PANJAB UNIVERSITY CHANDIGARH

**(Established under the Panjab University Act VII of 1947-
Enacted by the Government of India)**

PROSPECTUS
CET-2012

Date of Test: 27th May 2012

CET FEE:
General Category Rs. 1800/-
SC/ST Category Rs. 900/-

PANJAB UNIVERSITY ANTHEM

तमसो मा ज्योतिर्गमय:	Tamso ma jyotirgamaya:
तमसो मा ज्योतिर्गमय:	Tamso ma jyotirgamaya:
तमसो मा ज्योतिर्गमय:	Tamso ma jyotirgamaya:
तमसो मा ज्योतिर्गमय:	Tamso ma jyotirgamaya:
पंजाब विश्वविद्यालय	Panjab vishaw vidyalaya
तेरी शान-ओ-शौक़त सदा रहे	Teri shaan-o-shauqat sada rahe
मन में तेरा आदर मान	Mann mein tera aadar maan
और मोहब्बत सदा रहे	Aur mohabbat sada rahe
पंजाब विश्वविद्यालय	Panjab vishaw vidyalaya
तेरी शान-ओ-शौक़त सदा रहे	Teri shaan-o-shauqat sada rahe
तू है अपना भविष्य विधाता	Tu hai apna bhavishya vidhata
पंख बिना परवाज़ सिखाता	Pankh bina parwaaz sikhata
जीवन पुस्त□ रोज़ पढ़ा □र	Jeevan pustak roz padha kar
सही गलत □ी समझ बढ़ाता	Sahi galat ki samajh badhata
जीवन पुस्त□ रोज़ पढ़ा □र	Jeevan pustak roz padha kar
सही गलत □ी समझ बढ़ाता	Sahi galat ki samajh badhata
तेरी जय □ा शंख बजायें	Teri jai ka shankh bajayein
रौशन तारे बन जायें	Roshan tare ban jaayein
वखरी तेरी शोहरत	Vakhari teri shohrat
तेरी शोहरत सदा सदा रहे	Teri shohrat sada sada rahe
पंजाब विश्वविद्यालय	Panjab vishaw vidyalaya
तेरी शान-ओ-शौक़त सदा रहे	Teri shaan-o-shauqat sada rahe
पंजाब विश्वविद्यालय	Panjab vishaw vidyalaya
तेरी शान-ओ-शौक़त सदा रहे	Teri shaan-o-shauqat sada rahe
तमसो मा ज्योतिर्गमय:	Tamso ma jyotirgamya:
तमसो मा ज्योतिर्गमय:	Tamso ma jyotirgamaya:

CONTENTS

		Page
1.	Important Information	4
2.	Information about Test and Admission	5
3.	Part A: Eligibility Conditions	7
4.	Part B: General Rules	14
5.	Appendix I-V	19-55
6.	Dates/Information for CET-2012/ Enquiries regarding admission	56-58
7.	Procedure and steps for filling Online application form	59

- **Admission Form for B.A.LL.B. / B.Com. LLB. (Hons.) Five Year Integrated Course, B. Pharm. and B.Sc. (Hons. School) shall be available online on Panjab University website (http://cetadmissions.puchd.ac.in) after declaration of result of CET entrance test.**

- **Result card can be downloaded from the Panjab University website. No separate Result Cards will be issued.**

IMPORTANT INFORMATION

1. The candidates who have passed/appeared in 10+2 Examinations of Mahila Gram Vidyapith, Allahabad are ineligible to appear in the Common Entrance Test, as this institution has been derecognised by Panjab University, Chandigarh.
2. The candidates having compartment in 10+2 examination held in March-2012 will not be eligible for admission in the course. The candidates who do not appear in CET or who do not qualify CET shall not be considered for admission.

Admission Form: **To be submitted only by the CET-2012 qualified candidates online latest by July 02, 2012 (Monday) upto 5.00 pm as per the guidelines displayed on the Panjab University Website.**

3. **The candidates who are applying under the Sports Category should follow the website admissions.puchd.ac.in for procedures and guidelines.**
4. Candidates who wish to claim weightages on the basis of NCC, NSS, ADULT EDUCATION, YOUTH FESTIVAL and other activities should follow the guidelines displayed on the Panjab University website
5. **The maximum qualifications of a writer for a blind candidate for the entrance test is Matric. The writer should not have passed the mentioned qualifications one year prior to the examination. The candidate should contact the Assistant Registrar, CET Cell ten days before the commencement of the entrance test for the arrangement of writer and other formalities.**
6. **The result of the entrance test will be available on the University website. No separate Result Cards will be issued. Only the eligible candidates can apply for the admission.**
7. **Candidates seeking admission to M. B. B. S., B.D.S., B. A. M. S. and B. H. M. S. will have to apply separately by 22.06.2012 (Friday). They are advised to contact Director Principal, Govt. Medical College and Hospital, Sector 32, Chandigarh for further information.**

PANJAB UNIVERSITY, CHANDIGARH

INFORMATION ABOUT TEST AND ADMISSION

The Panjab University will hold Common Entrance Test on **May 27, 2012 (Sunday)** in Chandigarh for admission to the following courses:

Sr. No.	Courses	Institution(s)/Department(s) offering the Course
1.	B.A. LL.B/B.Com. LL.B (Hons.) 5 years Integrated Course	University Institute of Legal Studies, P.U., Chandigarh.
2.	B.A. LL.B. (Hons.) 5 Years Integrated Course	i) Panjab University Regional Centre, Ludhiana ii) UILS, Swami Sarvanand Giri, P.U., Regional Centre, Hoshiarpur
3.	M.B.B.S.	Govt. Medical College and Hospital, Sector 32-A, Chandigarh (Affiliated College)
4.	B.D.S. (Subject to the approval of the Government)	Dr. Harvansh Singh Judge Institute of Dental Sciences, Panjab University, Chandigarh
5.	B.A.M.S. (subject to the final decision of CWP No. 8697 of 2009 by the Hon'ble Punjab and Haryana High Court and /or any further orders therein).	Shri Dhanwantry Ayurvedic College, Sector-46 Chandigarh
6.	B.H.M.S. (subject to the grant of affiliation by the Panjab Unversity)	Homoeopathic Medical College, Sector, 26, Chandigarh
7.	B. Pharm.	University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh
8.	B.Sc. (Hons. School Semester System) in the subjects of: 1. Anthropology 2. Bio-Chemistry 3. Bio-Physics 4. Biotechnology 5. Botany 6. Chemistry 7. Geology 8. Microbiology 9. Mathematics 10. Mathematics & Computing 11. Physics 12. Physics & Electronics 13. Zoology	Respective Science Departments of Panjab University, Chandigah

Notes:

(i) The Chandigarh Administration has authorised the Panjab University to hold Entrance Test for admission to courses mentioned at Sr. Nos. 3, 5 & 6 through, Department of Medical Education & Research notification No. 2/83-FII (6)/-FII(6)/2010/2591 dated 09.03.2012.

(ii) I.N.M.O. (Indian National Mathematical Olympiad) Awardees can join B.Sc. (Hons. School) Department of Mathematics, without appearing in the Common

Entrance Test.

(iii) **Admission to M.B.B.S. at Govt. Medical College and Hospital, Sector 32-A, Chandigarh, B.D.S. at Panjab University, Chandigarh, B.A.M.S.at Shri Dhanwantry Ayurvedic College, Sector-46 Chandigarh, and B.H.M.S.at Homoeopathic Medical College, Sector, 26, Chandigarh will be centralized at Govt. Medical College and Hospital, Sector-32/A, Chandigarh. The candidates seeking admission in the colleges/courses mentioned at Sr. No. 3,4,5 & 6 above will have to apply directly and independently in the Govt. Medical College and Hospital, Sector-32, Chandigarh. The admission forms will be available from Govt. Medical College and Hospital, Sector-32/A, Chandigarh w.e.f. 01.06.2012 (Friday).**

(iv) **All the desirous candidates seeking admission for Courses at Sr. 1, 2, 7 & 8 above, should follow the website admissions.puchd.ac.in for procedures and guidelines for admissions. No letter will be issued for the purpose. The information will be made available on website on or before the date of declaration of results.**

Part A: ELIGIBILITY CONDITIONS

For appearing in test

All those candidates who have passed/appeared (up to the Academic Session 2011-2012) in the 10+2 Examination of the Central Board of Secondary Education, New Delhi or its equivalent Examination conducted by a recognized Board/University/Council shall be eligible to appear in the Common Entrance Test - 2012. The admission of candidates for the Common Entrance Test shall be provisional. It shall stand cancelled, if they fail to satisfy the requisite eligibility conditions as required by the concerned institution(s)/University by the date fixed for the purpose.

SPECIAL NOTE

The candidates who have passed/appeared in 10+2 Examinations of Mahila Gram Vidyapith, Allahabad are ineligible to appear in the Common Entrance Test, as this institution has been derecognised by Panjab University, Chandigarh. The examination conducted by the Board of Higher Secondary Education, Delhi, included in the booklet of recognised exams, have also been deleted from the Booklet.

For Admission to

(A) Medical Colleges situated in Chandigarh

(1) M.B.B.S. in Govt. Medical College and Hospital, Sector - 32/A, Chandigarh

There are 50 seats in admission to MBBS Course, categories as under:-

i)	U.T. Chandigarh Pool : (85%): General Category seats Scheduled Caste seats Physically Handicapped	43 seats 30 or 31 (rotational basis) 07 01 or 02 (rotational basis)
ii)	All India Pool seats: (15%)	07
iii)	NRI seats	03
iv)	Centre Govt. Nomination seat	01
	TOTAL	50

The eligibility criteria for admission to **MBBS course** for **U.T. Pool**, is as follows:-

The test shall be open to all candidates who-

a) Attain the age of 17 years on or before 31st December 2012

b) Have Passed 10+2 (12th class) examinations from Schools/Colleges recognized by the Chandigarh Administration and situated in the UT of Chandigarh as regular students of the said Schools/ Colleges. He / She should have passed in the subject of Physics, Chemistry, Biology and English individually, and must also have obtained a minimum of 50% marks in the aggregate of Physics, Chemistry and Biology at 10+2 level in the **first attempt.** Admission will be based on merit in CET. However, in the case of members of the Scheduled Castes relaxation in marks not exceeding 10% shall be allowed. Or

c) Are due to appear in +2 (12th class) examination in March, 2012, but whose result has not been declared, the admission of such candidates to the test shall be provisional. It shall stand cancelled if they fail to pass qualifying examination securing the prescribed percentage of marks. Such candidates will not have

any claim, whatsoever, with regard to their admission to the said course. Other eligibility conditions remain the same as in (b) above.

NOTE: As per the amended Regulation of Medical Council of India, the eligibility criteria for admission to MBBS course is 50% for General Category; 40% for SC/ST and 45% for Physically Handicapped (in qualifying examination & the competitive entrance examination i.e. Physics, Chemistry & Biology) *(Subject to the approval of the various Academic Bodies).*

(2). B.A.M.S. (Shri Dhanwantri Ayurvedic College, Sector 46-B, Chandigarh): 42 seats

The eligibility criteria for admission to B.A.M.S. Course is as follows:-
The test shall be opened to all such candidates as :-

a) Attain the age of 17 years on or before 31st December, 2012.

b) Have passed 10+2 examination from recognised Boards/ Bodies/ Councils or any other examination recognised as equivalent to 10+2 examination by the Panjab University with Physics, Chemistry and Biology obtaining at least 50% marks in the aggregate, provided he/she is qualified in English of 10+2 Standard. Admission will be based on Merit in CET. However, in the case of members of the Scheduled Castes, relaxation in marks not exceeding 10% shall be allowed; or

c) Are due to appear in +2 (12th class) examinations in March, 2012, but their admission to the test shall be provisional, which shall stand cancelled if they fail to pass qualifying examination securing the prescribed percentage of marks. Such candidates will not have any claim, whatsoever, with regard to their admission to the said course. Other eligibility conditions remain the same as in (b) above.

3. B.H.M.S. (Homeopathic Medical College, Sector 26, Chandigarh): (42 seats)

The eligibility criteria for admission to B.H.M.S. Course are as follows:-

The test shall be open to all such candidates as:-

a) Attain the age of 17 years on or before 31st December 2012.

b) Have passed 10+2 examination from a recognised Board/Bodies/Councils or any other examination recognised as equivalent to 10+2 examination by the Panjab University with Physics, Chemistry and Biology. Admission will be based on Merit in CET. Or

c) Are due to appear in +2 (12th class) examination in March, 2012, but their admission to the test shall be provisional, which shall stand cancelled if they fail to pass qualifying examination. Such candidates will not have any claim, whatsoever, with regard to their admission to the said course. Other eligibility conditions remain the same as in (b) above.

Annual tuition fee, etc. for each course will be according to the notification issued by the Chandigarh Administration from time to time. Admission in above said categories will be strictly on merit of Common Entrance Test except NRI Seats for admission to M.B.B.S./B.A.M.S./B.H.M.S. Courses for which the admission will be made on the basis of inter-se merit of the candidates in the qualifying examination without the need for appearing the CET. The students who have passed their +2 examination from Open Schools are not eligible for MBBS Course.

NOTE: All the candidates belonging to NRI category shall apply for admission to the concerned college/ management.

BDS in Dr. Harvansh Singh Judge Institute of Dental Sciences, Panjab University, Chandigarh. (subject to approval by Dental Council of India)

Admission to 100 seats in the BDS (Dr Harvansh Singh Judge Institute of Dental Sciences, Panjab University, Sector 25, Chandigarh) course shall be **strictly on merit as determined in the Common Entrance Test-2012.** For this course, 15 seats are reserved for NRI candidates. Of the balance **85** seats 2 seats are reserved from Hoshiarpur District preferably of Jaj (Judge) community, 22.5% shall be for SC/ST category and other shall be treated as belonging to Open Category.

** In case none of the candidates from Hoshiarpur District preferably of Jaj (Judge) community is available, these seats would be filled through open merit.*

Candidates desirous of seeking admission under the category of Foreign Nationals/ Persons of Indian Origin (PIO) / NRI seats, who are present in India at the time of test, will compete amongst themselves by appearing in the Common Entrance Test-2012. Foreign Nationals / NRI candidates, those living abroad shall be admitted on basis of their Scholastic Aptitude Test II (SAT-II) and have to comply with the requirements of Govt. of India, if any, as well as Panjab University, Chandigarh as prescribed for them from time to time.

The eligibility criteria for admission to B.D.S. Course is as under:-

a) *A candidate who has attained the age of 17 years on or before December 31st, 2012*

b) Candidate having passed 10+2 examination of the Punjab School Education Board / CBSE, New Delhi or its equivalent examination conducted by a recognised Board / University/ Council, as recognised by the syndicate with at least 50% marks in the aggregate of Physics, Chemistry and Biology (Botany and Zoology) provided he/she has qualified in English of 10+2 standard. However, for students belonging to reserved category (SC/ST), the minimum marks for admission shall be 40% as per rules and regulations of Dental Council of India.

c) Candidates who are due to appear in 10+2 (12th class) examination in March 2012, but whose result has not been declared, the admission of such candidates to the test shall be provisional. It shall stand cancelled, if they fail to pass the qualifying examination securing the prescribed percentage of marks. Such candidates will not have any claim, whatsoever, with regard to their admission in the said course.

Distribution of seats for BDS:

Total Seats	Foreign National/ PIO/NRI	Other Categories				
		Balance Seats	Gen	Reserved for candidates from Hoshiarpur District preferably of Jaj (judge) Community.	SC (15%)	ST (7.5%)
100	15*	85	64	2	13	06

***For admission to BDS course the seats under** Foreign National/PIO/NRI category, if fall vacant, will be converted into open category as these seats are within the sanctioned no. of seats by the DCI.

The concession to the wards of Kashmiri Displaced persons and additional seats for Only (Single) Girl Child and Cancer, Aids Patients is not applicable to the students falling under regulatory agencies such as MCI, DCI and NCTE.

B. Courses in Panjab University Teaching Departments and Institutions. Merit will be prepared as under:

(i)	**Weightages for admission to B. Pharm. and B.Sc. (Hons School):**	Qualifying Examination (+2): 25% Common Entrance Test 75%
(ii)	**Weightages for admission to B.A. LL.B/B.Com. LL.B (Hons.) 5 years Integrated Course,**	Qualifying Examination (+2): 50% Common Entrance Test: 50%

Course	Eligibility
B.A. LL.B (Hons.) 5 years Integrated Course	**a)** Candidates should have passed 10+2 examination with at least 50% marks (45% marks in case of SC/ST/BC) from any recognized Board/University (However, the candidates qualification 10+2 through Open Universities system **directly without having any basic qualification for prosecuting such studies are not eligible for admission in the law courses….”** Bar council of India communication No. Le:cir:02/2010 dated 20.12.2010
B.Com. LL.B (Hons.) 5 years Integrated Course	**a(i)** Candidates should have passed 10+2 examination in commerce with at least 50% marks (45% marks in case of SC/ST/BC) from any recognized Board/University (However, the candidates qualification 10+2 through Open Universities system **directly without having any basic qualification for prosecuting such studies are not eligible for admission in the law courses….”** Bar council of India communication No. Le:cir:02/2010 dated 20.12.2010 **b)** The candidate must not be above 20 years of age as on 1st November of the year in which admission is sought to the First Semester (22 years in case of SC/ST) **and other backward communities)’** *Clause 28 of Schedule III of Bar Council of India Rules of Legal Education, 2008.’* **c)** The admission shall be on the merit of Entrance test and 10 + 2 marks. No candidate shall be eligible for admission to B.A. / B.Com. LL.B.(Hons.) Ist Semester unless he/she appears in the entrance test of the relevant year of admission. A student who falls short of lectures in the Ist Semester shall be eligible for admission again through the entrance test provided he/she fulfils all other eligibility conditions.
B. Pharm.	Should have passed 10+2 examination with at least 50% marks (45% marks in case of SC/ST/BC) with Physics and Chemistry as compulsory subjects along with one of the following subjects: Mathematics / Biotechnology / Computer Science / Biology

B. Sc. (Hons. School Semester System) in various teaching Departments

Botany Microbiology Zoology	Should have passed 10+2 examination with at least 50% marks (45% marks in case of SC/ST/BC) with Physics, Chemistry, Biology and English
Anthropology Chemistry Geology Physics Physics & Electronics	Should have passed 10+2 examination with at least 50% marks (45% marks in case of SC/ST/ BC) with English, Physics, Chemistry, Mathematics / Biology
Biochemistry	Should have passed 10+2 examination with at least 50% marks (45% marks in case of SC/ST/ BC) with English, Physics, Chemistry, Mathematics/ Biology/ Biotechnology
Biotechnology Biophysics	Should have passed 10+2 examination with at least 50% marks (45% marks in case of SC/ST/ BC) with English, Physics, Chemistry, Mathematics / Biology / Biotechnology / Computer Science
Mathematics Mathematics & Computing	Should have passed 10+2 examination with at least 50% marks (45% marks in case of SC/ST/ BC) with Mathematics as one of the subjects

Seats available*

Name of Course	Open	Foreign Nationals / PIO / NRI
B.D.S.	85	15
B.A. LL.B (Hons.) 5 years Integrated Course at University Institute of Legal Studies, Panjab University, Chandigarh.	120	12
B.Com. LL.B (Hons.) 5 years Integrated Course at University Institute of Legal Studies, Panjab University, Chandigarh.	60*	6*
B. A.L L.B. (Hons.) Five year Integrated Course at P.U. Regional Centre, Ludhiana	87	08
B. A.L L.B. (Hons.) Five year Integrated Course at UILS, Swami Sarvanand Giri, P.U. Regional Centre, Hoshiarpur	50	08
B. Pharm.	46	06
B.Sc. (Hons. School) Anthropology	30	04
B.Sc. (Hons. School) Biochemistry	30	04
B.Sc. (Hons. School) Biophysics	30	04
B.Sc. (Hons. School) Biotechnology	15	02
B.Sc. (Hons. School) Botany	20	03
B.Sc. (Hons. School) Chemistry	58	08
B.Sc. (Hons. School) Geology	30	04
B.Sc. (Hons. School) Mathematics	25	04
B.Sc. (Hons. School) Mathematics & Computing	15	02
B.Sc. (Hons. School) Microbiology	29	04
B.Sc. (Hons. School) Physics	46	06
B.Sc. (Hons. School) Physics & Electronics	23	03
B.Sc. (Hons. School) Zoology	25	04

**60 seats out of 180 be reserved for B.Com. LL.B. (Hons.) 5 years Integrated course and 120 seats be reserved for B.A.LL.B. (Hons.) 5 years Integrated Course subject to the reservation as per Panjab University Rules.*

. These seats are subject to approval of the Syndicate.

Candidates desirous of seeking admission under the category of Foreign Nationals / Persons of Indian Origin (PIO) / NRI seats to B.A. LL.B/B.Com. LL.B (Hons.) Five year Integrated Course, B. Pharm. and B.Sc. (Honours School) courses, who are present in India at the time of test, will compete amongst themselves by appearing in the Common Entrance Test-2012. Foreign Nationals / Persons of Indian Origin (PIO) / NRI candidates, those living abroad shall be admitted on basis of their Scholastic Aptitude test II (SAT-II) and have to comply with the requirements of Govt. of India, if any, as well as Panjab University, Chandigarh as prescribed for them from time to time.

Part B: GENERAL RULES FOR THE TEST

1. **THE RESULT OF THE ENTRANCE TEST SHALL, *IPSO FACTO*, NOT ENTITLE A CANDIDATE TO GET ADMISSION IN AN INSTITUTION/DEPARTMENT CONCERNED WHERE HE/SHE INTENDS TO SEEK ADMISSION. IT WILL BE THE TOTAL RESPONSIBILITY OF THE CANDIDATE TO MAKE SURE ABOUT HIS/HER ELIGIBILITY AND FULFILMENT OF SUCH OTHER CONDITIONS AS MAY BE PRESCRIBED FOR ADMISSION IN THE RULES AND REGULATIONS OF UNIVERSITY/INSTITUTION CONCERNED. MERELY BECAUSE A CANDIDATE IS ALLOWED TO APPEAR IN THE ENTRANCE TEST DOES NOT MEAN THAT HE/SHE IS ELIGIBLE AND HIS/ HER APPEARANCE THEREIN WILL NOT ESTOP OR DEBAR THE UNIVERSITY/ INSTITUTION CONCERNED FROM SATISFYING ITSELF ABOUT HIS/HER ELIGIBILITY AT ANY SUBSEQUENT STAGE (SEE RULE 28).**
2. The Common Entrance Test will be held at **CHANDIGARH ONLY** on **Sunday May 27, 2012**.
3. IN NO CASE, THE FEE FOR THE ENTRANCE TEST ONCE PAID, SHALL BE REFUNDED.
4. The test will be conducted in the subjects of, (i) Legal and General Awareness (ii) Physics, (iii) Chemistry (iv) Biology (v) Mathematics (vi) Biotechnology and (vii) Computer Science as per date sheet. The scheme of the Common Entrance Test is given below:

   For B.A. LL.B/B.Com. LL.B (Hons.) 5 years Integrated Course; there shall be one objective type paper entitled 'Legal and General Awareness'. The paper will consist of 100 questions of one mark each. Of these, 60 questions will be for testing General Knowledge and Current Affairs, 20 for testing Aptitude for Law, 10 for testing Mental Ability and rest of 10 questions will be for testing Proficiency in English Language. Total time allocated to this paper will be 90 minutes. The Question Papers will be available in English, Hindi and Punjabi (except for the portion "proficiency in English Language"). However, the medium of instruction for teaching and semester examination will be English only.

For every wrong answer, 25% i.e. ¼ mark allotted to the question will be deducted.

Name of the Subject	Number of Questions	Marks allotted to each Question	Total Marks for the paper	Duration of the Paper
Paper–I Legal and General Awareness	100	1	100	90 minutes
Paper-II Physics	60	2	120	70 minutes
Paper-III Chemistry	60	2	120	70 minutes
Paper-IV Biology	60	2	120	70 minutes
Paper-V Mathematics	60	2	120	70 minutes
Paper-VI Biotechnology	60	2	120	70 minutes
Paper-VII Computer Science	60	2	120	70 minutes

The syllabi are given in *Appendix I.*

The candidate will be required to choose a suitable combination of subjects depending on his/her choice of the course(s) and subjects he/she has studied in 10 +2. Possible combinations are given in Appendix II.

5. The medium of examination shall be **ENGLISH** only except in the case B.A. LL.B/B.Com. LL.B (Hons.) 5 years Integrated Course.
6. The candidates shall be required to answer questions on the **OMR Answer-sheet** provided for the purpose only, strictly following all the rules/ norms as stated on the Question Booklet and the Answer-sheet and in *Appendix III*.
7. The candidates shall be required to hand-over both the Question booklet and OMR Answer-sheet to the Centre Superintendent when the time allotted to each paper is over. No candidate shall be allowed to leave the examination hall/room before the expiry of the time allotted for the examination.
8. The candidates shall be required to hand over their OMR answer-sheets and the question booklet to the Centre Superintendent even if they have not attempted any question. No page/part of the Question paper/OMR Answer-sheet is to be removed/torn/taken out of the Examination Centre under any circumstances, failing which the candidates shall be straight away disqualified for the entire entrance test.
9. The use of calculator is not allowed in any subject/paper.
10. The University will provide logarithmic table. Borrowing or carrying of log table or other material is not allowed.
11. Rough work, if any, is to be done only in the space provided in the question booklet and nowhere else. No rough work shall be done on the OMR Answer-sheet under any circumstances, failing which the same shall be cancelled.
12. ANY CANDIDATE WHO CARRIES ANY TELECOMMUNICATION EQUIPMENT SUCH AS PAGER, CELLULAR/CORDLESS PHONE, WIRELESS SET ETC. INSIDE THE EXAMINATION HALL SHALL BE EXPELLED FROM THE EXAMINATION HALL & DISQUALIFIED FOR THE ENTIRE ENTRANCE TEST. *("Expulsion" for this purpose would mean cancellation of his/her Entire Common Entrance Test)*
13. THE CANDIDATE MUST ENSURE THAT THE ANSWERS TO THE QUESTIONS ARE ATTEMPTED ON THE SPECIFICALLY PRESCRIBED **OMR ANSWER-SHEET** ONLY. NO ANSWER ATTEMPTED ON THE QUESTION BOOKLET OR ON A SEPARATE PIECE OF PAPER WILL BE CONSIDERED FOR EVALUATION. ONLY THOSE QUESTIONS ANSWERED ON THE OMR SHEET ITSELF SHALL BE TAKEN INTO ACCOUNT.
14. THERE SHALL BE NEGATIVE MARKING i.e. 25% MARKS WILL BE DEDUCTED FOR WRONG ANSWERS. THE TOTAL MARKS TO BE AWARDED TO A CANDIDATE IN A PAPER CONTAINING MULTIPLE CHOICE OBJECTIVE TYPE QUESTIONS, AFTER IMPOSING THE PRESCRIBED PENALTY, WILL BE CALCULATED BY THE FOLLOWING FORMULA.

***For example*,**

If for each correct answer to a question, 2 marks is to be awarded; for a wrong answer 1/2 mark will be deducted.

The total marks scored by the candidate will be computed as under: -

Let P - Number of correct answers.

Let Q - Number of wrong answers. (A wrong answer means an incorrect answer or filling of the wrong bubbles or filling more than one bubble for the same question or incomplete of partial filling of bubbles, as indicated in the instructions).

R - Number of unattempted questions. (An unattempted question means all bubbles left blank).

Then the final score will be 2P- 1/2 Q calculated to the second place of decimal only.

15. The result of the CET-2012 will be made available on the University website: http://www.results.puchd.ac.in as well as in the Enquiry Office of the University.

16. **There shall be no re-evaluation/re-checking/re-assessment of Answer-Sheets under any circumstances. Request for seeing the Question booklet/Answer-Sheets/Answer-books by the candidates shall not be entertained at all. The evaluation once done by the university shall be absolutely the final.**

17. **MERIT LISTS**

(a) The University will publish CET merit lists of the candidates for the following combinations of subjects:

1. Legal and General Awareness
2. Physics, Chemistry and Biology. (Medical Merit)
3. Physics, Chemistry and Mathematics (PCM Merit)
4. Physics, Chemistry and Biotechnology
5. Physics, Chemistry and Computer Sciences
6. Mathematics only.

(b) A candidate shall be included in a particular merit list on the basis of attainment of a minimum of 15% (cut off) aggregate of maximum marks in the test taken as a whole. Only in the case of candidates belonging to Scheduled Castes/Scheduled Tribes/Backward Class, this requirement will be a minimum attainment of 10% (cut off) aggregate of maximum marks in CET test, taken as a whole.

(c) Candidates scoring equal marks will be bracketed together. Their inter-se merit will be determined at the time of interview/counselling by the concerned authority, as explained in the admission procedure.

(d) Admissions to various courses shall be made on the basis of merit lists prepared by the Panjab University.

18. The admission to **B. Pharm and B.Sc. (Hons. School) courses** will be on the relative merit of the candidate on the basis of 75% weightages of C.E.T. Score and 25% weightages for the marks obtained in 10 + 2 examination, subject to such reservations and weightages as are prescribed in the rules of admission by the Govt./University Department/College/Institution concerned.

    For B.A. LL.B/B.Com. LL.B (Hons.) 5 years Integrated Course, will be 50% of Entrance Test and 50% of +2 examination. The admission to MBBS/BDS/BAMS/BHMS will be strictly on the basis of merit of CET-2012.

19. Any candidate who creates disturbance of any kind during examination or otherwise misbehaves in or around the examination hall or refuses to obey the Superintendent/Deputy Superintendent/Assistant Superintendent /any other official on examination duty or changes his/her seat with any other candidate or occupies any seat, other than the one allotted to him/her shall be expelled from the examination hall.
    ("Expulsion" for this purpose would mean cancellation /disqualification for the Entire Test of the candidate*)*

20. Any candidate having in his possession or accessible to him/her paper/books or notes which may possibly be of any assistance to him or is found giving or receiving assistance, or copying from any paper/book or note or from anywhere else or allowing any other candidate to copy from his/her answer book or found

writing on any other paper, questions set in the question paper, during examination or using or attempting to use any other unfair means or indulging in any kind of misconduct shall be expelled from the examination hall.
("Expulsion" for this purpose would mean cancellation /disqualification for the Entire Test of the candidate)

21. The Centre Superintendent/Observer/any other authorised University Officer/Official shall be competent to expel a candidate from the examination centre.
22. If any Answer-sheet of a candidate, subsequently at any stage, shows or it is otherwise established that he/she has received or attempted to receive help from any source in any manner or has given help or attempted to give help to any other candidate in any manner, the relevant answer-sheet shall be cancelled. The cancellation of the answer-sheet shall mean cancellation of his/her all answer-sheets of the Common Entrance Test-2012. The decision of the Controller of Examinations, Panjab University, Chandigarh in this regard shall be final .
23. If a candidate writes his/her name or puts any kind of identification mark or discloses his/her identity by any method whatsoever on the cover or anywhere else in the Question Booklet/Answer Sheet, the same shall be treated as cancelled. The cancellation of the answer-sheet shall mean cancellation of all his/her answer-sheets of the Common Entrance Test 2012. The decision of the Controller of Examinations, Panjab University, Chandigarh in this regard shall be final.
24. Any person who impersonates a candidate shall be disqualified from appearing in any University examination for a period of five years including this examination, if that person is a student on the rolls of a recognised School or College or University. But if the person is not on the rolls of a recognised School or College or University, he/she shall be declared as a person not fit and proper to be admitted to any examination of the University for a period of 5 years and the case, if necessary, shall also be reported to the police for any further action in the matter. The candidate who is being impersonated shall also be disqualified for a period of Five Years from appearing in any examination of this University, apart from any other action which the University may take against him, as deemed fit.
25. If it is found that a candidate has knowingly or wilfully concealed or suppressed or misrepresented any information/fact which renders him/her ineligible to take the Entrance Test, his/her result of the Test as also admission to a College/Institution/Department of the University, if granted, shall stand cancelled and he/she shall have no claim whatsoever against the College/ University/ Institution concerned and the case, if necessary shall also be reported to the police.
26. If a dispute or controversy of any kind arises before, during or after the conduct of Entrance Test, the decision of the Controller of Examinations, Panjab University, in all such cases, shall be absolutely final.
27. If any candidate who fills two application forms for the same Course his/her candidature shall be cancelled.
28. THE CANDIDATES SHALL BE ADMITTED TO THE TEST ONLY ON THE PRODUCTION OF THE ADMIT CARD AT THE TEST CENTRE. NO CANDIDATE SHALL BE ALLOWED TO TAKE THE TEST WITHOUT THE PRODUCTION OF THE ADMIT CARD UNDER ANY CIRCUMSTANCES. THE CANDIDATES MUST RETAIN THE ADMIT CARD WITH THEM TILL THE ADMISSION PROCESS IS OVER.
29. ADMIT CARDS WILL BE ISSUED TO THE CANDIDATES ONLY PROVISIONALLY, AT THEIR SOLE RISK AND RESPONSIBILITY, SUBJECT TO THE FINAL CONFIRMATION OF THEIR ELIGIBILITY AT THE TIME OF ADMISSION. IT IS FURTHER CLARIFIED THAT THE CANDIDATES SHALL BE TAKING THE TEST AT THEIR OWN RISK AND RESPONSIBILITY AS FAR AS THEIR ELIGIBILITY IS CONCERNED AND THE UNIVERSITY SHALL, IN NO WAY, BE RESPONSIBLE, IF THEY ARE FOUND TO BE

INELIGIBLE, LATER, LEADING TO CANCELLATION OF THEIR RESULT OR ANY OTHER CONSEQUENCE (S) EMANATING FROM THE SAME.

30. Notwithstanding anything contained in this prospectus, the eligibility conditions for admission to any particular course, shall be governed by the respective rules/regulations as enshrined in the P.U. Calendar, Volumes I, II and III (latest editions) and / or the General Guidelines for Admissions/ Hand Book of Information issued by the University and / or decisions of the University Senate/ Syndicate/Vice-Chancellor. In case of any conflict or inconsistency between the prospectus on the one hand and the aforesaid Panjab University Rules and Regulations/ Guidelines / Hand Book of information / decisions of Senate/ Syndicate/Vice-Chancellor, on the other, the latter shall prevail. Similarly in the case of admission of M.B.B.S., B.A.M.S. and B.H.M.S. courses, the relevant Instructions /Notifications issued by the Chandigarh Administration, U.T., Chandigarh will prevail over the provision of this prospectus in the event of any such conflict or inconsistency or dispute.

31. 4-5 days after the test, the question paper and its key will be put on the University website. The candidates can file their objections regarding discrepancies and accuracy of the key, in writing, within 48 hours of this announcement. The valid concerns thus expressed will be given due consideration while evaluation. If a candidate wishes to verify his/her result, he/she will be provided a photocopy of his/her answer sheet on payment of Rs.10,000/- within 10 days after the declaration of the entrance test result and the office should process the whole procedure within three working days. In case, a discrepancy is found in the result of the candidate, the result would accordingly be revised and the fee deposited will be refunded.

32. No separate Result Card will be issued. Only the eligible candidates can apply online for the admission.

33. Ragging in any form is banned in Educational Institutions. If a student is found to have indulged in Ragging, strict action will be taken against that student, which include expulsion from the Institution.

34. No change in category once marked will be allowed at any stage.

35. The following functionaries may be contacted for extremely urgent enquiry, if any, only on working hours i.e. from Monday to Friday.

1.	**Assistant Registrar (C.E.T.)**	**0172 – 2534829**
2.	**Controller of Examinations**	**0172 – 2534811**
3.	**Coordinator CET**	**0172 – 2534213**
4.	**Enquiry Office**	**0172 – 2534818, 2534819, 2534866**

APPENDIX I

Syllabus

MATHEMATICS

UNIT-I

I SETS AND FUNCTIONS

1. Sets:

Sets and their representations, Empty set. Finite & Infinite sets, Equal sets. Subsets. Subsets of the set of real numbers especially intervals (with notations). Power set. Universal set. Venn diagrams, Union and Intersection of sets. Difference of sets. Complement of a set.

2. Relations and Functions:

Ordered pairs, Cartesian product of sets, Number of elements in the Cartesian product of two finite sets. Cartesian product of the reals with itself (upto R x R x R). Definition of relation, pictorial diagrams, domain. Codomain and range of a relation. Function as a special kind of relation from one set to another. Pictorial representation of a function, domain, co-domain & range of a function. Real valued function of the real variable, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum and greatest integer functions with their graphs. Sum, difference, product and quotients of functions.

3. Trigonometric Functions:

Positive and negative angles. Measuring angles in radians & in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of the identity $\sin^2 x + \cos^2 x = 1$, for all x. Signs of trigonometric functions and sketch of their graphs. Expression sin (x+y) and cos (x+y) in terms of sinx, siny, cosx & cosy. Deducing the identities like following:

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

$$\sin x + \sin y = 2 \sin \frac{x+y}{2} \cos \frac{x-y}{2}, \cos x + \cos y = 2 \cos \frac{x+y}{2} \cos \frac{x-y}{2},$$

$$\sin x - \sin y = 2 \cos \frac{x+y}{2} \sin \frac{x-y}{2}, \cos x - \cos y = -2 \sin \frac{x+y}{2} \sin \frac{x-y}{2}$$

Identities related to sin 2x, cos2x, tan 2x, sin3x, cos3x and tan 3x. General solution of trigonometric equations of the type $\sin\theta = \sin\alpha, \cos\theta = \cos\alpha$ and $\tan\theta = \tan\alpha$.

II ALGEBRA

1. Principle of Mathematical Induction:

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

2. Complex Numbers and Quadratic Equations:

Need for complex numbers, especially $\sqrt{-1},$ to be motivated by inability to solve every quadratic equation. Brief description of algebraic properties of complex numbers. Argand plane and polar representation of complex numbers. Statement of Fundamental Theorem of Algebra, solution of quadratic equations in the complex number system.

3. Linear Inequalities:

Linear inequalities . Algebraic solutions of linear inequalities in one variable and their representation on the number line. Graphical solution of linear inequalities in two variables. Solution of system of linear inequalities in two variables – graphically.

4. Permutations and Combinations:

Fundamental principle of counting, Factorial *n. (n!)* Permutation and combinations, derivation of formulae and their connections, simple applications.

5. Binomial Theorem:

History, statement and proof of the binomial theorem for positive integral indices, Pascal's triangle, general and middle term in binomial expansion, simple applications.

6. Sequences and Series:

Sequence and Series. Arithmetic progression (A. P.). arithmetic mean (A.M.) Geometric progression G.P., general term of a G.P., sum of *n* terms of a G.P., geometric mean (G.M.), relation between A.M. and G.M. Sum to *n* terms of the special series$\sum n$, $\sum n^2$ and $\sum n^3$.

III COORDINATE GEOMETRY

1. Straight Lines:

Brief recall of 2D from earlier classes. Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axes, point-slope form, slope-intercept form, two-point form, intercepts form and normal form. General equation of a line. Distance of a point from a line.

2. Conic Sections:

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

3. Introduction to Three – dimensional Geometry:

Coordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points and section formula.

IV CALCULUS

1. Limits and Derivatives:

Derivative introduced as rate of change both as that of distance function and geometrically, intuitive, idea of limit. Definition of derivative, relate it to slope of tangent of the curve, derivative of sum, difference, product and quotient of functions.

Derivatives of polynomial and trigonometric functions.

V. MATHEMATICAL REASONING

1. Mathematical Reasoning:

Mathematically acceptable statements. Connecting words/phrases – consolidating the understanding of "if and only if (necessary and sufficient) condition", "implies", "and/or", "implied by", "and", "or", "there exists" and their use through variety of examples related to real life and Mathematics. Validating the statements involving the connecting words-difference between contradiction, converse and contapositive.

VI. STATISTICS & PROBABILITY

1. Statistics:

Measure of dispersion; mean deviation, variance and standard deviation of ungrouped/grouped data. Analysis of frequency distributions with equal means but different variances.

2. Probability:

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

UNIT-II MATHEMATICS

I RELATIONS AND FUNCTIONS

1. Relations and Functions:

Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions, composite functions, inverse of a function. Binary operations.

2. Inverse Trigonometric Functions:

Definition, range, domain, principal value branches. Graphs of inverse trigonometric functions. Elementary properties of inverse trigonometric functions.

II ALGEBRA

1. Matrices:

Concept, notation, order, equality, types of matrices, zero matrix, transpose of a matrix, symmetric and skew symmetric matrices. Addition, multiplication and scalar multiplication of matrices, simple properties of addition, multiplication and scalar multiplication. Non-commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Concept of elementary row and column operation. Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).

2. Determinants:

Determinant of a square matrix (up to 3 x 3 matrices), properties of determinants, minors, cofactors and applications of determinants in finding the area of a triangle, Adjoint and inverse of a square matrix. Consistency, inconsistency and number of

solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having solution) using inverse of a matrix.

III CALCULUS

1. Continuity and Differentiability:

Continuity and differentiability, derivative of composite functions, chain rule, derivatives of inverse trigonometric functions, derivative of implicit function. Concept of exponential and logarithmic functions and their derivative. Logarithmic differentiation. Derivative of functions expressed in parametric forms. Second order derivatives. Rolle's and Lagrange's Mean Value Theorems (without proof) and their geometric interpretations.

2. Applications of Derivatives:

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

3. Integrals:

Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, only simple integrals of the type

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

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

to be evaluated.

Definite integrals as a limit of a sum, Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.

4. Applications of the Integrals:

Applications in finding the area under simple curves, especially lines, areas of circles/parabolas/ellipses (in standard form only), area between the two above said curves (the region should be clearly identifiable).

5. Differential Equations:

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

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

IV VECTORS AND THREE-DIMENSIONAL GEOMETRY

1. Vectors:

Vectors and scalars, magnitude and direction of a vector. Direction cosines/ratios of vectors. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Scalar (dot) product of vectors, projection of a vector on a line, Vector (cross) product of vectors.

2. Three – dimensional Geometry:

Direction cosines/ratios of a line joining two points. Cartesian and vector equation of a line, coplanar and skew lines, shortest distance between two lines. Cartesian and vector equation of a plane. Angle between (i) two lines, (ii) two planes. (iii) a line and a plane. Distance of a point from a plane.

V LINEAR PROGRAMMING

1. Linear Programming:

Introduction, definition of related terminology such as constraints, objective function, optimisation, different types of linear programming (L.P.) problems, mathematical formulation of L.P. problems, graphical method of solution for problems in two variables, feasible and infeasible regions, feasible and infeasible solutions, optional feasible solutions (up to three non-trivial constrains).

VI PROBABILITY

1. Probability:

Multiplication theorem on probability. Conditional probability, independent events, total probability, Baye's theorem, Random variable and its probability distribution, mean and variance of haphazard variable. Repeated independent (Bernoulli) trials and Binomial distribution.

PHYSICS

UNIT- I

1. Physical World and Measurement

Physics-scope and excitement; nature of physical laws; Physics, technology and society need for measurement: Units of measurement; systems of units; SI units, fundamental and derived units. Length, mass and time measurements; accuracy and precision of measuring instruments; errors in measurement; significant figures.

Dimensions of physical quantities, dimensional analysis and its applications.

2. Kinematics

Frame of reference. Motion in a straight line: Position-time graph, speed and velocity, Uniform and non-uniform motion, average speed and instantaneous velocity.

Uniformly accelerated motion, velocity-time position-time graphs, relations for uniformly accelerated motion (graphical treatment).

Elementary concepts of differentiation and integration for describing motion.

Scalar and vector quantities, Position and displacement vectors, general vectors and notation; Equality of vectors, multiplication of vectors by a real number; Addition and subtraction of vectors. Relative velocity.

Unit vector; Resolution of a vector in a plane – rectangular components. Motion in a plane. Cases of uniform velocity and uniform acceleration-projectile motion. Uniform circular motion.

3. Laws of Motion

Intuitive concept of force. Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion. Law of conservation of linear momentum and its applications.

Equilibrium of concurrent forces. Static and Kinetic friction, laws of friction, rolling friction.

Dynamics of uniform circular motion; Centripetal force, examples of circular motion (vehicle on level circular road, vehicle on banked road)

4. Work, Energy and Power

Scalar product of vectors. Work done by a constant force and a variable force; Kinetic energy, work energy theorem, power.

Notion of Potential energy, potential energy of a spring, conservative forces; conservation of mechanical energy (Kinetic and potential energies), Non-conservative forces; elastic and inelastic collisions in one and two dimensions.

5. Motion of System of Particles and Rigid Body

Centre of mass of a two-particle system, momentum conservation and centre of mass motion. Centre of mass of a rigid body; centre of mass of uniform rod.

Vector product of vectors; moment of a force, torque, angular momentum, conservation of angular momentum with some examples.

Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions; Moment of inertia, radius of gyration.

Values of moments of inertia for simple geometrical objects (no derivation). Statement of parallel and perpendicular axes theorems and their applications.

6. Gravitation

Keplar's Laws of planetary motion. The universal law of gravitation.

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

Gravitational potential energy; gravitational potential. Escape velocity. Orbital velocity of a satellite. Geo-stationary satellites.

7. Properties of Bulk Matter

Elastic behaviour, Stress-strain relationship, Hooke's Law, Young's modulus, bulk modulus, shear, modulus of rigidity.

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

Viscosity, Stokes' law, terminal velocity, Reynold's number, streamline and turbulent flow. Bernoulli's theorem and its applications.

Surface energy and surface tension, angle of contact, application of surface tension ideas to drops, bubbles and capillary rise.

Heat, temperature, thermal expansion; specific heat – calorimetry; change of state – latent heat.

Heat transfer – conduction, convection and radiation, thermal conductivity, Newton's law of cooling.

8. Thermodynamics

Thermal equilibrium and definition of temperature (zeroth law of thermodynamics), Heat, work and internal energy. First law of thermodynamics.

Second law of thermodynamics: reversible and irreversible processes. Heat engines and refrigerators.

9. Behaviour of Prefect Gas and Kinetic Theory

Equation of state of a perfect gas, work done on compressing a gas.

Kinetic theory of gases – assumptions, concept of pressure. Kinetic energy and temperature rms speed of gas molecules; degrees of freedom, law of equipartition of energy (statement only) and application to specific heats of gases; concept of mean free path, Avogadro's number

10. Oscillations and Waves

Periodic motion – period, frequency, displacement as a function of time. Periodic function. Simple harmonic motion (S.H.M) and its equation; phase; oscillations of a spring- restoring force and force constant; energy in S.H.M.- Kinetic and potential energies; simple pendulum – derivation of expression for its time period; free, forced and damped oscillations (qualitative ideas only), resonance.

Wave motion. Longitudinal and transverse waves, speed of wave motion. Displacement relation for a progressive wave. Principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats, Doppler effect.

UNIT-II **PHYSICS**

1. Electrostatics

Electric Charges; Conservation of charge, Coulomb's law-force between two point charges, forces between multiple charges; superposition principle and continuous charge distribution.

Electric field, electric field due to a point charge, electric field lines; electric dipole, electric field due to a dipole' torque on a dipole in uniform electric field.

Electric flux, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field inside and outside).

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

Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarisation, capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor. Van de Graaff generator.

2. Current Electricity

Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, electrical resistance, V-I characteristics (linear and non-linear) electrical energy and power, electrical resistivity and conductivity. Carbon resistors, colour code for carbon resistors; series and parallel combination of resistors; temperature dependence of resistance.

Internal resistance of a cell, Potential difference and emf of a cell, combination of cells in series and in parallel.

Kirchoff's laws and simple applications. wheatstone bridge, metre bridge.

Potentiometer – principle and its applications to measure potential difference and for comparing emf of two cells; measurement of internal resistance of a cell.

3. Magnetic Effects of Current and Magnetism

Concept of Magnetic field, Oersted's experiment.

Bio – Savart law and its applications to current carrying circular loop.

Ampere's law and its applications to infinitely long straight wire, straight and toroidal solenoids.

Force on a moving charge in uniform magnetic and electric fields. Cyclotron.

Force on a current-carrying conductor in a uniform magnetic field. Force between two parallel current-carrying conductors-definition of ampere. Torque experienced by a current loop in uniform magnetic field; moving coil galvanometer-its current sensitivity and conversion to ammeter and voltmeter. Current loop as a magnetic dipole and its magnetic dipole moment. Magnetic dipole moment of a revolving electron. Magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis. Torque on a magnetic dipole (bar magnet) in a uniform magnetic field; bar magnet as an equivalent solenoid, magnetic field lines; Earth's magnetic field and magnetic elements. Para-, dia-and ferro – magnetic substances, with examples.

Electromagnets and factor affecting their strengths. Permanent magnets.

4. Electromagnetic Induction and Alternating currents

Electromagnetic induction; Faraday's law, induced emf and current; Lenz's Law, Eddy currents. Self and mutual inductance.

Need for displacement current.

Alternating currents, peak and rms value of alternating current/voltage; reactance and impedance; LC oscillations (qualitative treatment only), LCR series circuit, resonance; power in AC circuits, wattles current.

AC generator and transformer.

5. Electromagnetic waves

Displacement Current, Electromagnetic waves and their characteristics (qualitative ideas only). Transverse nature of electromagnetic waves.

Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.

6. Optics

Reflection of light, spherical mirrors, mirror formula. Refraction of light, total internal reflection and its applications, optical fibres, refraction at spherical surfaces, lenses, thin lens formula, lens-maker's formula. Magnification, power of a lens, combination of thin lenses in contact. Refraction and dispersion of light through a prism.

Scattering of light – blue colour of the sky and reddish appearance of the sun at sunrise and sunset.

Optical instruments: Human eye, image formation and accommodation, correction of eye defects (myopia, Hypermetropia, presbyopia and astigmatism) using lenses. Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.

Wave optics; wave front and Huygens' principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygens' principle. Interference, Young's double slit experiment and expression for fringe width, coherent sources and sustained interference of light. Diffraction due to a single slit, width of central maximum. Resolving power of microscopes and astronomical telescopes. Polarisation, plane polarised light; Brewster's law, uses of plane polarised light and Polaroids.

7. Dual Nature of Matter and Radiation

Dual nature of radiation. Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light.

Matter waves-wave nature of particles, de Broglie relation. Davisson-Germer experiment.

8. Atoms & Nuclei

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr Model, energy levels, hydrogen spectrum Composition and size of nucleus, atomic masses, isotopes, isobars; isotones. Radioactivity-alpha, beta and gamma particles/rays and their properties; radioactive decay law. Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission and fusion.

9. Electronic Devices

Semiconductors; semiconductor diode – I-V characteristics in forward and reverse bias, diode as a rectifier; I-V characteristics of LED, photodiode, solar cell, and Zener diode; Zener diode as a voltage regulator. Junction transistor, transistor action, characteristics of a transistor; transistor as an amplifier (common emitter configuration) and oscillator. Logic gates (OR, AND , NOT, NAND and NOR). Transistor as a switch.

10. Communication Systems

Elements of a communication system (block diagram only); bandwidth of signals (speech, TV and digital data); bandwidth of transmission medium. Propagation of electromagnetic waves in the atmosphere, sky and space wave propagation. Need for modulation. Production and detection of an amplitude-modulated wave.

CHEMISTRY

UNIT- I

1. Some Basic Concepts of Chemistry

General Introduction: Importance and scope of Chemistry.

Historical approach to particulate nature of matter, laws of chemical combination. Dalton's atomic theory: concept of elements, atoms and molecules.

Atomic and molecular masses. Mole concept and molar mass: percentage composition, empirical and molecular formula; chemical reactions, stoichiometry and calculations based on stoichiometry.

2. Structure of Atom

Discovery of electron, proton and neutron; atomic number, isotopes and isobars. Thomson's model and its limitations, Rutherford's model and its limitations. Bohr's model and its limitations, concept of shells and subshells, dual nature of matter and light , De Broglie's relationship, Heisenberg uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p, and d orbitals, rules for filling electrons in orbitals – Aufuau principle, Pauli exclusion principle and Hund's rule, electronic configuration of atoms, stability of half filled and completely filled orbitals.

3. Classification of Elements and Periodicity in Properties

Significance of classification, brief history of the development of periodic table, modern periodic law and the present form of periodic table, periodic trends in properties of elements –atomic radii, ionic radii. Ionization enthalpy, electron gain enthalpy, electro negativity, valence.

4. Chemical Bonding and Molecular Structure

Valence electrons, ionic bond, covalent bond: bond parameters. Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridisation, involving s, p and d orbitals and shapes of some simple molecules, molecular ortibal; theory of homo nuclear diatomic molecules (qualitative idea only), hydrogen bond.

5. States of Matter: gases and liquids

Three states of matter. Intermolecular interactions, type of bonding, melting and boiling points. Role of gas laws in elucidating the concept of the molecule, Boyle's law. Charles law, Gay Lussac's Law, Avogadro's Law. Ideal behaviour, empirical derivation of gas equation, Avogadro's number.Ideal gas equation. Derivation from ideal behaviour, liquefaction of gases, critical temperature.

Liquid State – Vapour pressure, viscosity and surface tension (qualitative idea only, no mathematical derivations).

6. Thermodynamics

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

First law of thermodynamics – internal energy and enthalpy, heat capacity and specific heat, measurement of ΔU and ΔH, Hess's law of constant heat summation, enthalpy of: bond dissociation, combustion, formation, atomization, sublimation. Phase transformation, ionization, and solution.

Introduction of entropy as a state function, free energy change for spontaneous and non-spontaneous processes, criteria for equilibrium.

7. Equilibrium

Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium – Le Chatelier's principle; ionic equilibrium – ionisation of acids and bases, strong and weak electrolytes, degree of ionisation, concept of pH. Hydrolysis of salts (elementary idea). Buffer solutions, solubility product, common ion effect (with illustrative examples).

8. Redox Reactions

Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions, applications of redox reactions.

9. Hydrogen

Position of hydrogen in periodic table, occurrence, isotopes, preparation, properties and uses of hydrogen; hydrides – ionic, covalent and interstitial; physical and chemical properties of water, heavy water; hydrogen peroxide-preparation, properties and structure; hydrogen as a fuel.

10 s-Block Elements (Alkali and Alkaline earth metals)

Group 1 and Group 2 elements:

General introduction, electronic configuration, occurrence, anomalous properties of the first element of each group, diagonal relationship, trends in the variation of properties (such as ionisation enthalpy, atomic and ionic radii), trends in chemical reactivity with oxygen, water, hydrogen and halogens; uses.

Preparation and properties of some important compounds:

Sodium carbonate, sodium chloride, sodium hydroxide and sodium hydrogen carbonate, biological importance of sodium and potassium.

CaO, $CaCO_3$ and industrial use of lime and limestone, biological importance of Mg and Ca

11. Some p-Block Elements

General Introduction to p-Block Elements

Group 13 elements: General introduction, electronic configuration, occurrence. Variation of properties, oxidation states, trends in chemical reactivity, anomalous properties of first element of the group; Boron-physical and chemical properties, some important compounds: borax, boric acids, boron hydrides. Aluminium: uses, reactions with acids and alkalies.

Group 14 elements: General introduction, electronic configuration, occurrence, variation of properties, oxidation states, trends in chemical reactivity, anomalous behaviour of first element, Carbon – catenation, allotropic forms, physical and chemical properties; uses of some important compounds: oxides

Important compounds of silicon and a few uses: silicon tetrachloride, silicones, silicates and zeolites.

12. Organic Chemistry – Some Basic Principles and Techniques

General introduction, method, qualitative and quantitative analysis, classification and IUPAC nomenclature of organic compounds.

Electronic displacements in a covalent bond: inductive effect, electromeric effect,

resonance and hyper conjugation.
Homolytic and heterolytic fission of a covalent bond: free radicals, carbocations, carbanions; electrophiles and nucleophiles, types of organic reactions.

13. Hydrocarbons

Classification of Hydrocarbons

Alkanes – Nomenclature, isomerism, conformations (ethane only), physical properties, chemical reactions including, free radical mechanism or halogenation, combustion and pyrolysis.
Alkenes – Nomenclature, structure of double bond (ethane) geometrical isomerism, physical properties, methods of preparation; chemical reactions: addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition.
Alkynes – Nomenclature, structure of triple bond (ethyne), physical properties. Mothods of preparation, chemical reactions; acidic character of alkynes, addition reaction of – hydrogen, halogens, hydrogen halides and water.
Aromatic hydrocarbons: Introduction, IUPAC nomenclature; Benzene: resonance aromaticity; chemical properties: mechanism of electrophilic substitution. – nitration sulphonation, halogenation, Friedel Craft's alkylation and acylation: directive influence of functional group in mono-substituted benzene; carcinogenicity and toxicity.

14. Environmental Chemistry

Environmental pollution – air, water and soil pollution, chemical reactions in atmosphere, smog, major atmospheric pollutants; acid rain, ozone and its reactions, effects of depletion of ozone layer, greenhouse effect and global warming – pollution due to industrial wastes; green chemistry as an alternative tool for reduction pollution, strategy for control of environmental Pollution.

UNIT-II

CHEMISTRY

1. Solid State

Classification of solids based on different binding forces: molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea), unit cell in two dimensional and three dimensional lattices, calculation of density of unit cell, packing in solids, voids, number of atoms per unit cell in a cubic unit cell, point defects, electrical and magnetic properties.

2. Solutions

Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, colligative properties – relative lowering of vapour pressure, elevation of Boiling Point, depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass.

3. Electrochemistry

Redox reactions, conductance in electrolytic solutions, specific and molar conductivity variations of conductivity with concentration, Kohlrausch's Law**,** electrolysis and laws of electrolysis (elementary idea), dry cell – electrolytic cells and Galvanic cells; lead accumulator, EMF of a cell, standard electrode potetial, Nernst equation and its application to chemical cells, fuel cells; corrosion.

4. Chemical Kinetics

Rate of a reaction (average and instantaneous), factors a affecting rates of reaction; concentration, temperature, catalyst; order and molecularity of a reaction; rate law and specific rate constant, integrated rate equations and half life (only for zero and first order reactions); concept of collision theory (elementary idea, no mathematical treatment)

5. Surface Chemistry

Adsorption – physisorption and chemisorption; factor affecting adsorption of gases on solids; catalysis : homogenous and heterogeneous, activity and selectivity: enzyme catalysis; colloidal state: distinction between true solutions, colloids and suspensions; lyophilic, lyophobic, multimolecular and macromolecular colloids; properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation; emulsion – types of emulsions.

6. General Principles and Processes of Isolation of Elements

Principles and methods of extraction – concentration, oxidation, reduction electrolytic method and refining; occurrence and principles of extraction of aluminium, copper, zinc and Iron.

7. p-Block Elements

Group 15 elements: General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties; nitrogen – preparation, properties and uses; compounds of nitrogen: preparation and properties of ammonia and nitric acid, oxides of nitrogen (structure only); Phosphorous-allotropic forms; compounds of phosphorous: preparation and properties of phosphine, halides (PCl_3, PCl_5) and oxoacids (elementary idea only).

Group 16 elements: General introduction, electronic configuration, oxidation states,

occurrence, trends in physical and chemical properties; dioxygen: preparation, properties and uses; simple oxides; Ozone. Sulphur – allotropic forms; compounds of sulphur: preparation, properties and uses of sulphur dioxide; sulphuric acid: industrial process of manufacture, properties and uses, oxoacids of sulphur (structures only).

Group 17 elements: General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; compounds of halogens: preparation, properties and uses of chlorine and hydrochloric acid, interhalogen compounds, oxoacids of halogens (structures only)

Group 18 elements: General introduction, electronic configuration. Occurrence, trends in physical and chemical properties, uses.

8. d and f Block Elements

General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first row transition metals – metallic character, ionisation enthalpy, oxidation states, ionic radii, colour catalytic property, magnetic properties, interstitial compounds, alloy formation. Preparation and properties of $K_2 Cr_2 O_7$ and $Kmno_4$.

Lanthanoids – electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction.

Actinoids – Electronic configuration, oxidation states.

9. Coordination Compounds

Coordination compounds – Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds. Bonding; isomerism, importance of coordination compounds (in qualitative analysis, extraction of metals and biological systems).

10. Haloalkanes and Haloarenes

Haloalkanes:

Nomenclature, nature of C-X bond, physical and chemical properties, mechanism of substitution reactions.

Haloarenes:

Nature of C-X bond, substitution reactions (directive influence of halogen for monosubstituted compounds only)

Uses and environmental effects of – dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT.

11. Alcohols, Phenols and Ethers

Alcohols: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only); identification of primary, secondary and tertiary alcohols; mechanism of dehydration, uses of methanol and ethanol.

Phenols: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophillic substitution reactions, uses of phenols.

Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses.

12. Aldehydes, Ketones and Carboxylic Acids

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

Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical and

chemical properties; uses.

13. Organic compounds containing Nitrogen

Amines: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines.

Cyanides and Isocyanides –will be mentioned at relevant places in context.

Diazonium salts: Preparation, chemical reactions and importance in synthetic organic chemistry.

14. Biomolecules

Carbohydrates – Classification (aldoses and ketoses), monosaccahrides (glucose and fructose), oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); importance.

Proteins - Elementary idea of α - amino acids, peptide bond, polypeptides proteins, structure of amines-primary, secondary, tertiary structure and quaternary structures (qualitative idea only),

Vitamins – Classification and functions.

Nucleic Acids: DNA & RNA.

15. Polymers

Classification – natural and synthetics, methods of polymerisation (addition and condensation), copolymerisation. Some important polymers: natural and synthetic like polythene, nylon, polyesters, bakelite, rubber.

16. Chemistry in everyday life:

1. **Chemicals in medicine – analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamines.**
2. **Chemicals in food – preservatives, artificial sweetening agents.**
3. **Cleansing agents – soaps and detergents, cleansing action.**

BIOLOGY

UNIT – I

1. Diversity in Living World

Diversity of living organisms
Classification of the living organisms (five kingdom classification, major groups and principles of classification within each kingdom).
Systematics and binomial System of nomenclature
Salient features of animal (non-chordates up to phylum level and chordates up to class level) and plant (major groups; Angiosperms up to class) classification, viruses, viroids, lichens, Botanical gardens, herbaria, zoological parks and museums.

2. Structural Organization in Animals and Plants

Tissues in animals and plants.

Morphology, anatomy and functions of different parts of flowering plants: Root, stem, leaf, inflorescence, flower, fruit and seed.

Morphology, anatomy and functions of different systems of an annelid (earthworm), an insect (cockroach) and an amphibian (frog).

3. CELL: STRUCTURE AND FUNCTION

Cell: Cell theory; Prokaryotic and eukaryotic cell, cell wall, cell membrane and cell organelles' (plastids, mitochondria, endoplasmic reticulum, Golgi bodies/dictyosomes, ribosomes, lysosomes, vacuoles, centrioles) and nuclear organization.

Mitosis, meiosis, cell cycle.
Basic chemical constituents of living bodies.
Structure and functions of carbohydrates, proteins, lipids and nucleic acids.
Enzymes: types, properties and function.

4. Plant Physiology

Movement of water, food, nutrients and gases, Plants and Water Mineral nutrition, Respiration, Photosynthesis, Plant growth and development.

5. Human Physiology

Digestion and absorption.
Breathing and respiration.
Body fluids and circulation.
Excretory products and elimination.
Locomotion and movement.
Neural control and coordination,
chemical coordination and regulation.

UNIT – II **BIOLOGY**

1. REPRODUCTION

Reproduction in organisms : Asexual and sexual reproduction. Sexual reproduction in flowering plants : Structure of flower, pollination, fertilization, development of seeds and fruits, apomixes and polyembryony.
Human reproduction : Reproductive system in male and female, menstrual cycle, production of gametes, fertilization, implantation, embryo development, pregnancy, parturition and lactation.
Reproductive Health : Population and birth control, contraception and MTP; sexually transmitted diseases, infertility.

2. GENETICS AND EVOLUTION

Mendelian inheritance.

Chromosome theory of inheritance, deviations from Mendelian ratio (gene interaction- incomplete dominance, co-dominance, multiple alleles).

Sex determination in human beings: XX, XY.

Linkage and crossing over.

Inheritance pattern : Mendelian disorders and chromosomal disorders in humans.

DNA and RNA, search for genetic material, replication, transcription, genetic code, translation.

Gene expression and regulation.

Genome and Human Genome Project.

DNA fingerprinting.

Evolution: Origin of life, theories and evidences, adaptive radiation, mechanism of Evolution, origin and evolution of man.

3. BIOLOGY AND HUMAN WELFARE

Basic concepts of immunology, vaccines.

Pathogens, Parasites

Cancer and AIDS

Adolescence and drug / alcohol abuse.

Plant breeding, tissue culture, single cell protein, food production, animal husbandry.

Mircobes in household food processing, industrial production, sewage treatment, energy generation, biocontrol agents and biofertilizers.

4. BIOTECHNOLOGY AND ITS APPLICATION

Principles and Processes; Recombinant DNA technology; Application in Health and Agriculture; genetically modified (GM) organisms; biosafety issues.

5. ECOLOGY & ENVIRONMENT

Ecosystems : components, types, energy flow, nutrient cycling and ecosystem services.
Organism and Population : Organisms and its environment, population and ecological adaptations.

Centres of diversity and conservation for biodiverity, Biosphere reserves, National parks and sancturaries. Environmental issues.

BIOTECHNOLOGY

UNIT- I

1. Introduction to Biotechnology

Fundamentals of Biochemical Engineering; Biotechnology and Society.

2. Biomolecules

[Building Blocks of Biomolecules-Structure and dynamics; Structure and function of Macromolecules. Biochemical Techniques.

3. Cell and Development

The basic unit of life; Cell Growth and development; Cellular Techniques.

4. Genetics and Molecular Biology

Principles of Genetics; Genome Function; Genetical Techniques.

UNIT- II

1. Protein and Gene Manipulation

Protein Structure and Engineering

Introduction to the word of Proteins; 3-D Shape of Proteins; Structure Function Relationship in Proteins; Purification of Proteins; Characterization of Proteins; Protein based products; Designing Proteins; Proteomics.

Recombinant DNA Technology

Introduction; Tools of rDNA Technology, Making Recombinant DNA; DNA Library; Introduction of Recombinant DNA into host cells; Identification of recombinants; Polymerase Chains Reaction (PCR); DNA Probes; Hybridization Techniques; DNA Sequencing; Site-directed mutagenesis

Genomics and Bioinformatics

Introduction; Genome Sequencing Projects; Gene Prediction and counting; Genome similarity, SNP's and comparative genomics; Functional Genomics; History of Bioinformatics; Sequences and Nomenclature; Information Sources; Analysis using Bioinformatics tools.

2. Cell Culture Technology

Microbial Culture and Applications

Introduction; Microbial Culture Techniques; Measurement and Kinetics of microbial Growth; Scale up of microbial process; Isolation of microbial products; Strain isolation and Improvement; Applications of microbial culture technology; Bioethics in microbial technology.

Plant Cell Culture and Applications

Introduction; Cell and Tissue Culture Techniques; Applications of Cell and Tissue Culture; Gene Transfer Methods in Plants; Transgenic Plants with Beneficial Traits; Diagnostics in Agriculture and Molecular Breeding, Bioethics in Plant Genetic Engineering.

Animal Cell Culture and Applications

Introduction; Animal Cell Culture Techniques; Characterization of Cell Lines; Scale-up of Animal Culture Process; applications of Animal Cell Culture; Stem Cell Technology; Bioethics of Genetic Engineering in Animals.

COMPUTER SCIENCE

UNIT- I

1: COMPUTER FUNDAMENTALS

Evolution of computers; Basics of computer and its operation: Functional Components and their interconnections, concept of Booting.

Software Concepts:

Types of Software - System Software, Utility Software and Application Software;
System Software: Operating System, Compilers, Interpreters and Assembler;
Utility Software : Anti Virus, File Management tools, Compression tools and Disk Management tools (Disk Cleanup, Disk Defragmenter, Backup);
Application Software as a tool: Word Processor, Presentation tools, Spreadsheet Package, Database Management System; Business software (for example: School Management System, Inventory Management System, Payroll System, Financial Accounting, Hotel Management, and Reservation System);

Operating System : Need for operating system, Functions of Operating System (Processor Management, Memory Management, File Management and Device Management), Types of operating system –
Interactive (GUI based), Time Sharing, Real Time and Distributed; Commonly used operating systems:
LINUX, Windows, BhartiOO, Solaris, UNIX;

2: PROGRAMMING METHODOLOGY

General Concepts; Modular approach; Clarity and Simplicity of Expressions, Use of proper
Names for identifiers, Comments, Indentation; Documentation and Program Maintenance;
Running and Debugging programs, Syntax Errors, Run-Time Errors, Logical Errors;

Problem Solving Methodology and Techniques: Understanding of the problem, Identifying minimum number of inputs required for output, Step by step solution for the problem, breaking down solution into simple steps, Identification of arithmetic and logical operations required for solution, Using Control Structure: Conditional control and looping (finite and infinite);

3: INTRODUCTION TO C++

Getting Started:

C++ character set, C++ Tokens (Identifiers, Keywords, Constants, Operators), Structure of a C++ Program (include files, main function); Header files – iostream.h, iomanip.h; **cout**, **cin**; Use of I/O operators (<< and >>), Use of endl and setw(), Cascading of I/O operators, Error Messages; Use of editor, basic commands of editor, compilation, linking and execution; standard input/output operations from C language: gets(), puts() of stdio.h header file;

Data Types, Variables and Constants:

Concept of Data types; Built-in Data types: **char**, **int**, **float** and **double**; Constants: Integer Constants, Character Constants (Backslash character constants - \n, \t), Floating Point Constants, String Constants; Access modifier: **const**; Variables of built-

in data types, Declaration/ Initialisation of variables, Assignment statement; Type modifier: signed, unsigned, long;

Operators and Expressions:
Operators: Arithmetic operators (-,+,*,/,%), Unary operator (-), Increment and Decrement Operators (—,++), Relational operators (>,>=,<,<=,==,!=), Logical operators (!, &&, ||), Conditional operator: <condition>?<if true>:<else>; Precedence of Operators; Expressions; Automatic type conversion in expressions, Type casting; C++ shorthand's (+=, -=, *=, /=, %=);

4: PROGRAMMING IN C++
Flow of control:
Conditional statements: **if-else**, Nested **if**, **switch..case..default**, Nested **switch..case**, break statement (to be used in switch..case only); Loops: **while**, **do - while** , **for** and Nested loops;

String Functions:
Header File: string.h
Function: **isalnum(), isalpha(), isdigit(), islower(), isupper(), tolower(), toupper()**;

Character Functions:
Header File: ctype.h
Functions: **isalnum(), isalpha(), isdigit(), islower(), isupper(), tolower(), toupper(), strcpy(), strcat(), strlen(), strcmp(), strcmpi()**;

Mathematical Functions:
Header File-math.h, stdlib.h;
Functions: **fabs()**, **log()**, **log10()**, **pow()**, **sqrt()**, **sin()**, **cos()**, **abs(),**

Other Functions:
Header File- stdlib.h;
Functions: **randomize(), random()**;

User Defined Functions:
Defining a function; function prototype, Invoking/calling a function, passing arguments to function, specifying argument data types, default argument, constant argument, call by value, call by reference, returning values from a function, calling functions with arrays, scope rules of functions and variables; local and global variables;

Structured Data Type: Array
Declaratrion/initialisation of One-dimensional array, Inputting array elements, Accessing array elements, Manipulation of Array elements (sum of elements, product of elements, average of elements, linear search, finding maximum/minimum value);
Declaration/Initialization of a String, string manipulations (counting vowels/consonants/digits/ special characters, case conversion, reversing a string, reversing each word of a string);

Two-dimensional Array :
Declaration/initialisation of a two-dimensional array, inputting arry elements Accessing array elements, Manipulation of Array elements (sum of row element, column elements, diagonal elements, finding maximum/minimum values);

User-defined Data Types
Need for User defined data type:
Defining a symbol name using typedef keyword and defining a m acro using #define directive;

Structures:
Defining a Structure, Declaring structure variables, Accessing structure elements, Passing structure of Functions as value and reference argument/parameter, Function returning structure, Array of structures, passing an array of structure as an argument/ a parameter to a function.

UNIT- II **COMPUTER SCIENCE**

1. PROGRAMMING IN C++
REVIEW: *C++* covered In Class -XI,

Object Oriented Programming:
Concept of Object Oriented Programming – Data hiding, Data encapsulation, Class and Object, Abstract class and Concrete class, Polymorphism (Implementation of polymorphism using Function overloading as an example in C++); Inheritance, Advantages of Object Oriented Programming over earlier programming methodologies,

Implementation of Object Oriented Programming concepts in C++:
Definition of a class, Members of a class - Data Members and Member Functions (methods), Using Private and Public visibility modes, default visibility mode (private); Member function definition: inside class definition and outside class definition using scope resolution operator (::); Declaration of objects as instances of a class; accessing members from object(s), Array of type class, Objects as function arguments - pass by value and pass by reference;

Constructor and Destructor:
Constructor: Special Characteristics, Declaration and Definition of a constructor, Default Constructor, Overloaded Constructors, Copy Constructor, Constructor with default arguments; Destructor: Special Characteristics, Declaration and definition of destructor;

Inheritance (Extending Classes):
Concept of Inheritance, Base Class, Derived Class, Defining derived classes, protected visibility mode; Single level inheritance, Multilevel inheritance and Multiple inheritance, Privately derived, Publicly derived and Protectedly derived class, accessibility of members from objects and within derived class(es);

Data File Handling:
Need for a data file, Types of data files – Text file and Binary file;
Text File: Basic file operations on text file: Creating/Writing text into file, Reading and manipulation of text from an already existing text File (accessing sequentially);
Binary File: Creation of file, Writing data into file, Searching for required data from file, Appending data to a file, Insertion of data in sorted file, Deletion of data from file, Modification of data in a file;

Implementation of above mentioned data file handling in C++;

Components of C++ to be used with file handling:

Header file: fstream.h; ifstream, ofstream, fstream classes;

Opening a text file in **in**, **out**, and **app** modes;
Using cascading operators for writing text to the file and reading text from the file; **open()**, **get()**, **put()**, **getline()** and **close()** functions; Detecting end-of-file (with or without using **eof()** function);
Opening a binary file using **in**, **out**, and **app** modes;
open(), **read()**, **write()** and **close()** functions; Detecting end-of-file (with or without using **eof()**
function); **tellg(), tellp(), seekg(), seekp()** functions

Pointers:
Declaration and Initialization of Pointers; Dynamic memory allocation/deallocation operators:
new, delete; Pointers and Arrays: Array of Pointers, Pointer to an array (1 dimensional array), Function returning a pointer, Reference variables and use of alias; Function call by reference. Pointer to structures: Deference operator: *, ->; self referencial structures;

2: DATA STRUCTURES

Arrays:

One and two Dimensional arrays: Sequential allocation and address calculation;
One dimensional array: Traversal, Searching (Linear, Binary Search), Insertion of an element in an array, deletion of an element from an array, Sorting (Insertion, Selection, Bubble sort), concatenation of two linear arrays, merging of two sorted arrays;
Two-dimensional arrays: Traversal, Finding sum/difference of two NxM arrays containing numeric values, Interchanging Row and Column elements in a two dimensional array;

Stack (Array and Linked implementation of Stack):
Operations on Stack (PUSH and POP) and its Implementation in C++, Converting expressions from INFIX to POSTFIX notation and evaluation of Postfix expression;
Queue: (Circular Array and Linked Implementation):
Operations on Queue (Insert and Delete) and its Implementation in C++.

3: DATABASES AND SQL

Database Concepts:

Relational data model: Concept of domain, tuple, relation, key, primary key, alternate key, candidate key;
Relational algebra: Selection, Projection, Union and Cartesian product;

Structured Query Language:

General Concepts: Advantages of using SQL, Data Definition Language and Data Manipulation
Language; Data types: NUMBER, CHARACTER, DATE;
SQL commands:
CREATE TABLE, DROP TABLE, ALTER TABLE, UPDATE...SET..., INSERT, DELETE;

SELECT, DISTINCT, FROM, WHERE, IN, BETWEEN, GROUP BY, HAVING, ORDER BY;
SQL functions: SUM, AVG, COUNT, MAX and MIN;
Note: Implementation of the above mentioned commands could be done on any SQL supported software on one or two tables.

4: BOOLEAN ALGEBRA

Binary-valued Quantities, Boolean Variable, Boolean Constant and Boolean Operators: AND,
OR, NOT; Truth Tables; Closure Property, Commutative Law, Associative Law, Identity law,
Inverse law, Principle of Duality, Idem potent Law, Distributive Law, Absorption Law, Involution law, DeMorgan's Law and their applications;

Obtaining Sum of Product (SOP) and Product of Sum (POS) form from the Truth Table, Reducing Boolean Expression (SOP and POS) to its minimal form, Use of Karnaugh Map for minimization of Boolean expressions (up to 4 variables);

Basic Logic Gates (NOT, AND, OR, NAND, NOR) and their use in circuits.

5: COMMUNICATION AND OPEN SOURCE CONCEPTS

Evolution of Networking: ARPANET, Internet, Interspace;

Different ways of sending data across the network with reference to switching techniques;

Data Communication terminologies:
Concept of Channel, Baud, Bandwidth (Hz, KHz, MHz) and Data transfer rate (bps, kbps, Mbps, Gbps, Tbps);

Transmission media:
Twisted pair cable, coaxial cable, optical fiber, infrared, radio link, microwave link and satellite link.

Network devices:
Modem, RJ45 connector, Ethernet Card, Hub, Switch, Gateway;

Network Topologies and types:
Bus, Star, Tree; Concepts of LAN, WAN, MAN

Network Protocol:
TCP/IP, File Transfer Protocol (FTP), PPP, Level-Remote Login (Telnet), Internet, Wireless/
Mobile Communication, GSM, CDMA, WLL, 3G, SMS, Voice mail, Application Electronic Mail, Chat, Video Conferencing;

Network Security Concepts:
Threats and prevention from Viruses, Worms, Trojan horse, Spams
Use of Cookies, Protection using Firewall;
India IT Act, Cyber Law, Cyber Crimes, IPR issues, Hacking.

Web Servers;
Hyper Text Markup Lanuage (HTML), extensible Markup Language (XML); Hyper Text Transfer Protocol (HTTP); Domain Names; URL; Protocol Address; Website, Web browser, Web Servers; Web Hosting, WEb Scripting – Client side (VB script, Java Script, PHP) and Server side (ASP, JSP, PHP)

Open Source Terminologies:
Open Source Software, Freeware, Shareware, Proprietary software, FLOSS, GNU, FSF, OSI;

Sample Question for Entrance Test for B.A. LL.B/B.Com. LL.B (Hons.) 5 years Integrated Course

The admission to B.A. LL.B/B.Com. LL.B (Hons.) 5 years Integrated Course shall be based on the merit prepared on the basis of total of 50% marks obtained in 10 +2 examination and 50% marks obtained in the Common Entrance Test 2011 conducted by the Panjab University. The paper will consist of 100 questions of one mark each. The distribution of marks for the respective areas of testing would be as under:

General Knowledge & Current Affairs	:	60 questions
Aptitude for Law	:	20 questions
Mental Ability	:	10 questions
Proficiency in English Language	:	10questions

25% marks will be deducted for every wrong answer. Total time to be allocated to this paper will be 90 minutes.

Sample Paper:

General Knowledge and Current Affairs:

1. Laws of gravitation were proposed by

   (A) Newton (B) Edison
   (C) Madam Curie (D) Archimedes

2. Printing for the blind was invented by

   (A) Benjamin Franklin (B) Louis Braille
   (C) C.V. Raman (D) Jagdish Chander Bose

3. The first revolt for India's independence, also called the Sepoy Mutiny took place in the year:

   (A) 1848 (B) 1857
   (C) 1757 (D) 1856

4. Which state in India shares border with maximum number of other states:

   (A) Madhya Pradesh (B) Rajasthan
   (C) Uttar Pradesh (D) Bihar

5. Which of the following is not Union Territory:

   (A) Lakshdweep (B) Manipur
   (C) Delhi (D) Chandigarh

6. AIDS stands for:

   (A) All India Doctors Society (B) Acquired Immunity Deficiency Syndrome
   (C) An International Disease Society (D) All India Dental Society

7. In which city is the headquarters of U.N.O. located :

   (A) Rome (B) New Delhi
   (C) Paris (D) New York

8. The first battle of Panipat was fought between:

   (A) Babar and Ibrahim Lodhi (B) Humayun and Sher Shah Suri
   (C) Akbar and Hemu (D) Alao-ud-din Khilji and Mohammod Tuglak

Aptitude for Law:

9. Choose the correct term for : Affidavit

   (A) A certificate
   (B) A statement on oath for use as evidence in law
   (C) A mark sheet (D) An application for bail

10. Choose the correct term for : Court Martial

(A) A military court to try persons under military law
(B) A court established by the state
(C) A court to decide marriage disputes
(D) Sentence to imprisonment

11. Choose the correct term for : Coma

(A) Used for letter writing (B) Used in writing to separate two parts of a sentence
(C) Complete loss of consciousness (D) State of disturbed mind

Mental Ability

Directions for Q. No. 12-14

Amit is son Rahul. Sarika, Rahul's sister has a son Sonu and daughter Rita. Raja is the maternal uncle of Sonu:

12. How is Amit related to Sonu?

(A) Nephew (B) Cousin (brother)
(C) Uncle (D) Father

13. How is Rita related to Raja?

(A) Sister (B) Daughter
(C) Niece (D) Mother

14. How may nephews does Raja have?

(A) 1 (B) 2
(C) 3 (D) 0

Proficiency in English Language

15. From the given options, choose the correct form of idiom.

(A) To eat humble pie (B) To eat a humble pie
(C) To eat an humble pie (D) To eat one humble pie

16. The Synonym of Executioner is

(A) Manager (B) Executive
(C) Hangman (D) Judge

17. The correct antonym of Huge is

(A) Tiny (B) Brittle
(C) Insignificant (D) Little

18. 'extempore' means:

(A) Without previous preparation (B) An extreme step
(C) Bad temper (D) Speaking with some aid

lkakp o"khZ; chñ,ñ,yñ,yñchñ / chñ dksae ,yñ,yñchñ (vkWulZ) lEiw.kZ ikB~;Øe gsrq izos'k ijh{kk

lkakp o"khZ; chñ,ñ ,yñ,yñchñ / chñ dksae ,yñ,yñchñ (vkWulZ) lEiw.kZ ikB~;Øe gsrq izos'k 10+2 ijh{kk esa izkIr 50% vadksa vkSj iatkc fo'ofo|ky; }kjk lapkfyr lkekU; izos'k ijh{kk 2011 esa izkIr 50% vadksa ds ;ksx ds vk/kj ij rS;kj ;ksX;rk lwph ij vk/kfjr gksxkA ijh{kk esa ,d&,d vad ds 100 iz'u gksaxsA ijh{kk esa lEcfU/r {ks=kksa gsrq vadkas dk foHkktu fuEukuqlkj gksxkA

lkekU; Kku vkSj lkef;d ekeys & 60 iz'u

fof/ gsrq vfHk#fp & 20 iz'u

ekufld ;ksX;rk & 10 iz'u

vaxzsth Hkk"kk esa izoh.krk & 10 iz'u

izR;sd xyr mÙkj gsrq 25% vad ?kVk fn, tk,axsA bl ijh{kk gsrq fu/kZfjr dqy le; 90 feuV gksxkA

uewuk i=k%

lkekU; Kku vkSj lkef;d ekeys&

1- xq#Rokd"kZ.k ds fl¼kar izLrqr fd,&

(d) U;wVu ([k) ,Mhlu
(x) eSMe D;wjh (?k) vkfdZehMht

2- us=kghuksa gsrq eqnz.k (NikbZ) dk vkfo"dkj fd;k&

(d) cSUtkfeu QzSadfyu ([k) yqbZl czsy
(x) lh0 oh0 jeu (?k) txnh'kpanz cksl

3- **Hkkjr dh Lok/hurk gsrq izFke fonzksg] ftls lSfud fonzksg Hkh dgk tkrk gS] vkjEHk gqvk&**

(d) 1848 esa ([k) 1857 esa
(x) 1757 esa (?k) 1856 esa

4- Hkkjr dk dkSu lk jkT; vf/dre vU; jkT;ksa ls lhek lk>h djrk gS&

(d) eè; izns'k ([k) jktLFkku
(x) mÙkj izns'k (?k) fcgkj

5- fuEu esa ls dkSu lk dsUnz'kkflr izns'k ugha gS&

(d) y{k}hi ([k) ef.kiqj
(x) fnYyh (?k) p.Mhx<+

6- ,M~l dk rkRi;Z gS&

(d) vf[ky Hkkjrh; fpfdRlk lHkk ([k) ,Dok;MZ bE;qfuVh MSfQf'k,alh flaMªkse
(x) ,d varjkZ"Vªh; jksx lHkk (?k) vf[ky Hkkjrh; nar lHkk

7- fdl uxj esa la;qDr jk"Vª la?k dk eq[;ky; fLFkr gS&

(d) jkse esa ([k) ubZ fnYyh esa
(x) isfjl esa (?k) U;w;kdZ esa

8- ikuhir dk izFke ;q¼ yM+k x;k&

(d) ckcj vkSj bczkfge yks/h ds eè; ([k) gqek;wa vkSj 'ksj'kkg lwjh ds eè;
(x) vdcj vkSj gsew ds eè; (?k) vykÅíhu f[kyth vkSj eksgEen rqxyd ds eè;

fof/ gsrq vfHk#fp

9- 'kiFk i=k (,sfQMSsfoV) gsrq mi;qDr 'kCn pqfu,&

(d) izke.k i=k
([k) dkuwu esa lk{; ds :Ik esa iz;qDr 'kiFk lEcU/h c;ku
(x) vad i=k
(?k) tekur gsrq izkFkZuk i=k

10- ^dksVZ ek'kZy* gsrq mi;qDr 'kCn pqfu,&

(d) lsuk ds fu;ek/hu O;fDr;ksa dks tkapus gsrq ,d lsuk U;k;ky;

([k) jkT; }kjk LFkkfir ,d U;k;ky;
(x) fookg lEcU/h fooknksa ds fu.kZ; gsrq U;k;ky;
(?k) dkjkokl dk n.M

11- dksek (lEewNkZ) gsrq mi;qDr 'kCn pqfu,&

(d) i=k fy[kus gsrq iz;qDr
([k) okD; ds nks izFke Hkkxksa dks fy[kus gsrq iz;qDr
(x) psruk dk iw.kZ ßkl
(?k) fopfyr eu%fLFkfr

ekufld ;ksX;rk

iz'u lañ 12 ls 14 gsrq fn'kkfunsZ'k%

vfer jkgqy dk iq=k gSA jkgqy dh cgu lkfjdk dk ,d iq=k lksuw vkSj iq=kh jhVk gSA jktk lksuw dk ekek gSA

12- vfer lksuw ls fdl izdkj lEcfU/r gS&

(d) Hkrhtk ([k) ppsjk@eesjk HkkbZ
(x) pkpk@ekek (?k) firk

13- jhVk jktk ls fdl izdkj lEcfU/r gS&

(d) cgu ([k) csVh
(x) Hkrhth (?k) ekrk

14- jktk ds fdrus Hkrhts gSa&

(d) 1 ([k) 2
(x) 3 (?k) 0

vaxzsth Hkk"kk esa izoh.krk

Ques.: 15, 16, 17, 18 as in sample question paper in English medium.

bI. ey. AYl. AYl. bI (Awnrz) /bI. kom AYl. AYl. bI (Awnrz) pMj swlw (integrated) kors dI dwKlw pRIiKAw

bI. ey. AYl. AYl. bI (Awnrz)_/bI. kom AYl. AYl. bI (Awnrz)_ pMj swlw kors dy dwKly leI 50% mYirt 10+2 dI pRIiKAw ivcooO pRwpq kIqy AMkW 'qy ADwirq hovygI qy bwkI dI 50 pRqISq pMjwb XUnIvristI vlO leI jwx vwlI sWJI dwKlw pRIiKAw (CET) 2011 ivcoN hwsl kIqy gey AMkW 'qy AwDwirq hovygI[prcy iv`c ie`k-ie`k AMk dy kul 100 pRSn hoxgy[AMkW dI vMf inmnilKq qrqIb Anuswr hovygI:

sDwrn igAwn (General Knowledge) Aqy - 60 pRSn
clMq msilAW dI prK sMbMDI
kwnUMn pRqI rucI- prKx sMbMDI - 20 pRSn
mwnisk Xogqw dI prK sMbMDI - 10 pRSn
AMgryzI BwSw dI muhwrq sMbMDI -10 pRSn
hryk glq auqr dy 25 pRqISq AMk k`t ley jwxgy prcy dw kul smW 90 iNMmt hovygw

sYNpl pypr

swDwrn / swmwnX igAwn (G.K.) Aqy clMq msly

1. gurUqw iK`c dw isDWq Kojx vwlw
   (a) inaUtn (A) AYfIsn
   (e) mYfm ikaUrI (s) AwrkIsIfIz

2. nyqrhIxW leI CpweI bnwaux vwlw:
   (a) bYNjimn PrYNklIn (A) lUeIs bryl
   (e) sI. vI.rmn (s) jgdIS cMdr bos

3. Bwrq dI AwzwdI pRwpqI leI kIqw igAw pihlw ivdroh ijs nMU &OjI bgwvq (Sepoy Mutiny) vI ikhw jWdw hY ikhVy swl iv`c hoieAw [
   (a) 1848 (A) 1857
   (e) 1757 (s) 1856

4. Bwrq dw auh pRWq d`so ijs dI srh`d sB qoN vDyry rwjW nwl l`gdI hYN:
   (a) m`D pRdyS (A) rwjsQwn
   (e) auqr pRdyS (s) ibhwr

5. hyT iliKAW iv`coN ikhVw kyNdrI Swsq pRdyS (Union Territory) nhIN hY:
   (a) lkSdIp (A) mnIpur
   (e) id`lI (s) cMfIgVH

6. eyfz qoN Bwv hYN:
   (a) srv BwrtrW dI sBw (A) SrIr dI rogW nwl lVn dI qwkq dw Kqm hoxw (e) AMqrrwStrI bImwrIAW sMbMDI sBw (s) srv BwrqI fYNtl suswietI

7. XU. AYn. E dw mu`K dPqr ikhVy Sihr iv`c hY?
   (a) rom (A) nvIN id`lI
   (e) pYirs (s) inaUXwrk

8. pwnIpq dI pihlI lVweI ikhdy ivckwr lVI geI :
   (a) bwbr Aqy iebrwhIm loDI (A) hmwXUM Aqy SyrSwh sUrI
   (e) Akbr Aqy hmwXUM (s) AlwaudIn iKljI Aqy muhMmd quglk

kwnUMn pRqI rucI sMbMDI pRSn

9. AYPIfYivt leI shI pd cuxo :
   (a) srtIi&kyt/prmwxp`qr
   (A) kwnUMnI sbUq vjo dwier kIqw igAw hl&IAw ibAwn
   (e) AMk prcw (s) jmwnq leI idqI geI ArzI

10. kort mwrSl leI shI pd cxo :
(a) &OjI Adwlq ij`Qy &ojI kwnUMn ADIn mukdmy dI suxvweI kIqI jWdI hY[
(A) styt Adwlq
(e) ivAwh sMbMDI JgiVHAW dw inptwrw krn vwlI Adwlq (s) kYd dI szw

11. komw (coma) leI ikhVy TIk pd dI vrqON krnI shI hY :
(a) ^q ilKx ivc huMdI ies dI vrqoN
(A) ies pd dI vrqoN vwk dy do BwgW nUM v`K krn vyly kIqI jwdI hY[
(e) pUrn byhoSI dI hwlq
(h) mn dI auKVI hoeI hwlq

mwnisk Xogqw dI prK sMbMDI

pRSn nM. 12 qoN 14 dw auqr dyx leI hyT ilKIAW hdwieqW nUM iDAwn nwl pVoH[

Aimq rwhul dw muMfw hY[rwhul dI BYx swirkw hY[swirkw dw muMfw sonUM qy kuVI rItw hY[rwjw sonUM dw mwmw hY[

12. Aimq sonUM dw kI l`gdw hY?
(a) BqIjw (A) ccyrw/mmyrw Brw
(e) AMkl (s) ipE

13. rItw, rwjw dI kI l`gdI hY?
(a) BYx (A) kuVI
(e) BqIjI (s) mW

14. rwjw dy ikMny BqIjy hn?
(a) 1 (A) 2
(e) 3 (s) 0

AMgryzI BwSw dI muhwrq sMbMDI

Ques.: 15, 16, 17, 18 as in sample question paper in English medium and the test for this portion will be in English Language.

APPENDIX II

Combinations of subjects in CET for Admission to various courses

Name of Course	Combination of subject(s)*
B.A. LL.B/B.Com. LL.B (Hons.) 5 years Integrated Course	Legal and General Awareness
B. Pharm. B. Sc (Hons School) Biotechnology B.Sc. (Hons. School) Biophysics	i) Physics, Chemistry, Biology **OR** ii) Physics, Chemistry, Mathematics **OR** iii) Physics, Chemistry, Biotechnology **OR** iv) Physics, Chemistry, Computer Science
M. B. B. S./ B.D.S./ B. A. M. S./ B .H. M. S. and B.Sc. (Hons. School) in Botany/ Microbiology/ Zoology	Physics, Chemistry, Biology
B.Sc. (Hons. School) in Anthropology/ Chemistry/ Geology/Physics/ Physics and Electronics	i) Physics, Chemistry, Mathematics **OR** ii) Physics, Chemistry, Biology
B. Sc. (Hons School) Biochemistry	i) Physics, Chemistry, Biology **OR** ii) Physics, Chemistry, Mathematics **OR** iii) Physics, Chemistry, Biotechnology
B.Sc. (Hons. School) in Mathematics / Mathematics & Computing	Mathematics

***Note:**

1. If a candidate appears in 4 subjects his/her name will be included in the entire merit list wherever possible. For example if a candidate appears in Biology, Chemistry, Mathematics and Physics, his/her name will be included in all the Merit lists where ever he/she qualifies.
2. Candidates who have preference for B. Sc. (Honours School) Mathematics and B. Sc. (Honours School) Mathematics & Computing only may appear in Mathematics only.

APPENDIX III

GENERAL INSTRUCTIONS FOR GIVING ANSWERS ON OMR ANSWER SHEET

1. All questions are to be attempted on the Answer-sheet as per instructions printed on the question booklet and OMR answer sheet.
2. **The Answer-sheet is designed for computer evaluation. Please follow the instructions given on the Answer-sheet strictly otherwise it may make evaluation by the computer difficult. Any resultant loss to the candidate on the above account i.e., not following the instructions completely, shall be of candidate only.**
3. Each question is followed by four answer choices labelled A, B, C and D. Select the answer you think is the best response and darken the bubble bearing the correct response label against the serial number of the question. For example if you think answer to question number 2 is D then mark as follows:

   Q. 2 Ⓐ Ⓑ Ⓒ ●

   The Answer marked as under shall be considered as wrong:

   Ⓐ Ⓑ Ⓒ Ⓓ Ⓐ Ⓑ Ⓒ Ⓓ Ⓐ Ⓑ Ⓒ Ⓓ Ⓐ Ⓑ Ⓒ Ⓓ Ⓐ Ⓑ Ⓒ Ⓓ Ⓐ ● Ⓒ ●
4. For marking answers use **Black Ball/Gel Pen only**.
5. If you do not want to answer any question, leave all the bubbles corresponding to that question blank.
6. Be very careful in filling in the bubble in the first instance since erasing or changing it will spoil the response and go to the disadvantage of the candidate.
7. In order to open the Question Booklet remove the paper band gently.
8. **Write your Roll Number on the answer-sheet as also on the Question Booklet only in the space provided for the purpose and at no other place in the question Booklet and Answer Sheet.**
9. For calculations, the use of log tables is permitted. Use of Calculator is not allowed.
10. For rough work, the sheets marked 'ROUGH WORK' at the end of the Question Booklet be used. No rough work shall be done on the Answer-sheet under any circumstances.
11. Penalty for wrong answers (Negative marking)

    Negative marking will be adopted for evaluation i.e. marks will be deducted for wrong answers. The total marks to be awarded to a candidate in a paper after imposing the penalty will be calculated by the following formula (Assuming that each question carries 2 mark):

    For each correct answer to a question, 2 marks will be awarded. However, if the answer is wrong 1/2 mark will be deducted. For example, these marks will be calculated as under:

    P = Number of correct answers.
    Q = Number of wrong answers
    R = Number of unattempted questions
    (An unattempted question means, the bubbles corresponding to that question is left blank).
    Then the final score will be 2P-1/2Q, calculated to second place of decimal.

    It will also be checked that P + Q + R = Total No. of questions in the Paper.

APPENDIX IV

Distribution of seats in various Science Departments and Institutes of the Panjab University Chandigarh

Course	Total No. of Seats	Kashmiri Migrant**	Foreign Nationals/ PIO/NRI	Any other
B.A. L.L.B (Hons.) 5 year Course **(Laws) UILS, PU, Chandigarh**	120	-	12	-
B.Com LL.B. (Hons.) 5 year Course **(Laws) UILS, PU, Chandigarh**	60*		06*	
B.A. L.L.B (Hons.) 5 year Course **(Laws), PU RC, Ludhiana**	87		08	
B.A. L.L.B (Hons.) 5 year Course **(Laws) UILS, SSG, PU RC, Hoshiarpur**	50	01	08	
B. Pharm.	46	01	06	01***
B.Sc. (Hons. School) Courses				
1. Anthropology	30	01	04	-
2. Biochemistry	30	01	04	-
3. Biophysics	30	01	04	-
4. Biotechnology	15	01	02	-
5. Botany	20	01	03	-
6. Chemistry	58	01	08	-
7. Geology	30	01	04	-
8. Maths	25	01	04	-
9. Maths & Computing	15	01	02	-
10. Microbiology	29	01	04	-
11. Physics	46	01	06	-
12. Physics & Electronics	23	-	03	-
13. Zoology	25	01	04	-

These seats are subject to approval of the Syndicate. Distribution of these seats will be made at the time of admission if approved.

**60 seats out of 180 be reserved for B.Com. LL.B. (Hons.) 5 years Integrated course and 120 seats be reserved for B.A.LL.B. (Hons.) 5 years Integrated Course subject to the reservation as per Panjab University Rules.*

**Seat for Kashmiri migrants are subject to approval of the Syndicate, Panjab University Chandigarh.

***out of 46 seats, one seat is reserved for the nominee of the Government of India from amongst the foreign students and the students from the States and Union Territories lacking facilities in this field and repatriates from Myanmar (Burma), Sri Lanka etc. of the remaining seats, general University reservation criteria would be applied.

Note: 1. The above tabulation for various categories reflects approximate figures and is subject to correction in accordance with the General

Guidelines for Admission of Panjab University and any other Government notification prior to the time of interview.

2. **Any other statutory reservation as prescribed by the Syndicate P.U./Govt. of India, if any.**

3. **<u>Additional Seat for only (Single) Girl Child and Cancer, Aids Patient, Kargil war :</u>**

   <u>For Only (Single) Girl Child:</u>

   Two additional seats for the only sibling (Single) girl child for admission in each course in the Panjab University, provided she is otherwise eligible from all angles.

   <u>For Cancer and Aids Patient:</u>

   The students will submit a certificate with proof from the National Medical Institute like PGI, AIIMS.

   <u>For Kargil War:</u>

   Wards of Kargil war as per syndicate decision dated 29.07.2008

4. **The concession to the wards of Kashmiri Displaced persons and additional seats for Single Girl Child and Cancer, Aids Patients, Kargil War is not applicable to the students falling under regulatory agencies such as BCI, MCI, DCI and NCTE.**

***Illustration*: In a course which has 25 seats, the distribution of seats among the various categories will be as under:-**

Open Category	SC	ST	BC	Sports	Defence Personnel	Phy. Handicapped	Riot Victim	Freedom Fighter	Total
55.5%	15%	7.5%	5%	5%	5%	3%	2%	2%	
14	4	2	1	1	1	1	1	1	26

APPENDIX V

APPROXIMATE AMOUNT TO BE PAID AT THE TIME OF ADMISSION

Course Institute/Deptt.	Indian Nationals		Foreign Nationals/ PIO/NRI			
	Ist installment at the time of Admission	IInd Installment in the month of November	Tuition fee + Development Fund (U.S. Dollar)	Total U.S. Dollar	Other charges (Rs.)	Registration fee (U.S. Dollar)
B.D.S. (Course) Dr. Harvansh Singh Judge Institute of Dental Sciences & Hospital	Rs. 1,01,887/- p.a		7580+ 830	8410	19522	650
B. A.LL.B. / B.Com. LL.B. (Hons.) 5 year Integrated Courses UILS P.U. Chandigarh; UILS, Swami Sarvanand Giri, PURC, Hoshiarpur & PURC, Ludhiana.	Rs.35537/- (in favour of Registrar P.U., Chandigarh) + Rs. 9580/- (in favour of Director UILS, P.U., Chandigarh / UILS Swami Sarvanand Giri, PURC, Hoshiarpur & PURC, Ludhiana)1st semester and Rs. 25000/- in second semester		2120+230	2350	15217	650
B.Sc. (Hons. School) courses						
Anthropology Botany, Chemistry, Geology, Physics and Zoology	Rs. 5357/-	Rs. 2535/-	1060+115	1175	3952	650
Mathematics	Rs. 4787/-	Rs. 1965/-	1060+115	1175	3382	650
Math & Computing	Rs. 19437/-	Rs. 1725/-	1060+115	1175	18032	650
Microbiology, Biophysics, Biochemistry	Rs. 5357/-	Rs. 2535/-	1590+175	1765	3952	650
Biotechnology	Rs.13002/-	Rs. 1725/-	2120+230	2350	11597	650
B. Pharm.	Rs. 7257/-	Rs. 3675/-	2950+580	3530	3772	650
Physics & Electronics	Rs. 28917/-	Rs. 16095/-				

All admitted students will be required to pay full fee at the time of admission. In case of shifting / left the courses/ Deptt. the fee will be refunded/adjusted later on for the students selected for this benefit as per P.U. rules mentioned in the Hand Book of Information & Rules for admissions.

IMPORTANT NOTE:

1. Registration fee (or equivalent Indian Rupees) payable by Foreign Nationals students are US $ 440 but PIO/NRI who are being registered for the first time in the University are required to pay US $ 650 as per university rules.

2. (i) Selected Candidates will be asked to make the payments on the spot. No extra time will be

given. Payments for the above mentioned fees will be accepted through Bank Draft (in favour of the **Registrar, Panjab University, Chandigarh** payable at **State Bank of India, Sector –14, Chandigarh**).

(ii) During the counselling, the fee would be collected only by way of drafts issued by any bank in favour of the Registrar/ Chairperson/ Coordinator as the case may be. The student shall prepare separate drafts for counselling fee, admission fee and department funds, if required. For this purpose, Department wise/ Class wise fee structure alongwith proper instruction for preparation of draft shall be incorporated / available in the University website.

(iii) The State Bank of India, Sector 14, Chandigarh shall held special drives to popularize the scheme of **"I Collect"** within University, Departments and also put special counters for opening the Zero Balance Accounts of student. The State Bank of India, Sector 14, Chandigarh shall also ensure that during rush hours more counters/ windows shall be opened to avoid any hassle or unwanted circumstances to arise (subject to final approval of the Syndicate).

3. Candidates selected to UILS will have to submit one demand draft of Rs. 35537/- in favour of Registrar, Panjab University, Chandigarh and other Demand draft of Rs. 9580/- in favour of the concerned Director, (UILS, P.U., Chandigarh/ UILS Swami Sarvanand Giri, PURC, Hoshiarpur/ PURC, Ludhiana).

4. The Candidates will have to pay the exact amount as per P.U. Fee structure prevailing at the time of admission. The amount mentioned above are approximate. The University is likely to increase the fee @ 10% of the existing fee structure. Therefore, the candidates are advised to bring sufficient money to cover the increase. The amount over and above the fee structure, if any, will also be accepted in the shape of draft. For that, if required, S.B.I. Sector 14, Chandigarh will open more counter / windows for the purpose.

5. In addition to amount paid at the time of admission, except BDS course, second installment of the fee will be due in November.

6. Hostel accommodation both for Boys and Girls is available. The seats as per quota would be allocated to the Department for further allotment to the students on merit basis. Candidates, interested to avail hostel facility, are advised to bring with them an extra amount of Rs. 7,000/- (approx) for admission in the hostels.

7. In case of Foreign Nationals/ PIO/NRI candidates: If the amount is paid in Indian Currency, a Bank Certificate must be attached confirming that the rate of US $ on that date and the draft is issued from the NRI account.

IMPORTANT DATES/ INFORMATION

Date & Day of Test : 27.5.2012 (Sunday)

DATE-SHEET

Paper and Subject	Time of Examination
Paper–I Legal and General Awareness	8.30-10.00 a.m.
Paper – II Physics	10.20-11.30 a.m.
Paper – III Chemistry	11.50-1.00 p.m.
Paper – IV Biology	2.00-3.10 p.m.
Paper – V Mathematics	3.30-4.40 p.m.
Paper-VI Biotechnology / Computer Science	5.00-6.10 p.m.

For enquiries regarding admission to

BDS, B.A. LL. B./B. Com LLB. (Hons.) 5 years Integrated Course, B. Pharm. and B. Sc. (H. S.) In Teaching Departments/Institutions of Panjab University Chandigarh, please contact:

Enquiry about admission to:	Person to be contacted	Phone
BDS	Director Principal, Dr.H.S. Judge Institute of Dental Sc., P.U., Chd.	0172-2534686 0172-2534687
B.A. LL.B/B.Com. LL.B (Hons.) 5 years Integrated Course	Director, UILS, P.U., Chandigarh	0172-2784397 0172-2534697
B.A. LL.B (Hons.) 5 years Integrated Course	Director, P.U. Regional Centre, Ludhiana	0161-2449558 0161-2448917 0161-2443830
	Director, UILS, S.S.G. P.U., Regional Centre, Hoshiarpur	01882-237797 01882-237521
B. Pharm.	Chairperson, University, Institute of Pharm. Sciences, P.U. Chd.	0172-2534110 0172-2354101
B. Sc. (Hons School)	Chairperson of the Departments	
Anthropology	-do-	0172 –2534223
Biochemistry	-do-	0172 –2534131
Biophysics	-do-	0172 –2534119
Biotechnology	-do-	0172 –2534085
Botany	-do-	0172 –2534023
Chemistry	-do-	0172 –2534401
Geology	-do-	0172 –2534235
Mathematics	-do-	0172 –2534501
Mathematics & Computing	-do-	0172 –2534501
Microbiology	-do-	0172 –2534140
Physics	-do-	0172 –2534466
Physics & Electronics	-do-	0172-2534466
Zoology	-do-	0172 –2534201
For dates of trials of Sports Category, the candidate should contact the Sports Department.		
Sports	Director Sports Panjab University Chandigarh	0172 – 2534033 0172 – 2544081

CET-2012 Schedule

Date of Advertisement regarding test & other information relevant thereto	21.03.2012 (Wednesday)
Date of Availability of CET Prospectus and Application Form on the website of Panjab University	21.03.2012 (Wednesday)
Last date for submission of information on the website to generate the Bank Challan	01-05-2012 (Tuesday)
Last date for deposit of fee in any branch of State Bank of India using website generated challan	03-05-2012 (Thursday) upto 4:00 p.m.
Last date for submission of fee details (journal no.; branch code and date of deposit given by Bank) and uploading of photograph, signature with rest of the information on the website	05-05-2012 (Saturday)
Final date by which Roll No./Admit Card will be available online Admit Card required to be downloaded from the website by the candidate using their own Login and Password (provided while generating Bank Challan). **There will be no physical communication for this purpose.**	17.05.2012 (Thursday)
No correction will be entertained / made regarding photograph, signature and any other information after **08-05-2012, 5:00 p.m.**	08-05-2012 (Tuesday) upto 5:00 p.m.
Date of Holding Entrance Test	27.05.2012 (Sunday)
Tentative date during which the result may be declared by the University	06.06.2012 to 08.06.2012 (Wednesday to Friday)
Centre for the Entrance test	Chandigarh only
CET Fee: General Category: SC/ST Category:	 Rs. 1800/- Rs. 900/-

For Enquiries about Test contact

Assistant Registrar (C.E.T.)	0172 – 2534829
Controller of Examinations	0172 – 2534811
Coordinator CET	0172 – 2534213

Admission Scheduled for MBBS, BDS, BAMS, BHMS

Tentative date of availability of prospectus/Admission forms	1.6.2012 (Friday)
Last date for submission of admission forms in the Govt. Medical college & Hospital, Sector-32, Chandigarh	22.6.2012 (Friday) upto 4.00 p.m.
Dates of interview/normal counselling	11.7.2012 to 13.7.2012 (Wednesday to Friday)
Date of Commencement of Session 2012-2013	16.7.2012 (Monday)
Date of late admission with the approval of Director Principal of the College	14.7.2012 to 31.8.2012
Late admission with the approval of Vice-Chancellor, P.U., Chandigarh	1.9.2012 to 30.9.2012
Venue of availability of the prospectus/admission forms etc	Govt. Medical College &

	Hospital, Sector 32-A, Chandigarh

Enquires for admission to MBBS, BDS, BAMS, BHMS contact:

Principal, Govt. Medical College and Hospital, Sector 32 Chandigarh	
A.R. Academic, G.M.C.H., Sector 32, Chandigarh	0172-2665253 Ext. No. 4233 4239
Director Principal, Dr. H.S. Judge Institute of Dental Sciences,	0172-2534686
Panjab University, Chandigarh	0172-2534687
Principal, Shri Dhanwantry Ayurvedic College, Sector – 46 Chandigarh	0172-5046201
Principal, Homeopathic Medical College, Sector, 26, Chandigarh	0172-2791760

COMMON ENTRANCE TEST (CET) 2012

PANJAB UNIVERSITY, CHANDIGARH
FOR ADMISSION TO M.B.B.S., B.D.S., B.A.M.S., B.H.M.S.,
B.A./B.COM. L.L.B. (FIVE YEAR LAW), B. PHARM., B.Sc. (HONS. SCHOOL)

STEPS TO FOLLOW:

1. Register Online at http://cetadmissions.puchd.ac.in
2. Note down your Login Id and Password.
3. Download SBI slip and pay fee in any SBI branch.
4. Login and upload scanned photograph, signature, fill other important information and Save and Confirm.

Registration Form:

Read Instructions and Eligibility Criteria carefully before registration.
 # Do not prefix the title such as Shri / Smt. / Mr. / Mrs. / Dr. etc. along with names.

Name #

Father's Name #

Mother's Name #

Date of Birth

E-mail

Class 10th Roll No.

Class 10th Board

Class 10th Passing Year

Category

Categories other than General

- ☐ **Scheduled Caste**
- ☐ **Scheduled Tribe**

- ☐ **Backward Class**

Defence

- ☐ Wards of Military/Paramilitary Personnel who died in action
- ☐ Wards of Military/Paramilitary Personnel incapacitated while in service
- ☐ Wards of Military/Paramilitary Personnel Ex-Serviceman
- ☐ Defence Personnel incapacitated while in service
- ☐ Wards of Serving Defence Personnel
- ☐ Ex-Servicemen
- ☐ Serving Defence Personnel

- ☐ **N.R.I./P.I.O**

Physically Handicapped

- ☐ Physically Handicapped
- ☐ Blind

- ☐ **Only (Single) Girl Child**
- ☐ **Riot Victim/Terrorist Victim**
- ☐ **Sports Person**
- ☐ **Freedom Fighter**
- ☐ **Wards of Kashmiri Migrants**
- ☐ **Wards of Kargil War**
- ☐ **Cancer/AIDS Patients**

Candidate Information Form

Stream in Class +2[*] ☐

Subjects Passed/ Appeared in Class +2 (for Science Students only) :

☐ Physics[#] ☐ Chemistry[#]

☐ Mathematics ☐ Biology

☐ Biotechnology ☐ Computer Science

Subjects in which appearing in CET[*]

☐ Physics ☐ Chemistry

☐ Biology ☐ Mathematics

☐ Biotechnology ☐ Computer Science

☐ Legal and General Awareness

Medium of Test for Legal and General Awareness only:
(For Admission to Law course) ☐

Candidate Name: ☐

Father's Name: ☐

Mother's Name: ☐

Gender: ☐ Male ☐ Female

Date of Birth: ☐

Nationality: ☐

Correspondence Address: ☐

☐

Permanent Address:	
Phone No./Mobile No:	
E-mail ID:	
Class +2 Roll No:	
Class +2 Board/University**:**	
Year of Appearing/Passing (Class +2):	
Are you regular student in +2 from: Schools situated in Chandigarh?	Yes ☐ No ☐
10^{th} Class %age:	
Upload Photograph:	
Upload Signature:	