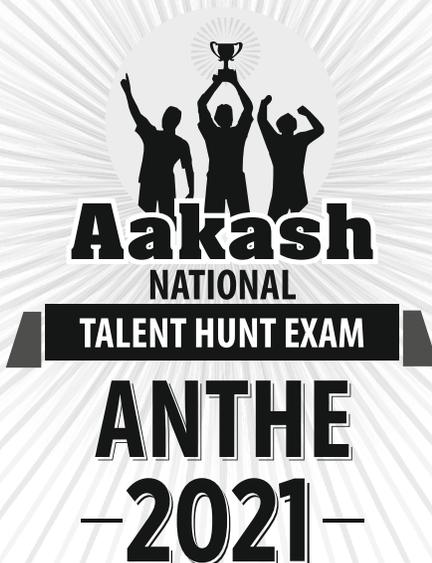


Sample Paper



(Class XII Studying Moving to XII Passed)

Physics, Chemistry, Biology

INSTRUCTIONS FOR CANDIDATE

1. Duration of Test is 1 hr.
2. The Test booklet consists of **35** questions. The maximum marks are **90**. There is **no negative marking** for wrong answer.
3. Pattern of the questions are as under:
 - (i) This question paper consists of three parts i.e., Physics, Chemistry and Biology, each having **five sections**.
 - (ii) **Section-I:** This section contains **16** multiple choice questions, which have **only one** correct answer. Each question carries **+2 marks** for correct answer.
 - (iii) **Section-II:** This section contains **7** multiple choice questions, in which **more than one** answer may be correct. Each question carries **+4 marks** for correct answer.
 - (iv) **Section-III:** This section contains **6** multiple choice questions based on paragraphs, which have **only one** correct answer. Each question carries **+2 marks** for correct answer.
 - (v) **Section-IV:** This section contains **3** multiple choice questions based on assertion-reason type, which have **only one** correct answer. Each question carries **+2 marks** for correct answer.
 - (vi) **Section-V:** This section contains **3** matrix match type questions. Each question has two matching Columns. Column-I has four entries (A, B, C, D) and Column-II has four entries (P, Q, R, S). Each entry in Column-I may match with one or more entries in Column-II. Each question carries **+4 marks** for correct answer.



Aakash
+ BYJU'S

3. A resistor develops 800 J of thermal energy in 8 s when a current of 5 A is passing through it. The resistance of the resistor will be
- (1) 8Ω (2) 5Ω
(3) 4Ω (4) 12Ω
4. In a plane, which makes an angle of 37° with the magnetic meridian, apparent dip is 45° . The true dip will be
- (1) $\tan^{-1}\left(\frac{3}{5}\right)$ (2) $\tan^{-1}\left(\frac{4}{5}\right)$
(3) $\tan^{-1}\left(\frac{4}{3}\right)$ (4) $\tan^{-1}\left(\frac{2}{3}\right)$
5. The current in an ac circuit is given by $i = (3 + 4 \sin 100\pi t + 4 \cos 100\pi t)$ A. The r.m.s. value of current will be
- (1) 3 A (2) 5 A
(3) $\frac{5}{\sqrt{2}}$ A (4) $3\sqrt{2}$ A

SECTION-II : MORE THAN ONE ANSWER TYPE

This section contains 2 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4) out of which **MORE THAN ONE** answer may be correct.

6. A conducting loop of area A is placed in a magnetic field B , which makes an angle θ with the plane of the loop. An emf will be induced in the loop if
- (1) Angle θ changes with time
(2) Both radius of the loop and magnetic field changes with time
(3) Magnetic field changes with time
(4) All given quantities remains same
7. Three equal charges each of value $(+q)$ are placed at the vertex of an equilateral triangle of side a , then
- (1) Electric potential at the centroid of triangle is zero
(2) Electric potential at the centroid of triangle will be $\frac{3\sqrt{3}q}{4\pi\epsilon_0 a}$
(3) Electric field at the centroid of the triangle is zero
(4) Electric field at the centroid of the triangle is $\frac{9q^2}{4\pi\epsilon_0 a^2}$

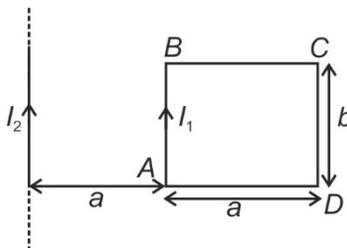
Space for Rough Work

SECTION-III : PARAGRAPH TYPE

This section contains a paragraph. Based upon this paragraph, 2 multiple choice questions have to be answered. Each question has 4 choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

Paragraph for Q. Nos. 8 & 9

A rectangular loop $ABCD$ carrying current I_1 is placed near and co-planar with a long straight conductor carrying current I_2 as shown in the figure, then



8. The net magnetic force on the current carrying rectangular loop $ABCD$ will be

- | | |
|------------------------------------|--------------------------------------|
| (1) $\frac{\mu_0 I_1 I_2}{2\pi a}$ | (2) $\frac{\mu_0 I_1 I_2 b}{2\pi a}$ |
| (3) $\frac{\mu_0 I_1 I_2}{4\pi a}$ | (4) $\frac{\mu_0 I_1 I_2 b}{4\pi a}$ |

9. The magnitude of magnetic potential energy of the rectangular loop $ABCD$ will be

- | | |
|--|--|
| (1) $\frac{\mu_0 I_1 I_2 b}{2\pi} \ln 2$ | (2) $\frac{\mu_0 I_1 I_2 a}{2\pi} \ln 2$ |
| (3) $\frac{\mu_0 I_1 I_2 b}{4\pi} \ln 2$ | (4) $\frac{\mu_0 I_1 I_2 a}{4\pi} \ln 2$ |

SECTION-IV : ASSERTION-REASON TYPE

This section contains 1 Assertion-Reason type question, which has 4 choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

10. **A** : Capacitor serves as a block for dc and offer an easy path to ac .

R : Capacitive reactance is inversely proportional to frequency.

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (3) (A) is true but (R) is false
- (4) (A) is false but (R) is true

Space for Rough Work

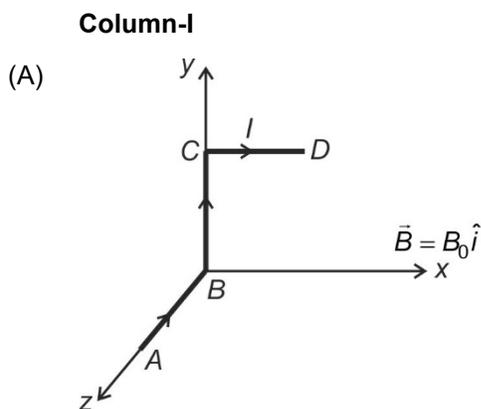
SECTION-V : MATRIX MATCH TYPE

This section contains 1 Matrix Match type question, which has 2 Columns (Column-I and Column-II). Column-I has four entries (A), (B), (C) and (D), Column-II has four entries (P), (Q), (R) and (S). Match the entries in Column-I with the entries in Column-II. Each entry in Column-I may match with one or more entries in Column-II. The OMR contains a 4×4 matrix whose layout will be similar to the one shown below:

For each entry in Column-I, darken the bubbles of all the matching entries. For example, if entry (A) in Column-I matches with entries (Q), (R) and (S), then darken these three bubbles in the OMR. Similarly, for entries (B), (C) and (D).

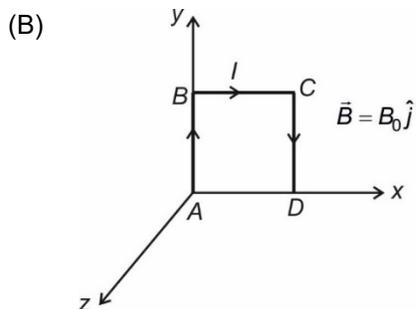
(A)	(P)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(B)	(P)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(C)	(P)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(D)	(P)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Column-I shows some current carrying wires bent in the shapes as shown in figures. The length of each section of wire is a and I is the current flowing in the wire. The wire is placed in uniform magnetic field. Column-II shows magnitude of force acting on the wire. Match column-I with column-II.



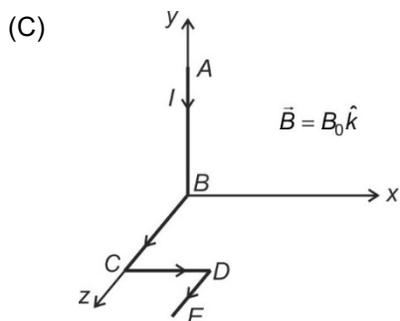
- Column-II**
- (P) $F = IB_0 a \sqrt{2}$
 F is force acting on whole wire

Space for Rough Work



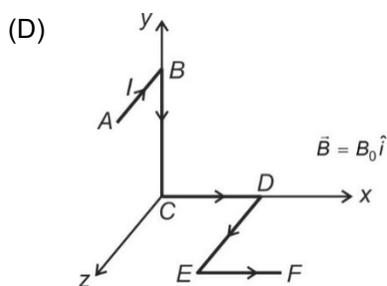
(Q) $F = IB_0a$

F is force acting on whole wire



(R) $F_{AB} = IB_0a$

F_{AB} is force acting on section AB



(S) $F_{CD} = 0$

F_{CD} is force acting on section CD

CHEMISTRY

SECTION-I : SINGLE ANSWER TYPE

This section contains 5 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

12. Fraction of edge occupied by atoms in a FCC unit cell is nearly

(1) 0.5

(2) 0.7

(3) 0.8

(4) 1

Space for Rough Work

13. Among the following cells, E_{cell} is maximum for
- (1) $\text{Pt(s)}|\text{H}_2(\text{g}, 1 \text{ bar})|\text{H}^+(\text{aq}, 1 \text{ M})||\text{Cu}^{2+}(\text{aq}, 1 \text{ M})|\text{Cu}$
 - (2) $\text{Pt(s)}|\text{H}_2(\text{g}, 1 \text{ bar})|\text{H}^+(\text{aq}, 2 \text{ M})||\text{Cu}^{2+}(\text{aq}, 1 \text{ M})|\text{Cu}$
 - (3) $\text{Pt(s)}|\text{H}_2(\text{g}, 2 \text{ bar})|\text{H}^+(\text{aq}, 1 \text{ M})||\text{Cu}^{2+}(\text{aq}, 1 \text{ M})|\text{Cu}$
 - (4) $\text{Pt(s)}|\text{H}_2(\text{g}, 2 \text{ bar})|\text{H}^+(\text{aq}, 1 \text{ M})||\text{Cu}^{2+}(\text{aq}, 2 \text{ M})|\text{Cu}$
14. Highest coagulating power is shown by
- (1) Cl^-
 - (2) PO_4^{3-}
 - (3) SO_4^{2-}
 - (4) $[\text{Fe}(\text{CN})_6]^{4-}$
15. Zn, Cd or Hg are not considered as transition metals because they have
- (1) Completely filled d -orbitals in ground state
 - (2) Completely filled d -orbitals in their common oxidation state
 - (3) Completely filled s -orbitals
 - (4) Both (1) and (2)
16. Maximum oxidising power and most acidic oxoacid of chlorine respectively are
- (1) $\text{HClO}_4, \text{HClO}_4$
 - (2) $\text{HClO}, \text{HClO}_4$
 - (3) $\text{HClO}_4, \text{HClO}$
 - (4) HClO, HClO

SECTION-II : MORE THAN ONE ANSWER TYPE

This section contains 2 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4) out of which **MORE THAN ONE** answer may be correct.

17. Select the **correct** statement(s) regarding azeotropes.
- (1) Solutions which show large positive deviations from Raoult's law form maximum boiling azeotrope.
 - (2) Not possible to separate the components by fractional distillation.
 - (3) Liquid and vapour have the same composition at azeotropic composition.
 - (4) They have constant boiling point.
-

Space for Rough Work

18. Which of the following plot(s) is/are straight line for a zero order reaction?
- (1) Concentration of reactant vs time
 - (2) Rate of reaction vs time
 - (3) Half life period vs initial concentration of reactant
 - (4) Rate of reaction vs concentration of reactant

SECTION-III : PARAGRAPH TYPE

This section contains a paragraph. Based upon this paragraph, 2 multiple choice questions have to be answered. Each question has 4 choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

Paragraph for Q. Nos. 19 & 20

In the crystal field theory, ligands are treated as point charges in case of anions or point dipoles in case of neutral molecules. In an isolated gaseous metal atom/ion, the five *d*-orbitals are degenerate. Due to negative field caused by the ligands, the degeneracy of *d*-orbitals is lifted and results in splitting of *d*-orbitals. Splitting of *d*-orbitals depends on nature of metal, ligands as well as the coordination number of central metal atom. The splitting in presence of ligands is known as crystal field splitting and energy separation of non-degenerate orbitals is denoted by Δ .

19. The CFSE of the ion $[\text{FeF}_6]^{3-}$ is (Δ_0 stands for CFSE for octahedral species)
- | | |
|---------------------|---------------------|
| (1) 0 | (2) $-1.2 \Delta_0$ |
| (3) $-1.6 \Delta_0$ | (4) $-2.0 \Delta_0$ |
20. Violet colour among the following is of
- | | |
|--|--|
| (1) $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ (aq) | (2) $[\text{Ni}(\text{H}_2\text{O})_4\text{en}]^{2+}$ (aq) |
| (3) $[\text{Ni}(\text{H}_2\text{O})_2(\text{en})_2]^{2+}$ (aq) | (4) $[\text{Ni}(\text{en})_3]^{2+}$ (aq) |

SECTION-IV : ASSERTION-REASON TYPE

This section contains 1 Assertion-Reason type question, which has 4 choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

21. **A** : Λ_m^0 of KCl is greater than Λ_m^0 of NaCl.
R : Degree of ionisation of KCl is more than NaCl at infinite dilution.
- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
 - (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
 - (3) (A) is true but (R) is false
 - (4) (A) is false but (R) is true

Space for Rough Work

SECTION-V : MATRIX MATCH TYPE

This section contains 1 Matrix Match type question, which has 2 Columns (Column-I and Column-II). Column-I has four entries (A), (B), (C) and (D), Column-II has four entries (P), (Q), (R) and (S). Match the entries in Column-I with the entries in Column-II. Each entry in Column-I may match with one or more entries in Column-II. The OMR contains a 4×4 matrix whose layout will be similar to the one shown below:

For each entry in Column-I, darken the bubbles of all the matching entries. For example, if entry (A) in Column-I matches with entries (Q), (R) and (S), then darken these three bubbles in the OMR. Similarly, for entries (B), (C) and (D).

(A)	(P)	(Q)	(R)	(S)
(B)	(P)	(Q)	(R)	(S)
(C)	(P)	(Q)	(R)	(S)
(D)	(P)	(Q)	(R)	(S)

22. Match each of the species given in column-I with the corresponding product(s) formed, given in column-II when species react with HNO_3 (dilute or concentrated).

Column-I	Column-II
(A) Cu	(P) Oxoacid
(B) Zn	(Q) NO
(C) P_4	(R) N_2O
(D) I_2	(S) NO_2

BIOLOGY**SECTION-I : SINGLE ANSWER TYPE**

This section contains 6 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

23. It is said that the fertilised ovules form the seeds or they are seeds. Apomictic seeds
- (1) Lack embryo as embryo is formed by zygote
 - (2) Are found in the parthenocarpic fruits
 - (3) Are produced without fertilisation
 - (4) Are always triploid

Space for Rough Work

24. A father has blood group A and mother has blood group B. Their progeny have all types of blood group (A, AB, B) except 'O'. What could be the genotype of both parents?

Father

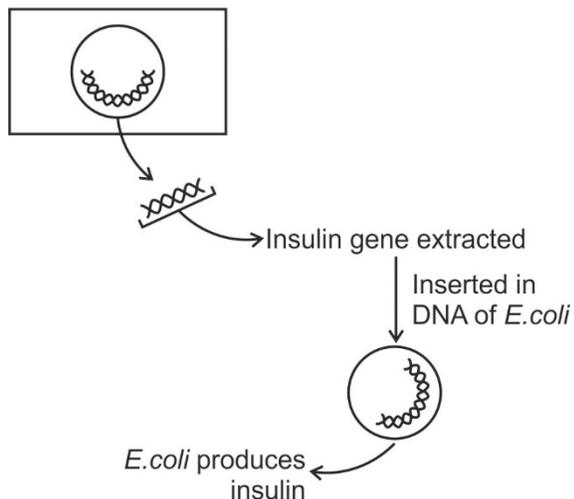
Mother

- | | |
|---------------|-----------|
| (1) $I^A i$ | $I^B i$ |
| (2) $I^A I^B$ | $i i$ |
| (3) $I^A I^B$ | $I^A I^B$ |
| (4) $i i$ | $I^A I^B$ |

25. An immunosuppressive agent used in organ-transplant patients, that is produced by a fungus *Trichoderma polysporum* is

- | | |
|-------------------|------------|
| (1) Streptokinase | (2) Lipase |
| (3) Cyclosporin A | (4) Statin |

26. Human cell



The figure given above depicts a technique involving gene transfer.

E. coli bacteria do not naturally produce insulin, however on transfer of the DNA coding for insulin from a human cell they start producing insulin.

Which of the following theories is proved by this procedure?

- (1) DNA of all organisms have silent genes
- (2) Every organism has same genetic code
- (3) Genetic code is universal
- (4) Genetic code is organism specific

Space for Rough Work

27. In RT-PCR technique cDNA synthesis is mostly carried out by incubating _____ with reverse transcriptase just before PCR amplification. Choose the option that fills the blank **correctly**.
- (1) dsDNA
 - (2) mRNA
 - (3) t-RNA
 - (4) ssDNA
28. A 70-year old post-menopausal female has low bone density indicating osteoporosis. The levels of which hormone will be considerably high in her urine sample?
- (1) Progesterone
 - (2) Estrogen
 - (3) FSH
 - (4) MSH

SECTION-II : MORE THAN ONE ANSWER TYPE

This section contains 3 multiple choice questions. Each question has 4 choices (1), (2), (3) and (4) out of which **MORE THAN ONE** answer may be correct.

29. During replication, on the template strand with polarity 5' → 3'
- (1) The replication is discontinuous
 - (2) Many primers are required for new strand synthesis
 - (3) No activity of DNA ligase is required
 - (4) Forms the leading daughter strand
30. A childless couple opt for the test tube baby programme. The female can produce healthy ova but the male suffers from a low sperm count. The ART to be used here which will also fall under the umbrella of test tube baby programme is
- (1) ZIFT
 - (2) GIFT
 - (3) IVF-ET
 - (4) IUI
31. Choose the techniques involving ionising radiations for detection of cancer.
- (1) Biopsy
 - (2) CT-scan
 - (3) MRI
 - (4) X-rays

Space for Rough Work

SECTION-III : PARAGRAPH TYPE

This section contains a paragraph. Based upon this paragraph, 2 multiple choice questions have to be answered. Each question has 4 choices (1), (2), (3) and (4), out of which **ONLY ONE** is correct.

Paragraph for Q. Nos. 32 & 33

In a laboratory, a scientist wanted to study the structure and functions of RNA polymerase I, II and III. He know that RNA polymerase II is most studied and synthesizes mRNA and some other small RNAs and the RNAs which are integral part of ribosomes are formed by RNA polymerase I but while his experiments he did not get 5 S rRNA from RNA polymerase I.

On the basis of above paragraph answer the following questions.

32. The most probable reason for not getting 5 S rRNA from RNA polymerase I is
- (1) During the experiment RNA polymerase I gets mutated and unable to code 5 S rRNA.
 - (2) As rRNA is smaller RNA, we cannot extract it experimentally
 - (3) It is synthesized by different RNA polymerase that also codes for tRNA
 - (4) It is soluble RNA so readily solubilizes in the solution
33. Which of the given is the most probable source taken by him for his experiments?
- (1) *Nostoc*
 - (2) *Aspergillus*
 - (3) *Rhizobium*
 - (4) *E. coli*
-

SECTION-IV : ASSERTION-REASON TYPE

This section contains 1 Assertion-Reason type question, which has 4 choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

34. **A** : A person who has undergone a road traffic accident should be administered a tetanus immunisation.
R : TT is an inactive vaccine used to prevent tetanus.
- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
 - (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
 - (3) (A) is true but (R) is false
 - (4) (A) is false but (R) is true
-

Space for Rough Work

SECTION-V : MATRIX MATCH TYPE

This section contains 1 Matrix Match type question, which has 2 Columns (Column-I and Column-II). Column-I has four entries (A), (B), (C) and (D), Column-II has four entries (P), (Q), (R) and (S). Match the entries in Column-I with the entries in Column-II. Each entry in Column-I may match with one or more entries in Column-II. The OMR contains a 4 × 4 matrix whose layout will be similar to the one shown below:

For each entry in Column-I, darken the bubbles of all the matching entries. For example, if entry (A) in Column-I matches with entries (Q), (R) and (S), then darken these three bubbles in the OMR. Similarly, for entries (B), (C) and (D).

(A)	(P)	(Q)	(R)	(S)
(B)	(P)	(Q)	(R)	(S)
(C)	(P)	(Q)	(R)	(S)
(D)	(P)	(Q)	(R)	(S)

35. Match the given Column-I with Column-II.

Column-I	Column-II
(A) Haemophilia	(P) Can pass from carrier mother to sons to make sons affected
(B) Cystic fibrosis	(Q) Sex linked recessive disorder
(C) Colourblindness	(R) Mendelian disorder
(D) Phenylketonuria	(S) Autosomal recessive disorder

Space for Rough Work

33 Year Old Legacy of Delivering Outstanding Results



84230 NEET-UG 2020

69759 Classroom + 14471 Digital & Distance



Perfect Score
720
2



715
720
3

1700 JEE (Advanced) 2020

(1560 Classroom + 140 Digital & Distance)



Highest Scorer
352
396
1



65

JEE (Main) 2021 PHASE-III



100
PERCENTILE



100
PERCENTILE

Our Result in Scholarship Exams /Olympiads

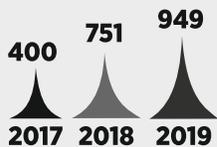
949 832 Classroom + 117 Digital & Distance NTSE (Stage-I) 2019-2020

Our 1st Rankers from Classroom Programs

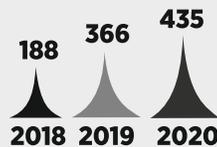


Our performance in Olympiads & Scholarship Exams Over Past 3 Years

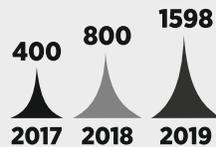
NTSE Stage-I



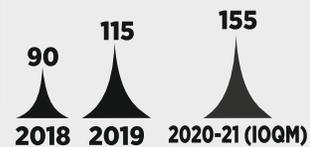
NTSE Stage-II



PRMO



RMO



AAKASHIANS OUTSHINE IN CBSE CLASS X BOARD EXAM 2020

Glimpse of our top performers



1598

1556 Classroom + 42 Digital & Distance

PRMO
2019

155

151 Classroom + 04 Digital & Distance

IOQM
2020-21

620

533 Classroom + 87 Digital & Distance

KVPY Aptitude
Test 2019

521

435 Classroom + 86 Digital & Distance

KVPY Fellowship
Award 2020-21

771

705 Classroom + 66 Digital & Distance

NSEs
2019

1611

1477 Classroom + 134 Digital & Distance

IMO (Level-I)
2020-21

1656

1528 Classroom + 128 Digital & Distance

NSO (Level-I)
2020-21

26

20 Classroom + 06 Digital & Distance

INO
2020