NATIONAL ENTRANCE SCREENING TEST 2026

NEST 2026

INFORMATION BROCHURE & SYLLABUS

Entrance test for admission to

5-year Integrated MSc Program, 2026-31

at

National Institute of Science Education and Research (NISER), Bhubaneswar

and

University of Mumbai - Department of Atomic Energy Centre for Excellence in Basic Sciences (UM-DAE CEBS), Mumbai

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1. Introduction to NEST, NISER and UM-DAE CEBS

- The **National Entrance Screening Test** (NEST) is a compulsory online computer-based test for admission to the five-year Integrated MSc programs offered by the **National Institute of Science Education and Research (NISER)**, and the **University of Mumbai – Department of Atomic Energy Centre for Excellence in Basic Sciences (UM–DAE CEBS)**.

- NISER and UM-DAE CEBS are autonomous institutions established by the Department of Atomic Energy (DAE), Government of India, in 2007. These institutes were started with the mandate of providing research-oriented teaching in basic sciences by faculties of practising scientists aimed at creating a national pool of human resources to lead the nation to excellence in teaching and research in basic and applied sciences.

  NISER, located near Bhubaneswar in Odisha, is an off-campus centre of the Homi Bhabha National Institute (HBNI), a deemed-to-be university established by DAE. Academic programs of NISER are affiliated with HBNI.

  UM-DAE CEBS, located on the Vidyanagari campus of the University of Mumbai (UM), was established jointly by DAE and UM in 2007. Academic programs of CEBS are affiliated with UM.

2. Integrated MSc Program

- These institutes offer unique Integrated MSc programs in Biology, Chemistry, Mathematics and Physics.

  The integrated MSc programs offered in these institutes are residential, stipendiary, and follow a biannual semester and credit-based course curriculum which also encourages ample exposure of students to research early in the program.

  The details of the Integrated MSc program, list of courses, research activities of the individual schools, institute facilities, and faculty profiles at NISER and UM-DAE CEBS may be found on their respective websites (*www.niser.ac.in* and *www.cbs.ac.in*). NISER and UM-DAE CEBS are equipped with state-of-the-art teaching and research laboratories, modern computational facilities, and excellent libraries.

- The candidates admitted to the Integrated MSc program are eligible to receive an annual scholarship of Rs 60,000 through the DISHA program of the Department of Atomic Energy, Government of India. In addition, the scholarship recipients receive a grant of Rs 20,000/- per annum for summer internships. Candidates selected by DST for the INSPIRE-SHE program are endorsed for the INSPIRE scholarship by NISER and UM-DAE CEBS.

- A vast majority of students graduating from the integrated MSc programs offered in the two institutes pursue doctoral research at universities and institutions of repute in India and abroad, including NISER or CEBS and join academia or industry primarily in research positions. The placements of the graduated students from NISER and UM-DAE CEBS provide testimony to the success of this program.

  Students graduating with overall grades above a certain threshold are eligible to appear directly for the interview for appointment as Trainee Scientific Officer in Bhabha Atomic Research Centre (BARC).

- NISER and UM-DAE CEBS comply with the UGC and Govt. of India guidelines on anti-ragging. Ragging in any form is a punishable offence and hence is prohibited on these campuses. Any complaint regarding ragging can be made at the 24x7 toll-free National Anti-Ragging Help Line number 1800-180-5522 and/or at the email ID: helpline@antiragging.in.

3. Eligibility Criteria for Admission to the Program

- Candidates seeking admission to NISER and UM–DAE CEBS for the Integrated MSc programme 2026–31 should have **at least three** out of the four disciplines of basic sciences, namely, Biology, Chemistry, Mathematics and Physics, in classes XI and XII.
- Candidates must have passed the class XII examination from any recognised Board in India in the year 2024 or 2025 or should be appearing for the same in 2026.
- Candidates appearing for the board examination in 2026 must satisfy the eligibility criteria at the time of admission into the program.
- The certificate/ provisional certificate declaring the aggregate should be from a single board.
- Candidates in the unreserved category must secure at least 60% marks in aggregate or equivalent grade in class XII examination to be eligible for admission to NISER and UM-DAE CEBS. For candidates belonging to scheduled castes (SC), scheduled tribes (ST), and Divyangjan categories, the minimum requirement of marks is relaxed to 55% in aggregate or equivalent grade in class XII examination.
- Where only letter grades are available, a certificate from the concerned Board specifying an equivalent percentage of marks is required to be submitted. In the absence of such a certificate, the decision of the admissions committee of the concerned institution will be final.
- Candidates satisfying **all the above criteria** will be considered for admission strictly based on the ***Merit List of NEST 2026 examination***. Please refer to pages 9 -12 of this document for the methodology of merit list preparation.
- There is no age limit for appearing in the NEST 2026 examination and admission to either NISER or UM-DAE CEBS.

Note: *Necessary certificates supporting the eligibility criteria have to be furnished only at the time of admission. Admission is subject to verification of all original certificates at the time of admission/counselling. Certificates in support of the eligibility criteria need not be produced for appearing in the NEST 2026 examination.*

4. Reservation of Seats

For the Integrated MSc program 2026–31, the total number of seats at NISER and UM-DAE CEBS are 200 and 57, respectively. NISER and UM-DAE CEBS follow the Govt. of India rules for reservation of seats. The categories and the extent of reservation are as follows:

Other Backward Classes belonging to the Non–Creamy Layer (OBC–NCL): 27% of seats are reserved for OBC–NCL. The class should have been mentioned in the central list of OBCs (*http://www.ncbc.nic.in/User_Panel/CentralListStateView.aspx*). If offered admission under the OBC-NCL category, the candidate must produce the relevant valid certificate on the date of admission.

Candidates belonging to the creamy layer of OBC are **NOT** entitled to reservation. Such candidates are treated as belonging to the Unreserved (UR) category. The Socially and Educationally Backward Classes (SEBC) as notified by some of the State Governments, are, as such, **NOT** eligible to avail any reservation unless they satisfy the OBC–NCL criteria.

Reservation for Economically Weaker Sections (EWS) of society is allowed in the Unreserved (UR)-EWS category for admission to UM-DAE CEBS only.

Scheduled Caste (SC) / Scheduled Tribe (ST): 15% of seats are reserved for the SC category candidates and 7.5% of seats are reserved for the ST category candidates. The benefit of reservation will be given only to those castes and tribes that are mentioned in the respective lists of corresponding states published by the Government of India: *(https://socialjustice.gov.in/ and https://tribal.nic.in/downloads/statistics/ListScheduledTribes26092025.pdf).*

The number of seats reserved for SC, ST, OBC (Non–Creamy–Layer), and Divyangjan candidates is according to the Government of India norms. To claim seats under the reserved category, relevant documents must be furnished at the time of admission. All category certificates should be written in either English or Hindi. In case certificates are written in any other language, a translated copy, duly notarized, must also be provided.

Divyangjan: **5%** of seats are reserved in every category, i.e., Unreserved (UR), OBC–NCL, SC and ST for persons with disabilities (Divyangjan). Benefit would be given only to those with at least 40% impairment, irrespective of the type of disability. Leprosy–cured candidates who are otherwise medically fit to pursue the course are also included in this subcategory. Candidates are advised to ensure that the certificate is in accordance with the latest guidelines of the Government of India (visit the website of the Ministry of Social Justice and Empowerment, Department of Disability Affairs for the latest information: https://disabilityaffairs.gov.in). The reservation for Divyangjan candidates is horizontal and hence, unfilled seats will be allotted to candidates belonging to the respective categories, for e.g., unfilled seats reserved for Divyangjan in the SC category will be allotted to other candidates within the SC category and so on. If selected, the candidates must produce all original certificates at the time of admission, failing which, the offer of admission will be cancelled.

5. NEST 2026 Examination

The NEST 2026 examination will be conducted at multiple centres (major towns or cities) all over India in **a single session**, on **June 06, 2026 (Saturday). The timing of the session will be 02:00 PM – 05:00 PM**. *Divyangjan category candidates are eligible for a compensatory time of 20 minutes per hour of examination duration as per GOI guidelines*. Based on the performance in NEST 2026, a merit list of the candidates will be prepared (see merit list preparation section on page 9 - 12) and posted on the NEST 2026 website (*www.nestexam.in*) by **June 25, 2026**.

Note: Any changes related to NEST 2026 will be updated on the website. The dates mentioned on the website shall be final.

NEST 2026 examination will be a Computer-Based Test (CBT/online exam)

6. Examination Centres for NEST 2026

Examination centres*: A proposed list of about 140 centres (cities and towns of India) for the NEST examination is given in the table below. Candidates must choose **3 (three)** centres in order of their preference while filling out the application form. Every effort will be made to allot the centre of first preference. Please note that the allotment of an examination centre by the NEST Committee will be deemed final, and any request for a change of centre will, in general, not be entertained. The address of the test venue allotted to the applicant will be mentioned on the NEST admit card. Admit cards will be available for download from the online application portal from **15 May 2026**. Please refer to the section '**How to Apply**' below for details of the online registration and application process.

* ***The list of centres is subject to change and will be updated when the application portal opens***

#	Centre Name *	#	*Centre Name *	#	Centre Name *
1	Port Blair [AN]	28	Srinagar [JK]	55	Jabalpur [MP]
2	Guntur [AP]	29	Bokaro Steel City [JH]	56	Aurangabad [MH]
3	Kurnool [AP]	30	Dhanbad [JH]	57	Jalgaon [MH]
4	Rajahmundry [AP]	31	Jamshedpur [JH]	58	Kolhapur [MH]
5	Tirupathi [AP]	32	Ranchi [JH]	59	Mumbai [MH]
6	Vijayawada [AP]	33	Bengaluru [KA]	60	Nagpur [MH]
7	Visakhapatnam [AP]	34	Hubballi(Hubli) [KA]	61	Nanded [MH]
8	Vizianagaram [AP]	35	Mangaluru [KA]	62	Pune [MH]
9	Naharlagun [AR]	36	Mysuru(Mysore) [KA]	63	Ratnagiri [MH]
10	Dibrugarh [AS]	37	Alappuzha [KL]	64	Solapur [MH]
11	Guwahati [AS]	38	Ernakulam [KL]	65	Imphal [MN]
12	Tezpur [AS]	39	Idukki [KL]	66	Shillong [ML]
13	Bhagalpur [BR]	40	Kannur [KL]	67	Aizawl [MZ]
14	Patna [BR]	41	Kasaragod [KL]	68	Dimapur [NL]

15	Bhilai Nagar [CG]	**42**	Kollam [KL]	**69**	Kohima [NL]
16	Raipur [CG]	**43**	Kottayam [KL]	**70**	Angul [OD]
17	New Delhi [DL]	**44**	Kozhikode [KL]	**71**	Balangir [OD]
18	Panaji [GA]	**45**	Malappuram [KL]	**72**	Balasore [OD]
19	Ahmedabad [GJ]	**46**	Palakkad [KL]	**73**	Bargarh [OD]
20	Bhuj [GJ]	**47**	Pathanamthitta [KL]	**74**	Baripada [OD]
21	Rajkot [GJ]	**48**	Thiruvananthapuram [KL]	**75**	Berhampur [OD]
22	Surat [GJ]	**49**	Thrissur [KL]	**76**	Bhadrak [OD]
23	Hisar [HR]	**50**	Wayanad [KL]	**77**	Bhawanipatna [OD]
24	Kurukshetra [HR]	**51**	Leh [LA]	**78**	Bhubaneswar [OD]
25	Hamirpur [HR]	**52**	Bhopal [MP]	**79**	Boudh [OD]
26	Shimla [HP]	**53**	Gwalior [MP]	**80**	Cuttack [OD]
27	Jammu [JK]	**54**	Indore [MP]	**81**	Deogarh [OD]
82	Dhenkanal [OD]	**102**	Bhatinda [PB]	**122**	Agra [UP]
83	Jagatsinghpur [OD]	**103**	Jalandhar [PB]	**123**	Aligarh [UP]
84	Jajpur [OD]	**104**	Chandigarh [PB]	**124**	Gorakhpur [UP]
85	Jeypore [OD]	**105**	Mohali [PB]	**125**	Kanpur [UP]
86	Jharsuguda [OD]	**106**	Bikaner [RJ]	**126**	Lucknow [UP]
87	Kendrapara [OD]	**107**	Jaipur [RJ]	**127**	Noida [UP]
88	Keonjhar [OD]	**108**	Jodhpur [RJ]	**128**	Prayagraj [UP]
89	Malkangiri [OD]	**109**	Kota [RJ]	**129**	Varanasi [UP]
90	Nayagarh [OD]	**110**	Udaipur [RJ]	**130**	Dehradun [UK]
91	Nuapada [OD]	**111**	Gangtok [SK]	**131**	Haldwani [UK]
92	Paralakhemundi [OD]	**112**	Chennai [TN]	**132**	Roorkee [UK]
93	Phulbani [OD]	**113**	Coimbatore [TN]	**133**	Asansol [WB]
94	Puri [OD]	**114**	Madurai [TN]	**134**	Berhampur [WB]
95	Rayagada [OD]	**115**	Salem [TN]	**135**	Burdwan [WB]
96	Rourkela [OD]	**116**	Tiruchirappalli [TN]	**136**	Durgapur [WB]
97	Sambalpur [OD]	**117**	Tirunelveli [TN]	**137**	Hooghly [WB]
98	Sonepur [OD]	**118**	Hyderabad [TS]	**138**	Kalyani [WB]
99	Sundargarh [OD]	**119**	Karimnagar [TS]	**139**	Kolkata [WB]
100	Umerkote [OD]	**120**	Warangal [TS]	**140**	Siliguri [WB]
101	Puducherry [PY]	**121**	Agartala [TR]	**-**	-

* ***The list of centres is subject to change and will be updated when the application portal opens***

Any three cities from the above list, as per the applicant's preference, have to be chosen while filling out the application form. Depending on the number of applicants opting for a particular test city/town, the NEST 2026 committee reserves the right to cancel or add any of the test cities without prior notice to applicants. The address of the NEST test centre allotted to an applicant will be printed on the admit card. ***Only the test centre indicated on the Admit Card should be treated as final****, irrespective of the order of preference of test cities filled in at the time of online application.*

7. Examination Rules:

Candidates should reach the test venue at least 60 minutes before the examination commences. The examination is ***3 hours*** in duration, and will *start at 02:00 PM*. Candidates *will not be allowed* to enter the examination hall *after 03:00 PM*. The earliest a candidate *can leave* the examination hall is *04:00 PM,* unless it becomes necessary on medical grounds. Use of log tables and calculators inside the examination hall is not allowed. **Candidates MUST bring to the examination hall their Admit Card, and the school photo Identity Card or any other valid photo ID issued by Government agencies**. ***These documents must be carried ONLY in a 'transparent' folder/ sleeve/ pouch***. Any candidate found adopting unfair means will be expelled from the examination hall without warning and results will be withheld. Pen, pencils, erasers, mobile phones, writing or drawing pads, digital pads/notebooks and other electronic gadgets including Bluetooth or WiFi-enabled wearable devices **are strictly not allowed** inside the examination hall. Opaque water bottles will not be permitted inside the hall.

NEST 2026 will be conducted in compliance with the guidelines issued by the Government of India regarding scribes for Divyangjan category candidates and are eligible for a total compensatory time of one hour for 3 hours examination duration (please refer to the website: http://disabilityaffairs.gov.in).

Divyangjan category candidates who require the assistance of scribes should bring their own scribes, complying with the guidelines mentioned above, to the examination venue. The scribe will help the candidate only in reading the questions and/or keying in the answers as per the directions of the candidate. A scribe will *NEITHER* explain the questions *NOR* suggest any solutions.

Question type: The question paper will consist of **4 (four)** sections with subject-specific questions from Biology, Chemistry, Mathematics, and Physics. Each section corresponds to a subject and will have 20 questions of objective type, i.e. Multiple Choice Questions (MCQ) having four options to choose from, with *ONLY* one of them being the correct answer. Each section is of 60 marks. Marking a correct answer will fetch **3 marks**, choosing an incorrect answer will lead to a deduction of **1 mark** and no marks will be deducted for not answering a question. The merit list for both institutes will be prepared as described under the section "NEST 2026 Merit List Preparation" (pages 9 - 12 of this document). For NEST question papers of the last few years, refer to the NEST 2026 website (www.nestexam.in). The language of the question paper will be **Hindi and English.** *In the case of any confusion/discrepancy due to language, the question paper in English will be considered to be the standard one and final.*

Answering questions: The examination is a Computer-Based Test (CBT). The candidate will enter all the requisite details at the given computer terminal. The questions and the answer options will be displayed on the monitor. Answers to each question are to be provided by choosing the desired option using the peripheral input device provided with the computer terminal. Details of how to answer at the terminal will be provided before the examination. Applicants are encouraged to practise by using a mock test link that will be made available on the NEST 2026 web page several days before the exam date. Practice sessions on the computer-based test will be available for all applicants on the application portal after online registration and completion of the submission of online applications. The application portal will be accessible with the correct login credentials only.

8. How to Apply:

To apply for NEST 2026, candidates must fill out the online application form through www.nestexam.in. Candidates are strongly advised to read through the detailed online application procedure available on the website by clicking on 'How to Apply online'. The online application process closes on **April 06, 2026 (11:30 PM),** and any pending payments must be completed by **April 12, 2026 (11:30 PM)**.

Applications can be submitted only through the NEST 2026 website. There is no other mode of submission of application. Login credentials for filling-up the application form and payment of fees will be provided upon online registration.

***Application Fee*:**

- The application fee for the male candidates of the Unreserved (UR) and OBC categories is ₹1,400/–.
- The application fee for candidates in the Unreserved-EWS (UR-EWS) and SC/ST/Divyangjan categories and all female candidates is ₹700/–.
- Payments can be made using credit card/debit card/net–banking through an online payment gateway.
- You may use Mastercard/Visa/RuPay cards or UPI as payment options.

Candidates need not send any documents to the NEST office in the entire application process.

Please refer to the instruction sheet (the 'How to Apply Online' tab on www.nestexam.in) for details regarding the application process.

Admit card: The admit card for NEST 2026 can be downloaded by the candidates starting **15 May, 2026** from the NEST website using their respective login credentials. Admit cards will **NOT** be dispatched to any applicant. The download link will be available only till the day of the examination.

9. Address for Correspondence:

Any NEST 2026-related queries should be addressed to:

► *by postal mail:*
Chief Coordinator NEST 2026,
National Institute of Science Education and Research Bhubaneswar
At/PO: Jatni, Khurda, Odisha, India
PIN: 752050

► *by e-mail to:* ***nest-exam@niser.ac.in***
(for a quicker response, email is recommended)

The official website of NEST 2026 is: ***www.nestexam.in***

(follow link or QR)

10. Important Dates:

- Start of Online application for NEST 2026: **Jan 05, 2026**
- Closing of Online application: **April 06, 2026 (11:30 PM)**
- Closing of payment portal: **April 12, 2026 (11:30 PM)**
- Download of Admit Card begins: **May 15, 2026**
- NEST 2026 examination: **June 06, 2026** *(Hours of examination:* ***02:00 PM – 05:00 PM****.*
- Announcement of results on NEST website: **Please visit NEST website for updates**

11. Important Things to Remember:

✓ Candidates are advised to reach the examination venue at least 60 minutes before the start of the examination.
✓ Candidates will NOT be allowed to enter the examination hall any later than half an hour (30 minutes) after the start of the examination.
✓ Candidates will be allowed to leave the examination hall no sooner than two hours after the start of the examination (except when required by medical emergencies).
✓ Candidates **MUST** bring their Admit Card and a valid photo Identity Card to the examination hall. Without these documents the candidate may not be allowed to enter the examination centre. ***These documents must be carried ONLY in a 'transparent' folder/ sleeve/ pouch***.
✓ Use of log tables and calculators in the examination hall is not allowed. Blank pages, pen/pencils for rough work will be provided in the examination hall. A simple on-screen calculator will be provided.
✓ ANY kind of electronic gadgets, including mobile phones, digital/smart watches, storage devices, Bluetooth or WiFi-enabled wearable devices etc., are strictly prohibited inside the examination hall.

12. Essentials for Online Application:

- Correct email addresses for correspondence should be provided. The NEST office communicates with candidates only through these provided e-mail address.
- The phone number provided during the application should be accessible by the candidate. The NEST office uses these phone numbers to reach the candidates or to send SMS messages whenever necessary.
- A recent passport-sized photograph and signature, scanned and cropped as mentioned in the application portal, should be uploaded.

- The photograph and signature files must not be more than 80 KB each and must be in .JPG or .JPEG format only.
- Applications incomplete in any respect will not be accepted.
- *Any dispute arising out of or related to the NEST 2026 examination shall be subject to the jurisdiction of the Odisha High Court.*

13. Proposed Student Intake at NISER and CEBS for 2026-2031:

The number of seats available at NISER and CEBS for admission in the year 2026 would be as follows.

Category	NISER	UM-DAE CEBS
Unreserved (UR)	101	23
UR – EWS	0	06
OBC – NCL	54	15
SC	30	09
ST	15	04
Divyangjan	5% seats in each category (UR)-05; (OBC-NCL)-03; (SC)-02; (ST)-01	5% seats in each category
Total Seats	**200**	**57**
J & K, Ladakh	02	02
Total intake	**202**	**59**

Two supernumerary seats are reserved at both NISER and CEBS for eligible candidates from Jammu & Kashmir, Ladakh, as per existing government regulations.

14. NEST 2026 Merit List Preparation

This section lists rules employed for the preparation of the merit list in the National Entrance Screening Test (NEST) 2026.

I. Scoring system

1. In the NEST 2026 examination, there are four sections of 60 marks each with subject-specific questions from Biology, Chemistry, Mathematics, and Physics. A candidate can attempt all sections.

2. A candidate has to attempt at least three sections to be considered in the scoring process.

3. The total marks obtained in each section will be calculated following the marking scheme of three (3) marks for a correct answer, minus one (-1) mark for a wrong answer and zero (0) marks for an unanswered question.

4. In case a question is required to be dropped from any section, the marks of all the candidates will be scaled appropriately.

II. 'Section–wise' Minimum Admissible Score (SMAS) or section-wise cut–off marks

2. For each section, **20% of the average of the best 100 scores in that section** will be considered as the Section–wise Minimum Admissible Score (SMAS).

   *For example, if the average of the best 100 scores in the Chemistry section is 48 out of 60, then SMAS for the Chemistry section would be 48*0.20 = 9.6 marks, similarly for other sections.*

3. SMAS for different sections can be of different numerical values. SMAS will be rounded off at the fourth place of decimal.

4. SMAS for OBC candidates would be **90%** of the respective SMAS for Unreserved (UR) category candidates.
   For example, if in the Chemistry section, the SMAS is 9.6 for Unreserved (UR) category candidates, then the SMAS for OBC candidates would be 8.64 (90% of 9.6).

5. SMAS for SC/ST candidates would be **50%** of the respective SMAS for Unreserved (UR) category candidates.

6. A relaxation of **5%** in SMAS for Divyangjan candidates in their respective categories would be applicable. SMAS for Divyangjan candidates under UR, OBC and SC/ST categories would be 95%, 85% and 45% of the respective SMAS for Unreserved (UR) category candidates.

7. A candidate must secure a **section score equal to or above the SMAS** in **at least three sections** to be considered further in the scoring process.

8. Only the scores that are **equal to or above the SMAS** will be considered for scoring and ranking process.

III. Total score:

1. Total score is calculated as the sum of at least three section scores, provided the section scores are equal to or above the respective SMAS.
2. If the candidates scores above SMAS in all the four sections, the total score is calculated as the sum of the three best section scores obtained.

IV. Percentile calculation:

Total scores are sorted and a percentile is calculated. If the exam is conducted in multiple sessions, the percentile is calculated separately for each session, and merged into one for merit list preparation.

V. Minimum Admissible Percentile (MAP)

1. In addition to SMAS, a candidate is required to have a percentile that is equal to or above a Minimum Admissible Percentile (MAP), to get a merit rank. Category-wise MAP for NEST 2026 will be announced along with the declaration of results.
2. A candidate scoring less than the MAP would not be allotted any merit rank, even if the candidate secures SMAS in all sections.

VI. Merit list rank preparation

The final ranking of the candidates will be based on percentiles calculated from the total scores. The merit list will be published based on the following criteria:

1. A candidate is required to obtain a section score that is equal to or greater than the SMAS in at least three sections. Then the candidate is said to be SMAS-qualified.
2. The total score of an SMAS-qualified candidate is the sum of the three best scores from the SMAS securing sections.
3. A candidate is required to obtain a percentile that is equal to or above the Minimum Admissible Percentile/ MAP (announced for NEST 2026) to get a merit rank.
4. A merit rank will be assigned based on the percentile.
5. A tie of rank would be broken by first comparing the sum of the two best section scores.
6. If the tie of rank persists, then the best section score will be considered.
7. If the tie of rank persists, the candidates would be given the same provisional rank at the time of declaration of the results.
8. The tie would be broken during admission/counselling by first comparing the aggregate percentage of class XII followed by class X.

A candidate with an OBC-NCL/ SC/ST category rank will take a Unreserved (UR) seat if the candidate secures a general rank above or equal to the cut-off in the Unreserved (UR) category.

For example, if the topper of the exam (General rank 1) happens to be an OBC-NCL candidate, he/she would get OBC rank 1, as well. In such a case, he/she would be admitted against the General rank under the Unreserved category (UR) so that all OBC-NCL reserved seats remain available.

VII. Summary of the scoring method and ranking:

1. There are four sections on four different subjects (biology, chemistry, mathematics and physics), each comprising of 20 questions.

   If a candidate attempts N_i number of questions out of the total 20 questions in the i-th section, and correctly answers M_i number of questions out of the N_i attempted, then section-score (S_i) of the candidate in the i-th section will be :

   $S_i = 3 \times M_i + (-1) \times (N_i - M_i) + 0 \times (20 - N_i)$.

2. A *section-wise minimum admissible score* (SMAS) for each category will be decided based on the performance of all candidates in that section.

   For each section, the SMAS applicable for a candidate in the unreserved category (UR) is set to 20% of the average of the top 100 scores.

   For OBC and SC/ST candidates SMAS are respectively set to 90% and 50% of that applicable in the UR category.

   For Divyangjan candidates under UR, OBC and SC/ST categories SMAS are respectively set to 95%, 85% and 45% of that applicable in the UR category.

3. Total score (S_{total}) will be awarded to candidates with at least three of the four section-scores more than or equal to the respective SMAS in the category of the candidate.

Example:

Let C_1, C_2, C_3, C_4 be the SMAS for the four sections in the category of a candidate with section-scores S_1, S_2, S_3, S_4.

If $S_1 \geq C_1,\ S_2 \geq C_2, S_3 \geq C_3, S_4 \geq C_4$ and $S_2 \geq S_1 \geq S_4 \geq S_3$ then $S_{total} = S_2 + S_1 + S_4$.

If $S_1 \geq C_1,\ S_2 < C_2, S_3 \geq C_3, S_4 \geq C_4$ then $S_{total} = S_1 + S_3 + S_4$.

If $S_1 < C_1,\ S_2 \geq C_2, S_3 \geq C_3, S_4 \geq C_4$ then $S_{total} = S_2 + S_3 + S_4$.

If $S_1 < C_1,\ S_2 \geq C_2, S_3 < C_3, S_4 \geq C_4$ then no S_{total} will be awarded to the candidate.

4. Within each category, percentile of a candidate is $(m/m_{total}) \times 100$ if m is the number of candidates with S_{total} less than that of the candidate, and m_{total} is the total number of candidates with S_{total} awarded.

5. A category-wise *Minimum Admissible Percentile* (MAP) will be decided based on the performance of candidates in each category

   Within each category, rank will be generated for candidates with percentile equal or above the MAP decided for the category.

   The rank of a candidate is $l + 1$ if l is the number of candidates with a percentile more than that of the candidate in the same category.

6. Within a category, if two or more candidates have the same percentile, then an attempt will be made to assign different ranks first by considering the sum of their two best section scores.

   In case tie of rank persists then the maximum of the four section-scores of the candidates will be considered for the assignment of rank.

In case a tie of rank still persists then same rank will be assigned to all tied candidates. The tie would be broken during admission/counselling by comparing the aggregate percentage of total marks obtained in class XII, followed by class X.

Example:
Let candidates A, B and C in the same category have the same S_{total} leading to the same percentile.

If $S_3^A \geq S_1^A \geq S_4^A \geq S_2^A$ is the order of section-scores with $S_1 \geq C_1,\ S_2 \geq C_2, S_3 \geq C_3, S_4 \geq C_4$ of candidate A, then the sum of the two best section scores of candidate A is $S_3^A + S_1^A$, which we refer to as T^A.

If $T^B > T^A > T^C$ is the order of the sum of the two best section scores of the three candidates (A, B and C), and l is the rank of all three of them before the tie is broken, then the candidates A, B and C will be reassigned rank $l+1$, l and $l+2$, respectively, and all ranks lower than l before the tie is broken will be lowered by 2.

If a tie of ranks still persists, say $T^B > T^A and\ T^A = T^C$, and let $S_3^A \geq S_1^A \geq S_4^A \geq S_2^A$ and $S_4^C \geq S_1^C \geq S_3^C \geq S_2^C$. If $S_3^A > S_4^C$, then candidates A, B and C would be reassigned rank $l+1$, l and $l+2$, respectively, and all ranks lower than l before the tie is broken will be lowered by 2.

If a tie of rank still persists, say $T^A = T^C\ and\ S_3^A = S_4^C$, then candidates A and C would be assigned the same provisional rank at the time of publication of rank list. The tie would be broken during admission/counselling by first comparing the aggregate percentage of total marks obtained in class XII.

If a tie of rank still persists, the aggregate percentage of total marks obtained in class X will be compared.

VIII. Admission:

Getting a merit rank by satisfying SMAS and MAP criteria does not automatically entitle a candidate to be called for admission/counselling. The details of the admission/counselling process will be uploaded on the website sufficiently in advance.

Note: *NEST committee reserves the right to relax any of the defined cut–offs in extenuating circumstances.*

15. Syllabus for NEST 2026

SYLLABUS FOR NEST 2026

***IMPORTANT NOTE*:**

The detailed syllabus for the NEST 2026 examination is provided at the end of this document under the heading: '*Syllabus for NEST 2026'*.

The syllabus for NEST 2026 primarily follows the CBSE curriculum (2025-26) and NCERT books of classes XI–XII for Mathematics, Physics, Chemistry and Biology. *The knowledge gained in the science subjects up to class 10 may also be required to answer some of the questions.*

NCERT textbooks can be downloaded directly from https://ncert.nic.in/textbook.php.

Prescribed books are merely suggestive to cover the listed syllabus for NEST 2026.

The syllabus can also be downloaded from the NEST 2026 website, *www.nestexam.in*, under the Syllabus tab.

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NATIONAL ENTRANCE SCREENING TEST 2026

NEST 2026

SYLLABUS

Entrance test for admission to

5-year Integrated MSc Programme, 2026-31

at

National Institute of Science Education and Research (NISER), Bhubaneswar

and

University of Mumbai - Department of Atomic Energy Centre for Excellence in Basic Sciences (UM-DAE CEBS), Mumbai

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CLASS XI - THEORY

Unit	Title
I	Diversity of Living Organisms
II	Structural Organization in Plants and Animals
III	Cell: Structure and Function
IV	Plant Physiology
V	Human Physiology

Unit-I Diversity of Living Organisms

1: The Living World

Biodiversity; Need for classification; three domains of life; taxonomy and systematics; concept of species and taxonomical hierarchy; binomial nomenclature

2: Biological Classification

Five kingdom classification; Salient features and classification of Monera, Protista and Fungi into major groups; Lichens, Viruses and Viroids.

3: Plant Kingdom

Classification of plants into major groups; Salient and distinguishing features and a few examples of Algae, Bryophyta, Pteridophyta, Gymnospermae and Angiosperms.

4: Animal Kingdom

Salient features and classification of animals, non-chordates up to phyla level and chordates upto class level (salient features and a few examples of each category).

Unit-II Structural Organization in Plants and Animals

5: Morphology of Flowering Plants

Morphology of different parts of flowering plants: root, stem, leaf, inflorescence, flower, fruit and seed. Semi-technical description of a typical flowering plant. Description of family Solanaceae

6: Anatomy of Flowering Plants

Anatomy and functions of tissue systems in dicots and monocots.

7: Structural Organisation in Animals

Morphology, Anatomy and functions of different systems (digestive, circulatory, respiratory, nervous and reproductive) of frog.

Unit-III Cell: Structure and Function

8: Cell-The Unit of Life

Cell theory and cell as the basic unit of life, structure of prokaryotic and eukaryotic cells; Plant cell and animal cell; cell envelope; cell membrane, cell wall; cell organelles - structure and function; endomembrane system, endoplasmic reticulum, golgi bodies, lysosomes, vacuoles, mitochondria, ribosomes, plastids, microbodies; cytoskeleton, cilia, flagella, centrosomes and centrioles; nucleus.

9: Biomolecules

Chemical constituents of living cells: metabolites, biomolecules, structure and function of proteins, carbohydrates, lipids, and nucleic acids; Enzyme - types, properties, enzyme action.

10: Cell Cycle and Cell Division

Cell cycle, mitosis, meiosis and their significance.

Unit-IV Plant Physiology

11: Photosynthesis in Higher Plants

Photosynthesis as a means of autotrophic nutrition; site of photosynthesis, pigments involved in photosynthesis; photochemical and biosynthetic phases of photosynthesis; the electron transport chain and use of ATP and NADPH; cyclic and non-cyclic photophosphorylation; chemiosmotic hypothesis; photorespiration; C3 and C4 pathways; factors affecting photosynthesis.

12: Respiration in Plants

Exchange of gases; cellular respiration - glycolysis, fermentation (anaerobic), TCA cycle, electron transport system and oxidative phosphorylation (aerobic); energy relations – respiratory balance sheet and number of ATP molecules generated; amphibolic pathways; respiratory quotient.

13: Plant - Growth and Development

Seed germination; phases of plant growth and plant growth rate; conditions of growth; differentiation, dedifferentiation and redifferentiation; sequence of developmental processes in a plant cell; plant growth regulators - auxin, gibberellin, cytokinin, ethylene, abscisic acid (ABA).

Unit-V Human Physiology

14: Breathing and Exchange of Gases

Respiratory organs in animals; Respiratory system in humans; mechanism of breathing and its regulation in humans - exchange of gases, transport of gases and regulation of respiration, respiratory volume; disorders related to respiration - asthma, emphysema, occupational respiratory disorders.

15: Body Fluids and Circulation

Composition of blood, blood groups, coagulation of blood; composition of lymph and its function; human circulatory system - Structure of human heart and blood vessels; cardiac cycle, cardiac output, ECG; double circulation; regulation of cardiac activity; disorders of circulatory system - hypertension, coronary artery disease, angina pectoris, heart failure.

16: Digestion and Absorption

Alimentary canal and digestive glands, role of digestive enzymes and gastrointestinal hormones; Peristalsis, digestion, absorption and assimilation of proteins, carbohydrates and fats; calorific values of proteins, carbohydrates and fats; egestion; nutritional and digestive disorders - PEM, indigestion, constipation, vomiting, jaundice, diarrhoea.

17: Excretory Products and their Elimination

Modes of excretion - ammonotelism, ureotelism, uricotelism; human excretory system – structure and function; urine formation, function of tubules, mechanism of concentration of filtrate, osmoregulation; regulation of kidney function - renin - angiotensin, atrial natriuretic factor, micturition, ADH and diabetes insipidus; role of other organs in excretion; disorders - uremia, renal failure, renal calculi, glomerulonephritis; dialysis and artificial kidney, kidney transplant.

18: Locomotion and Movement

Types of movement – amoeboid, ciliary, flagellar, muscular; muscle - skeletal muscle, visceral and smooth muscles, cardiac muscles, contractile proteins and muscle contraction; skeletal system and its functions; joints; disorders of muscular and skeletal systems - myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout.

19: Neural Control and Coordination

Neuron and nerves; Nervous system in humans - central nervous system; peripheral nervous system and visceral nervous system; neural system – structure and function of neurons, generation and conduction of nerve impulse, transmission of impulse, central neural system.

20: Chemical Coordination and Integration

Endocrine glands and hormones; human endocrine system - hypothalamus, pituitary, pineal, thyroid, parathyroid, adrenal, pancreas, gonads; harmones of heart, kidney and gastrointestinal system; mechanism of hormone action; role of hormones as messengers and regulators, hypo - and hyperactivity and related disorders; dwarfism, acromegaly, cretinism, goiter, exophthalmic goitre, diabetes, Addison's disease.

CLASS XII - THEORY

Unit	Title
VI	Reproduction
VII	Genetics and Evolution
VIII	Biology and Human Welfare
IX	Biotechnology and its Applications
X	Ecology and Environment

Unit-VI Reproduction

1: Sexual Reproduction in Flowering Plants

Flower structure; structure and development of male and female gametophytes; pollination - types, agencies and examples; out breeding devices; pollen-pistil interaction; double fertilization; post fertilization events – structure and development of endosperm and embryo, development of seed and formation of fruit; special modes- apomixis, parthenocarpy, polyembryony; Significance of seed dispersal and fruit formation.

2: Human Reproduction

Male and female reproductive systems; microscopic anatomy of testis and ovary; gametogenesis -spermatogenesis and oogenesis; menstrual cycle; fertilisation, embryo development upto blastocyst formation, implantation; pregnancy and placenta formation; parturition; lactation.

3: Reproductive Health

Need for reproductive health – problems and strategies, Sexually Transmitted Diseases (STDs) or infections and their prevention; population stabilisation and birth control - need and methods, contraception and medical termination of pregnancy (MTP); amniocentesis; infertility and assisted reproductive technologies - IVF, ZIFT, IUT, GIFT, ICSI, AI, IUI (elementary idea for general awareness).

Unit-VII Genetics and Evolution

4: Principles of Inheritance and Variation

Heredity and variation: Mendelian inheritance; laws of inheritance - law of dominance and law of segregation; deviations from Mendelism – incomplete dominance, co-dominance, multiple alleles, inheritance of two genes and inheritance of blood groups, pleiotropy; elementary idea of polygenic inheritance; chromosome theory of inheritance; chromosomes and genes; Sex determination - in humans, birds and honey bee; linkage recombination and crossing over; genetic

disorders – pedigree analysis, Mendelian disorders in humans - sex linked inheritance - haemophilia, colour blindness; sickle-cell anaemia, thalassemia, phenylketonuria; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

5: Molecular Basis of Inheritance

DNA - Search for genetic material and DNA as genetic material; RNA world; Structure of DNA and RNA; DNA packaging; DNA replication; Central Dogma; transcription, genetic code, translation; gene expression and regulation - lac operon; Genome, Human and rice genome projects; DNA fingerprinting.

6: Evolution

Origin of life; biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology and molecular evidences); Darwin's contribution, modern synthetic theory of evolution; mechanism of evolution - variation (mutation and recombination) and natural selection with examples and evolutionary history, types of natural selection; Gene flow and genetic drift; Hardy- Weinberg's principle; adaptive radiation; human evolution.

Unit-VIII: Biology and Human Welfare

7: Human Health and Diseases

Pathogens; parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ring worm) and their control; Basic concepts of immunology – acquired immunity, active and passive immunity, vaccines and immunisation; Allergies; auto immunity; Immune system and human diseases - cancer, HIV and AIDS; drug and alcohol abuse, Adolescence – addiction and dependence; effects of drug and alcohol abuse, prevention and control.

8: Microbes in Human Welfare

Microbes in food processing, industrial production, sewage treatment, energy generation and microbes as bio-control agents and bio-fertilizers. Antibiotics; production and judicious use.

Unit-IX Biotechnology and its Applications

9: Biotechnology - Principles and Processes

Principles, Genetic Engineering (Recombinant DNA Technology) – Tools and processes.

10: Biotechnology and its Applications

Application of biotechnology in health and agriculture: Green revolution and tissue culture; Human insulin and vaccine production, stem cell technology, gene therapy; genetically modified organisms – Bt crops; transgenic animals; biosafety and ethical issues, biopiracy and patents.

Unit-X Ecology and Environment

11: Organisms and Populations

Population interactions - mutualism, competition, predation, parasitism; population attributes - growth, birth rate and death rate, age distribution.

12: Ecosystem

Ecosystems: Patterns, components; productivity and decomposition; energy flow; pyramids of number, biomass, energy.

13: Biodiversity and its Conservation

Biodiversity-Concept, patterns, importance; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Red Data Book, Sacred Groves, biosphere reserves, national parks, wildlife, sanctuaries and Ramsar sites.

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CLASS XI - THEORY

Unit	Title
1	Some Basic Concepts of Chemistry
2	Structure of Atom
3	Classification of Elements and Periodicity in Properties
4	Chemical Bonding and Molecular Structure
5	Chemical Thermodynamics
6	Equilibrium
7	Redox Reactions
8	Organic Chemistry: Some basic Principles and Techniques
9	Hydrocarbons

Unit 1: Some Basic Concepts of Chemistry

General Introduction: Importance and scope of Chemistry, Nature of matter, laws of chemical combination,

Dalton's atomic theory: concept of elements, atoms and molecules, atomic and molecular masses, mole concept and molar mass, percentage composition, empirical and molecular formula, chemical reactions, stoichiometry and calculations based on stoichiometry.

Unit 2: Structure of Atom

Discovery of Electron, Proton and Neutron, atomic number, isotopes and isobars. Thomson's model and its limitations. Rutherford's model and its limitations, Bohr's model and its limitations, concept of shells and subshells, dual nature of matter and light, de Broglie's relationship, Heisenberg uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p and d orbitals, rules for filling electrons in orbitals - Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of atoms, stability of half-filled and completely filled orbitals.

Unit 3: Classification of Elements and Periodicity in Properties

Significance of classification, brief history of the development of periodic table, modern periodic law and the present form of periodic table, periodic trends in properties of elements -atomic radii,

ionic radii, inert gas radii, Ionization enthalpy, electron gain enthalpy, electronegativity, valiancy, Nomenclature of elements with atomic number greater than 100.

s & p Block Elements - Electronic configuration, atomic & Ionic radii, Ionization Enthalpy, Hydration Enthalpy and general trends in physical and chemical properties of s and p block elements across the periods and down the groups; unique behavior of the first element in each group.

Unit 4: Chemical Bonding and Molecular Structure

Valence electrons, ionic bond, covalent bond, bond parameters, Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules, molecular orbital theory of homonuclear diatomic molecules (qualitative idea only), Hydrogen bond.

Unit 5: Chemical Thermodynamics

Concepts of System and types of systems, surroundings, work, heat, energy, extensive and intensive properties, state functions.

First law of thermodynamics - internal energy and enthalpy, heat capacity and specific heat, measurement of ΔU and ΔH, Hess's law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization, solution and dilution.

Second law of Thermodynamics - (brief introduction), Introduction of entropy as a state function, Gibb's energy change for spontaneous and non- spontaneous processes, criteria for equilibrium,

Third law of thermodynamics (brief introduction).

The Gaseous State - Qualitative treatment of Gas laws, Ideal gas equation and deviations from it.

Unit 6: Equilibrium

Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium – Le Chatelier's principle, ionic equilibrium- ionization of acids and bases, strong and weak electrolytes, degree of ionization, ionization of poly basic acids, acid strength, concept of pH, hydrolysis of salts (elementary idea), buffer solution, Henderson Equation, solubility product, common ion effect (with illustrative examples).

Unit 7: Redox Reactions

Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions, in terms of loss and gain of electrons and change in oxidation number, applications of redox reactions.

Unit 8: Organic Chemistry – Some Basic Principles and Techniques

General introduction, methods of purification, qualitative and quantitative analysis, classification and IUPAC nomenclature of organic compounds. Electronic displacements in a covalent bond: inductive effect, electrometric effect, resonance and hyper conjugation. Homolytic and heterolytic fission of a covalent bond: free radicals, carbocations, carbanions, electrophiles and nucleophiles, types of organic reactions.

Unit 9: Hydrocarbons

Aliphatic Hydrocarbons

Alkanes - Nomenclature, isomerism, conformation (ethane only), physical properties, chemical reactions including free radical mechanism of halogenation, combustion and pyrolysis.

Alkenes - Nomenclature, structure of double bond (ethene), geometrical isomerism, physical properties, methods of preparation, chemical reactions: addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition.

Alkynes - Nomenclature, structure of triple bond (ethyne), physical properties, methods of preparation, chemical reactions: acidic character of alkynes, addition reaction of - hydrogen, halogens, hydrogen halides and water.

Aromatic Hydrocarbons

Introduction, IUPAC nomenclature, benzene: resonance, aromaticity, chemical properties: mechanism of electrophilic substitution. Nitration, sulphonation, halogenation, Friedel Craft's alkylation and acylation, directive influence of functional group in mono substituted benzene, carcinogenicity and toxicity

CLASS XII - THEORY

Unit	Title
1	Solutions
2	Electrochemistry
3	Chemical Kinetics
4	d -and f -Block Elements

5	Coordination Compounds
6	Haloalkanes and Haloarenes
7	Alcohols, Phenols and Ethers
8	Aldehydes, Ketones and Carboxylic Acids
9	Amines
10	Biomolecules

Unit 1: Solutions

Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, Raoult's law, colligative properties - relative lowering of vapor pressure, elevation of boiling point, depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, Van't Hoff factor

Unit 2: Electrochemistry

Redox reactions, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells, Relation between Gibbs energy change and EMF of a cell, conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Kohlrausch's Law, electrolysis and law of electrolysis (elementary idea), dry cell-electrolytic cells and Galvanic cells, lead accumulator, fuel cells, corrosion.

Unit 3: Chemical Kinetics

Rate of a reaction (Average and instantaneous), factors affecting rate of reaction: concentration, temperature, catalyst; order and molecularity of a reaction, rate law and specific rate constant, integrated rate equations and half-life (only for zero and first order reactions), concept of collision theory (elementary idea, no mathematical treatment), activation energy, Arrhenius equation.

Unit 4: d and f Block Elements

General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first row transition metals – metallic character, ionization enthalpy, oxidation states, ionic radii, colour, catalytic property, magnetic properties, interstitial compounds, alloy formation, preparation and properties of $K_2Cr_2O_7$ and $KMnO_4$.

Lanthanides - Electronic configuration, oxidation states, chemical reactivity and lanthanide contraction and its consequences.

Actinides - Electronic configuration, oxidation states and comparison with lanthanides.

Unit 5: Coordination Compounds

Coordination compounds - Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds. Bonding, Werner's theory, VBT, and CFT; structure and stereoisomerism, importance of coordination compounds (in qualitative analysis, extraction of metals and biological system).

Unit 6: Haloalkanes and Haloarenes

Haloalkanes: Nomenclature, nature of C–X bond, physical and chemical properties, optical rotation mechanism of substitution reactions.
Haloarenes: Nature of C–X bond, substitution reactions (Directive influence of halogen in monosubstituted compounds only).
Uses and environmental effects of - dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT.

Unit 7: Alcohols, Phenols and Ethers

Alcohols: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only), identification of primary, secondary and tertiary alcohols, mechanism of dehydration, uses with special reference to methanol and ethanol. **Phenols:** Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols.
Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses

Unit 8: Aldehydes, Ketones and Carboxylic Acids

Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes, uses.
Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

Unit 9: Amines

Amines: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines. **Diazonium salts:** Preparation, chemical reactions and importance in synthetic organic chemistry.

Unit 10: Biomolecules

Carbohydrates - Classification (aldoses and ketoses), monosaccahrides (glucose and fructose), D-L configuration oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); Importance of carbohydrates.

Proteins - Elementary idea of - amino acids, peptide bond, polypeptides, proteins, structure of proteins - primary, secondary, tertiary structure and quaternary structures (qualitative idea only), denaturation of proteins; enzymes. Hormones - Elementary idea excluding structure.

Vitamins - Classification and functions.

Nucleic Acids: DNA and RNA.

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SYLLABUS (NEST 2026)
MATHEMATICS
Classes XI - XII

CLASS XI - THEORY

Unit	Title
I.	Sets and Functions
II.	Algebra
III.	Coordinate Geometry
IV.	Calculus
V.	Statistics and Probability

Unit-I: Sets and Functions

1.1. Sets

Sets and their representations, Empty set, Finite and Infinite sets, Equal sets, Subsets, Subsets of a set of real numbers especially intervals (with notations). Universal set. Venn diagrams. Union and Intersection of sets. Difference of sets. Complement of a set. Properties of Complement. Practical problems on Union and Intersection of two sets.

1.2. Relations & Functions

Ordered pairs. Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the set of reals with itself (up to R x R x R). Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special type of relation. Pictorial representation of a function, domain, co-domain and range of a function. Real valued functions, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum, exponential, logarithmic and greatest integer functions, with their graphs. Sum, difference, product and quotients of functions. Composition of Functions

1.3. Trigonometric Functions

Positive and negative angles. Measuring angles in radians and in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of the identity $sin^2x + cos^2x = 1$, for all x. Signs of trigonometric functions. Domain and range of trigonometric functions and their graphs. Expressing

$sin\ (x \pm y)$ and $cos\ (x \pm y)$ in terms of $sinx$, $siny$, $cosx$ & $cosy$ and their simple applications. Deducing identities like the following:

$\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y}, \cot(x \pm y) = \frac{\cot x \mp \cot y}{\cot y \pm \cot x}$

$\sin \alpha \pm \sin \beta = 2 \sin \frac{1}{2}(\alpha \pm \beta) \cos \frac{1}{2}(\alpha \mp \beta)$

$\cos \alpha + \cos \beta = 2 \cos \frac{1}{2}(\alpha + \beta) \cos \frac{1}{2}(\alpha - \beta)$

$\cos \alpha - \cos \beta = -2 \sin \frac{1}{2}(\alpha + \beta) \sin \frac{1}{2}(\alpha - \beta)$

Identities related to $\sin 2x$, $\cos 2x$, $\tan 2x$, $\sin 3x$, $\cos 3x$ and $\tan 3x$. General solution of trigonometric equations of the type $\sin y = \sin a$, $\cos y = \cos a$ and $\tan y = \tan a$.

Unit-II: Algebra

2.1. Principle of Mathematical Induction

Process of the proof by induction, motivating the application of the method by looking at natural numbers as the least inductive subset of real numbers. The principle of mathematical induction and simple applications.

2.2. Complex Numbers and Quadratic Equations

Need for complex numbers, especially $\sqrt{-1}$, to be motivated by inability to solve some of the quadratic equations. Algebraic properties of complex numbers. Argand plane. Polar representation of complex numbers. Statement of Fundamental Theorem of Algebra, solution of quadratic equations (with real coefficients) in the complex number system.

2.3. Linear Inequalities

Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line. Graphical solution of linear inequalities in two variables. Graphical method of finding a solution of system of linear inequalities in two variables.

2.4. Permutations and Combinations

Fundamental principle of counting. Factorial *n.* (n!) Permutations and combinations, derivation of Formulae for ${}^{n}P_{r}$, ${}^{n}C_{r}$ and their connections, simple applications.

2.5. Binomial Theorem

Historical perspective, statement and proof of the binomial theorem for positive integral indices.

Pascal's triangle, simple applications. General and middle term in binomial expansion.

2.6. Sequence and Series

Sequence and Series. Arithmetic Mean (A.M.) Geometric Progression (G.P.), general term of a G.P., sum of *n* terms of a G.P., infinite G.P. and its sum, geometric mean (G.M.), relation between A.M. and G.M

Formulae for the following special sums

$$\sum_{k=1}^{n} k \, , \sum_{k=1}^{n} k^2 \, , \sum_{k=1}^{n} k^3$$

Unit-III: Coordinate Geometry

3.1. Straight Lines

Brief recall of two-dimensional geometry from earlier classes. Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axis, point -slope form, slope-intercept form, two-point form, intercept form. Distance of a point from a line. Normal form. General equation of a line.

3.2. Conic Sections

Sections of a cone: circles, ellipse, parabola, hyperbola, a point, a straight line and a pair of intersecting lines as a degenerated case of a conic section. Standard equations and simple properties of parabola, ellipse and hyperbola. Standard equation of a circle.

3.3. Introduction to Three-dimensional Geometry

Coordinate axes and coordinate planes in three dimensions. Coordinates of a point.

Distance between two points. Section formula.

Unit-IV: Calculus

4.1. Limits and Derivatives

Derivative introduced as rate of change both as that of distance function and geometrically. Intuitive idea of limit. Limits of polynomials and rational functions trigonometric, exponential and logarithmic functions. Definition of derivative relate it to scope of tangent of the curve, derivative of sum, difference, product and quotient of functions of polynomial and trigonometric functions. Derivatives of composite functions (Chain rule).

Unit-V Statistics and Probability

5.1. Statistics

Measures of Dispersion: Range, Mean deviation, variance and standard deviation of ungrouped/grouped data.

5.2. Probability

Events; occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events, Axiomatic (set theoretic) probability, connections with other theories of earlier classes. Probability of an event, probability of 'not', 'and' and 'or' events. Random experiments; outcomes, sample space (set representation).

CLASS XII - THEORY

Unit	Title
I.	Relations and Functions
II.	Algebra
III.	Calculus
IV.	Vectors and Three - Dimensional Geometry
V.	Linear Programming
VI.	Probability

Unit-I: Relations and Functions

1.1. Relations and Functions

Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions.

1.2. Inverse Trigonometric Functions

Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions.

Unit-II: Algebra

2.1. Matrices

Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operations on matrices: Addition and multiplication and multiplication with a scalar. Simple properties of addition, multiplication and scalar multiplication. Non- commutativity of multiplication of matrices and existence of nonzero matrices whose product is the zero matrix (restrict to square matrices of order 2). Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).

2.2. Determinants

Determinant of a square matrix (up to 3 x 3 matrices), minors, co-factors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.

Unit-III: Calculus

3.1. Continuity and Differentiability

Continuity and differentiability, chain rule, derivative of composite functions, derivatives of inverse trigonometric functions like $\sin^{-1} x$, $\cos^{-1} x$ and $\tan^{-1} x$, derivative of implicit functions. Concept of exponential and logarithmic functions. Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives.

3.2. Applications of Derivatives

Applications of derivatives: rate of change of quantities, increasing/decreasing functions, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real- life situations).

3.3. Integrals

Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, Evaluation of simple integrals of the following types and problems based on them.

$$\int \frac{dx}{x^2 \pm a^2}, \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}}, \int \frac{px + q}{ax^2 + bx + c} dx,$$

$$\int \frac{px + q}{\sqrt{ax^2 + bx + c}} dx, \int \sqrt{a^2 \pm x^2}\, dx, \int \sqrt{x^2 - a^2}\, dx, \int \sqrt{ax^2 + bx + c}\, dx$$

Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.

3.4. Application of the Integrals

Applications in finding the area under simple curves, especially lines, circles/ parabolas/ellipses (in standard form only)

3.5. Differential Equations

Definition, order and degree, general and particular solutions of a differential equation. Solution of differential equations by method of separation of variables, solutions of homogeneous differential equations of first order and first degree. Solutions of linear differential equation of the type:

$\frac{dy}{dx} + py = q$, where p and q are functions of x or constants.

$\frac{dx}{dy} + px = q$, where p and q are functions of y or constants.

Unit-IV: Vectors and Three-dimensional Geometry

4.1. Vectors

Vectors and scalars, magnitude and direction of a vector. Direction cosines and direction ratios of a vector. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Definition, Geometrical Interpretation, properties and application of scalar (dot) product of vectors, vector (cross) product of vectors.

4.2. Three-dimensional Geometry

Direction cosines and direction ratios of a line joining two points. Cartesian equation and vector equation of a line, skew lines, shortest distance between two lines. Angle between two lines.

Unit-V: Linear Programming Problem

5.1. Linear Programming

Introduction, related terminology such as constraints, objective function, optimization, graphical method of solution for problems in two variables, feasible and infeasible regions (bounded or unbounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).

Unit-VI: Probability

5.2. Probability

Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem.

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SYLLABUS (NEST 2026)
PHYSICS
Classes XI - XII

CLASS XI – THEORY

1: Units and Measurements

Units of measurement ; Systems of units ; SI units ; Fundamental and derived units ; Significant figures ; Dimensions of physical quantities ; Dimensional analysis and its applications.

2: Motion in a Straight Line

Frame of reference ; Motion in a straight line ; Uniform and non- uniform motion ; Average speed and average velocity and instantaneous velocity ; Uniformly accelerated motion ; Graphical representation of rectilinear motion ; Kinematic relations for uniformly accelerated motion

3: Motion in a Plane

Scalar and vector quantities to describe planar motion ; Unit vectors ; Addition and subtraction of vectors, Resolution of vectors into rectangular components in a plane ; Scalar and Vector product of two vectors.
Motion in a plane with uniform acceleration ; projectile motion ; uniform circular motion.

4: Laws of Motion

Concept of inertia and Newton's first law of motion ; Concept of momentum and Newton's second law of motion ; Impulse ; Newton's third law of motion.

Law of conservation of linear momentum and its applications.

Equilibrium of concurrent forces ; Static and kinetic friction, laws of friction, rolling friction, lubrication.

Dynamics of uniform circular motion: Centripetal and centrifugal forces, common examples of circular motion.

5: Work, Energy and Power

Work done by a constant force and a variable force; kinetic energy, work- energy theorem, power.

Notion of potential energy, example of a spring ; Conservative and non-conservative forces ; Motion in a vertical circle ; Elastic and inelastic collisions in one and two dimensions.

6: Rigid System of Particles and Rotational Motion

Centre of mass of a system of particles ; momentum conservation and Centre of mass motion.

Moment of a force, torque, angular momentum, law of conservation of angular momentum and its applications.

Equilibrium of a rigid body ; Moment of inertia, radius of gyration, moments of inertia for simple geometrical objects.

Comparison of linear and rotational motions.

7: Gravitation

Kepler's laws of planetary motion ; Universal law of gravitation.

Acceleration due to gravity and its variation with altitude and depth.

Gravitational potential energy ; Escape speed ; Orbital velocity and energy of an orbiting satellite.

8: Mechanical Properties of Solids

Elasticity ; Stress-strain relationship ; Hooke's law ; Young’s modulus, bulk modulus, concept of shear modulus of rigidity, Poisson's ratio ; Elastic energy ; Application of elastic behavior of materials (qualitative idea only).

9: Mechanical Properties of Fluids

Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes), effect of gravity on fluid pressure ;

Viscosity : Stokes' law, terminal velocity, streamline and turbulent flow, critical velocity, Bernoulli's theorem and its simple applications (Torricelli's law and Dynamic lift) ;

Surface energy and surface tension, angle of contact, excess of pressure across a curved surface, application of surface tension in understanding droplets, bubbles and capillary rise.

10: Thermal Properties of Matter

Heat, temperature, thermal expansion of solids, liquids and gases ; anomalous expansion of water ; specific heat capacity : Cp, Cv – calorimetry ; change of state - latent heat capacity

Heat transfer : conduction, convection and radiation, thermal conductivity, qualitative ideas of Blackbody radiation : Wein's displacement Law , Stefan's law ; Newton's law of cooling.

11: Thermodynamics

Thermal equilibrium ; zeroth law of thermodynamics ; Heat, work and internal energy;

First law of thermodynamics ; Thermodynamic state variable and equation of state ;

Thermodynamic processes : isothermal, adiabatic, reversible, irreversible, and cyclic processes ; Second law of thermodynamics ; Carnot engine.

12: Kinetic Theory of gases

Equation of state of ideal gas, work done in compressing a gas.

Kinetic theory of an ideal gas - assumptions, concept of pressure ; Kinetic interpretation of temperature ; rms speed of gas molecules ; degrees of freedom, law of equi-partition of energy (statement only) and application to specific heat capacities of gases ; concept of mean free path ; Avogadro's number.

13: Oscillations

Periodic motion - time period, frequency, displacement as a function of time, periodic functions and their applications.
Simple harmonic motion (S.H.M) : velocity, acceleration ; uniform circular motion and its equations of motion ; Concept of phase ; Energy in S.H.M. :, kinetic and potential energies ; Simple pendulum : derivation of expression for its time period ; Oscillations of a loaded spring.

14: Waves

Wave motion: Transverse and longitudinal waves ; speed of a traveling wave ; displacement relation for a progressive wave ; principle of superposition of waves ; reflection of waves ; standing waves in strings and organ pipes, fundamental mode and harmonics ; Beats.

CLASS XII – THEORY

1: Electric Charges and Fields

Electric charges ; Conductors and Insulators ; Coulomb's law - force between two- point charges, forces between multiple charges ; superposition principle and continuous charge distribution

Electric field, electric field lines, electric dipole, electric field due to a dipole, torque on a dipole in uniform electric field ;

Electric flux, statement of Gauss's theorem and its applications to find field due to charged objects ;

2: Electrostatic Potential and Capacitance

Electric potential, potential difference ; electric potential due to : a point charge, a dipole and system of charges ; Equipotential surfaces ; electrical potential energy of a system of charges and electric dipole in electrostatic field.

Conductors and insulators ; Electrostatics of conductor ;

Dielectrics and electric polarization ; Capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor

3: Current Electricity

Electric current : flow of electric charges in a metallic conductor ; drift velocity, mobility and their relation with electric current ; Ohm's law ; V-I characteristics (linear and non-linear) ; electrical energy and power ; electrical resistivity and conductivity ; temperature dependence of resistance ; Cells : Internal resistance, potential difference and emf, combination of cells in series and in parallel ; Kirchhoff's rules ; Wheatstone bridge.

4: Moving Charges and Magnetism

Concept of magnetic field ; Oersted's experiment ; Biot - Savart law and its application ; Ampere's law and its applications; Straight solenoid ; Force on a moving charge in uniform magnetic and electric fields.

Force on a current-carrying conductor in a uniform magnetic field, force between two parallel current-carrying conductors-definition of ampere ; Torque experienced by a current loop in uniform magnetic field ; Current loop as a magnetic dipole and its magnetic dipole moment ; Moving coil galvanometer- its current sensitivity and conversion to ammeter and voltmeter.

5: Magnetism and Matter

Bar magnet ; Magnetism and Gauss’s Law ; Magnetisation and Magnetic Intensity ; Torque on a magnetic dipole (bar magnet) in a uniform magnetic field, Magnetic field lines.

Magnetic properties of materials- Para-, dia- and ferro- magnetic substances ;

Effect of temperature on magnetic properties.

6: Electromagnetic Induction

Electromagnetic induction ; Faraday's laws, induced EMF and current ; Lenz's Law, Self and mutual induction.

7: Alternating Current

Alternating currents, peak and RMS value of alternating current/voltage; Representation of AC current and voltage by rotating Vectors — Phasors ; AC voltage applied to resistor(R), inductor(L), capacitor(C) ; reactance and impedance ; AC current and voltage in LR, LC, LCR series circuits ; Resonance ; Power in AC circuits, power factor, wattless current. AC generator, Transformer.

8: Electromagnetic Waves

Displacement current, Electromagnetic waves.

Electromagnetic spectrum : Elementary facts (frequency range, sources and use) about radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays.

9: Ray Optics

Reflection of light, spherical mirrors, mirror formula ; Refraction of light, total internal reflection and optical fibers, refraction at spherical surfaces, lenses, thin lens formula, lens maker’s formula, magnification, power of a lens, combination of thin lenses in contact ; Refraction of light through a prism.

10: Wave Optics

Wave front and Huygen’s principle : Reflection and refraction of plane wave at a plane surface using wave fronts, Proof of laws of reflection and refraction using Huygen’s principle ; Interference : Young's double slit experiment, coherent sources and sustained interference of light, diffraction due to a single slit.

11: Dual Nature of Radiation and Matter

Dual nature of radiation ; Photoelectric effect, Hertz and Lenard's observations ;
Einstein's photoelectric equation : energy quantum of radiation ;
Experimental study of photoelectric effect ;
Wave nature of particles : de-Broglie relation.

12: Atoms

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom, Expression for radius of nth possible orbit, velocity and energy of electron in nth orbit, hydrogen line spectra.

13: Nuclei

Atomic masses and composition and size of nucleus ; nuclear force ;

Mass-energy relation, mass defect ; binding energy per nucleon and its variation with mass number; nuclear fission, nuclear fusion.

14: Semiconductor Electronics: Materials, Devices and Simple Circuits

Classification of Metals, Conductors and Semiconductors ;
Intrinsic and extrinsic semiconductors- p and n type, p-n junction ;
Semiconductor diode - I-V characteristics in forward and reverse bias, application of junction diode -diode as a rectifier.

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