ICAR-NATIONAL DAIRY INSTITUTE
(DEEMED UNIVERSITY)
KARNAL (HARYANA) -132001, INDIA

INFORMATION BULLETIN

Diploma (Dairy Technology / Animal Husbandry & Dairying)
2019-20

1.1 INTRODUCTION

ICAR - National Dairy Research Institute (NDRI), Deemed University (here-in-after referred to as the Institute) serves as the prime centre for Research, Extension and Human Resource Development Programmes of the country in the field of Dairying. The Institute was developed from the erstwhile Imperial Institute of Animal Husbandry and Dairying established at Bengaluru in 1923. The Main Campus of ICAR - NDRI is now located at Karnal (Haryana). It has two Regional Stations: Southern Regional Station at Bengaluru (Karnataka) and Eastern Regional Station at Kalyani (West Bengal).The Institute offers academic programmes in the field of Dairy Science. At present the following programme, are being offered:

1. Diploma in Dairy Technology
2. Diploma in Animal Husbandry & Dairying
3. B. Tech. (Dairy Technology)
4. Masters Programme
5. Doctoral Programme

2.1 Diploma Programmes

Diploma in Dairy Technology is being offered from the year 2013 at Southern Regional Station of the Institute, Bengaluru. This Diploma programme offers intensive training in dairy processing, quality assurance of milk and milk products, engineering aspects of dairy processing equipment and dairy business management.

Diploma in Animal Husbandry and Dairying is being offered from the year 2014 at Eastern Regional Station of the Institute, Kalyani, Nadia District of West Bengal. This Diploma programme offers intensive curriculum on different aspects of animal husbandry and dairying.

3.0 PROCEDURE FOR APPLICATION

3.1 Eligibility

The candidates having passed their 12thStandard Examination of the Central Board of Secondary Education or any other examination within scope and standard found to be equivalent to the Secondary School Examination of a recognized Indian University/Board after a period of 10 + 2 years of study are eligible to apply for the Entrance Examination for admission into Diploma Programme. For Diploma (Dairy Technology) the candidate must have taken Physics, Chemistry, Mathematics and English during his / her 12th standard or equivalent programme, while for Diploma (Animal Husbandry and Dairying) the candidate must have taken Physics, Chemistry, Biology / Agriculture and English as his / her subjects in the 12th standard examination. The candidates must have passed the qualifying examination securing not less than 50% marks in aggregate in Physics, Chemistry and Mathematics / Biology / Agriculture by General, OBC and UPS categories and 40% for SC/ST, PH categories. The candidates due to appear for the final examination of 12thStandard in 2019 may also apply for the Entrance Examination provided they complete the examinations and obtain the results on or before**31stJuly 2019.**

3.2 Application

3.1 Diploma (Dairy Technology and Diploma (Animal Husbandry & Dairying)

(1) Candidate applying for the Admissions in various UG programmes **of ICAR-National Dairy Research Institute (Deemed University) Karnal (Haryana)** are required to apply online only through the official website of NDRI, Karnal **http://www.ndri.res.in** and accessing the link **'Apply Online**. Application will not be accepted by any other mode. Candidates are requested to read important instructions for filling up online application form before apply available on the website.

The entrance examination will be conducted at following centres in ONLINE

Mode on 09-06-2019 at Karnal/Kurukshetra, Delhi, Mumbai, Bengaluru, Kolkata, Hyderabad and Thiruvananthapuram.

(2) All correspondence for admission should be addressed to the Academic Coordinator, National Dairy Research Institute, Karnal-132001 (Haryana). For all important dates please see important instructions on the website **http://www.ndri.res.in**

(3) In case of SC/ST/OBC and EWS candidate, a certificate as per annexure from a first class Magistrate of a District / Competent Authority indicating that the candidate belongs to a particular category.

4. All original certificates and marks sheet are to be produced at the time of registration/counselling. Candidates who do not produce all the original certificates and mark sheet will be not admitted.

5. If a candidate wilfully furnishes wrong information or suppresses any relevant information, his/her candidature/ admission will automatically stand cancelled.

(6) Roll Nos and centre of examination of the eligible candidates will be displayed on NDRI website (www.ndri.res.in).

4.0 ENTRANCE EXAMINATION AND SELECTION PROCEDURE

4.1 **The entrance examination will be conducted at following centres in ONLINE Mode on 09-06-2019 at Karnal/Kurukshetra, Delhi, Mumbai, Bengaluru, Kolkata, Hyderabad and Thiruvananthapuram.**

i. There will be a common question paper for all candidates based on Physics and Chemistry 12thStandard syllabus for 90 min duration and of 100 marks. Paper will be of objective type with multiple choice questions.

ii. There will be an additional question paper based on Mathematics of 12thStandard syllabus for the candidates applying for Diploma (DT) programme, while candidates applying for Diploma (AHD) will have to appear for a question paper based on Biology / Agriculture of class 12th syllabus. This paper would be of one hour duration and for 50 marks.

iii. The syllabus for Entrance Examination for Diploma (DT) and Diploma (AHD) programme is appended in the Information Bulletin as Annexure-I.

iv. The qualifying marks in the Entrance Examination will be 50% for General, OBC and UPS and 45% for SC/ST, PH and In-service categories.

v. The final selection for admission to Diploma Programme will be based on rank list prepared on the basis of marks obtained in the Entrance Examination. Separate rank lists will be published for Diploma (DT) and Diploma (AHD).

vi. Only those students who complete their qualifying examination in all respects latest before the commencement of academic session 31-07-2019 will be considered.

vii. The results in the form of the merit list showing marks of qualified candidates **will be announced in the third week of June, 2019**on NDRI website (www.ndri.res.in).

5.0 COUNSELLING PROCESS

5.1 The qualified candidates will be called for counselling on **30-07-2019** at Eastern Regional Station of ICAR-National Dairy Research Institute, **Kalyani, West Bengal–741235for DAHD course** and at Southern Regional Station of ICAR-National Dairy Research Institute, **Adugodi,Bengaluru–560030 for DDT course**. The candidates will mark their attendance on arrival and will be considered for counselling. Those reporting late will have to register arrival time as late entry in the attendance register and will be considered for counselling as per the latest situation of seat availability at that time. The seats already filled up will not be disturbed in such situation.

5.2 The candidates belonging to PH category will be called first and offered seat against the category to which they belong. The seats for PH category are 3% and will be filled within the overall number of total seats. If the number of PH candidates available is more than the number of reserved seats for PH category, then priority will be decided based on the ranks of Entrance Examination. If the ranks are same, then the marks obtained in the qualifying examination (12thstandard or equivalent) will be used as selection criterion. The same process will be repeated to fill the UPS quota of 2%.

5.3 The candidates belonging to other reserved categories will be called in order of ST, SC, OBC and EWS after the admission of PH and UPS candidates is over. The seats in SC and ST categories are inter-changeable and in case candidates of SC/ST categories are not available, the seats thus remaining vacant will be filled from General Category. Similarly, if the candidates from OBC category are not available, the same will be filled from General Category.

5.4 The General Category candidates will be called after the counselling of candidates of above categories is over. The reserved seats left vacant, if any and the vacant seats for unreserved category will be filled-up from the General Category in the order of merit.

5.5 The merit list, showing names of qualified candidates, made on the basis of marks obtained in the Entrance Examination will be displayed on the NDRI website only and no intimation will be given to candidates by letter or fax or any other means. **The candidates are advised to visit NDRI website (www.ndri.res.in) from time to time.**

5.6 Candidates called for counselling should bring **admit card, all original certificates with mark sheets, SC/ST/OBC/EWS category certificate (Annexure – III, IV and V)** and appropriate certificates for PH and UPS Categories in original for verification and submission.

5.7 **Immediately on offer of admission, candidates are required to deposit counselling fee (Non-refundable) 5000/- in the form of Bank Draft in favour of "ERS of NDRI" payable at Kalyani(SBI, Branch Code 01082). The amount can also be paid by cash on the day of counselling. The deposit will be adjusted towards fee payable during registration**.

6.8 Candidates must appear in person at the time of counselling. In case a candidate is not in the position to present himself/herself, an authorized representative can attend the counselling on production of original certificates and authorization letter (Annexure-IV).

6.0 IN-SERVICE CANDIDATES AND THEIR SELECTION PROCEDURE

An additional five seats in the Diploma (DT) programme will be reserved for in-service candidates. However, the in-service candidates also should qualify in the Entrance Examination and a separate merit list will be prepared in this category.

i) Candidates in permanent employment with Central/State Governments and Dairies/Food Industries with minimum two years service (as on 31-7-2019) in the relevant field and meeting the eligibility requirements given above are eligible to apply under this category. The minimum marks for the in-service candidates, however, shall be 40% in the 12thstandard or equivalent examination and 45% in the Entrance Examination. The candidates must be fully sponsored by the employer.
ii) In-service candidates shall be admitted over and above the seats with the approval of the Competent Authority.
iii) The Application Form duly for In Service candidates for DDT course Advance copy of the Application reached on or before 19.05.2019 will be accepted for the purpose of examination. However, the candidates must submit the application (including Form-A) through proper channel (forwarded by the Employer/Organisation) so as to reach the office on or before 26-06-2019.
iv) The eligible candidates will have to appear and qualify in the Entrance Examination.
v) The admission of in-service candidates will be decided on merit obtained in the Entrance Examination.
vi) The Application of ineligible candidates shall be rejected.

7.0 Number of seats:

7.1. Diploma (DT): 20 + 5 (in-service candidates)

General (unreserved)	10
SC (15%)	03
ST (7.5%)	02
OBC (27%)	05
Total	**20**
EWS (10 % of Total Seats) :	02
Grand Total:	**22**

*PH: 3% *UPS: 2%,ews

(*The seats will be provided to the candidates against the category i.e. General/SC/ST/OBC/EWS to which they belong).

Five in-service candidates will be admitted over and above the seats making the total number of seats to 25.

Seats under "Economical Weaker Section (EWS) Category" for Ph.D programme offered at NDRI, Karnal in reference to the OM No. 20013/01/2018-

BC-II dated January 17, 2019 issued by the Ministry of Social Justice and Empowerment and the OM No. 12-4/2019-U1 dated 17.01.2019 as well as the Letters No 35-2/2019-T.S.I dated 21.01.2019, 01.02.2019, 04.02.2019 and 15.02.2019 of MHRD Department of Higher Education regarding implementation of reservation for Economically Weaker Sections (EWSs) for admission in Central Educational Institution.

7.2. Diploma (AHD): 20+5 (NEH States Candidates)

General (unreserved)	10
SC (15%)	03
ST (7.5%)	02
OBC (27%)	05
Total	**20**
EWS (10 % of Total Seats) :	02
Grand Total:	**22**

*PH: 3% *UPS: 2%

(*The seats will be provided to the candidates against the category i.e. General/SC/ST/OBC/ to which they belong).

Five NEH states nominated candidates shall be admitted over and above the seats with the approval of the Competent Authority making the total number of seats to 25.

Seats under "Economical Weaker Section (EWS) Category" for PhD programme offered at NDRI, Karnal in reference to the OM No. 20013/01/2018-BC-II dated January 17, 2019 issued by the Ministry of Social Justice and Empowerment and the OM No. 12-4/2019-U1 dated 17.01.2019 as well as the Letters No 35-2/2019-T.S.I dated 21.01.2019, 01.02.2019, 04.02.2019 and 15.02.2019 of MHRD Department of Higher Education regarding implementation of reservation for Economically Weaker Sections (EWSs) for admission in Central Educational Institution.

8.0 RESERVATION

8.1 Reservation for SC, ST, OBC,EWS and PH

15% of total seats are reserved for bonafide candidates belonging to Scheduled Castes, 7.5% for Scheduled Tribes, 27% seats for OBC,10% seats for EWS, 3% for Physically Handicapped subject to their being otherwise eligible. The reservation of seats is interchangeable amongst the SC/ST candidates depending upon the availability of such candidates. In case candidates from Reserved Categories are not available, the same will be filled up from General Category.

8.2 Reservation for Remote and Under Privileged States/Union Territories

2% Seats would be reserved for the candidates of the remote and Under Privileged States/ Union Territories(UPS/UT) namely Andaman and Nicobar Islands, Arunachal Pradesh, Dadra and Nagar Haveli, Daman & Diu, Goa, Lakshadweep, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura where educational facilities in Agriculture and Allied Science subjects do not exist. However, these seats will be filled by merit amongst the qualified candidates against the category i.e. General/SC/ST/OBC. Candidates from UPS/UT will have to produce domicile certificate issued by the Competent Authority at the time of counselling.

8.3 Definition for Physically Handicapped

Candidates having permanent disability of not less than 40%, provided they are otherwise fit for admission are eligible under the category of physically handicapped. Such candidates will have to bring a certificate from the Chief Medical Officer of the District to which the candidate belongs. Such candidates will also have to appear before the Medical Officer/Board constituted by the competent authority for determining the percentage of disability and for assessment whether they are fit to carry out the studies despite being handicapped.

9.0 AGE LIMIT

Minimum age limit for Diploma in DT and AHD candidates shall be 17 years on or before31-07-2019 and the maximum age limit shall be 23 years as on 31-07-2019.Maximum age limit for in-service candidates will be 45 years as on 31-07-2019.

10.0 Syllabus

10.1 The syllabus for Diploma programme is governed by the regulations of the Institute and as modified by it from time to time. In-Plant training in a commercial dairy plant for DDT course and training for DAHD course for one semester are part of the syllabus. The medium of instruction is English.

10.2 The Diploma (DT) students have to complete their Diploma programme at SRS of ICAR - NDRI, Bengaluru

10.3 The Diploma (AHD) students have to complete their Diploma programme at ERS of ICAR - NDRI, Kalyani.

11.0 RIGHT TO REFUSE ADMISSION

11.1 The Director reserves the right to refuse admission of any candidate even though he/she may fulfil the academic requirements of admission on the basis of criteria laid down in the regulations, and/or may otherwise be eligible for admission on the basis of assigning any reason thereof. The decision of the Director shall be final and legally binding.

12.0 REGISTRATION

12.1 Students must report for registration on the due date mentioned in the admission letter/e-mail failing which offer for admission is liable to be withdrawn automatically. The candidates are also required to check for this information on the website of the Institute.

12.2 At the time of registration, the students must produce the following original documents:-

a) Certificate of date of birth

b) Original certificates and mark sheets of all the examinations passed.

c) In case of SC/ST/OBC/EWS candidates, a certificate from a first class Magistrate of a District/Competent Authority indicating that the candidate belongs to a particular SC/ ST category which is included in the latest list appended to the constitution of India, SC/ ST 1950.

d) Three passport size photographs (which should not be more than 6 months old)for the preparation of ID card/ Hostel Forms.

16.3 The students and the parents will have to submit affidavits as per UGC guidelines not to indulge in ragging and other related activities.

13.0 RAGGING

13.1 Ragging in any form is totally banned. As per directives from Hon'ble Supreme Court of India, if any incident of ragging comes to the notice of the authority, the concerned student shall be given liberty to explain and if his/her explanation is not found satisfactory, the authority would expel him/her from the Institute. Affidavits need to be submitted by the student and Parent/Guardian as given in Annexure I & II, respectively that the student/ward will not indulge in ragging and other related activities.

14.0 GENERAL INFORMATION

14.1 The selected candidates should join the course by the date indicated in the admission letter/e-mail or as displayed on the website.

14.2 The admission of a candidate who fails to join the course by the stipulated date will stand cancelled automatically.

14.3 Candidates should produce Migration/ Transfer Certificate from the Board/Institution from which they have obtained the eligible qualification within three months of commencement of session.

14.4 Once the admissions are finalized for an academic session, there will be no scope for lateral entry via transfer from any other Institutes to the ICAR - NDRI.

14.5 The Institute reserves the right of admission and also the right to cancel the admission of a candidate at any stage if it is found that the information furnished by the candidate in his/her Application is not true or is incomplete.

14.6 While every care is taken to call the eligible candidates for the Entrance Examination and admit only those who have qualified, it is the responsibility of the candidate to fully ensure his/her eligibility. NDRI will not be responsible for inadvertently calling the candidates for the Entrance Examination or in granting them admission.

14.7 Admission to the Institute implies acceptance by the student and his/her parents/guardian of all provisions given in the Bulletin and/or change in the Institute Rules, Regulation, Fee, etc. that are made from time to time.

14.8 The information indicated in the Information Bulletin is only for general guidance and could be modified/ changed from time to time by the Institute. The Information Bulletin shall not be treated as a legal document.

14.9 The result of the Entrance Examination declared by the Institute shall be treated as final. There is no provision for scrutiny of answer books.

14.10 In case of any legal dispute, the same shall be subject to Bengaluru / Kolkata court jurisdiction only.

15.0 FEES

All fees (see Table below) must be paid on the due date in each Semester. Fees cannot be adjusted against stipends/scholarship. Non-receipt of scholarship etc. will not be considered as a valid reason for late payment of fees. Fees and annual dues once paid will not be refunded to the students leaving the course for any reason what-so-ever.

Sl.No	Description of fee	Fee (Rs.)
1	Caution Money	10000.00
2	Registration Fee (per annum	50.00
3	*Tuition Fee, per annum (To be paid in two instalments semester wise)	4000.00
Hostel Charges		
4	**Students Hostel Fee** Hostel Fee, per annum (to be paid in two instalments semester wise)	2000.00
5	**Married Hostel Fee(only at Bengaluru)** (i) Hostel Fee, per annum (To be paid on monthly basis) (ii) Electricity & Water charges	 3000.00 Actual
6**Charges for Guest Room in Hostel** The Hostel charges for students/students guests for short stay will be as per approved existing rates as per permission of the competent authority.		
7	Students Council Fee	150.00
8	Magazine Fee	50.00
9	*Welfare Fund	100.00
10	Sports Fund	100.00
11	Cultural and Literary Activities Fee	100.00
12	*Examination Fee (per semester)	300.00
13	Identity Card Fee	50.00
14	**Provisional Diploma Certificate	100.00
15	Late Registration Fine	250.00
16	**Alumni Association	250.00
17	**Migration Certificate	50.00
18	**Convocation Fee	100.00

(i) Fee at * marked is exempted for students belonging to SC/ST category.

(ii) Fee at ** marked will be charged in the 2nd year 1stSemester at the time of Registration along with the normal fee.

(iii) Caution money will not be refunded to the candidates if they leave the course after the closing of admission and without completing their degree.

Note:

a) In-service candidates shall also be required to pay all the fees as applicable in the case of other candidates.

b) The Institute shall reserve the right to recover any kind of dues from any amount payable to the students.

c) Unless specially permitted by the Head/Joint Director/Director, the name of the defaulter shall stand struck off from the rolls if he/she does not report for registration within a period of two weeks from the date of commencement of the respective semester. He/She may, however, be re-admitted at the discretion of the Head/Joint Director/Director and on payment of re-admission fee at the prescribed rate and also the fine.

d) The fee and other charges once paid are not refundable. However, the caution money will be refundable only to the passed out students, if claimed within one year of completion of the course. The unclaimed amount will be transferred to Students Union Fund. Caution money will not be refunded if the seat-vacated by the student remains vacant.

16.0 Academic Calendar

2019-20 SESSION

2019		**FIRST SEMESTER**	
August	1st	Registration and payment of fees	(for fresh students)
	2nd -12th	Foundation Course for fresher	
	13th	Regular Classes Begin	
December	1st	Last Working Day	
	7th	Examination Begin (Tentative)	
2020		**SECOND SEMESTER**	
January	11th	Registration and payment of fees	
	12th	Classes begin	
May	17th	Last Working Day	
	25th	Examinations Begin (Tentative)	

ANNEXURE-I

SYLLABUS FOR ENTRANCE EXAMINATION FOR

DIPLOMA IN DAIRY TECHNOLOGY / DIPLOMA IN ANIMAL HUSBANDRY & DAIRYING

(12TH STANDARD LEVEL)

PHYSICS

Unit-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.

Unit-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 graph, 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. Motion of objects in three dimensional space. Motion of objects in three dimensional space

Unit-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).

Unit-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.

Unit-5: Motion of System of Particles and Rigid Body Centre of mass of a two-particle system, momentum conversation 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.Statement of parallel and perpendicular axes theorems and their applications.

Unit-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.

Unit-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 transferconduction, convection and radiation, thermal conductivity, Newton's law of cooling.

Unit-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.

Unit-9: Behaviour of Perfect 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.

Unit-10: Oscillations and Waves Periodic motion - period, frequency, displacement as a function of time. Periodic functions. 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, 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-11: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.

Unit-12: 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 combinations 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.

Unit-13:Magnetic Effects of Current and Magnetism Concept of magnetic field, Oersted's experiment. Biot - Savart law and its application 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 factors affecting their strengths.Permanent magnets.

Unit-14: 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, wattless current.AC generator and transformer.

Unit-15: 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.

Unit-16: 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, lensmaker'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.

Unit-17: Dual Nature of Matter and Radiation Dual nature of radiation. Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equationparticle nature of light. Matter waves-wave nature of particles, de Broglie relation. Davisson-Germer experiment.

Unit-18: 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, nuclear reactor, nuclear fusion.

Unit-19: 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.

Unit-20: 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-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.

Unit-2: 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.

Unit-3: 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.

Unit-4: Structure of Atom Discovery of electron, proton and neutron; atomic number, isotopes and isobars. Thomson's model and its limitations, Rutherford's model and its limitations. Bohr's model and its limitations, concept of shells and subshells, dual nature of matter and light, de Broglie's relationship, Heisenberg uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p, and d orbitals, rules for filling electrons in orbitals - Aufbau principle, Pauli exclusion principle and Hund's rule, electronic configuration of atoms, stability of half filled and completely filled orbitals.

Unit-5: 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.

Unit-6: Chemical Bonding and Molecular Structure Valence electrons, ionic bond, covalent bond: bond parameters. Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules, molecular orbital; theory of homo nuclear diatomic molecules (qualitative idea only), hydrogen bond.

Unit-7: 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).

Unit-8: 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 DU and DH, 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 nonspontaneous processes, criteria for equilibrium.

Unit-9: Equilibrium Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium - Le Chatelier's principle; ionic equilibrium - ionization of acids and bases, strong and weak electrolytes, degree of ionization, concept of pH. Hydrolysis of salts. Buffer solutions, solubility product, common ion effect.

Unit-10: Redox Reactions Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions, applications of redox reactions.

Unit-11: 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.

Unit-12: 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 ionization enthalpy, atomic and ionic radii), trends in chemical reactivity with oxygen, water, hydrogen and halogens; uses.

Unit-13: 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

Unit-14: 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. Aluminum: uses, reactions with acids and alkalies.

Unit-15: 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.

Unit-16: Organic Chemistry Some Basic Principles and Techniques General introduction, methods of 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.

Unit-17: Hydrocarbons Classification of hydrocarbons Alkanes - Nomenclature, isomerism, conformations (ethane only), physical properties, chemical reactions including free radical mechanism of halogenation, combustion and pyrolysis. Alkenes - Nomenclature, structure of double bond (ethene) geometrical isomerism, physical properties, methods of preparation; chemical reactions: addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition. Alkynes - Nomenclature, structure of triple bond (ethyne), physical properties. Methods of preparation, chemical reactions: acidic character of alkynes, addition reaction of - hydrogen, halogens, hydrogen halides and water. Aromatic hydrocarbons: Introduction, IUPAC nomenclature; benzene: resonance, aromaticity; chemical properties: mechanism of electrophilic substitution. – nitration, sulphonation, halogenation, Friedel Craft's alkylation and acylation: directive influence of functional group in mono-substituted benzene; carcinogenicity and toxicity.

Unit-18: Electrochemistry 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 potential, Nernst equation and its application to chemical cells, fuel cells; corrosion.

Unit-19: Chemical Kinetics Rate of a reaction (average and instantaneous), factors affecting rate of reaction; concentration, temperature, catalyst; order and molecularity of a reaction; rate law and specific rate constant, integrated rate equations and half life (only for zero and first order reactions); concept of collision theory (elementary idea, no mathematical treatment)

Unit-20: Surface Chemistry Adsorption – physisorption and chemisorption; factors 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.

Unit-21: 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.

Unit-22: 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

Unit-23: 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).

Unit-24: 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).

Unit-25: Group 18 elements General introduction, electronic configuration. Occurrence, trends in physical and chemical properties, uses.

Unit-26: d and f Block Elements General introduction ,electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first row transition metals – metallic character, ionization enthalpy, oxidation states, ionic radii, colour catalytic property, magnetic properties, interstitial compounds, alloy formation preparation and properties of K2Cr2O7 and KMnO4. Lanthanoids - electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction. Actinoids - Electronic configuration, oxidation states.

Unit-27: 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).

Unit-28: Haloalkanes and HaloarenesHaloalkanes: 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.

Unit-29: 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.

Unit-30: Aldehydes, Ketones and Carboxylic Acids Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes; uses. Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

Unit-31: 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.

Unit-32: Biomolecules Carbohydrates- Classification (aldoses and ketoses), monosaccharide's (glucose and fructose), oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); importance. Proteins - Elementary idea of ?á-amino acids, peptide bond, polypeptides, proteins, structure of amines-primary, secondary, tertiary structure and quaternary structures (qualitative idea only), denaturation of proteins; enzymes. Vitamins -Classification and functions. Nucleic Acids: DNA and RNA .

Unit-33: Polymers Classification - natural and synthetic, methods of polymerization (addition and condensation), copolymerization. Some important polymers: natural and synthetic like polythene, nylon, polyesters, bakelite, rubber.

Unit-34: 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 reducing pollution, strategy for control of environmental pollution.

Unit-35: Chemistry in Everyday life

1. Chemicals in medicines - 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.

MATHEMATICS

Unit-1: 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 & 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, Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions, composite functions, inverse of a function.Binary operations, Pictorial representation of a function, domain.Co-domain and range of a relation. Function as a special kind of relation from one set to another. 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 sin2x + cos2x=1, for all x. Signs of trigonometric functions and sketch of their graphs. Expressing sin (x+y) and cos (x+y) in terms of sinx, siny, cosx& cosy. Deducing the common trigonometric identities Identities related to sin2x, cos2x, tan2x, sin3x, cos3x and tan3x. General solution of trigonometric equations Inverse Trigonometric Functions: Definition, range, domain, principal value branches. Graphs of inverse trigonometric functions.Elementary properties of inverse trigonometric functions.Properties of triangles, including centroid, incentre, circum-centre and orthocentre, Solution of triangles.Heights and Distances.

Unit-2: 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 & Combinations: Fundamental principle of counting. Factorial n. (n!).Permutations 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. Sequence 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 Ón, $Ón^2$ and $Ón^3$.

7. 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 operations.Invertible matrices and proof of the uniqueness of inverse, if it exists.

8. 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 unique solution) using inverse of a matrix.

Unit-3:Coordinate Geometry

1. Straight Lines: 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: circle, 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.

Unit-4: 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.

2. 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.

3. Applications of Derivatives: Applications 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.

4. Integrals: Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts; Definite integrals as a limit of a sum, Fundamental Theorem of Calculus (without proof).Basic properties of definite integrals and evaluation of definite integrals.

5. 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. 6. 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 of variables, homogeneous differential equations of first order and first degree. Solutions of linear differential equation of the type: dx dy + py = q , where p and q are functions of x.

Unit-5: 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.

Unit-6:Linear Programming Linear Programming:

Introduction, definition of related terminology such as constraints, objective function, optimization, 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, optimal feasible solutions (up to three non-trivial constraints).

Unit-7: Mathematical Reasoning 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 contrapositive.

Unit-8: Statistics & Probability

1. Statistics: Measures of central tendency, mean, median and mode from ungrouped/grouped data. Measures of dispersion, mean deviation, variance and standard deviation from ungrouped/grouped data.Correlation, regression lines.

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, Probability of an event, probability of 'not', 'and' & 'or' events. Multiplication theorem on probability. Conditional probability, independent events, total probability, Bayes' theorem, Random variable and its probability distribution, mean and variance of stochastic variable. Repeated independent (Bernoulli) trials and Binomial distribution.

Unit-9: Statics Introduction, basic concepts and basic laws of mechanics, force, resultant of forces acting at a point, parallelogram law of forces, resolved parts of a force, Equilibrium of a particle under three concurrent forces. Triangle law of forces and its converse, Lami's theorem and its converse, Two Parallel forces, like and unlike parallel forces, couple and its moment.

Unit-10: Dynamics Speed and velocity, average speed, instantaneous speed, acceleration and retardation, resultant of two velocities. Motion of a particle along a line, moving with constant acceleration.Motion under gravity.Laws of motion, Projectile motion.A variables, feasible and infeasible regions, feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).

BIOLOGY

Unit 1 Diversity in Living World : What is living?; Biodiversity; Need for classification; Three domain of life; Taxonomy & Systematics; Concept of species and taxonomical hierarchy; Binomial nomenclature; Tools for study of Taxonomy– Museums, Zoos, Herbaria, Botanical gardens. Five kingdom classification; Salient features and classification of Monera; Protista and Fungi into major groups; Lichens; Viruses and Viroids. Salient features and classification of plants into major groups- Algae, Bryophytes, Pteridophytes, Gymnosperm and Angiosperm (three to five salient and distinguishing features and at least two examples of each category); Angiosperms- classification up to class, characteristic features and examples. Salient features and classification of animals- non chordate up to phyla level and chordate up to classes level (three to five salient features and at least two examples).

Unit 2 Structural Organisation in Animals and Plants : Morphology and modifications; Tissues; Anatomy and functions of different parts of flowering plants: Root, stem, leaf, inflorescence-cymose and racemose, flower, fruit and seed (To be dealt along with the relevant practical of the Practical Syllabus). Animal tissues; Morphology, anatomy and functions of different systems (digestive, circulatory, respiratory, nervous and reproductive) of an insect (cockroach). (Brief account only)

Unit 3 Cell Structure and Function : Cell theory and cell as the basic unit of life; Structure of prokaryotic and eukaryotic cell; Plant cell and animal cell; Cell envelope, cell membrane, cell wall; Cell organelles– structure and function; Endomembrane system- endoplasmic reticulum, Golgi bodies, lysosomes, vacuoles; mitochondria, ribosomes, plastids, microbodies; Cytoskeleton, cilia, flagella, centrioles (ultra structure and function); Nucleus–nuclear membrane, chromatin, nucleolus. Chemical constituents of living cells: Biomolecules–structure and function of proteins, carbodydrates, lipid, nucleic acids; Enzymes–types, properties, enzyme action. Cell division : Cell cycle, mitosis, meiosis and their significance.

Unit 4 Plant Physiology : Transport in plants: Movement of water, gases and nutrients; Cell to cell transport– Diffusion, facilitated diffusion, active transport; Plant – water relations– Imbibition, water potential, osmosis, plasmolysis; Long distance transport of water– Absorption, apoplast, symplast, transpiration pull, root pressure and guttation; Transpiration– Opening and closing of stomata; Uptake and translocation of mineral nutrients– Transport of food, phloem transport, Mass flow hypothesis; Diffusion of gases (brief mention). Mineral nutrition: Essential minerals, macro and micronutrients and their role; Deficiency symptoms; Mineral toxicity; Elementary idea of Hydroponics as a method to study mineral nutrition; Nitrogen metabolism – Nitrogen cycle, biological nitrogen fixation. 4 Photosynthesis: Photosynthesis as a means of Autotrophic nutrition; Where does photosynthesis take place; How many pigments are involved in Photosynthesis (Elementary idea); Photochemical and biosynthetic phases of photosynthesis; Cyclic and non cyclicphotophosphorylation; Chemiosmotic hypothesis; Photorespiration; C3 and C4 pathways; Factors affecting photosynthesis. Respiration: Exchange of gases; Cellular respiration – glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); Energy relations – Number of ATP molecules generated; Amphibolic pathways; Respiratory quotient. Plant growth and development: Seed germination; Phases of plant growth and plant growth rate; Conditions of growth; Differentiation, dedifferentiation and redifferentiation; Sequence of

developmental process in a plant cell; Growth regulators–auxin, gibberellin, cytokinin, ethylene, ABA; Seed dormancy; Vernalisation; Photoperiodism.

Unit 5 Human Physiology : Digestion and absorption: Alimentary canal and digestive glands; Role of digestive enzymes and gastrointestinal hormones; Peristalsis, digestion, absorption and assimilation of proteins, carbohydrates and fats; Calorific value of proteins, carbohydrates and fats (for box item not to be evaluated); Egestion; Nutritional and digestive disorders– PEM, indigestion, constipation, vomiting, jaundice, diarrhea. Breathing and Respiration: Respiratory organs in animals (recall only); Respiratory system in humans; Mechanism of breathing and its regulation in humans– Exchange of gases, transport of gases and regulation of respiration, Respiratory volumes; Disorders related to respiration-Asthma, Emphysema, Occupational respiratory disorders. Body fluids and circulation: Composition of blood, blood groups, coagulation of blood; Composition of lymph and its function; Human circulatory system– Structure of human heart and blood vessels; Cardiac cycle, cardiac output, ECG; Double circulation; Regulation of cardiac activity; Disorders of circulatory system-Hypertension, Coronary artery disease, Angina pectoris, Heart failure. Excretory products and their elimination: Modes of excretion – Ammonotelism, ureotelism, uricotelism; Human excretory system– structure and fuction; Urine formation, Osmoregulation; Regulation of kidney function– Renin-angiotensin, Atrial Natriuretic Factor, ADH and Diabetes insipidus; Role of other organs in excretion; Disorders-Uraemia, Renal failure, Renal calculi, Nephritis; Dialysis and artificial kidney. Locomotion and Movement: Types of movement – ciliary, flagellar, muscular; Skeletal muscle – contractile proteins and muscle contraction; Skeletal system and its functions (To be dealt with the relevant practical of Practical syllabus); Joints; Disorders of muscular and skeletal system-Myasthenia gravis, Tetany, Muscular dystrophy, Arthritis, Osteoporosis, Gout. Neural control and coordination: Neuron and nerves; Nervous system in humans– central nervous system, peripheral nervous system and visceral nervous system; Generation and conduction of nerve impulse; Reflex action; Sensory perception; Sense organs; Elementary structure and function of eye and ear. Chemical coordination and regulation: Endocrine glands and hormones; Human endocrine systemHypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, Adrenal, Pancreas, Gonads; Mechanism of hormone action (Elementary Idea); Role of hormones as messengers and regulators, Hypo-and hyperactivity and related disorders (Common disorders e.g. Dwarfism, Acromegaly, Cretinism, goiter, exopthalmicgoiter, diabetes, Addison's disease). Imp: Diseases related to all the human physiology systems to be taught in brief.

Unit 6 Reproduction: Reproduction in organisms: Reproduction, a characteristic feature of all organisms for continuation of species; Modes of reproduction – Asexual and sexual; Asexual reproduction; Modes- Binary fission, sporulation, budding, gemmule, fragmentation; vegetative propagation in plants. Sexual reproduction in flowering plants: Flower structure; Development of male and female gametophytes; Pollination–types, agencies and examples; Outbreedings devices; Pollen-Pistil interaction; Double fertilization; Post fertilization events– Development of endosperm and embryo, Development of seed and formation of fruit; Special modes– apomixis, parthenocarpy, polyembryony; Significance of seed and fruit formation. Human Reproduction: Male and female reproductive systems; Microscopic anatomy of testis and ovary; Gametogenesis- spermatogenesis & oogenesis; Menstrual cycle; Fertilisation, embryo development upto blastocyst formation, implantation; Pregnancy and placenta formation (Elementary idea); Parturition (Elementary idea); Lactation (Elementary idea). Reproductive health: Need for reproductive health and prevention of sexually transmitted diseases (STD); Birth control-Need and Methods, Contraception and Medical Termination of Pregnancy (MTP); Amniocentesis; Infertility and assisted reproductive technologies – IVF, ZIFT, GIFT (Elementary idea for general awareness).

Unit 7: Genetics and Evolution : Heredity and variation: Mendelian Inheritance; Deviations from Mendelism– Incomplete dominance, Co-dominance, Multiple alleles and Inheritance of blood groups, Pleiotropy; Elementary idea of polygenic inheritance; Chromosome theory of inheritance; Chromosomes and genes; Sex determination– In humans, birds, honey bee; Linkage and crossing over; Sex linked inheritance-Haemophilia, Colour blindness; Mendelian disorders in humans– Thalassemia; Chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes. Molecular Basis of Inheritance: Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; DNA replication; Central dogma; Transcription, genetic code, translation; Gene expression and regulation– Lac Operon; Genome and human genome project; DNA finger printing. Evolution: Origin of life; Biological evolution and evidences for biological evolution (Paleontological, comparative anatomy, embryology and molecular evidence); Darwin's contribution, Modern Synthetic theory of Evolution; Mechanism of evolution–

Variation (Mutation and Recombination) and Natural Selection with examples, types of natural selection; Gene flow and genetic dirft; Hardy-Weinberg's principle; Adaptive Radiation; Human evolution.

Unit 8 Biology and Human Welfare: Health and Disease: Pathogens; parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, ring worm); Basic concepts of immunology–vaccines; Cancer, HIV and AIDs; Adolescence, drug and alcohol abuse. Improvement in food production: Plant breeding, tissue culture, single cell protein, Biofortification; Apiculture and Animal husbandry. Microbes in human welfare: In household food processing, industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers.

Unit 9 Biotechnology and Its Applications: Principles and process of Biotechnology: Genetic engineering (Recombinant DNA technology). Application of Biotechnology in health and agriculture: Human insulin and vaccine production, gene therapy; Genetically modified organisms- Bt crops; Transgenic Animals; Biosafety issues–Biopiracy and patents.

Unit 10 Ecology and environment: Organisms and environment: Habitat and niche; Population and ecological adaptations; Population interactions–mutualism, competition, predation, parasitism; Population attributes–growth, birth rate and death rate, age distribution. Ecosystems: Patterns, components; productivity and decomposition; Energy flow; Pyramids of number, biomass, energy; Nutrient cycling (carbon and phosphorous); Ecological succession; Ecological Services– Carbon fixation, pollination, oxygen release. Biodiversity and its conservation: Concept of Biodiversity; Patterns of Biodiversity; Importance of Biodiversity; Loss of Biodiversity; Biodiversity conservation; Hotspots, endangered organisms, extinction, Red Data Book, biosphere reserves, National parks and sanctuaries. Environmental issues: Air pollution and its control; Water pollution and its control; Agrochemicals and their effects; Solid waste management; Radioactive waste management; Greenhouse effect and global warming; Ozone depletion; Deforestation; Any three case studies as success stories addressing environmental issues.

RECOMMENDED BOOKS

(for the entrance examination)

Standard Textbooks of 12th Standard

ANTI-RAGGING MEASURES: SUBMISSION OF AFFIDAVIT BY THE STUDENTS/PARENT/GUARDIAN

Dear Parents/Guardian/Student,

You are fully aware of the orders of the Government and of Hon'ble Supreme Court on the Anti-Ragging measures. As per the latest policy all students and parent/guardians are required to submit an affidavit before a student is allowed registration in the University. The Format of Affidavits isgiven at Annexure- V and Annexure-VI and to be submitted on a Non-Judicial paper of Rs.10/- duly attested by the oath commissioner.

All parents/guardian/students may get them duly attested by the Oath commissioner and bring it on the day of student's registration. Kindly note that there are two Affidavits as Annexure-V & VI.The Annexure-V is to be signed by the student and Annexure-VI shall be signed by the parent / guardian.

In case a student does not submit the same he/she shall not be allowed to proceed with the registration.

It is further, requested that this information be passed amongst friends.

Best wishes, Sd/-Director

ANNEXURE-I
AFFIDAVIT BY THE STUDENT

1) I, _____(full name of student with admission/ registration/enrolment number) S/o D/o Mr. /Mrs. /Ms. _____ , having been admitted to (name of the institution) , have seen the UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions, 2009, as placed on the NDRI website;www. ndri.res.in (hereinafter called the —Regulationsll) carefully read and fully understood the provisions contained in the said Regulations.

2) I have, in particular, perused clause 3 of the Regulations and am aware as to what constitutes ragging.

3) I have also, in particular, perused clause 7 and clause 9.1 of the Regulations and am fully aware of The penal and administrative action that is liable to be taken against me in case I am found guilty of or abetting ragging, actively or passively, or being part of a conspiracy to promote ragging.

4) I hereby solemnly aver and undertake that –

a) I will not indulge in any behaviour or act that may be constituted as ragging under clause 3of the Regulations.

b) I will not participate in or abet or propagate through any act of commission or omission that may be constituted as ragging under clause 3 of the Regulations.

5) I hereby affirm that, if found guilty of ragging, I am liable for punishment according to clause9.1 of the Regulations, without prejudice to any other criminal action that may be taken against me under any penal law or any law for the time being in force.

6) I hereby declare that I have not been expelled or debarred from admission in any institution in the country on account of being found guilty of, abetting or being part of a conspiracy to promote, ragging; and further affirm that, in case the declaration is found to be untrue, I am aware that my admission is liable to be cancelled.

Declared this _____day of _____ month of _____year.

Signature of Deponent&Name

VERIFICATION

Verified that the contents of this affidavit are true to the best of my knowledge and no part of the affidavit is false and nothing has been concealed or misstated therein. Verified at ……(place)…..……..on this the……. (day……..) of ……. (month),……(year).

Signature of Deponent

Solemnly affirmed and signed in my presence on this the (day) of (month), (year) after reading the contents of this affidavit.

OATH COMMISIONER

ANNEXURE-II

AFFIDAVIT BY PARENT /GUARDIAN

1) I, Mr. /Mrs. /Ms. _____ (full name of parent/guardian) father/mother/guardian of , (full name of student with admission /registration /enrolment number), having been admitted to the ICAR-National Dairy Research Institute , have been informed about the UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions, 2009, (hereinafter called the Regulations‖),carefully read and fully understood the provisions contained in the said Regulations as placed on NDRI website (www.ndri.res.in).

2) I have, in particular, perused clause 3 of the Regulations and am aware as to what constitutes ragging.

3) I have also, in particular, perused clause 7 and clause 9.1 of the Regulations and am fully aware of the penal and administrative action that is liable to be taken against my ward incase he/she is found guilty of or abetting ragging, actively or passively, or being part of aconspiracy to promote ragging.

4) I hereby solemnly aver and undertake that

a) My ward will not indulge in any behavior or act that may be constituted as ragging under clause 3 of the Regulations.

b) My ward will not participate in or abet or propagate through any act of commission or omission that may be constituted as ragging under clause 3 of the Regulations.

5) I hereby affirm that, if found guilty of ragging, my ward is liable for punishment according to clause 9.1 of the Regulations, without prejudice to any other criminal action that may be taken against my ward under any penal law or any law for the time being in force.

6) I hereby declare that my ward has not been expelled or debarred from admission in any institution in the country on account of being found guilty of, abetting or being part of a conspiracy to promote, ragging; and further affirm that, in case the declaration is found to be untrue, the admission of my ward is liable to be cancelled.

Declared this_____day of_____ month of _____year.

Signature of Deponent

Name:

Address:Telephone/Mobile No:

VERIFICATION

Verified that the contents of this affidavit are true to the best of my knowledge and no part of theaffidavit is false and nothing has been concealed or misstated therein.

Verified at _____(place) on this the _____ (day) of _____ (month),_____(year).

Signature of Deponent

Solemnly affirmed and signed in my presence on this the _____(day) of _____(month),_____(year) after reading the contents of this affidavit.

OATH COMMISSIONER

ANNEXURE-III

SCHEDULED CASTE/TRIBE CERTIFICATE

FORMAT CASTE CERTIFICATE

1. This is to certify that Shri/Smt/Kumari.....Son/Daughter of ..... Date of Birth .....of village/town .....in District/Division of State/Union Territory .....belongs to the .....Caste/Tribe which is recognized as SC/ST under The Constitution (Scheduled Caste) Order, 1950. The Constitution (Scheduled Caste) Union Territories Order, 1951. The Constitution (Scheduled Tribes) Union Territories Order. 1951, as amended by the SCs And STs List (Modification) Order. 1950. The Bombay Reorganisation Act, 1960; The Punjab Reorganization Act, 1966; The State Of HP Act, 1970; The North Eastern Areas (Reorganisation) Act, 1971 and the SCs And STs Order (Amendment) Act, 1976. The Constitution (Jammu & Kashmir) SC Order, 1956. The Constitution (Andaman & Nicobar Islands) SC Order 1959 as amended by SCs and STs Order (Amendment) Act, 1976. The Constitution (Dadra And Nagar Haveli) SCs Order, 1962. The Constitution (Dadra And Nagar Haveli) STs Order, 1962. The Constitution (Pondicherry) SCs Order, 1964. The Constitution Scheduled Tribes (Uttar Pradesh) Order. 1967. The Constitution (Goa, Daman & Diu) SCs Order, 1968. The Constitution (Nagaland) STs Order. 1970. The Constitution (Sikkim) SCs Order, 1968.

2. Shri/Smt/Kumari .....and/or his/her family ordinarily reside(s)in Village/ Town..... of District.....of State/Union Territoryof.....

3. Applicable in the case of SC/ST persons who have migrated from State/Union Territory Administration to another State/Union Territory. The certificate is issued on the basis of the SC/ST Certificate toShri/Smt.....father/mother of Shri/Smt/Kumari..... ofVillage/Town..... in District/ Division.....of theState/Union Territory ..... who belongs to the ....Scheduled Caste/ Scheduled Tribe in the State/Union Territory issued bythe .....(Nameof the prescribed authority) vide their No ..... Dated.....

Signature

Designation (With Seal of Office)

Place..... (State/Union Territory)

Date.....

*Please delete the words which are not applicable. Please quote specific presidential order.

NOTE: The term ordinarily reside(s) used here has the same meaning as in section 20 of the

representation of the people‘s act, 1950.

List of Authorities Empowered to Issue SC/ST Certificates

1. District Magistrate/Additional District Magistrate/Deputy Commissioner/Additional DeputyCommissioner/ Deputy Collector/1st Class Stipendiary Magistrate/City Magistrate/Sub-divisionalMagistrate/Taluka Magistrate/Executive Magistrate/Extra Assistant Commissioner not below therank of 1st class Stipendiary Magistrate.

2. Chief Presidency Magistrate/Additional Chief Presidency Magistrate/Presidency Magistrate

3. Revenue Officers, not below the rank of Tehsildar

4. Sub-divisional Officer of the area where the candidate and/or his family normally resides

5. Administrator/Secretary to Administrator/Development Officer (Lakshadweep Islands)

ANNEXURE-IV

FORM OF CERTIFICATE TO BE PRODUCED BY OTHER BACKWARD CLASS

(OBC APPLYING FOR ADMISSION TO CENTRAL EDUCATIONAL INSTITUTIONS

(CEIs), UNDER THE GOVE RNMENT OF INDIA

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

(i) i. Resolution No. 12011/68/93-BCC(C) dated 10/09/93 published in the Gazette of India Extraordinary Part I Section I No186 dated 13/09/93.

ii. Resolution No. 12011/9/94-BCC dated 19/10/94 published in the Gazette of India Extraordinary Part I Section I No. 163 Dated 20/10/94.

iii. Resolution No. 12011/7/95-BCC dated 24/05/95 published in the Gazette of India Extraordinary Part I Section I No. 88 Dated 25/05/95.

iv. Resolution No. 12011/96/94-BCC dated 9/03/96.

v. Resolution No. 12011/44/96-BCC dated 6/12/96 published in the Gazette of India Extraordinary Part I Section I No. 210 Dated 11/12/96.

vi. Resolution No. 12011/13/97-BCC dated 03/12/97.

vii. Resolution No. 12011/99/94-BCC dated 11/12/97.

viii. Resolution No. 12011/68/98-BCC dated 27/10/99.

ix. Resolution NO. 12011/88/98-BCC Dated 6/12/99 published in the Gazette of India Extraordinary Part I Section INo. 270 dated 06/12/99.

x. Resolution NO. 12011/36/99-BCC dated 04/04/2000 published in the Gazette of India Extraordinary Part ISection I No. 71 dated 04/04/2000.

xi. Resolution NO. 12011/44/99-BCC Dated 21/09/2000 published in the Gazette of India Extraordinary Part ISection I No. 210 dated 21/09/2000.

xii. Resolution NO. 12015/9/2000-BCC dated 06/09/2001.

xiii. Resolution NO. 12011/1/2001-BCC dated 19/06/2003.

xiv. Resolution NO. 12011/4/2002-BCC dated 13/01/2004.

xv. Resolution NO. 12011/9/2004-BCC dated 16/01/2006

xvi. Published in the Gazette of India Extraordinary Part I Section I No. 210 dated 16/01/2006.

xvii. Resolution NO. 12011/14/2004-BCC dated the 12th March, 2007, published in the Gazette of India-Extraordinary-Part I, Section 0-I, No.67 dated 12th January, 2007.

Shri/Smt./Kum. _____and/or his family ordinarily reside(s) in the_____ District/Division of_____ State. This is also to certify that the/she does not belong to the persons/sections (Creamy Layer) mentioned in Column 3 of the Schedule to theGovernment of India, Department of Personnel & Training O.M. No. 36012/22/93-Estt.(SCT) Dated 08/09/93 whichis modified vide OM No. 36033/3/2004

Estt.(Res.) dated 09/03/2004

Dated: .....

DISTRICT MAGISTRATE/

DEPUTY COMMISSIONER, ETC.SEAL

NOTE:

(a) The term ‗Ordinarily' used here will have the same meaning as in Section 20 of the Representation of the PeopleAct, 1950.

(b) The authorities competent to issue Caste Certificates are indicated below:

(i) District Magistrate / Additional Magistrate / Collector / Deputy Commissioner / Additional DeputyCommissioner / Deputy Collector / I Class Stipendiary Magistrate / Sub-Divisional Magistrate / Taluka Magistrate /Executive Magistrate / Extra Assistant Commissioner (Not Below The Rank Of I Class Stipendiary Magistrate).

(ii) Chief Presidency Magistrate / Additional Chief Presidency Magistrate / Presidency Magistrate.

(iii) Revenue Officer not below the rank of Tehsildar' and

(iv) Sub-Divisional Officer of the area where the candidate and / or his family resides.

DECLARATION /UNDERTAKING - FOR OBC CANDIDATES ONLY

I,_____Son/Daughter of Shri _____ _____resident of Village/Town/City _____ District _____ State hereby declare that I belong to the _____ Community which is recognized as a Backward Class by the Government of India for the purpose of reservation in services as per orders contained in Department of Personnel and Training Office Memorandum No.36012/22/93- Estt. (SCT), dated 8/9/1993. It is also declared that I do not belong to persons/Sections (Creamy Layer) mentioned in Column 3 of The Schedule to the above referredOffice Memorandum, Dated 8/9/1993, which is Modified vide Department of Personnel and Training Office Memorandum No.36033/3/2004 Estt. (Res.)Dated 9/3/2004.

Place: ..... Signature of the Candidate

Date: .....

- **Declaration/undertaking not signed by candidate will be rejected.**
- **False declaration will render the applicant liable for termination of enrolment at any time.**

Creamy Layer Definition

OBC Creamy layer is defined comprehensively at http://ncbc.nic.in/html/creamylayer.htmlall candidates for the OBC reserved seats should make sure that they do not satisfy any of the creamy layer criteria as listed in the website. Some general exclusion for quick reference (no way comprehensive) is as follows.

1. Any of the parents holds a constitutional position in Govt. of India

2. Any one of the parents is a class I officer.

3. Both the parents are class II officers.

4. Any one of the parents is employed in an equivalent rank to class I officer or both parents equivalent to class II officer in a public sector, insurance companies, banks, universities or in other organizations

5. Land holdings on irrigated land is 85% or more of the statutory ceiling area.

6. Parents income is more than Rs. 4.5 lakhs per year.

ANNEXURE-V
FORM OF CERTIFICATE TO BE PRODUCED BY ECONOMICALLY WEAKER SECTIONS

Government of _____
(Name & Address of the Authority issuing the certificate)

Certificate No._____ Date:_____

VALID FOR THE YEAR_____

This is to certify that Shri/Smt./Kumari,_____Son/Daughter/wife of Shri _____ permanent resident of Village/Town/City _____, Post Office_____ District _____ in the State/Union Territory _____ Pin Code_____ whose photograph is attested below belongs to Economically Weaker Section, Since the gross annual income* of his/her family** is below Rs. 8 Lakh (Rs. Eight Lakh only) for the financial year_____. His/her family does not own or possess any of the following assests***:

i. 5 acres of agricultural land and above;
ii. Residential flat of 1000 sq.ft. and abov.;
iii. Residential plot of 100 sq.yards and above in notified municipalities;
iv. Residential plot of 200 sq.yards and above in areas other than the notified municipalities

2. Shri/Smt./Kumari_____ belongs to the _____ caste which is not recognized as a Scheduled Caste, Scheduled Tribe and Other Backward Classes (Central List)

Signature with seal of office_____
Name_____
Designation_____

*Note1: Income covered all sources i.e. salary, agriculture, business, profession, etc.

**Note2: The term 'finally' for this purpose include the person, who seeks benefit of reservation, his/her parents and siblings below the age of 18 years as also his/her spouse and children below the age of 18 years.

***Note 3: The property held by a "family" in different locations or different placed/cities have been clubbed while applying the land or property holding test to determine EWS status.

GENERAL ADMINISTRATION

1.	R.R.B. Singh, Ph.D	Director(Acting) and Vice Chancellor
2.	R.R.B. Singh, Ph.D	Joint Director (Academic)
3.	Latha Sabhiki, Ph.D	Joint Director (Research) - Acting
4.	Susanta Saha, MBA	Joint Director (Administration) & Registrar
5.	S.K. Tomar, Ph. D.	Academic Coordinator
6.	A.P. Ruhil, Ph.D	Controller of Examinations
7.	D.D. Verma, M.Com, PGDFM	Comptroller

SRS of NDRI, BENGALURU

1.	K.P. Ramesha, Ph.D	Head
2.	Mukund A. Kataktalware, Ph.D	Incharge, Education and Training Section

ERS of NDRI, KALYANI

1.	T.K.Datta, Ph.D	Head
2.	Anupam Chatterjee, Ph D	In charge Academic Cell
3.	Sukhdev Singh	Asst. Admn. Officer