) $\frac{10}{\sqrt{2}}V$

3. If a diamagnetic substance is brought near the north or the south pole of a bar magnet, it is

A) Repelled by the north pole and attracted by the south pole
B) Attracted by the north pole and repelled by the south pole
C) Attracted by both the poles
D) Repelled by both the poles

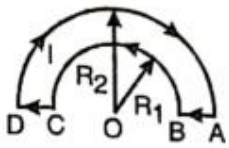
4. Electromagnets are made of soft iron because soft iron has

A) Low retentivity and low coercive force
B) High retentivity and low coercive force
C)Low retentivity and high coercive force
D) High retentivity and high coercive force

5. A thin ring of radius R meter has charge q coulomb uniformly spread on it. The ring rotates about its axis with a constant requency of f revolution /s . The value of magnetic induction in Wb/ m^2 at the centre of the ring is

A) $\frac{\mu_0 qf}{2R}$ B) $\frac{\mu_0 qf}{2\pi R}$ C) $\frac{\mu_0 qf}{2\pi fR}$ D) $\frac{\mu_0 q}{2fR}$

6. A wire ABCD formed by joining two semi-circular wires of radii R_1 and R_2 . If it carries a current I, the magnetic induction at the centre O is



A) $\frac{\mu_0 I}{4}\left[\frac{1}{R_1} + \frac{1}{R_2}\right]$ B) $\frac{\mu_0 I}{4\pi}\left[\frac{1}{R_1} - \frac{1}{R_2}\right]$ C) $\frac{\mu_0 I}{2\pi}\left[\frac{1}{R_1} - \frac{1}{R_2}\right]$ D) $\frac{\mu_0 I}{4}\left[\frac{1}{R_2} - \frac{1}{R_1}\right]$

Space for rough work

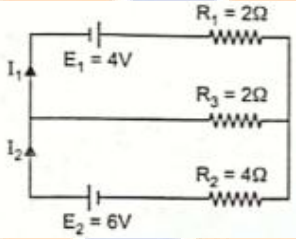
7. Two circular coils of wire carrying same currents and of radii 20 cm and 40 cm in parallel. The radio of the magnetic fields at their centres is

A)4 : 1 B) 1 : 4 C) 2 : 1 D) 1 : 2

8. An electric bulb is designed to draw power P_0 at voltage V_0 . If the voltage is V it draws a power P. then

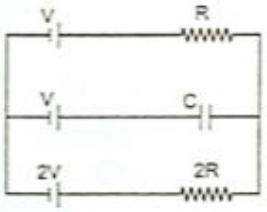
A) $P=\left(\frac{V_0}{V}\right)^2 P_0$ B) $P=\left(\frac{V}{V_0}\right)^2 P_0$ C) $P=\left(\frac{V}{V_0}\right)P_0$ D) $P=\left(\frac{V_0}{V}\right)P_0$

9. In the circuit shown below $E_0 = 4.0V, R_1 = 2\Omega, E_2 = 6.0V, R_2 = 4\Omega$ *and* $R_3 = 2\Omega$. The current I_1 is



A) 1.6 A B) 1.8 A C) 1.25 A D)1.0 A

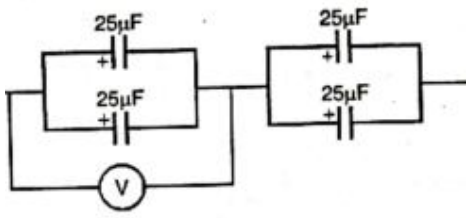
10. In the given circuit, with steady current , the potential drop across the capacitor must be



A) V B) V/2 C)V/3 D)2V/3

Space for rough work

11. Four capacitors of $25\mu F$ each are connected as shown, If the voltmeter as shown reads 200 V, charge on each of the capacitor is



A) $2\times10^{-3}C$ B) $5\times10^{-3}C$ C) $2\times10^{-2}C$ D) $5\times10^{-2}C$

12. An electric dipole is kept in non-uniform electric field. It experiences

A) A force and a torque B) A force but no torque

C) A torque but no force D) neither a force nor a torque.

Space for rough work

CHEMISTRY

13. For tetrahedral co-ordination the radius ratio (r^+/r^-) should be –
(A) 0.414 - 0.732 (B) > 0.732
(C) 0.156 - 0.225 (D) 0.225 - 0.414

14. An element (atomic mass = 100 g/mol) having BCC structure has unit cell edge 400 pm. The density of the element is –
(A) 2.144 g/cm^3 (B) 5.188 g/cm^3 (C) 7.289 g/cm^3 (D) 10.376 g/cm^3

15. The molality of 15% (wt./vol.) solution of H_2SO_4 of density 1.1 g/cm^3 is approximately-
(A) 1.2 (B) 1.4 (C) 1.8 (D) 1.6

16. A solution of sulphuric acid in water exhibits –
(A) Negative deviations from Raoult's law (B) Positive deviations from Raoult's law
(C) Ideal properties (D) The applicability of Henry's law

17. Solid PCl_5 exists as–
(A) PCl_5 (B) PCl_4^+ & PCl_6^- (C) PCl_6^- (D) PCl_4^+

18. The increasing order of volatility of hydrides of group 16 elements is –
(A) $H_2O < H_2Te < H_2Se < H_2S$ (B) $H_2S < H_2O < H_2Se < H_2Te$
(C) $H_2O < H_2S < H_2Se < H_2Te$ (D) $H_2Te < H_2Se < H_2S < H_2O$

19. Which of the following is the life saving mixture for an asthma patient ?
(A) Mixture of helium and oxygen (B) Mixture of neon and oxygen
(C) Mixture of xenon and nitrogen (D) Mixture of argon and oxygen

20. Reimer Tiemann reaction involves –
(A) Carbanion intermediate (B) A carbene intermediate
(C) Carbonium ion intermediate (D) Free redical intermediate

Space for rough work

21. Consider the following reaction.

$$CH_3-\overset{\overset{O^{16}}{\|}}{C}-O^{18}-C_2H_5 + H_2O^{16} \xrightarrow[\text{heat}]{H^+}$$

The products formed in the reaction are

(A) $CH_3-\overset{\overset{O^{16}}{\|}}{C}-O^{16}H$ and $C_2H_5O^{18}H$

(B) $CH_3-\overset{\overset{O^{16}}{\|}}{C}-O^{18}H$ and $C_2H_5O^{16}H$

(C) $CH_3-\overset{\overset{O^{16}}{\|}}{C}-O^{16}H$ and $C_2H_5O^{16}H$

(D) $CH_3-\overset{\overset{O^{18}}{\|}}{C}-O^{18}H$ and $C_2H_5O^{18}H$

22. Propene, $CH_3 - CH = CH_2$ can be converted to 1-propanol by oxidation. Which set of reagents among the following is ideal to effect the conversion –

(A) Alkaline $KMnO_4$

(B) B_2H_6 and alkaline H_2O_2

(C) O_3 /Zn dust

(D) OsO_4 / $NaHSO_3$

23. Which of the following is the correct order of decreasing SN^2 reactivity ?

(A) $RCH_2X > R_3CX > R_2CHX$

(B) $RCH_2X > R_2CHX > R_3CX$

(C) $R_3CX > R_2CHX > RCH_2X$

(D) $R_2CHX > R_3CX > RCH_2X$

24. In Finkelstein Reaction, which reactants are used –

(A) NaI + C_2H_5OH

(B) NaCl + acetone

(C) NaBr + CH_3COCH_3

(D) NaI + CH_3COCH_3

25. Cellulose is a linear polymer of:

A) α D – glucose

B) β D – glucose

C) β D – fructose

D) β L – glucose

Space for rough work

Space for rough work

30. In the Meselson and Stahl experiment, *E.coli* cells grown on heavy nitrogen were transferred to light nitrogen. What percentage of DNA can be expected of light nitrogen after three generations of multiplication?

A) 75% B) 50 % C) 25% D) 100 %

31. In polygenic inheritance of wheat kernel colour, how many plants will have darkest red kernel

A) $\frac{1}{16}$ B) $\frac{4}{16}$ C) $\frac{6}{16}$ D) $\frac{20}{64}$

32. A colour-blind daughter is born when

A) Father is colourblind, mother is normal

B) Mother is colourblind, father is normal

C) Mother is carrier, father is normal

D) Mother is carrier, father is colourblind

33. In F_2 generation of dihybrid crossing, offsprings are phenotypically

A) Two types B) Three types C) Four types D) Seven types

34. The salient features of the double helix structure of DNA are all except

A) The two chains are coiled in a right handed fashion

B) The bases in two strands are paired through phosphodiester bond forming base pair

C) The distance between a base pair in a helix is approximately 0.34 nm

D) The two chains have antiparallel polarity

35. Adenosine is

A) Purine B) Pyrimidine C) Nucleoside D) Nucleotide

Space for rough work

Space for rough work

44. Cryptorchidism is a condition in which

A) Sperms are not formed

B) Testes do not descend into scrotal sacs

C) Male hormones are not reactive

D) Ovaries are removed

45 . When is the world AIDS Day celebrated?

A) 7th July B) 14th July C) Ist December D) 23 rd May

Space for rough work

COURSES OFFERED FOR STUDENTS STUDYING IN:

Class 7th	Class 8th	Class 9th	Class 10th	Class 11th	Class 12th
7th Moving to 8th	8th Moving to 9th	9th Moving to 10th	10th Moving to 11th	11th Moving to 12th	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

BELOW 1000 **126** RANKS

TOTAL QUALIFIED FOR JEE-ADV. **15146**

NARAYANA STUDENTS WHO SECURED HIGHEST PERCENTILE IN MATHS, PHYSICS & CHEMISTRY

Percentile & Above	in Maths	in Physics	in Chemistry
100	70	48	21
99	719	532	610
98	1325	864	1030
97	1848	1201	1392
96	2420	1490	1742
95	2969	1785	2095
94	3502	2076	2447
93	4035	2401	2807
92	4639	2746	3182
91	5223	3022	3539
90	5806	3364	3967

ALL CATEGORIES ALL INDIA RANKS BELOW 100 **109**

ALL CATEGORIES ALL INDIA RANKS BELOW 1000 **564**

NARAYANA STUDENTS QUALIFIED FOR JEE-ADVANCED **15146**

NEET- 2020

*All Cat: Below 10 **8** Ranks | Below 100 **32** Ranks | Below 200 **43** Ranks | Below 300 **59** Ranks *All Cat

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

INMO (INDIAN NATIONAL MATHEMATICS OLYMPIAD) 6 School Students Selected *Last 3 Yrs.*	**EGMO** (EUROPEAN GIRLS' MATHEMATICAL OLYMPIAD) *One of 3 Students selected is from Narayana Schools*	**IOAA** (INTERNATIONAL OLYMPIAD IN ASTRONOMY & ASTROPHYSICS) 67% medals won by Narayana Schools. 2 Out Of 3 Medals Won	**NSEB** (NATIONAL STANDARD EXAMINATION IN BIOLOGY) 100% School Selections In South India Only From Narayana	**NSEC** (NATIONAL STANDARD EXAMINATION IN CHEMISTRY) 100% School Selections In South India Only From Narayana
IAO(Jr.) (INTERNATIONAL JUNIOR ASTRONOMY OLYMPIAD) *All India* 1st & 2nd RANKS	**IMO** (INTERNATIONAL MATHEMATICS OLYMPIAD) 1st Rank IN CLASS III, IV, & VII	**NSO** (NATIONAL SCIENCE OLYMPIAD) *International Rank 1 in Classes III, IV, VI & VIII* 56.12% of zonal ranks below 100 bagged by our students	**UIEO** (UNIFIED INTERNATIONAL ENGLISH OLYMPIAD) 1st Rank IN CLASS II, III & V	**AMTI** (ASSOCIATION OF MATHEMATICS TEACHERS OF INDIA) 6 out of 10 Ranks *at National level* 2, 5, 6, 7, 8, 10
NSTSE (NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION) *All India* 1, 2, 4 Ranks	**UCO** (UNIFIED CYBER OLYMPIAD) 55% of Top 100 Ranks Total 4083 Ranks. *National Topper for the 5th year in a row.*	**INO** (INDIAN NATIONAL OLYMPIADS) CONDUCTED BY IAPT 310 Highest No. of Selections from South India	NASA RETAINING WORLD NO.1 POSITION FOR THE 6th CONSECUTIVE YEAR	ONLY 2019-20 RESULT 243 Students Selected WORLD NO.1 5 PRIZES | WORLD NO.2 7 PRIZES | WORLD NO.3 5 PRIZES

SRAMAYEVA JAYATHE

NARAYANA
IIT-JEE / NEET / FOUNDATIONS
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