

Joint Admission Test for M.Sc. 2013

J A M - 2013

To be held on Sunday, 10 February, 2013

Admission to Integrated Ph.D. Programmes
at
INDIAN INSTITUTE OF SCIENCE, BANGALORE
and

M.Sc. (Two Year), Joint M.Sc. - Ph.D., M.Sc. - Ph.D. Dual Degree,
and other Post - Bachelor's Degree Programmes
at

INDIAN INSTITUTES OF TECHNOLOGY

- BOMBAY • DELHI • GUWAHATI • KANPUR • KHARAGPUR
- MADRAS • ROORKEE • BHUBANESWAR • GANDHINAGAR
- HYDERABAD • INDORE

Information Brochure



Organising Institute
Indian Institute of Technology Delhi
Hauz Khas, New Delhi - 110 016

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JAM 2013: What's New?

- JAM 2013 includes the Integrated Ph.D. Programmes at the Indian Institute of Science (IISc), Bangalore.
- There will be a new JAM test paper on Biological Sciences.
- No application fee for female candidates.
- Non programmable calculator is allowed.
- Interview may be conducted for admission to some of the programmes at IISc, Bangalore, IITB and IITK.

1. INTRODUCTION

The Indian Institutes of Technology (IITs) are institutions of national importance established through an Act of Parliament. The Indian Institute of Science (IISc) is a premier research and teaching institute established in 1909. The IISc, Bangalore & IITs are well known, the world over, for quality education in engineering, science, management and research in frontier areas. The aim of the IISc, Bangalore & IITs is to build a sound foundation of knowledge, pursue excellence and enhance creativity in an intellectually stimulating environment. The current pace of advancement of technology needs a coherent back up of basic science, education and research. The vibrant academic ambience and research infrastructure of IISc, Bangalore & IITs motivate the students to pursue Research and Development careers in frontier areas of basic sciences as well as interdisciplinary areas of science and technology. Further, IISc, Bangalore & IITs have well equipped modern laboratories, efficient computer networks and state-of-the-art libraries. The teaching process is structured to promote close and continuous contact between the faculty and the students. A number of financial assistantships are available to SC/ST and other deserving and meritorious students at individual institutes.

From the Academic Session 2004-05, Indian Institutes of Technology have started conducting a **Joint Admission Test for M.Sc. (JAM)**. The objective of JAM is to provide admissions to M.Sc. (Two Year), Joint M.Sc.-Ph.D., M.Sc.-Ph.D. Dual Degree and other Post-Bachelor's Degree programmes at the IITs and to the Integrated Ph.D. programmes at IISc and to consolidate Science as a career option for bright students from across the country. JAM is expected to serve as a benchmark for undergraduate level science education in the country. IISc is joining the JAM for the first time this year to select candidates to its Integrated Ph.D. Programmes. The integrated Ph.D. Programmes at IISc was started in the early 90's to enable students to directly join for a Ph.D. degree after their B.Sc. Degree.

The M.Sc. (Two Year), Joint M.Sc.-Ph.D, M.Sc.-Ph.D. Dual Degree and other post-bachelor's degree programmes at the IITs and the integrated Ph.D. programmes at IISc offer high quality education in their respective disciplines, comparable to the best in the world. The curricula for these programmes are designed to provide the students with opportunities to develop academic talent leading to challenging and rewarding professional life. The curricula are regularly updated at IISc, Bangalore & IITs. The interdisciplinary content of the curricula equips the students with the ability to utilize scientific knowledge for practical applications. The medium of instruction in all the programmes is English.

2. GENERAL INFORMATION

- (i) The JAM 2013 is open to all nationals (Indian / Foreign). Candidates seeking admission to academic

programmes covered under JAM 2013 need to appear in JAM 2013. There is no age restriction.

- (ii) **The JAM 2013 will be held on 10 February, 2013.**
- (iii) For admission, foreign nationals are required to satisfy the rules and regulations of the admitting Institute(s) pertaining to foreign students. For further details, they are advised to contact the concerned Admitting Institute(s).
- (iv) To apply for admission in a desired programme, a candidate is required to qualify in the corresponding test paper and also satisfy the minimum educational qualifications and eligibility criteria of the respective academic programme.
- (v) The candidates who have either appeared or are due to appear in the final examination of their qualifying degree in 2013 are eligible to appear in the test. By qualifying in JAM 2013, candidates can apply for provisional admission subject to the condition that: (i) All parts of their final examination shall be completed by the date of registration of the Admitting Institute, and (ii) Proof of having passed the qualifying degree with required eligibility, as specified by the admitting institute will be submitted by 30 September, 2013 as per the regulations prevailing in the admitting institutes.
- (vi) Admissions to various academic programmes at different institutes will be made on the basis of merit in JAM 2013. On the basis of performance in the test, for each test paper, separate merit lists will be prepared for General, OBC (non-creamy layer), SC, ST and Persons with Disability (PD) category candidates.
- (vii) For admission to Integrated Ph.D. programme at IISc, Bangalore, M.Sc.-Ph.D. Dual Degree programme at IIT Bombay and M.Sc.-Ph.D. Dual Degree programme in Physics at IIT Kanpur, the JAM-2013 qualified candidates are required to refer to the admissions website of the respective institute for details including the dates for interview.
- (viii) Request for the change of category, if any, with proper documentation, should reach the Organising Institute by **6 December, 2012**. Requests received after this date will not be accepted under any circumstances.
- (ix) **Candidates should note that mere appearance in JAM 2013 or being in the merit list of any test paper neither guarantees nor provides any automatic entitlement to admission.** Qualified candidates will have to apply for admission as per the prescribed procedure. Admissions shall be made in order of merit and depending on the number of seats available at the Admitting Institute(s).
- (x) With regard to the interpretation of the provisions of any matter not covered in this Information Brochure, the decision of the Organising Institute shall be final and binding on all the parties concerned.

3. ACADEMIC PROGRAMMES

The following are the full-time M.Sc. (Two Year), Joint M.Sc.-Ph.D., M.Sc.-Ph.D. Dual Degree and other post-bachelor's degree programmes at different IITs and Integrated Ph.D. programmes at IISc to which admissions shall be made on the basis of JAM 2013.

Indian Institute of Science, Bangalore (IISc): Integrated Ph.D. programmes in Biological Sciences, Chemical Sciences, Mathematical Sciences and Physical Sciences.

IIT Bombay (IITB): Two-year Master of Science (M.Sc.) programmes in (i) Applied Geology (ii) Applied Geophysics (iii) Applied Statistics and Informatics (iv) Biotechnology (v) Chemistry (vi) Mathematics and (vii) Physics.

Four-year Dual Degree Programme in M.Sc. (Physics)-M.Tech. (Materials Science) with specialization in Nano-Science and Technology.

M.Sc.-Ph.D. Dual Degree programmes in (i) Applied Geology (ii) Applied Geophysics (iii) Biotechnology (iv) Chemistry (v) Energy (vi) Environmental Science and Engineering (vii) Operations Research and (viii) Physics. Both the degrees will be awarded together after the successful completion of the programmes.

IIT Delhi (IITD): Two-year Master of Science (M.Sc.) programmes in (i) Chemistry (ii) Mathematics and (iii) Physics.

IIT Guwahati (IITG): Two-year Master of Science (M.Sc.) programmes in (i) Chemistry (ii) Mathematics and Computing and (iii) Physics.

IIT Kanpur (IITK): Two-year Master of Science (M.Sc.) programmes in (i) Chemistry (ii) Mathematics (iii) Physics and (iv) Statistics.

M.Sc.-Ph.D. Dual Degree programme in Physics (Transfer from M.Sc.-Ph.D. Dual Degree programme to M.Sc. Physics programme is not permitted. However, for the students admitted to the M.Sc.-Ph.D. Dual Degree programme, the M.Sc. degree will be given after successful completion of all academic requirements of the first six semesters while working towards Ph.D. degree).

IIT Kharagpur (IITKgp): Joint M.Sc.-Ph.D. programmes in (i) Chemistry (ii) Geology (iii) Mathematics and (iv) Physics.

IIT Madras (IITM): Two-year Master of Science (M.Sc.) programmes in (i) Chemistry (ii) Mathematics and (iii) Physics.

IIT Roorkee (IITR): Two-year Master of Science (M.Sc.) programmes in (i) Applied Geology (ii) Applied Mathematics (iii) Biotechnology (iv) Chemistry (v) Industrial Mathematics and Informatics and (vi) Physics.

Three-year Master of Technology (M.Tech.) programmes (Lateral entry at 3rd Year level in the Integrated M.Tech. programmes) in (i) Geological Technology and (ii) Geophysical Technology.

Three-year Interdisciplinary Master of Computer Applications (MCA) programme.

IIT Bhubaneswar (IITBBS): Joint M.Sc.-Ph.D. Programme in (i) Chemistry (ii) Geology (iii) Mathematics and (iv) Physics.

IIT Gandhinagar (IITGN): Two-year Master of Science (M.Sc.) programmes in (i) Chemistry and (ii) Mathematics.

IIT Hyderabad (IITH): Two-year Master of Science (M.Sc.) programmes in (i) Chemistry (ii) Mathematics and (iii) Physics.

IIT Indore (IITI): Two-year Master of Science (M.Sc.) programmes in (i) Chemistry and (ii) Physics.

The academic programmes, their durations and number of seats available in different institutes with programme codes are listed in Appendix-I.

4. MINIMUM EDUCATIONAL QUALIFICATIONS FOR ADMISSION / TEST PAPERS FOR ACADEMIC PROGRAMMES

Minimum educational qualifications for admissions, name of the test papers with their codes and the corresponding academic programmes for admission are given in Appendix-II. Admission to each academic programme shall be made on the basis of merit in the corresponding test paper(s) of JAM 2013.

5. ELIGIBILITY REQUIREMENTS FOR ADMISSION

The candidates who qualify in JAM 2013 shall have to fulfill the following eligibility criteria for admissions in IISc, Bangalore & IITs.

(i) **For IISc, Bangalore:** First class marks (as declared by the university) for General/OBC category candidates and at least second class or 50% **aggregate** marks for SC and ST category candidates in the qualifying degree.

(ii) **For IITs:** At least **55% aggregate** marks (taking into account all subjects, including languages and subsidiaries, all years combined) for General/OBC category candidates and at least **50% aggregate** marks (taking into account all subjects, including languages and subsidiaries, all years combined) for SC, ST and PD category candidates in the qualifying degree.

For candidates with letter grades/CGPA (instead of percentage of marks), the equivalence in percentage of marks will be decided by the Admitting Institute(s).

(iii) Proof of having passed the qualifying degree with the minimum educational qualifications as specified by the admitting institute should be submitted by **30 September, 2013**.

At the time of admission, all admitted candidates will have to submit a physical fitness certificate from a registered medical practitioner in the prescribed form. At the time of registration, the admitted candidates may also have to undergo a physical fitness test by a medical board constituted by the Admitting Institute. In case a candidate is not found physically fit to pursue his/her chosen course of study, his/her admission is liable to be cancelled.

Note :

(a) It will entirely be the responsibility of the candidate to prove that he/she satisfies the minimum educational qualifications and eligibility requirements for admissions.

(b) The admitting institute has the right to cancel, at any stage, the admission of a candidate who is found to have been admitted to a course to which he/she is not entitled, being unqualified or ineligible in accordance with the rules and regulations in force.

6. PATTERN OF TEST PAPERS

The questions for Biological Sciences (BL), Biotechnology (BT) and Computer Applications (CA) test papers will be fully objective type. There will be **negative** marking for wrong answers to the **objective type questions** in BL, BT and CA **test papers**. Candidates will get **negative** 1/3 for a wrong answer. **These test papers have to be answered in an Objective Response Sheet (ORS) by darkening appropriate bubbles using a black ink ball point pen.** Since the ORS will be evaluated by electronic means, it is imperative that the instructions given on the ORS are carefully read and followed by the candidates.

All other test papers will be objective-cum-descriptive type. There will be a “question-cum-answer booklet” for each of these six test papers. Answers to various questions are to be given at appropriate places in the “question-cum-answer booklet” itself. No supplementary sheet will be provided. Each of these six test papers will have multiple choice type questions(MCQ), fill-in-blank type questions, and descriptive type questions, carrying weightages of 20%, 30% and 50%, respectively. The objective type questions in these test papers will have four choices as possible answers, of which, only **one** will be correct. There will be **negative** marking for wrong answers to the **objective type questions**. Each objective type question carries 02 marks for a correct answer and **negative** 0.50 marks for a wrong answer. There will be no negative marking for fill-in-the-blank type questions.

Note :

- (a) **Use of any kind of cellular phone/ electronic gadgets (other than non-programmable calculator) is NOT permitted in the examination hall.**
- (b) Use of calculator (non programmable) is permitted.
- (c) All answers to the subjective type questions must be written in blue/ black/ blue-black ink only. Sketch pen, pencil or ink of any other colour is not permitted.
- (d) The medium for all the test papers will be English only.
- (e) Use of unfair means by a candidate in JAM 2013, whether detected at the time of test, evaluation or at any other stage, will lead to cancellation of his/her candidature as well as disqualification of the candidate from appearing in JAM in future.
- (f) Disclosure of identity in any form, such as writing registration number or name inside the question-cum-answer booklet, or making any kind of distinguishing marks, may lead to disqualification of the candidate.

7. TEST SCHEDULE

The JAM 2013 exam will be held on **10 February, 2013 (Sunday)** in two sessions. The schedule for different test papers of JAM 2013 is given in Table 1.

Table 1: Test schedule for JAM 2013

Date	Session	Time	Test Paper Codes
10 February 2013 (Sunday)	I	9:00 a.m.- 12:00 noon	BL/CA/CY/ GP/MS
	II	2:00 p.m.- 5:00 p.m.	BT/GG/ MA/PH

The test schedule will not be changed under any circumstances.

7.1. Number of test papers allowed: A candidate can appear in either one or two test papers, subject to the restrictions imposed by the Test schedule (Table 1) and on payment of requisite additional fee for the second test paper, as applicable. Candidates desiring to appear in two test papers must ensure, from the Test schedule (Table 1), that there is no clash of time schedule for the chosen test papers.

8. CHOICE OF EXAMINATION CENTRES

The locations of examination cities/towns for JAM 2013 are listed in **Appendix-III**. Candidate must indicate the codes of two cities where he/she is willing to appear in JAM 2013. If enough candidates are not available at a listed city/town,

then the city/town may be dropped from the list, and candidates will either be allotted a centre in the city of their second choice or in a city near the city of first choice.

A centre once allotted will not normally be changed. A request for change of a centre within the same city/town will **not** be permitted. In exceptional circumstances, a change of centre to another city/town may be permitted if a request with a valid reason for the same is received in the office of the Organising Chairman, JAM 2013, IIT Delhi, Hauz Khas, New Delhi-110016, on or before **30th November, 2012** along with a Demand Draft of Rs. 250/- (Rs.125/- for SC/ST and PD candidates) drawn in favour of “**Chairman JAM, IIT Delhi**”, from any Nationalized Bank, payable at Delhi. The decision of the Organising Chairman JAM 2013, in this regard will be final.

9. RESERVED SEATS

In every programme, a certain number of seats are reserved for candidates belonging to various reserved categories. The number of seats reserved under various categories is given in **Appendix-I**. The category rank in a JAM paper will be prepared based on the category declaration by the candidate in his/her application form. The final seat allotment will be done based on a valid category certificate (in the prescribed format) submitted along with the application form for admission.

A candidate who seeks admission under SC/ST/OBC category must submit, along with the application form for admission, the requisite certificate issued by a competent authority as specified in **Appendix-IV**, failing which his/her candidature for admission will not be considered under the reserved category.

A candidate who seeks admission under the OBC category must submit an OBC certificate in the format shown in **Appendix-V** along with the application form for admission. **The candidate will be considered in the General Category in case of non-compliance of OBC (non-creamy layer) certificate with the prescribed format and no opportunity will be given to the candidate for late submission under any circumstances.**

For PD candidates with any category of disability (viz., blindness or low vision, hearing impairment, locomotor disability or cerebral palsy), benefit will be given to only those who have at least 40% permanent physical impairment in relation to a body part/system/extremity/ whole body, etc. Such candidates must submit, along with the Application Form, the certificate of disability from a Government Medical Board and should be fit to pursue the programme. The percentage of disability of candidates selected for admission under PD category will also be required to be certified by a Medical Board, duly constituted by the Admitting Institute.

Note :

- (a) The provisions for the reserved seats given above are subject to modification in accordance with any Government order, if issued subsequently by the Government of India.
- (b) It will entirely be the responsibility of a candidate to prove his/her eligibility for admission in terms of minimum educational qualifications, etc., and for claiming reservation under a specific category.

10. APPLICATION PROCEDURE FOR JAM 2013

Candidates may apply for JAM 2013 through an “offline” procedure or an “online” procedure. Details of the application fee for different categories are given in Table 2.

10.1 Offline Procedure: The “OMR (Optical Mark Recognition) Application Form” along with the “Information Brochure” will be available from **20 September, 2012 to 20 October, 2012** on **cash payment** of application fee of Rs. 1200/- for General/OBC category male candidates, Rs. 600/- for SC/ST and PD category male candidates from the designated branches of **Canara Bank as given below.**

Agra (Cantonment), **Ahmedabad** (Revdi Bazar), **Aligarh** (Apsara Complex), **Allahabad** (Civil Lines), **Amritsar** (Dharam Singh Market), **Bareilly** (Civil Lines), **Bengaluru** (Town Hall), **Bhopal** (Maharana Pratap Nagar), **Bhubaneswar** (Bapuji Nagar), **Chandigarh** (Sector 17 C), **Chennai** (IIT Campus and T. Nagar), **Coimbatore** (Oppannakara Street), **Dehradun** (Clock Tower, Rajpur Road), **Delhi** (IIT Campus, Janpath, Maharani Bagh and Vivek Vihar), **Dhanbad** (New Market Bank More), **Durgapur** (RH Benachitty), **Ernakulam** (Nettipadam Road), **Faridabad** (New Industrial Town), **Goa** (F.L.Gomes Road, Vasco), **Gorakhpur** (Bank Road), **Gurgaon** (Alwar Road), **Guwahati** (Fancy Bazar), **Haldwani** (Bareilly Road), **Haridwar** (Railway Road), **Hubli** (Billappanavar Nagar), **Hyderabad** (Abid Road), **Indore** (MG Road), **Jabalpur** (M.K. Chowk), **Jaipur** (Ajmeri Gate), **Jammu** (Shalimar Road), **Jamshedpur** (Loyola School, Bistupur), **Jhansi** (Civil Lines), **Jodhpur** (12th Chopasani Road), **Jorhat** (Garali), **Kadapa** (Chinna Chowk), **Kakinada** (Jawahar Street), **Kanpur** (Mall Road), **Kharagpur** (Fatak Bazar, Kharida), **Kochi** (Mattanchery), **Kolkata** (College Street and Gariahat Road, Gole Park), **Kozhikode** (Cherooty Road), **Kuruksheetra** (Railway Road), **Lucknow** (Hazratganj), **Madurai** (Eastmasi Street), **Mangalore** (Balmatta Road), **Meerut** (Abu Lane), **Mumbai** (IIT Campus and Opp. Fort Market), **Muzzafarpur** (Motijheel), **Nagpur** (Sitabuldi), **Nanded** (Tara Singh Market), **Nellore** (Jonagaddavari Street), **Noida** (Sector VI, Noida Complex), **Patna** (Exhibition Road), **Pune** (Camp), **Raipur** (Malviya Road), **Ranchi** (SN Ganguli Road), **Rishikesh** (Adarsh Nagar, Dehradun Road), **Roorkee** (Anaj Mandi), **Rourkela** (Uditnagar), **Saharanpur** (Court Road), **Secunderabad** (MG Road), **Shillong** (Gulasta Fancy Market), **Shimla** (The Mall), **Silchar** (Rangerkhiri), **Siliguri** (Sevoke Road), **Srinagar** (Agarwal Complex Gola Bazar, Pauri Garhwal), **Thiruvananthapuram** (MG Road, Spencer Junction), **Tiruchirapalli** (Teppakulam), **Vadodara** (Manick Rao Road), **Varanasi** (Bansphatak), **Vijayawada** (Sivalayam Street), **Visakhapatnam** (Daba Gardens).

Female candidates are exempted from payment of the application fee. They can obtain the Application Form from the designated Canara Bank counters by submitting a self attested photocopy of University/ College/Institute Identity card and pre-final year/final year mark-sheet or degree certificate.

The OMR Application Form enclosed in the envelope provided with the Information Brochure is to be completed by the candidate in all respects. After reading the instructions given in **Section 12**, carefully fill in all the items of the form. **Fold the form only where it was originally folded.** Also write the code(s) of the test paper(s) applied, and the first/second choice of city /town of test on the envelope.

Candidates desiring to appear for a second test paper must clearly mention their option in the OMR Application Form. Such candidates are required to pay **an additional fee** of Rs. 300/- (Rs. 150/- for SC/ST and PD candidates) through a demand draft in favour of “**Chairman JAM, IIT Delhi**”, from any Nationalized Bank, payable at **Delhi**. This demand draft is to be sent along with the OMR Application Form. **Female candidates are not required to pay any additional fee** if they desire to appear for a second test paper. The last date of receipt of completed application form along with application fee (where applicable) is **30 October, 2012 at JAM office IIT Delhi.**

10.2 Online Procedure: The facility for Online Registration will be available through the website <http://gate.iitd.ac.in/jam> from **20 September, 2012**. The last date for submission of Online Application Form on website is **23 October, 2012 at 18:00 hrs**. A candidate can fill in electronically his/her personal data and the appropriate application fee can be paid by a Demand Draft drawn in favour of “**Chairman JAM, IIT Delhi**”, from any **Nationalized Bank**, payable at **Delhi**.

After electronically filling his/her personal data and information pertaining to the Demand Draft in the Online Application Form on the website, the candidate can download this form and take a print out of the same. The photograph, declaration and signature will have to be provided by the candidate on the printed Online Application Form. The photograph should be glued at the appropriate place provided in the form and must not be stapled and not be signed/attested. **The candidate must write his/her name and application form number at the reverse-side of photograph.** The candidate is advised to keep a photocopy of the completed Online Application Form for his/her record.

10.3 List of enclosures and address for sending the completed OMR Application Form/Online Application Form: The following documents should be enclosed along with the completed OMR Application Form: (i) Bank Pay-in-slip, (ii) Demand Draft for additional fee for the second test paper, if applicable, (iii) Self attested SC/ST Certificate (copy), if applicable, and (iv) Self attested Physical Disability Certificate (copy), if applicable.

The following documents should be enclosed along with the completed Online Application Form: (i) Demand Draft / bank pay-in-slip for the application fee, (ii) Self attested SC/ST Certificate (copy), if applicable, and (iii) Self attested Physical Disability Certificate (copy), if applicable.

Male candidates are required to write their name and application number on the back of the Demand Draft for the application fee/fee for second test paper.

Irrespective of the choice of the test centres, candidate must send the duly filled in OMR Application Form or completed Online Application Form, as the case may be, along with all necessary enclosures indicated above, to the following address:

**Organising Chairman, JAM 2013
GATE/JAM Office, Block-I, IIT Delhi,
Hauz Khas, New Delhi-110 016**

The candidates are advised to send their completed OMR Application Forms/Online Application Forms by **Speed Post/Registered Post only** and retain the receipt of posting.

10.4 Last Date for Receipt of the Completed OMR Application Form/Online Application Form: The last date for receipt of the duly completed OMR Application Form/Online Application Form at the JAM Office, IIT Delhi, is **30 October, 2012**. Any OMR Application Form/Online Application Form received after this date will not be accepted. Any delay in receiving the application material by the candidate will not be considered as a valid reason for the late submission of the completed OMR Application Form/Online Application Form after the deadline. The organising institute is not responsible for any postal delay or irregularity or loss in postal transit.

Table 2: Application Fee for male candidates

Category	Fee for offline application form from Canara Banks [#]		Fee for online application [§]	
	Only one Test Paper	Two Test Papers	Only one Test Paper	Two Test Papers
General/OBC	Rs.1200/-	Rs.1200/- + DD for Rs.300/-	Rs.1100/-	Rs.1400/-
SC/ ST/ PD	Rs.600/-	Rs.600/- + DD for 150/-	Rs.500/-	Rs.650/-
NO APPLICATION FEE FOR FEMALE CANDIDATES				

[#] Through Bank pay-in-slip on cash payment at designated Canara bank branches.

[§] Through Demand Draft in favour of "Chairman JAM, IIT Delhi" payable at Delhi.

Note :

1. There is no application fee for female candidates (Application fee, if paid will not be refunded in any case).
2. If a male candidate fills up the offline form designated for female candidates, it will be rejected without any intimation.

11. ADMIT CARD

An Admit Card, bearing the candidate's name, registration number, photograph, signature, category as declared by the candidate, disability status and name(s) and code(s) of the test paper(s) applied along with the name and address of the test centre allotted, will be sent by speed/registered post ONLY to the mailing address given by the candidate in his/her OMR Application Form/Online Application Form. The candidate should carefully examine the Admit Card received by him/her for all the entries made therein. In case of any discrepancy, the candidate should inform the Organising Chairman, JAM 2013, IIT Delhi immediately. Admit cards will also be available online through the website <http://gate.iitd.ac.in/jam>

If Admit Card is not received by **21 January, 2013**, and if the candidate is not able to download the online admit card, then the Chairman JAM of the respective IISc/IITs (see **Appendix-III**), under which the first choice test centre of the candidate falls, may be contacted through Phone/Fax/E-mail, giving the Application Form Number/Online Application Number, name, mailing address and city code of the desired test centre (first choice) to get information about registration number and name of the test centre allotted. Those candidates who have not received their Admit Card, due to postal delay or any other reason, will be issued a Duplicate Admit Card by the Presiding Officer of their respective Test centres, on the date of examination, **10**

February, 2013 (one hour before the examination), on production of a photograph identical to that pasted on the Offline/Online Application Form and the Identity Card from the institution last attended (bring original Identity Card and its photocopy).

No candidate will be permitted to appear in JAM 2013 test without a valid Admit Card. The Admit Card should be presented to the invigilators/JAM officials for verification.

The Admit Card of JAM 2013 must be carefully preserved by the candidate and produced at the time of admission/registration, if required by the Admitting Institute.

The Organising Institute will not be responsible for any postal delay or irregularity resulting in non/late delivery of the Admit Card. A plea that the candidate failed to appear in JAM 2013 due to non-receipt of the Admit Card will not be accepted as a reason for the refund of application fee or any other redressal.

The Organising Institute may withdraw the permission granted to a candidate to appear in JAM 2013, if it is found that he/she is not eligible to appear in the Test even though an Admit Card has been issued and is produced by the candidate before the Presiding Officer of the test centre.

12. INSTRUCTIONS FOR FILLING THE OMR APPLICATION FORM

Read the following instructions carefully and follow the SAMPLE filled-in OMR Application Form on Page Nos. 13 and 14.

- (i) Note down the OMR Application Form number and keep a photocopy of the completely filled-in form as a personal record for future reference.
- (ii) The OMR Application Form will be processed by a machine, which picks up only black ink pen marks. The signature and address will be scanned by a machine that reads only dark black images and only from the specified areas of the form. Ensure that you use Black Ink Ball Point Pen to fill the boxes and **use the HB pencil to fill the bubbles wherever applicable**. The colour photograph must be of good quality and taken not more than two months earlier.
- (iii) Fill the form in English only. First, write in capital letters the required information in the boxes above the bubbles (wherever provided), and then darken the appropriate bubble underneath each letter. **Darken the bubbles by using a HB pencil only.**
- (iv) Options filled in this form cannot be changed at a later stage.
- (v) The name and date of birth should be exactly the same as recorded in the High School (10th Class) Certificate. Any departure, whenever discovered, may lead to cancellation of candidature.
- (vi) If any change of name has been accepted by the government, a copy of the gazette notification has to be attached.
- (vii) The application must be complete in all respects. Incomplete Application Forms will be summarily rejected.

You may now proceed to fill the OMR Application Form for the item numbers as given below:

Item 1: Name of the Candidate

Fill in the name in CAPITAL letters using a black ink ball-point pen, as recorded in High School (10th Class) Certificate. Write a single letter in each box. Do not leave

any blank box within any part of the name. Leave only one blank box between any two parts of the name. If the name has several initials, leave one blank after each of them. Darken the appropriate bubble under each letter of the name using a HB pencil. *Any change in name/ surname at any stage has to be duly supported by a proper affidavit.*

Item 2: Nationality

Darken the appropriate bubble corresponding to INDIAN or FOREIGNER.

Item 3: Gender

Darken the appropriate bubble for MALE or FEMALE.

Item 4: Category

Darken the appropriate bubble: GEN for General Category, OBC for Other Backward Classes (non creamy layer), SC for Schedule Caste, ST for Schedule Tribe.

Item 5: Date of Birth

Fill in your date of birth as given in your High School (Class 10th) certificate in the space provided and darken the appropriate bubbles.

Example: if the date of birth is 17 September 1989, fill in

D	D	M	M	Y	Y
1	7	0	9	8	9

Item 6: Person with Disability (PD)

Darken the appropriate bubble, YES or NO

PD candidates claiming concession for buying the Application Form must attach a duly self attested copy of Physical Disability Certificate (PD) issued by an appropriate medical authority.

If any PD candidate requires the services of a scribe, darken the bubble YES. Otherwise, darken the bubble NO. Requests for scribe received at a later date may not be considered. The role of the scribe will be to read the question paper for the candidate and darken the bubbles/write the answer as per the instructions of the candidate.

Item 7: Number of the Test Paper(s) Applied for

The total number of Test Paper(s) (1 or 2) the candidate wishes to appear must be entered in the box provided and the appropriate bubble must be darkened.

Item 8: Choice of Test Paper(s)

Depending on the number of test papers mentioned in Item 7, darken one or two bubble(s) shown against the choice(s) of test paper(s). If only one test paper scheduled in Session I (or Session II) is chosen, then all the bubbles shown against Session II (or Session I) must be left blank. If two test papers are chosen, it must be ensured that they are **not scheduled in the same session** and that one bubble shown against each session is darkened.

Item 9: Choice of Cities/Towns for the Test

A candidate must choose any two cities/towns for the test from the list of cities/towns of JAM 2013 centres given in **Appendix-III**. Write the codes (see Appendix-III) of FIRST Choice and SECOND Choice for the test city/town in the corresponding boxes and darken the appropriate bubbles.

Item 10: Name of the Qualifying Degree

Darken the bubble shown against the qualifying degree. If the qualifying degree is other than B.A., B.Sc., B.Sc.(Agri.) B.E./B.Tech., B.Pharma. MBBS, B.V.Sc., darken the bubble shown against OTHERS.

Item 11: Qualifying Examination Passed

If the candidate has already passed the final examination of the qualifying degree, darken the bubble

shown against YES. If the candidate is going to appear or has already appeared in (and is awaiting results of) the final examination, darken the bubble shown against NO.

Item 12: Year of Qualifying Examination

Write the year of passing/appearing at the qualifying examination in the boxes provided and darken the appropriate bubbles.

Item 13: Percentage of Aggregate Marks/CGPA

In the first column, darken the bubble corresponding to the grading scheme followed at your institution. In the boxes provided in the second column, write the percentage of aggregate marks/CGPA (calculated **out of 10** considering all subjects, including languages and subsidiaries, all years combined) up to two decimal places, obtained in the qualifying examination or up to pre-final year/semester, if appearing in the qualifying examination in 2013, as the case may be. Darken the bubbles accordingly.

Item 14: Mobile Number

Write, in the boxes, the Mobile Number on which you may be contacted. Accordingly, darken the appropriate bubbles.

Item 15: Name and Complete Postal Address

Write the name, complete postal address with PIN code (in CAPITAL letters using a black ink ball-point pen) where your Admit Card or any other communication is to be sent.

Item 16: Photograph

Paste (please do not staple) a 3.0 cm x 4.0 cm recent good quality colour photograph which should not be taken more than **two months earlier**. The photograph must not be larger than the space (box) provided for pasting it. Retain some spare copies of this photograph for future need. The photograph should neither be signed nor attested. However, **the candidate must write his/her name and application form number on the reverse-side of photograph before pasting.**

Item 17: Full Signature of the Candidate

Sign using a black ink ball-point pen within the box provided. The signature must not overflow or touch the border of the box provided. The signature must be in running hand. The signature here and the one below the declaration (Item 25) should be identical. Application Form without signatures or with different signatures at the two places will be treated as incomplete and rejected.

Item 18: E-mail Address

Write your e-mail address in the boxes without leaving space between words.

Item 19: Name of the Parent/Guardian

The name of parent or guardian must be written in CAPITAL letters. Write a single letter in a box. Darken the appropriate bubble under each letter of the name. Follow the instructions as given in Item 1.

Item 20: Relationship of Parent/Guardian to the Candidate

Darken the bubble against the relationship of parent/guardian, whose name is given in Item 19, to the candidate.

Item 21: PIN Code

Write your PIN Code in the boxes provide same as given in Item 15. Darken the appropriate bubbles.

Item 22: Details of the Demand Draft Enclosed (if applicable)

Write the Demand Draft Number in the boxes and darken the bubbles below the boxes. Write the date of demand draft in the boxes under DD, MM and YY and darken the bubbles accordingly.

Item 23: Amount of Additional Fee Paid (if applicable)

Darken the appropriate bubbles shown against the amount of additional fee paid for appearing in the second test paper. Refer Table 2.

Item 24: Landline Phone Number with STD Code (without "0")

Write, in the boxes, STD Code (without "0") and landline telephone number on which you may be contacted. Accordingly, darken the appropriate bubbles.

Item 25: Declaration by the Candidate

The declaration is to be signed by the candidate using a black ink ball-point pen. Read the declaration carefully before signing it. The place and date should be written at the places marked for this purpose. Unsigned OMR Application Form will **not** be considered. The signature must be in running hand and identical to the signature that the candidate has given in Item 17.

Check List

The candidate should tick (✓) the options in the check list. The check list for the offline application form is given on the back of the envelope.

List of Enclosures

The candidate should tick (✓) against the documents enclosed with the Application Form. For offline application form the list of enclosures is given on the back of the envelope.

Correspondence with JAM office

For any correspondence with the JAM office of the Organising Institute, you must quote the Application Form Number until Admit Card is received.

13. RANK AND MERIT LIST**13.1 Rank List**

For each test paper in JAM 2013, separate rank lists, on the basis of written test will be prepared for candidates in General, OBC (non-creamy layer), SC, ST and PD categories.

NOTE: To OBC (Non-creamy layer) candidates

- I. OBC (non-creamy layer) candidates need not submit any category certificate along with the **OMR Application Form/Online Application form**.
- II. The category rank in a JAM paper for JAM 2013 qualified candidates will be prepared based on the category declaration by the candidate in his/her application form. **The relevant certificate will not be accepted after 30 April, 2013 under any circumstances.** The final seat allotment will be done based on the OBC certificate (in the prescribed format) submitted along with application form for admission. **The candidate will be considered in the General Category in case of non-compliance of OBC non-creamy layer certificate with the prescribed format.**

Tie-Breaking: The tie-breaking criterion for awarding the ranks to candidates scoring the same aggregate marks in a test paper will be as follows:

(a) For Fully Objective Type Test Papers:

The candidate with a higher ratio of positive marks to negative marks will be given a higher rank. If this criterion fails to break ties, the candidates concerned will be awarded the same rank.

(b) For Objective-cum-Descriptive Type Test Papers:

The candidate having higher score in the subjective

questions (both fill in the blank and descriptive) of the test paper shall be given a higher rank. If this criterion fails to break ties, the candidates concerned will be awarded the same rank.

13.2 Merit List

The results (merit lists) will be declared at 17:00 hrs on **10 April 2013**. The results will be available on the website: <http://gate.iitd.ac.in/jam>.

For each test paper, an All India merit list will be prepared. Separate merit lists will be prepared for OBC (non-creamy layer), SC, ST and PD category candidates. The number of candidates included in the All India Merit List will depend on the total number of seats available in a given subject.

These candidates (henceforth called qualified candidates) are eligible to apply for admission to any of the corresponding academic programmes available (Appendix-I) at IISc, Bangalore & IITs.

The Score Card (indicating the All India Rank(s) and the mark(s) obtained by the Candidate) will be sent to the candidates appearing in merit list.

14. ADMISSION PROCEDURE

Only the candidates who **qualify** in JAM 2013 (whose names appear in the merit list) will be eligible to apply for admission to any of the corresponding academic programmes available at IISc, Bangalore & IITs (refer Appendix-I and II of this Information Brochure).

For admission to Integrated Ph.D. programmes at IISc, Bangalore & M.Sc.-Ph.D. Dual Degree programme at IIT Bombay & M.Sc.-Ph.D. Dual Degree Programme in Physics at IIT Kanpur, the JAM-2013 qualified candidates are required to refer to the IISc, Bangalore & IITB and IITK admissions website for details including the dates for interview.

Candidates are advised, in their own interest, to refer to the brief profiles of the admitting institutes and departments at their respective websites (Table 3). Applicants should note that they have to apply for admission by sending an Application Form for Admission (henceforth called Admission Form) only to the Organising Institute (IIT Delhi).

An applicant can apply to one or more academic programmes corresponding to the test paper(s) in which he/she has qualified, subject to fulfillment of the minimum educational qualifications and the eligibility requirements of the Admitting Institute(s). For the academic session 2013-14, the following admission procedure shall be followed for all the programmes at the IISc, Bangalore & IITs covered under JAM 2013. Candidates are also advised to refer to IIT Delhi website (<http://gate.iitd.ac.in/jam>) for latest updates.

- (i) After JAM 2013 results are announced, a qualified candidate will have to apply online on the prescribed Admission Form to the Organising Institute (IIT Delhi) only, irrespective of IISc, Bangalore & IITs where he/she desires to seek admission. The application form will be available from the website of the Organising Institute (IIT Delhi).
- (ii) Irrespective of whether a candidate has qualified in one or two test papers, he/she needs to submit **only one** duly completed Admission Form listing all the programmes at IISc, Bangalore & IITs (along with the order of preferences) to which the admission is sought.
- (iii) The printout of duly completed Admission Form along with the required enclosures must be sent by the applicant to the **Organising Chairman, JAM 2013**,

GATE/JAM office, Block-I, IIT Delhi, Hauz Khas, New Delhi-110016, along with a Demand Draft of Rs.300/- (Rupees Three Hundred only), drawn in favour of "Chairman JAM, IIT Delhi", payable at Delhi, as a non-refundable processing fee. The Admission Form will not be considered if it is found incomplete in any respect or if it is not accompanied by a Demand Draft of Rs.300/- and the candidate will not be considered for admission irrespective of his/her eligibility for any programme(s) for which Admission Form has been submitted. Also, a candidate will be considered for admission only to the programme(s), given in his/her Admission Form. **The last date for receiving the completed Admission Form along with Demand Draft of Rs. 300/- at the Organising Institute (IIT Delhi) is 30 April, 2013.**

- (iv) Candidates who have chosen to apply for Integrated Ph.D. programmes at IISc, Bangalore & selected M.Sc.-Ph.D. Dual Degree programme at IIT Bombay, M.Sc.-Ph.D. Dual Degree programme in Physics at IIT Kanpur will additionally follow procedure given on admission website of these institutes and complete the required procedure.
- (v) Taking into consideration the order of preference as given in the Admission Form and corresponding rank(s) in the merit list, the first Admission List for each programme under JAM 2013 will be prepared by the Organising Institute and will be announced at 17:00 hrs on **31 May, 2013**.
- (vi) After the declaration of the First Admission List, admission offers will be sent by the respective Admitting Institute(s) to the candidates concerned on **3 June, 2013**. Last date for conveying the acceptance of the offer by the candidates to the Organising Chairman, JAM 2013, IIT Delhi, is **17 June 2013**. Along with the acceptance of offer, these candidates will also have to send an advance fee of Rs. 5000/- to the Organising Chairman through a demand draft in favour of the "Chairman JAM, IIT Delhi", payable at **Delhi**. This amount will be transferred to the Admitting Institute and this will be adjusted at the time of registration.
- (vii) If seats remain vacant after the admission process is over based on the First Admission List, the Organising Institute will prepare a second admission list. This second list will be announced by the **Organising Institute at 17:00 hrs on 24 June, 2013** and admission offers based on this list, if any, will be sent by the Admitting Institute(s) to the candidates concerned. The candidates offered admission through the second list must report directly to the **admitting institute** on the date of registration. **With that the admission process based on JAM 2013 will come to an end.**
- (viii) If a candidate is allotted a seat through the First Admission List and if he/she accepts the offer of admission, his/her lower preferences, if any, will be automatically cancelled. However, he/she will remain on the waiting list for all of his/her higher preferences (if any). Eligible candidates, who are not allotted any seat in the First Admission List, will remain on the waiting list in the next round of admission. If a candidate fails to accept an admission offer, he/she will not be considered further in the admission process.

Note :

- (a) Verification of minimum educational qualifications and the eligibility criteria for admission is the prerogative of the Admitting Institute(s) only and the Organising Institute will not respond to any queries in this regard.
- (b) The offer of admission to a candidate will be provisional, subject to the fulfillment of all the

requirements by the dates specified.

- (c) Candidates should note that being in the merit list of any Test Paper neither guarantees nor provides any automatic entitlement for admission. Admissions shall be made in order of merit and depending on the number of seats available at the Admitting Institute(s).

15. PROFILE OF IISc, BANGALORE & IITs

These can be seen at the websites of the respective Institutions (see Table-3).

Table 3: Website addresses of IISc, Bangalore & IITs.

S.No.	Name of Institute	Website
1	IISc, Bangalore	www.iisc.ernet.in/
2	IIT Bombay	www.iitb.ac.in/
3	IIT Delhi	www.iitd.ac.in/
4	IIT Guwahati	www.iitg.ac.in/
5	IIT Kanpur	www.iitk.ac.in/
6	IIT Kharagpur	www.iitkgp.ac.in/
7	IIT Madras	www.iitm.ac.in/
8	IIT Roorkee	www.iitr.ac.in/
9	IIT Bhubaneswar	www.iitbbs.ac.in/
10	IIT Gandhinagar	www.iitgn.ac.in/
11	IIT Hyderabad	www.iith.ac.in/
12	IIT Indore	www.iiti.ac.in/

16. SYLLABI FOR TEST PAPERS

16.1 BIOLOGICAL SCIENCES (BL)

Biological Sciences question paper will be fully of objective type. There will be negative marking (one third) for wrong answer.

General Biology

Taxonomy and physiology, Pro-and eukaryotic organisms; cell organelles and their function; multicellular organisation; energy transformations; internal transport systems of plants; respiration; regulation of body fluids and excretory mechanisms; cellular reproduction; Mendelian genetics and heredity; biology and populations and communities; evolution; genesis and diversity of organisms; animal behaviour, plant and animal diseases.

Basics of Biochemistry, Biophysics, Molecular Biology

Buffers; trace elements in biological systems; enzymes and proteins; vitamins; biological oxidations, carbohydrates and lipids and their metabolisms; digestion and absorption; detoxifying mechanisms; plant and animal hormones and their action, nervous system, nucleic acids, nature of gene and its function, Genetic code, synthesis of nucleic acids and proteins. Enzyme mechanisms and kinetics, nucleic acid metabolism, photo synthesis.

Structure of biomolecules; intra and intermolecular forces; thermodynamics and kinetics of biological systems, principles of x-ray diffraction, IR and UV spectroscopy and hydrodynamic techniques.

Microbiology, Cell Biology and Immunology

Classes of microorganisms and their characterization, nutrient requirement for growth; laboratory techniques in microbiology, pathogenic microorganisms and disease; applied microbiology; viruses, Microbial genetics. Innate and adaptive immunity, antigen antibodies.

Cell theory; Cell architecture; methods of cell fractionation; cell division; types of chromosome structure; biochemical genetics- inborn errors of metabolisms; viruses and fungi; principles of processes of development.

Mathematical Sciences

Mathematical functions (algebraic, exponential, trigonometric), their derivatives (derivatives and integrals of simple functions), permutations and combinations.

16.2 BIOTECHNOLOGY (BT)

The Biotechnology (BT) test paper comprises of Biology (44% weightage), Chemistry (20% weightage), Mathematics (18% weightage) and Physics (18% weightage). The question paper will be fully of objective type. There will be negative marking (one third) for wrong answer.

BIOLOGY (10+2+3 level)

General Biology: Taxonomy; Heredity; Genetic variation; Conservation; Principles of ecology; Evolution; Techniques in modern biology. **Biochemistry and Physiology:** Carbohydrates; Proteins; Lipids; Nucleic acids; Enzymes; Vitamins; Hormones; Metabolism – Glycolysis, TCA cycle, Oxidative Phosphorylation; Photosynthesis. Nitrogen Fixation, Fertilization and Osmoregulation; Vertebrates - Nervous system; Endocrine system; Vascular system; Immune system; Digestive system and Reproductive System. **Basic Biotechnology:** Tissue culture; Application of enzymes; Antigen-antibody interaction; Antibody production; Diagnostic aids. **Molecular Biology:** DNA; RNA; Replication; Transcription; Translation; Proteins; Lipids and Membranes; Operon model; Gene transfer. **Cell Biology:** Cell cycle; Cytoskeletal elements; Mitochondria; Endoplasmic reticulum; Chloroplast; Golgi apparatus; Signaling. **Microbiology:** Isolation; Cultivation; Structural features of virus; Bacteria; Fungi; Protozoa; Pathogenic micro-organisms.

CHEMISTRY (10+2+3 level)

Atomic Structure: Bohr's theory and Schrodinger wave equation; Periodicity in properties; Chemical bonding; Properties of s, p, d and f block elements; Complex formation; Coordination compounds; Chemical equilibria; Chemical thermodynamics (first and second law); Chemical kinetics (zero, first, second and third order reactions); Photochemistry; Electrochemistry; Acid-base concepts; Stereochemistry of carbon compounds; Inductive, electromeric, conjugative effects and resonance; Chemistry of Functional Groups: Hydrocarbons, alkyl halides, alcohols, aldehydes, ketones, carboxylic acids, amines and their derivatives; Aromatic hydrocarbons, halides, nitro and amino compounds, phenols, diazonium salts, carboxylic and sulphonic acids; Mechanism of organic reactions; Soaps and detergents; Synthetic polymers; Biomolecules– amino acids, proteins, nucleic acids, lipids and carbohydrates (polysaccharides); Instrumental techniques-chromatography (TLC, HPLC), electrophoresis, UV-Vis, IR and NMR spectroscopy, mass spectrometry.

MATHEMATICS (10+2 level)

Sets, Relations and Functions, Mathematical Induction, Logarithms, Complex numbers, Linear and Quadratic equations, Sequences and Series, Trigonometry, Cartesian System of Rectangular Coordinates, Straight lines and Family, Circles, Conic Sections, Permutations and Combinations, Binomial Theorem, Exponential and Logarithmic Series, Mathematical Logic, Statistics, Three Dimensional Geometry, Vectors, Matrices and Determinants, Boolean Algebra, Probability, Functions, limits and Continuity, Differentiation, Application of Derivatives, Definite and Indefinite Integrals, Differential Equations.

PHYSICS (10+2 level)

Physical World and Measurement, Elementary Statics and Dynamics, Kinematics, Laws of Motion, Work, Energy and Power, Electrostatics, Current electricity, Magnetic Effects of Current and Magnetism, Electromagnetic Induction and Alternating Current, Electromagnetic waves, Optics, Dual Nature of Matter and Radiations, Atomic Nucleus, Solids and Semiconductor Devices, Principles of Communication, Motion of System of Particles and Rigid Body, Gravitation, Mechanics of Solids and Fluids, Heat and Thermodynamics, Oscillations, Waves.

16.3 CHEMISTRY (CY)

PHYSICAL CHEMISTRY

Basic Mathematical Concepts: Functions, maxima and minima, integrals, ordinary differential equations, vectors and matrices, determinants, elementary statistics and probability theory.

Atomic and Molecular Structure: Fundamental particles, Bohr's theory of hydrogen-like atom; wave-particle duality; Uncertainty principle; Schrödinger's wave equation; Quantum numbers, shapes of orbitals; Hund's rule and Pauli's exclusion principle, electronic configuration of simple homonuclear diatomic molecules.

Theory of Gases: Equation of state of ideal and non-ideal (van der Waals) gases, Kinetic theory of gases. Maxwell-Boltzmann distribution law; equipartition of energy.

Solid state: Crystals, crystal systems, X-rays, NaCl and KCl structures, close packing, atomic and ionic radii, radius ratio rules, lattice energy, Born-Haber cycle, isomorphism, heat capacity of solids.

Chemical Thermodynamics: Reversible and irreversible processes; First law and its application to ideal and non-ideal gases; Thermochemistry; Second law; Entropy and free energy, Criteria for spontaneity.

Chemical and Phase Equilibria: Law of mass action; K_p , K_c , K_x and K_f ; Effect of temperature on K; Ionic equilibria in solutions; pH and buffer solutions; Hydrolysis; Solubility product; Phase equilibria–Phase rule and its application to one-component and two-component systems; Colligative properties.

Electrochemistry: Conductance and its applications; Transport number; Galvanic cells; EMF and Free energy; Concentration cells with and without transport; Polarography; Concentration cells with and without transport; Debye-Huckel-Onsagar theory of strong electrolytes.

Chemical Kinetics: Reactions of various order, Arrhenius equation, Collision theory; Theory of absolute reaction rate; Chain reactions – Normal and branched chain reactions; Enzyme kinetics; photochemical processes; Catalysis.

Adsorption: Gibbs adsorption equation, adsorption isotherm, types of adsorption, surface area of adsorbents, surface films on liquids.

ORGANIC CHEMISTRY

Basic Concepts in Organic Chemistry and Stereochemistry: Electronic effect (resonance, inductive, hyperconjugation) and steric effects and its applications (acid/base property). Optical isomerism in compounds without any stereocenters (allenes, biphenyls), conformation of acyclic systems (substituted ethane/n-propane/n-butane) and cyclic systems (mono and di substituted cyclohexanes).

Organic Reaction Mechanism and Synthetic Applications: Chemistry reactive intermediates, carbene, nitrene, benzyne, Hofmann-Curtius-Lossen rearrangement, Wolf rearrangement, Simmons-Smith reaction, Reimer-Tiemann reaction, Michael reaction, Darzens reaction, Wittig reaction, McMurry reaction. Pinacol-pinacolone, Favorskii, benzoic acid rearrangement, dienone-phenol rearrangement, Bayer-Villegier reaction). Oxidation and reduction reactions in organic chemistry. Organometallic reagents in organic synthesis (Grignard and organocopper). Diels-Alder reaction, Sigmatropic reactions.

Qualitative Organic Analysis: Functional group interconversions, structural problems using chemical reactions, identification of functional groups by chemical tests, elementary ^1H NMR and IR spectroscopy as a tool for structural elucidation.

Natural Products Chemistry : Introductory chemistry of alkaloids, terpenes, carbohydrates, amino acids, peptides and nucleic acids.

Heterocyclic Chemistry: Monocyclic compounds with one hetero atom.

INORGANIC CHEMISTRY

Periodic Table: Periodic classification of elements and periodicity in properties; general methods of isolation and purification of elements.

Chemical Bonding and Shapes of Compounds: Types of bonding; VSEPR theory and shapes of molecules; hybridization; dipole moment; ionic solids; structure of NaCl, CsCl, diamond and graphite; lattice energy.

Main Group Elements (s and p blocks): Chemistry with emphasis on group relationship and gradation in properties;

structure of electron deficient compounds of main group elements and application of main group elements.

Transition Metals (d block): Characteristics of 3d elements; oxide, hydroxide and salts of first row metals; coordination complexes; VB and Crystal Field theoretical approaches for structure, colour and magnetic properties of metal complexes. Organometallic compounds, metal carbenyls, nitrosyls and metallocenes, ligands with back bonding capabilities; MO theory approaches to explain bonding in metal-carbonyl, metal-nitrosyl and metal-phosphine complexes.

Bioinorganic Chemistry: Essentials and trace elements of life, basic reactions in the biological systems and the role of metal ions especially Fe²⁺, Fe³⁺, Cu²⁺ and Zn²⁺, function of hemoglobin and myoglobin.

Instrumental Methods of Analysis: Basic principles, instrumentations and simple applications of conductometry, potentiometry, UV-vis spectro-photometry, analysis of water, air and soil samples.

Analytical Chemistry: Principles of qualitative and quantitative analysis; acid-base, oxidation-reduction and EDTA and precipitation reactions; use of indicators; use of organic reagents in inorganic analysis; radioactivity; nuclear reactions; applications of isotopes.

16.4 COMPUTER APPLICATIONS (CA)

The Computer Applications (CA) test paper comprises of Mathematics, Computer Awareness, and Analytical Ability and General Awareness and they will be in the ratio 4:2:1. The question paper will be fully of objective type. There will be negative marking (one third) for wrong answer.

MATHEMATICS

Algebra: Set theory and its simple applications. Basic concepts of groups, fields and vector spaces.

Matrices: Rank of a matrix. Existence and uniqueness of solution of a system of linear equations. Eigenvalues and Eigenvectors. Inverse of a matrix by elementary transformations.

Differential Calculus: Differentiation, Partial differentiation, Taylor series and approximate calculations. Maxima and minima of functions of one and two variables.

Integral Calculus: Single and multiple integration. Definite integrals, Change of order and change of variables. Applications to evaluation of area, surface and volume.

Differential Equations: First order differential equations, linear differential equations of higher order with constant coefficients.

Vector Algebra: Addition, subtraction, dot product, cross product, triple product and their applications.

Numerical Analysis: Solution of non-linear equations using iterative methods. Interpolation (Lagrange's formula and Newton's formula for equidistant points). Numerical differentiation and integration (Trapezoidal and Simpson's rules).

Probability: Basic concepts of probability theory. Binomial and Poisson distributions.

Linear Programming: Formulation and its graphical solution for two variable problems.

COMPUTER AWARENESS

Elements of computers. Number systems. Basic electronic gates. Boolean algebra. Flip-Flops. Algorithmic approach to solve problems. Fundamentals of C language.

ANALYTICAL ABILITY AND GENERAL AWARENESS

Simple questions will be asked to test the analytical ability and general awareness of candidates.

16.5 GEOLOGY (GG)

The Planet Earth: Origin of the Solar System and the Earth; Geosphere and the composition of the Earth; Shape and size of the earth; Earth-moon system; Formation of continents and oceans; Dating rocks and age of the Earth; Energy in the earth system; Volcanism and volcanic landforms; Interior of earth; Earthquakes; Earth's magnetism and gravity, Isostasy; Elements of Plate tectonics; Orogenic cycles.

Geomorphology: Weathering and erosion; Transportation and deposition due to wind, ice, river, sea, and resulting landforms, Structurally controlled landforms.

Structural Geology: Concept of stratum; Contour; Outcrop patterns; Maps and cross sections; Dip and strike; Classification and origin of folds, faults, joints, foliation and lineation, unconformities; shear zones.

Palaeontology: Major steps in the evolution of life forms; Fossils; their mode of preservation and utility; Morphological characters, major evolutionary trends and ages of important groups of animals - Brachiopoda, Mollusca, Trilobita, Graptolitoidea, Anthozoa, Echinodermata; Gondwana plant fossils; Elementary idea of vertebrate fossils in India.

Stratigraphy: Principles of stratigraphy; Litho-, chrono- and biostratigraphic classification; distribution and classification of the stratigraphic horizons of India from Archaean to Recent.

Mineralogy: Symmetry and forms in common crystal classes; Physical properties of minerals; Isomorphism and polymorphism, Classification of minerals; Structure of silicates; Mineralogy of common rock-forming minerals; Mode of occurrence of minerals in rocks. Transmitted polarised light microscopy and optical properties of uniaxial and biaxial minerals.

Petrology: Definition and classification of rocks; Igneous rocks - forms of igneous bodies; Crystallization from magma; classification, association and genesis of igneous rocks; Sedimentary rocks - classification, texture and structure; size and shape of sedimentary bodies. Metamorphic rocks - classification, facies, texture and properties.

Economic Geology: Properties of common economic minerals; General processes of formation of mineral deposits; Physical characters; Mode of occurrence and distribution in India both of metallic and non-metallic mineral deposits; Coal and petroleum occurrences in India.

Applied Geology: Ground Water; Mineral exploration, elements of Mining Geology and Environmental Geology; Principles of Engineering Geology.

16.6 GEOPHYSICS (GP)

There will be **Three Sections** in the Geophysics (GP) test paper, namely, Geology, Mathematics and Physics, each with a weightage of 50%. A candidate has to attempt any **Two Sections**.

The syllabi for the Geology, Mathematics and Physics Sections of the Geophysics (GP) test paper are given below:

GEOLOGY SECTION

The Planet Earth: Origin of the Solar System and the Earth; Geosphere and the composition of the earth; Shape and size of the Earth; Earth-moon system; Formation of continents and oceans; dating the rocks and age of the Earth; Energy in the earth system; Volcanism and volcanic landforms; Interior of earth; Earthquakes. Earth's magnetism and gravity, Elements of plate tectonics.

Geomorphology: Weathering and erosion; transportation and deposition due to wind, ice, river, sea, and resulting landforms, structurally controlled landforms.

Structural Geology: Concept of stratum; Contour; Outcrop patterns; Maps and cross sections; Dip and strike; classification and origin of folds, faults, joints, foliation and lineation, unconformities; shear zones.

Mineralogy: Symmetry and forms in common crystal classes; physical properties of minerals; Isomorphism and polymorphism, Classification of minerals; Structure of silicates; Mineralogy of common rock-forming minerals; Mode of occurrence of minerals in rock. Transmitted polarised light microscopy and optical properties of uniaxial and biaxial minerals.

Palaeontology: Major steps in the evolution of life forms; Fossils; their mode of preservation and utility; Morphological characters, major evolutionary trends and ages of important groups of animals - Brachiopoda, Mollusca, Trilobita, Graptolitoidea, Anthozoa, Echinodermata;

Stratigraphy: Principles of Stratigraphy, Geological Time Scale and ages of major stratigraphic units of India.

Petrology: Definition and classification of rocks; Igneous rock-forms of igneous bodies; Crystallisation from magma; classification, association and genesis of igneous rocks; Sedimentary rocks-classification, texture and structure; Metamorphic rocks-Classification, facies, texture and

structure.

Economic Geology: Physical properties of common ore minerals, General processes of formation of mineral deposits; Mode of occurrence of important metallic and non-metallic deposits in India; Coal, petroleum and ground water occurrences in India.

MATHEMATICS SECTION

Sequences, Series and Differential Calculus: Sequences of real numbers, Convergent sequences and series. Mean Value Theorem, Taylor's theorem, Maxima and Minima, functions of several variables.

Integral Calculus: Fundamental theorem of calculus, Integration, Double and Triple integrals, change of order of integration, Surface Areas and Volumes.

Differential Equations: Linear and Non-linear ODE, existence and uniqueness (without proof), Linear Differential Equations of second order with constant coefficients.

Vector Calculus: Gradient, Divergence, Curl, Laplacian, Green's, Stokes and Gauss theorems and their Applications.

Linear Algebra: System of Linear Equations, Matrices, Rank, Determinant, Inverse, eigenvalues and eigenvectors. Dimension, Linear transformations.

Probability: Probability spaces, Conditional Probability, Independence, Bayes Theorem, Univariate and Bivariate Random Variables, Moment Generating and Characteristic Functions, Binomial, Poisson and Normal distributions.

Statistics: Sampling Distributions of Sample Mean and Variance, Exact Sampling Distribution (Normal Population), Simple and Composite hypothesis, Best critical region of a Test, Neyman-Pearson theorem, Likelihood Ratio Testing and its Application to Normal population, comparison of normal populations, large sample theory of test of hypothesis, approximate test on the parameter of a binomial population, comparison of two binomial populations.

Numerical Analysis: Difference table, symbolic operators, differences of a factorial, representation of a polynomial by factorials. Forward, backward and central difference approximation formulae. Simpson's one-third rule, Newton-Raphson method for finding the solution of $f(x)=0$.

PHYSICS SECTION

Mechanics and General Properties of Matter: Newton's laws of motion and applications, Kepler's laws, Gravitational Law and field, Conservative and non-conservative forces. System of particles, Centre of mass (CM), equation of motion of the CM, conservation of linear and angular momentum, conservation of energy. Elastic and inelastic collisions. Rigid body motion, fixed axis rotations, rotation and translation, moments of Inertia and products of Inertia. Principal moments and axes. Elasticity, Hooke's law and elastic constants of isotropic solid, stress energy. Kinematics of moving fluids, equation of continuity, Euler's equation, Bernoulli's theorem, viscous fluids, surface tension and surface energy, capillarity.

Oscillations, Waves and Optics: Differential equation for simple harmonic oscillator and its general solution. Superposition of two or more simple harmonic oscillators. Lissajous figures. Damped and forced oscillators, resonance. Wave equation, travelling and standing waves in one-dimension. Energy density and energy transmission in waves. Group velocity and phase velocity. Sound waves in media. Doppler Effect. Fermat's Principle. General theory of image formation. Thick lens, thin lens and lens combinations. Interference of light, optical path retardation. Fraunhofer diffraction. Rayleigh criterion and resolving power. Diffraction gratings. Polarization: linear, circular and elliptic polarization. Double refraction and optical rotation.

Electricity and Magnetism: Coulomb's law, Gauss's law. Concept of Potential, Field and Boundary Conditions, Solution of Laplace's equation for simple cases. Conductors, capacitors, dielectrics, dielectric polarization, volume and surface charges, electrostatic energy. Magnetic susceptibility, bar magnet, Earth's magnetic field and its elements. Biot-Savart law, Ampere's law, Lenz's law, Faraday's law of electromagnetic induction, self and mutual inductance. Alternating currents. Simple DC and AC circuits with R, L and C components. Displacement current,

Maxwell's equations and plane electromagnetic waves. Lorentz Force and motion of charged particles in electric and magnetic fields.

Kinetic theory, Thermodynamics: Elements of Kinetic theory of gases. Velocity distribution and Equipartition of energy. Specific heat of Mono-, di- and tri-atomic gases. Ideal gas, Van-der-Waals gas and equation of state. Mean free path. Laws of thermodynamics. Zeroth law and concept of thermal equilibrium. First law of thermodynamics and its consequences. Isothermal and adiabatic processes. Reversible, irreversible and quasi-static processes. Second law of thermodynamics. Carnot cycle.

Modern Physics: Inertial frames and Galilean invariance. Postulates of special relativity. Lorentz transformations. Length contraction, time dilation. Relativistic velocity addition theorem, mass energy equivalence. Blackbody radiation, photoelectric effect, Bohr's atomic model, X-rays. Wave-particle duality, Uncertainty principle, Pauli Exclusion Principle, Structure of atomic nucleus, mass and binding energy. Radioactivity and its applications. Laws of radioactive decay and half life, Fission and fusion

Solid State Physics and Electronics: Crystal structure, Bravais lattices and basis. Miller indices. X-ray diffraction and Bragg's law, Origin of energy bands. Concept of holes. Intrinsic and extrinsic semiconductors. p-n junctions, transistors. Amplifier circuits with transistors.

16.7 MATHEMATICS (MA)

SEQUENCES, SERIES AND DIFFERENTIAL CALCULUS:

Sequences and Series of real numbers: Sequences and series of real numbers. Convergent and divergent sequences, bounded and monotone sequences, Convergence criteria for sequences of real numbers, Cauchy sequences, absolute and conditional convergence; Tests of convergence for series of positive terms – comparison test, ratio test, root test, Leibnitz test for convergence of alternating series.

Functions of one variable: limit, continuity, differentiation, Rolle's Theorem, Mean value theorem. Taylor's theorem. Maxima and minima.

Functions of two real variable: limit, continuity, partial derivatives, differentiability, maxima and minima.

Method of Lagrange multipliers, Homogeneous functions including Euler's theorem.

Integral Calculus: Integration as the inverse process of differentiation, definite integrals and their properties, Fundamental theorem of integral calculus. Double and triple integrals, change of order of integration. Calculating surface areas and volumes using double integrals and applications. Calculating volumes using triple integrals and applications.

Differential Equations: Ordinary differential equations of the first order of the form $y'=f(x,y)$. Bernoulli's equation, exact differential equations, integrating factor, Orthogonal trajectories, Homogeneous differential equations-separable solutions, Linear differential equations of second and higher order with constant coefficients, method of variation of parameters. Cauchy-Euler equation.

Vector Calculus: Scalar and vector fields, gradient, divergence, curl and Laplacian. Scalar line integrals and vector line integrals, scalar surface integrals and vector surface integrals, Green's, Stokes and Gauss theorems and their applications.

Group Theory: Groups, subgroups, Abelian groups, non-abelian groups, cyclic groups, permutation groups; Normal subgroups, Lagrange's Theorem for finite groups, group homomorphisms and basic concepts of quotient groups (only group theory).

Linear Algebra: Vector spaces, Linear dependence of vectors, basis, dimension, linear transformations, matrix representation with respect to an ordered basis, Range space and null space, rank-nullity theorem; Rank and inverse of a matrix, determinant, solutions of systems of linear equations, consistency conditions. Eigenvalues and eigenvectors. Cayley-Hamilton theorem. Symmetric, skew-symmetric, hermitian, skew-hermitian, orthogonal and unitary matrices.

Real Analysis: Interior points, limit points, open sets, closed sets, bounded sets, connected sets, compact sets; completeness of \mathbb{R} , Power series (of real variable) including Taylor's and Maclaurin's, domain of convergence, term-wise differentiation and integration of power series.

16.8 MATHEMATICAL STATISTICS (MS)

The Mathematical Statistics (MS) test paper comprises of Mathematics (40% weightage) and Statistics (60% weightage).

Mathematics:

Sequences and Series: Convergence of sequences of real numbers, Comparison, root and ratio tests for convergence of series of real numbers.

Differential Calculus: Limits, continuity and differentiability of functions of one and two variables. Rolle's theorem, mean value theorems, Taylor's theorem, indeterminate forms, maxima and minima of functions of one and two variables.

Integral Calculus: Fundamental theorems of integral calculus. Double and triple integrals, applications of definite integrals, arc lengths, areas and volumes.

Matrices: Rank, inverse of a matrix, systems of linear equations. Linear transformations, eigenvalues and eigenvectors. Cayley-Hamilton theorem, symmetric, skew-symmetric and orthogonal matrices.

Differential Equations: Ordinary differential equations of the first order of the form $y' = f(x,y)$. Linear differential equations of the second order with constant coefficients.

Statistics Probability: Axiomatic definition of probability and properties, conditional probability, multiplication rule. Theorem of total probability. Bayes' theorem and independence of events.

Random Variables: Probability mass function, probability density function and cumulative distribution functions, distribution of a function of a random variable. Mathematical expectation, moments and moment generating function. Chebyshev's inequality.

Standard Distributions: Binomial, negative binomial, geometric, Poisson, hypergeometric, uniform, exponential, gamma, beta and normal distributions. Poisson and normal approximations of a binomial distribution.

Joint Distributions: Joint, marginal and conditional distributions. Distribution of functions of random variables. Product moments, correlation, simple linear regression. Independence of random variables.

Sampling distributions: Chi-square, t and F distributions, and their properties.

Limit Theorems: Weak law of large numbers. Central limit theorem (i.i.d. with finite variance case only).

Estimation: Unbiasedness, consistency and efficiency of estimators, method of moments and method of maximum likelihood. Sufficiency, factorization theorem. Completeness, Rao-Blackwell and Lehmann-Scheffe theorems, uniformly minimum variance unbiased estimators. Rao-Cramer inequality. Confidence intervals for the parameters of univariate normal, two independent normal, and one parameter exponential distributions.

Testing of Hypotheses: Basic concepts, applications of Neyman-Pearson Lemma for testing simple and composite hypotheses. Likelihood ratio tests for parameters of univariate normal distribution.

16.9 PHYSICS (PH)

Mathematical Methods: Calculus of single and multiple variables, partial derivatives, Jacobian, imperfect and perfect differentials, Taylor expansion, Fourier series. Vector algebra, Vector Calculus, Multiple integrals, Divergence theorem, Green's theorem, Stokes' theorem. First order equations and linear second order differential equations with constant coefficients. Matrices and determinants, Algebra of complex numbers.

Mechanics and General Properties of Matter: Newton's laws of motion and applications, Velocity and acceleration in Cartesian, polar and cylindrical coordinate systems, uniformly rotating frame, centrifugal and Coriolis forces, Motion under a central force, Kepler's laws, Gravitational Law

and field, Conservative and non-conservative forces. System of particles, Centre of mass, equation of motion of the CM, conservation of linear and angular momentum, conservation of energy, variable mass systems. Elastic and inelastic collisions. Rigid body motion, fixed axis rotations, rotation and translation, moments of Inertia and products of Inertia, parallel and perpendicular axes theorem. Principal moments and axes. Kinematics of moving fluids, equation of continuity, Euler's equation, Bernoulli's theorem.

Oscillations, Waves and Optics: Differential equation for simple harmonic oscillator and its general solution. Super-position of two or more simple harmonic oscillators. Lissajous figures. Damped and forced oscillators, resonance. Wave equation, traveling and standing waves in one-dimension. Energy density and energy transmission in waves. Group velocity and phase velocity. Sound waves in media. Doppler Effect. Fermat's Principle. General theory of image formation. Thick lens, thin lens and lens combinations. Interference of light, optical path retardation. Fraunhofer diffraction. Rayleigh criterion and resolving power. Diffraction gratings. Polarization: linear, circular and elliptic polarization. Double refraction and optical rotation.

Electricity and Magnetism: Coulomb's law, Gauss's law. Electric field and potential. Electrostatic boundary conditions, Solution of Laplace's equation for simple cases. Conductors, capacitors, dielectrics, dielectric polarization, volume and surface charges, electrostatic energy. Biot-Savart law, Ampere's law, Faraday's law of electromagnetic induction, Self and mutual inductance. Alternating currents. Simple DC and AC circuits with R, L and C components. Displacement current, Maxwell's equations and plane electromagnetic waves, Poynting's theorem, reflection and refraction at a dielectric interface, transmission and reflection coefficients (normal incidence only). Lorentz Force and motion of charged particles in electric and magnetic fields.

Kinetic theory, Thermodynamics: Elements of Kinetic theory of gases. Velocity distribution and Equipartition of energy. Specific heat of Mono-, di- and tri-atomic gases. Ideal gas, van-der-Waals gas and equation of state. Mean free path. Laws of thermodynamics. Zeroth law and concept of thermal equilibrium. First law and its consequences. Isothermal and adiabatic processes. Reversible, irreversible and quasi-static processes. Second law and entropy. Carnot cycle. Maxwell's thermodynamic relations and simple applications. Thermodynamic potentials and their applications. Phase transitions and Clausius-Clapeyron equation. Ideas of ensembles, Maxwell-Boltzmann, Fermi-Dirac and Bose-Einstein distributions.

Modern Physics: Inertial frames and Galilean invariance. Postulates of special relativity. Lorentz transformations. Length contraction, time dilation. Relativistic velocity addition theorem, mass energy equivalence. Blackbody radiation, photoelectric effect, Compton effect, Bohr's atomic model, X-rays. Wave-particle duality, Uncertainty principle, the superposition principle, calculation of expectation values, Schrödinger equation and its solution for one, two and three dimensional boxes. Solution of Schrödinger equation for the one dimensional harmonic oscillator. Reflection and transmission at a step potential, Pauli exclusion principle. Structure of atomic nucleus, mass and binding energy. Radioactivity and its applications. Laws of radioactive decay.

Solid State Physics, Devices and Electronics: Crystal structure, Bravais lattices and basis. Miller indices. X-ray diffraction and Bragg's law; Intrinsic and extrinsic semiconductors, variation of resistivity with temperature. Fermi level. p-n junction diode, I-V characteristics, Zener diode and its applications, BJT: characteristics in CB, CE, CC modes. Single stage amplifier, two stage R-C coupled amplifiers. Simple Oscillators: Barkhausen condition, sinusoidal oscillators. OPAMP and applications: Inverting and non-inverting amplifier. Boolean algebra: Binary number systems; conversion from one system to another system; binary addition and subtraction. Logic Gates AND, OR, NOT, NAND, NOR exclusive OR; Truth tables; combination of gates; de Morgan's theorem.

18. E-MAIL ADDRESS (Don't leave space between words)

manoj_kumar@gmail.com

20. RELATIONSHIP OF PARENT/GUARDIAN TO THE CANDIDATE

FATHER () MOTHER (2) GUARDIAN (3)

19. NAME OF THE PARENT / GUARDIAN (IN CAPITAL LETTERS)

SHIV KUMAR

21. PIN CODE

382010

22. DETAILS OF THE DD ENCLOSED (Not Applicable for Female candidates)

DEMAND DRAFT NO. DATE OF DD

5544 62 260912

23. AMOUNT (₹) OF ADDITIONAL FEE PAID (Not Applicable for Female candidates)

150 (1) 300 (2)

24. LANDLINE PH. NO. WITH STD CODE (Without "0")

2712352201

JAM 2013

25. DECLARATION BY THE CANDIDATE :

I hereby declare that, all the particulars stated in the Application form are true to the best of my knowledge and belief. I have read the Information Brochure and I shall abide by the terms and conditions therein. In the event of suppression or distortion of any fact made in this application form, I understand that I will be denied the opportunity to appear in JAM 2013, and if already appeared/selected/admitted, my admission/degree acquired is liable to cancellation.

Place : GANDHI NAGAR

Date : 26 / 09 / 2012

Manoj Kumar

FULL SIGNATURE OF THE CANDIDATE
(IN BLACK INK BALL-POINT PEN)

Appendix-I: Academic programmes available at different institutes for JAM 2013 qualified candidates*

IISc Bangalore (Zone-11)*

Integrated Ph.D.	Biological Sciences	Chemical Sciences	Mathematical Sciences	Physical Sciences
[Programme code] Seats Available	[1101] 15	[1102] 15	[1103] 12	[1104] 12

*Govt of India rules as applicable at the time of seat allotment will be followed in allocating seats for reserved category candidates

IIT Bombay (Zone-12)

M.Sc. (4 semesters)	Applied Geology	Applied Geophysics	Applied Statistics and Informatics	Biotechnology	Chemistry	Mathematics	Physics
[Programme code] Seats Available	[1201] 15+8+5+2 OBC(1)	[1202] 8+4+3+1 SC(1)	[1203] 19+10+5+3	[1204] 14+8+4+2 SC(1)	[1205] 20+11+5+3	[1206] 15+8+5+2	[1207] 17+8+5+2 OBC(1)

M.Sc. – Ph.D. dual degree	Applied Geology	Applied Geophysics	Biotechnology	Chemistry	Energy	Environmental Science & Engineering	Operations Research	Physics
[Programme code] Seats Available	[1208] 2+1+1+0 SC (1)	[1209] 2+1+1+0 ST (1)	[1210] 4+2+1+1	[1211] 8+4+2+1 OBC (1)	[1212] 9+5+3+1 ST(1)	[1213] 5+3+1+1 GE (1)	[1214] 6+3+2+1	[1215] 4+2+1+1

M.Sc.-M.Tech.Programme (8 semesters)	M.Sc.(Physics)-M.Tech.(Materials Sciences with specialization in Nano-Science & Tech.)						
[Programme code] Seats Available	[1216] 4+2+1+1						

IIT Delhi (Zone-13)

M.Sc. (4 semesters)	Chemistry	Mathematics	Physics
[Programme code] Seats Available	[1301] 27+15+8+4 GE(1),SC(1)	[1302] 27+15+8+4 GE(1)	[1303] 27+15+8+4 GE (1),OBC(1)

IIT Guwahati (Zone-14)

M.Sc. (4 semesters)	Chemistry	Mathematics & Computing	Physics
[Programme code] Seats Available	[1401] 24+13+7+4 GE(1)	[1402] 24+13+7+4 OBC(1)	[1403] 24+13+7+4 GE(1)+SC(1)

IIT Kanpur (Zone-15)*

M.Sc. (4 semesters)	Chemistry	Mathematics	Physics	Statistics
[Programme code] Seats Available	[1501] 21+11+6+3	[1502] 20+11+6+3	[1503] 15+8+5+2	[1504] 20+11+6+3

*The number of PD seats will be announced later on the website of the Institute.

M.Sc.- Ph.D. dual degree	Physics
[Programme code] Seats Available	[1505] 7+4+2+1

IIT Kharagpur (Zone-16)

Joint M.Sc.- Ph.D. (4 semesters)	Chemistry	Geology	Mathematics	Physics
[Programme code] Seats Available	[1601] 23+12+7+4 SC(1)	[1602] 15+8+5+2 OBC(1)	[1603] 15+8+5+2 SC(1)	[1604] 23+12+7+4 GE(1)

IIT Madras (Zone-17)

M.Sc. (4 semesters)	Chemistry	Mathematics	Physics
[Programme code]	[1701]	[1702]	[1703]
Seats Available	27+15+8+4 OBC(1)	27+15+8+4 GE(1) OBC(1)	22+12+7+3 GE(1) OBC(1)

IIT Roorkee (Zone-18)

M.Sc. (4 semesters)	Applied Geology	Applied Mathematics	Biotechnology	Chemistry	Industrial Mathematics and Informatics	Physics
[Programme code] Seats Available	[1801] 8+4+2+1	[1802] 8+4+2+1 ST(1)	[1803] 18+10+6+3 ST(1)	[1804] 13+6+4+2 ST(1)	[1805] 8+4+2+1	[1806] 13+6+4+2 ST(1)

M.Tech. (6 Semesters)	Geological Technology [§]	Geophysical Technology [§]
[Programme code] Seats Available	[1807] 6+3+2+1	[1808] 6+3+2+1 ST(1)

§Later entry at 3rd Year level in the Integrated M. Tech. Programmes.

M.C.A. (6 Semesters)	Master of Computer Applications
[Programme code] Seats Available	[1809] 24+13+7+4 ST(1)

IIT Bhubaneswar (Zone- 19)*

Joint M.Sc.- Ph.D. (4 semesters)	Chemistry	Mathematics	Physics	Geology
[Programme code] Seats Available	[1901] 10+5+3+2	[1902] 10+5+3+2	[1903] 10+5+3+2	[1904] 10+5+3+2

*The number of PD seats will be announced later on the website of the Institute.

IIT Gandhinagar (Zone-20)*

M.Sc. (4 semesters)	Chemistry	Mathematics
[Programme code] Seats Available	[2001] 7+2+1+0	[2002] 7+2+1+0

*No seat for PD category for Academic Year 2013-14.

IIT Hyderabad (Zone-21)

M.Sc. (4 semesters)	Chemistry	Mathematics	Physics
[Programme code] Seats Available	[2101] 14+8+5+2 GE (1)	[2102] 7+4+2+1 GE(1)	[2103] 10+4+3+2 OBC(1)

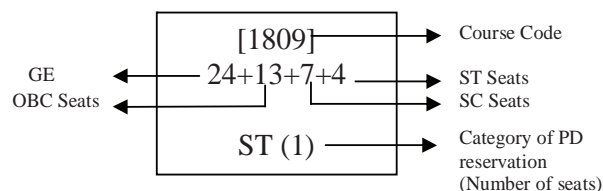
IIT Indore (Zone-22)*

M.Sc. (4 semesters)	Chemistry	Physics
[Programme code] Seats Available	[2201] 6+3+2+1	[2202] 6+3+2+1

*No seat for PD category for Academic Year 2013-14.

Note: *The number of seats is subject to change.

Explanation of Cells
in Appendix-I



Appendix-II: Test papers with codes, corresponding academic programmes and minimum educational qualifications for admission

Test Paper (Test paper code)	Academic Programme(s)	Institute(s)	Minimum Educational Qualification(s) for admission
Biological Sciences(BL)	Integrated Ph.D. in Biological Sciences	IISc Bangalore	Bachelor's degree in Biology or Chemistry or Physics or Mathematics. The candidates should have passed Biology at the Higher Secondary (10+2) level.
	Integrated Ph.D.in Chemical Sciences	IISc Bangalore	B.Sc. or an equivalent degree with Chemistry as one of the subjects. The candidates should have passed mathematics at the PUC or +2 level.
	M.Sc.- Ph.D. Dual Degree in Biotechnology	IITB	Bachelor's degree in any branch of Science/ Agriculture / Pharmacy / Veterinary / Engineering / Medicine (MBBS).The candidate should have passed Mathematics at the (10+2) level.
Biotechnology(BT)	Integrated Ph.D.in Biological Sciences	IISc Bangalore	Bachelor's degree in Biology or Chemistry or Physics or Mathematics. The candidates should have passed Biology at the Higher Secondary (10+2) level.
	M.Sc. Biotechnology	IITB, IITR	Bachelor's degree in any branch of Science/ Agriculture / Pharmacy / Veterinary / Engineering / Medicine (MBBS).
	M.Sc.- Ph.D. Dual Degree in Biotechnology	IITB	NOTE: For IITB only, M.Sc. Biotechnology and M.Sc.-Ph.D. Dual Degree in Biotechnology, the candidate should have passed Mathematics at the (10+2) level.
	M.Sc.- Ph.D. Dual Degree in Environmental Science & Engineering	IITB	Bachelor's degree with any one of Biology, Biotechnology, Chemistry, Mathematics and Physics for two years/four semesters, and any one of the other four subjects for at least one year/two semesters. The candidate should have passed Mathematics at (10 + 2) level.
Chemistry(CY)	Integrated Ph.D. in Chemical Sciences	IISc Bangalore	B.Sc. or an equivalent degree with Chemistry as one of the subjects. The candidates should have passed mathematics at the PUC or +2 level.
	Integrated Ph.D. in Biological Sciences	IISc Bangalore	Bachelor's degree in Biology or Chemistry or Physics or Mathematics. The candidates should have passed Biology at the Higher Secondary (10+2) level.
	Joint M.Sc.-Ph.D. Programme in Chemistry	IITBBS, IITKgp	Bachelor's degree with Chemistry as a subject for three years/six semesters and should have passed Mathematics at (10+2) level.
	M.Sc. Chemistry	IITB, IITD, IITGN, IITG, IITH, IITI, IITK, IITM, IITR	
	M.Sc.- Ph.D. Dual Degree Programme in Chemistry	IITB	

Test Paper (Test paper code)	Academic Programme(s)	Institute(s)	Minimum Educational Qualification(s) for admission
	M.Sc.- Ph.D. Dual Degree Programme in Energy	IITB	Bachelor's degree with any one of Chemistry, Mathematics and Physics for two years/four semesters and any one of the remaining two subjects for at least one year/ two semesters.
	M.Sc.- Ph.D. Dual Degree in Environmental Science & Engineering	IITB	Bachelor's degree with any one of Biology, Biotechnology, Chemistry, Mathematics and Physics for two years/four semesters, and any one of the other four subjects for at least one year/two semesters. The candidate should have passed Mathematics at (10 + 2) level.
	M.Sc.- Ph.D. Dual Degree in Biotechnology	IITB	Bachelor's degree in any branch of Science/ Agriculture / Pharmacy / Veterinary / Engineering / Medicine (MBBS).The candidate should have passed Mathematics at the (10+2) level.
Computer Applications (CA)	Master of Computer Applications	IITR	Bachelor's degree with Mathematics as a subject for at least one year for annual system candidates/ at least two papers of Mathematics for semester system candidates.
Geology (GG)	Joint M.Sc.-Ph.D. Programme in Earth Science	IITBBS	Bachelor's degree with Geology as a subject for three years/six semesters and any two subjects among Mathematics, Physics, Chemistry, and Biological Sciences. The candidate should have passed Mathematics at (10+2) level.
	M.Sc. Applied Geology	IITB, IITR	
	Joint M.Sc.- Ph.D. Programme in Geology	IITKgp	
	M.Tech. in Geological Technology	IITR	
	M.Sc.- Ph.D. Dual Degree Programme in Applied Geology	IITB	
Geophysics(GP)	M.Sc. Applied Geophysics	IITB	Bachelor's degree with both Mathematics and Physics as subjects for two years and at least one of them as a subject for three years.
	M.Sc.- Ph.D. Dual Degree Programme in Applied Geophysics	IITB	
	M.Tech. in Geophysical Technology	IITR	Bachelor's degree with Mathematics and Physics as subjects and anyone of the following subjects: Chemistry, Geology, Statistics, Electronics and Computer Science.
Mathematics(MA)	Integrated Ph.D. in Mathematical Sciences	IISc Bangalore	Bachelor's degree in science or engineering with mathematics as a subject for three years/ six semesters.
	Integrated Ph.D. in Biological Sciences	IISc Bangalore	Bachelor's degree in Biology or Chemistry or Physics or Mathematics with Biology at the Higher Secondary (10+2) level.
	M.Sc. Mathematics	IITB, IITD, IITGN, IITH, IITK, IITM	Bachelor's degree with Mathematics as a subject for at least two years/four semesters.
	Joint M.Sc.-Ph.D. Programme in Mathematics	IITBBS, IITKgp	Bachelor's degree with Mathematics / Statistics as a subject for at least two years/four semesters.
	M.Sc. Mathematics & Computing	IITG	
	M.Sc. Applied Mathematics	IITR	
	M.Sc. Industrial Mathematics and Informatics	IITR	
	M.Sc.- Ph.D. Dual Degree in Operations Research	IITB	

Test Paper (Test paper code)	Academic Programme(s)	Institute(s)	Minimum Educational Qualification(s) for admission
	M.Sc.- Ph.D. Dual Degree in Environmental Science & Engineering	IITB	Bachelor's degree with any one of Biology, Biotechnology, Chemistry, Mathematics and Physics for two years/four semesters, and any one of the other four subjects for at least one year/two semesters. The candidate should have passed Mathematics at (10 + 2) level.
	M.Sc.- Ph.D. Dual Degree Programme in Energy	IITB	Bachelor's degree with any one of Chemistry, Mathematics and Physics for two years/four semesters and any one of the remaining two subjects for at least one year/ two semesters.
Mathematical Statistics(MS)	M.Sc. Applied Statistics and Informatics	IITB	Bachelor's degree with either Mathematics or Statistics as a subject for at least two years or four semesters.
	M.Sc.- Ph.D. Dual Degree in Operations Research	IITB	
	M.Sc. Statistics	IITK	Bachelor's degree with Statistics as a subject for at least two years or four semesters
PHYSICS (PH)	Integrated Ph.D. in Physical Sciences	IISc Bangalore	B.Sc. or equivalent degree with Physics as one of the main subjects.
	Integrated Ph.D. in Biological Sciences	IISc Bangalore	Bachelor's degree in Biology or Chemistry or Physics or Mathematics. The candidates should have passed Biology at the Higher Secondary (10+2) level.
	Integrated Ph.D. in Chemical Sciences	IISc Bangalore	B.Sc. or an equivalent degree with Chemistry as one of the subjects. The candidates should have passed mathematics at the PUC or+2 level.
	Joint M.Sc.-Ph.D. Programme in Physics	IITBBS, IITKgp	Bachelor's degree with Physics as a subject for at least two years/four semesters and Mathematics for at least one year/two semesters.
	M.Sc. Physics	IITB, IITD, IITG, IITH, ITI, IITK, IITM, IITR	
	M.Sc.- Ph.D. Dual Degree Programme in Physics	IITB, IITK	
	M.Sc. (Physics) - M.Tech. Materials Sciences with specialization in Nano-Science & Tech.)	IITB	
	M.Sc.- Ph.D. Dual Degree Programme in Energy	IITB	
	M.Sc.- Ph.D. Dual Degree Programme in Environmental Science & Engineering	IITB	Bachelor's degree with any one of Biology, Biotechnology, Chemistry, Mathematics and Physics for two years/four semesters, and any one of the other four subjects for at least one year/two semesters. The candidate should have passed Mathematics at (10 + 2) level.
	M.Sc.- Ph.D. Dual Degree Programme in Biotechnology	IITB	Bachelor's degree in any branch of Science/ Agriculture / Pharmacy / Veterinary / Engineering / Medicine (MBBS).The candidate should have passed Mathematics at the (10+2) level.

Appendix–III: EXAMINATION CITIES / TOWNS FOR JAM 2013

IISc, Bangalore Zone

Test City	Code
Bengaluru	101
Hubli	102
Hyderabad	103
Kozhikode	104
Mangalore	105

IIT Bombay Zone

Test City	Code
Ahmedabad	201
Goa	202
Mumbai	203
Nagpur	204
Nanded	205
Pune	206
Vadodara	207

IIT Delhi Zone

Test City	Code
Delhi Central	301
Delhi East	302
Delhi North	303
Delhi South	304
Delhi West	305
Faridabad	306
Gurgaon	307
Indore	308
Jaipur	309
Jodhpur	310

IIT Guwahati Zone

Test City	Code
Agartala	401
Asansol	402
Bhagalpur	403
Dhanbad	404
Durgapur	405
Gangtok	406
Guwahati	407
Imphal	408
Itanagar	409
Jorhat	410
Kalyani	411
Patna	412
Silchar	413
Siliguri	414
Tezpur	415

IIT Kanpur Zone

Test City	Code
Agra	501
Allahabad	502
Bareilly	503
Bhopal	504
Gorakhpur	505
Jabalpur	506
Jhansi	507
Kanpur	508
Lucknow	509
Varanasi	510

IIT Kharagpur Zone

Test City	Code
Bhubaneswar	601
Jamshedpur	602
Kakinada (AP)	603
Kharagpur	604
Kolkata	605
Raipur	606
Ranchi	607
Rourkela	608
Vijayawada	609
Visakhapatnam	610

IIT Madras Zone

Test City	Code
Chennai North	701
Chennai South	702
Coimbatore	703
Ernakulam	704
Kadapa	705
Madurai	706
Nellore	707
Thiruvananthapuram	708
Tiruchirapalli	709

IIT Roorkee Zone

Test City	Code
Amritsar	801
Chandigarh	802
Haldwani	803
Jammu	804
Kurukshetra	805
Noida	806
Roorkee	807
Shimla	808

Appendix-IV

AUTHORITIES WHO MAY ISSUE SC / ST / OBC (NON CREAMY LAYER) CERTIFICATES

SC/ST/OBC (non creamy layer) candidates should submit a certificate issued by any of the following authorities:

District Magistrate / Additional District Magistrate / Collector / Deputy Commissioner / Additional Deputy Commissioner / Deputy Collector / 1st Class Stipendary Magistrate / Sub-Divisional Magistrate / Taluka Magistrate / Executive Magistrate / Extra Assistant Commissioner (not below the rank of 1st class Stipendary Magistrate) / Chief Presidency Magistrate / Additional Chief Presidency Magistrate / Presidency Magistrate / Revenue Officer not below the rank of Tehsildar / Sub-Divisional Officer of the area where the candidate and / or his / her family normally resides / Administrator / Secretary to Administrator / Development Officer (Lakshadweep Island).

(Certificate issued by any other authority will be rejected)

IMPORTANT NOTE

- In all matters concerning JAM 2013, the decision of the **Organising Institute** or the **Organising Chairman, JAM 2013** will be final and binding on all the applicants.
- Although JAM 2013 is held at different centres across country, **Indian Institute of Technology Delhi** is the **Organising Institute**, and has the overall responsibility of conducting JAM 2013. In case of any claims or disputes arising in respect of JAM 2013, it is hereby made absolutely clear that the Delhi High Court alone shall have the exclusive jurisdiction to entertain and settle any such disputes and claims.

Appendix-V
Proforma for Other Backward Class (Non-Creamy Layer) Certificate

**(CERTIFICATE TO BE PRODUCED BY OTHER BACKWARD CLASSES APPLYING FOR ADMISSIONS TO
CENTRAL EDUCATIONAL INSTITUTIONS (CEIs), UNDER THE GOVERNMENT OF INDIA)**

This is to certify that Shri/Smt./Kum. _____ Son/Daughter
of Shri/Smt. _____ of Village/Town _____
District/Division _____ in the _____ State belongs to the
_____ Community which is recognized as a backward class under:

- (i) Resolution No. 12011/68/93-BCC(C) dated 10/09/93 published in the Gazette of India Extraordinary Part I Section I No. 186 dated 13/09/93.
- (ii) Resolution No. 12011/9/94-BCC dated 19/10/94 published in the Gazette of India Extraordinary Part I Section I No. 163 dated 20/10/94.
- (iii) Resolution No. 12011/7/95-BCC dated 24/05/95 published in the Gazette of India Extraordinary Part I Section I No. 88 dated 25/05/95.
- (iv) Resolution No. 12011/96/94-BCC dated 9/03/96.
- (v) Resolution No. 12011/44/96-BCC dated 6/12/96 published in the Gazette of India Extraordinary Part I Section I No. 210 dated 11/12/96.
- (vi) Resolution No. 12011/13/97-BCC dated 03/12/97.
- (vii) Resolution No. 12011/99/94-BCC dated 11/12/97.
- (viii) Resolution No. 12011/68/98-BCC dated 27/10/99.
- (ix) Resolution No. 12011/88/98-BCC dated 6/12/99 published in the Gazette of India Extraordinary Part I Section I No. 270 dated 06/12/99.
- (x) Resolution No. 12011/36/99-BCC dated 04/04/2000 published in the Gazette of India Extraordinary Part I Section I No. 71 dated 04/04/2000.
- (xi) Resolution No. 12011/44/99-BCC dated 21/09/2000 published in the Gazette of India Extraordinary Part I Section I No. 210 dated 21/09/2000.
- (xii) Resolution No. 12015/9/2000-BCC dated 06/09/2001.
- (xiii) Resolution No. 12011/1/2001-BCC dated 19/06/2003.
- (xiv) Resolution No. 12011/4/2002-BCC dated 13/01/2004.
- (xv) Resolution No. 12011/9/2004-BCC dated 16/01/2006 published in the Gazette of India Extraordinary Part I Section I No. 210 dated 16/01/2006.

Shri/Smt./Kum. _____ and/or his family ordinarily reside(s) in the
_____ District/Division of _____ State. This is also to certify

that he/she does not belong to the persons/sections (Creamy Layer) mentioned in Column 3 of the Schedule to the Government of India, Department of Personnel & Training O.M. No. 36012/22/93-Estt.(SCT) dated 08/09/93, modified vide OM No. 36033/3/2004 Estt.(Res.) dated 09/03/2004, or the latest notification of the Government of India.

This certificate is being issued based on the annual income / status of the parents / guardian of the applicant as on financial year ending March 31, 2012.

Dated:

Seal

NOTE:

- (a) The term 'Ordinarily' used here will have the same meaning as in Section 20 of the Representation of the People Act, 1950.
- (b) The authorities competent to issue Caste Certificates are indicated below:
 - (i) District Magistrate / Additional Magistrate / Collector / Deputy Commissioner / Additional Deputy Commissioner / Deputy Collector / Ist Class Stipendiary Magistrate / Sub-Divisional Magistrate / Taluka Magistrate / Executive Magistrate / Extra Assistant Commissioner (not below the rank of 1st Class Stipendiary Magistrate).
 - (ii) Chief Presidency Magistrate / Additional Chief Presidency Magistrate / Presidency Magistrate.
 - (iii) Revenue Officer not below the rank of Tehsildar and
 - (iv) Sub-Divisional Officer of the area where the candidate and / or his/her family resides.

The date of issue of OBC (NCL) certificate should be after 31 March, 2012

District Magistrate/
Deputy Commissioner, etc.

IMPORTANT DATES FOR JAM 2013

Issue of OMR Application Form and Information Brochure at Canara Bank Counters	20 September, 2012 (Thursday)
Commencement of Online Application	20 September, 2012 (Thursday)
Last date for issue of OMR Application Form and Information Brochure at Canara Bank Counters	20 October, 2012 (Saturday)
Last date for Online Application on the website / website closure.	23 October 2012, (Tuesday) at 18:00 hrs
Last date for receipt of completed OMR Application Form along with Pay-in-slip and Demand Draft (if any) at IIT Delhi	30 October, 2012 (Tuesday)
Last date for receipt of completed Online Application Form along with Demand Draft at IIT Delhi	30 October, 2012 (Tuesday)
Date of JAM 2013 Test	10 February, 2013 (Sunday)
Announcement of the Results of JAM 2013	10 April, 2013 (Wednesday) at 17:00 hrs
Submission of ONLINE Application Form, for admission at the website of IIT Delhi	12 April 2013 - 19 April 2013 (website closes at 17:00 hrs)
Last date for receipt of completed application forms for admission along with Demand Draft of Rs. 300/- at IIT Delhi	30 April, 2013 (Tuesday)
Interview at IISc / IITB / IITK (<i>candidates are advised to refer to the respective institute websites for further details</i>)	10 May 2013 - 22 May 2013
Declaration of First Admission List	31 May, 2013 (Friday) at 17:00 hrs
Declaration of Second Admission List	24 June, 2013 (Monday) at 17:00 hrs

CONTACT DETAILS OF JAM OFFICES

Institute	Email	Website	Phone / Fax
IISc, Bangalore, Bengaluru - 560 012	jam@gate.iisc.ernet.in	gate.iisc.ernet.in/jam	(080) 22932392/23601227
IIT Bombay, Powai, Mumbai - 400 076	jam@iitb.ac.in	www.iitb.ac.in/jam	(022) 25767022 / 25722674
IIT Delhi, Hauz Khas, New Delhi-110 016	jam@admin.iitd.ac.in	http://gate.iitd.ac.in/jam	(011) 26591749 / 26581579
IIT Guwahati, Guwahati - 781 039	jam@iitg.ernet.in	www.iitg.ernet.in/jam	(0361) 2582751 / 2582755
IIT Kanpur, Kanpur - 208 016	jam@iitk.ac.in	www.iitk.ac.in/jam	(0512) 2597412 / 2590932
IIT Kharagpur, Kharagpur - 721 302	gate2013@adm.iitkgp.ernet.in	www.gate.iitkgp.ac.in/jam	(03222) 282091 / 278243
IIT Madras, Chennai - 600 036	jam@iitm.ac.in	jam.iitm.ac.in	(044) 22578200 / 22578204
IIT Roorkee, Roorkee - 247 667	jam@iitr.ernet.in	www.iitr.ac.in/jam	(01332) 284531 / 285707