ODISHA STAFF SELECTION COMMISSION
Barrack No.1, Unit – V, Bhubaneswar – 751054

Advertisement No.IIE-79/2019-4723/OSSC; Date: 30.12.2019

Recruitment to the post of Assistant Scientific Officer in State Forensic Science Laboratory(SFSL) under Home Department, Govt. of Odisha on contractual basis

DETAILED ADVERTISEMENT
(Post Code-ASTO/151)
(WEBSITE: www.ossc.gov.in)

IMPORTANT:

Mode of apply	Online Mode only using the website www.ossc.gov.in. No Physical copy/Hard copy of the online application form need to be submitted by the applicant.
Opening date of Online Application form & Payment of Examination fees	08.08.2020
Closing date of Online Application form & Payment of Examination fees	07.09.2020

- Candidates are to be extra vigilant while filling up the online application form as there is no 'EDIT' option available once the form is submitted.
- The Candidates who intend to apply should go through the eligibility criteria prescribed in the advertisement, before filling up the online application. The candidate must satisfy himself/herself about his/her eligibility for the post before applying and only through online mode. No other mode of application shall be entertained by the Commission.
- The applicants are required to upload the required certificates/documents as listed at clause-7 of the advertisement in the "Document Upload" tab. The documents should be in pdf format, clearly visible and in prescribed size as prescribed in Clause-1 (b).
- PwD candidates have to follow the Advisory Notice published vide No.3453/OSSC Dtd. 24.10.2019 available in the website of the Commission while applying for the post.
- In-service contractual candidates claiming benefits under provision of Odisha Group-B Posts (contractual appointment) Rules, 2013 will also have to follow the advisory notice Annexed as Annexure-B to this advertisement.

- Candidates must have passed Masters Degree with Minimum 50% Marks in aggregate from a recognised university in the subject mentioned against the respective division and must possess requisite certificate of passing HSC or ME standard in Odia as language subject.
- The appointment will be initially on contractual basis carrying a consolidated pay of Rs.16880/- per month (for 1st year) as per Odisha Group-B Posts (Contractual Appointment) Amendment Rules, 2017 notified vide Government in GA & PG Department Notification No. GAD-SC-RULES-0037 -2017 - 19569 / Gen. dtd. 12th September, 2017. The service condition shall be governed by "The Orissa Forensic Science Service (Method of Recruitment & Condition of Service) Rules 1996 and subsequent amendments.
- Candidate must not be below 21 Years and must not exceed 32 years of age as on 1st January 2019 to be eligible to apply for the post (refer to Clause-5(a) of this Advertisement) with usual age relaxation for reserved categories as per relevant rules of Govt. in force.

(i) **If at any stage of recruitment or thereafter, it is found that any information furnished by the candidate in his/her online application is false/incorrect or the candidate has suppressed any relevant information or the candidate otherwise does not satisfy the eligibility criteria prescribed for the post, his/her candidature for the examination will be cancelled forthwith and he may be debarred either temporarily or permanently from appearing any further recruitment examination conducted by the Commission.**

1. How to apply:

The applicants have to go through the detail advertisement before filling up the online application.

1. **(a)** Aspirants have to apply online using the official website of the Commission "www.ossc.gov.in". The applicants other than S.C., S.T. & PwD categories are required to deposit non-refundable examination fee of **Rs.200/-** only through online mode following the procedure as detailed at **clause-6** of this advertisement to apply for the post. By clicking on the tab **'online application'** in the home page of the website, different advertisement for online application along with different useful details will be displayed on the computer screen. The instructions provided in this Advertisement are required to be read carefully before proceeding to complete the online application process.

There will be 2 links under **"Form Links"** column for each advertisement.

(i) **For Registration.**

(ii) **For registered user login.**

All the Candidates first need to complete the Registration process before filling the Application Form.

For Registration the candidate needs to **click** the link **"For Registration"** present in the Form Link section.

On clicking the link mentioned, he/she will be redirected to the **Registration Form,** where few basic Details will be required as follows to be filled up by the applicant correctly.

i. **Nationality**
ii. **Applicant's Full Name**
iii. **Applicant's Father's Name**
iv. **Applicant's Mother's Name**
v. **Name of the husband (In case of Married female applicant)**
vi. **Gender**
vii. **10th Standard Roll Number (As Mentioned in the Certificate)**
viii. **10th Standard Year of Passing**
ix. **10th Standard Board (Name)**
x. **10th Standard Passed Exam Type**
xi. **Whether passed minimum Seventh class exam. in Odia**
xii. **Mobile Number**
xiii. **Email Address**

All the above fields need to be filled in mandatorily by the candidate.

Caution: The candidate must submit the correct data in this section as the subsequent sections will be automatically populated with the data filled in this section. **No change in this section will be allowed after the candidates submit the 'I Agree' box.**

Once the above details are filled by the candidate, one CAPTCHA image will be shown to the candidate which he/she needs to enter correctly in the field given below and then need to check the box **"I Agree" for** declaration and submit the registration form.

On Submitting the registration form a unique Application Sequence No. will be generated and will be shown to the candidate.

Application Sequence No. generated will act as **user id** of the candidate for the post. E-mail and SMS will be sent to the candidates through his registered **email id** and **mobile no** intimating the '**User id**' and '**Password**'.

Note:

The details submitted by the candidate for 10th Standard Roll Number (As mentioned in the Certificate), 10th Standard Board, 10th Standard Year of Passing & 10th Standard Passed Exam Type (Annual or Supplementary) need to be furnished correctly.

Furnishing of any wrong information may lead to rejection of the application and no request in this regard for correction of the same will be entertained. User registration is only required once during applying for a specific post/advertisement.

After successful submission of the registration form **"Go to Application Form" & "Logout" button will be visible** in the top right hand corner of the webpage.

Candidate can also click on the **"Go to Application Form"** to continue with the filling of the application form. Candidate can click the **"Logout"** button if he/she wishes to exit the current session.

1. (b) For registered user login

In order to fill in the Application form candidate needs to Click the link present under **"For registered user login"** present in the Form Link section.

The same will redirect the candidate to the login page of the Application Form. The candidate need to login using the '**User id**' and '**password**' he/she received after registration though **e-mail** as well as **SMS** in the registered mobile no. & e-mail id.

Once the candidate successfully logged in to the application form he/she will be getting 4 tabs as follows:-

1. **Personal Details**
2. **Additional Details**
3. **Qualification details**
4. **Document Upload**

All the detail data are required in the above 4-tabs need to be furnished correctly by the candidate. The details submitted by the candidate during submission of the registration form will be auto populated in the respective fields of the application form. Please read the caution below while filing up the column of Marks Secured and Full Mark for the examinations passed

The candidate have the option of filling the application form in more than 1 session but before logging out he/she needs to ensure that all the data filled by him/her **has been saved** by clicking **"Save & Continue button"** present in the end of the each tab.

Candidate can **preview** the application by clicking the **"Preview Application"** button present in the end of **"Document Upload"** tab as and when required.

All candidate mandatorily need to upload the scanned image of his/her **recent passport size photograph and scanned image of his/her full signature** in the on line application form which **must be within max 80 kb (The Format supported -JPEG/JPG).**

In addition to the above requirement all the candidates need to upload the following document in the **Document Upload Section** in (**File size max 300kb, format supported-pdf**).

i. **10th Standard Pass Certificate & Mark sheet** containing the 10th Standard Roll Number as given in the registration form.

ii. **Masters Degree with minimum 50% marks in aggregate certificate & Mark sheet.**

iii. Candidates Claiming reservation under **SC/ST/SEBC** category need to upload valid caste certificate (refer to Clause-7(vi) of this Advertisement) or may upload a self declaration in the prescribed format at Annexure-A /B to claim their category.

iv. **"PwD (Persons with Disabilities)"** category candidates may follow instructions issued Vide Commission's Advisory Notice No.3453/OSSC Dtd.24.10.2019 available in the website of the Commission to avail the benefits & upload certificate accordingly.

v. Candidates Claiming "**Ex-Serviceman**" category need to upload any one of the Ex-Servicemen Documents (**Discharge Certificate/ Identity Card/ PPO indicating therein the date of entry, date of discharge and period of service** rendered in Defence Forces) as per Clause-7(x) of the advertisement.

vi. Candidates not having Odia as a subject in HSC Examination, has to upload Odia Pass certificate in at least **ME Standard (Class-VII)** or more issued by Head Master/Principal or any other competent authority affiliated to Education Department of Govt. of Odisha or any other competent Authority.

vii. **In-service contractual employees** in the category-I & II (Govt. in G.A. Department Notification No.GAD-SC-Rules-0061-2013-1147/Gen dtd.17.01.2014) claiming age relaxation up to 45 years as on 01.01.2019 and have completed one year of continuous service prior to effective of Odisha Contractual Appointment Rules, 2013 must upload the required certificate issued by the concerned employer as per proforma prescribed by the Commission annexed as **Annexure-C** to this Advertisement).

The uploaded documents must be clearly identifiable /visible, otherwise the application is liable to be rejected and no further correspondence in this regard will be entertained.

The candidates are also advised to fill up relevant details under different tabs, mentioning category, special category, present address, permanent address, full marks, marks secured in H.S.C, +2 level, Bachelor's Degree level & Masters Degree level which are required for eligibility of the candidate for the post.

The filled in Application Form must be submitted by clicking the '**Submit Button**'. Before submitting the **online application the applicant must re-check the information** filled in and ensure that the information provided and the scanned signature and scanned photographs uploaded are clearly identifiable /visible. After clicking the submit button, the system will redirect all candidates (except SC/ST/PwD category candidates) to SBI Collect portal for payment of examination Fees, The details of which has been furnished at Clause-6 of this advertisement. After successful payment of Examination fees (as applicable) the form will be submitted in the OSSC website. In case of applicants in the category of SC/ST/PwD the form will be submitted directly. After the form is successfully submitted, the candidate has to take the printout of the filled in on line application form for future reference.

1. (c) The copy of the Online Application Form has to be preserved by the applicant for future use. In case the candidate is shortlisted for Viva Voce Test, he/she has to submit the same in the Office of the Commission on the date of certificate verification along with the originals & a set of self attested photo copies of certificates/ documents before the Viva Voce Test.

1. (d) Applications received through any mode other than online mode are liable to be summarily rejected.

1. (e) If at any stage of recruitment or thereafter, it is found that any information furnished by the candidate in his application is false/incorrect or the candidate has suppressed any relevant information or the candidate does not satisfy the eligibility criteria prescribed for the post or has not paid the requisite examination fee, his/her candidature will be cancelled forthwith. Further, the Commission reserves the right to debar such candidates from applying for other recruitment examinations conducted by the Commission either temporarily or permanently.

1. (f) The candidate may find out the status of his/her application as well as his/her Admission letter/hall ticket for appearing the examination by accessing OSSC website, clicking therein **'online application'** tab, and thereafter clicking on the link present under **"For registered user login"** in **Form Link section against that particular advertisement/post,** by using the user ID and password.

1. (g) Candidates should possess valid e-mail address & Mobile number which should remain active till publication of the final result pursuant to the Advertisement.
The Commission shall not be responsible for any loss/ non receipt of message/information sent on the wrong /invalid e-mail address/ mobile number provided by the candidate in the on-line registration form or for delay/non-receipt of information if a candidate fails to access his/her E-mail or Mobile phone in time. Candidates will be allowed in the examination only if they possess a valid admission letter for the examination and valid Photo Identity proof issued by any Govt. Authority.

Option to be exercised by the Candidates:

The candidates may chose options in order of preference in the respective discipline correctly while filling up of online application form and no subsequent modification is allowed once the option has been exercised by the Candidate. However, the Commission at its discretion reserves the right to allot any candidate in any discipline as per his eligibility for the post.

2. Last date of online Applications:

2.a. The last date for submission of online Application in response to this advertisement is 11.55 P.M. of Dtd.**07.09.2020**. The system will be automatically disabled from 11.55 PM of the said date after which the application form for this particular post will not be generated.

2.b. No. Physical Copy (hard copy) of the online application form/documents required to be sent to the Commission. Candidates have to upload the relevant documents as listed in the online form at the time of online application. Candidates are required to furnish documents/certificate in original and a set of photocopy of the same at the time of document verification on the date of viva voce Test.

3. (a)Vacancies be filled up and reservations :

Sl No	Discipline	Educational Qualification required for the post in Masters Degree	Category wise vacancy position								Total
			UR		SEBC		SC		ST		
			Total	Out of which women	Total	Out of which women	Total	Out of which women	Total	Out of which women	
1	2	3	4	5	6	7	8	9	10	11	12
1	Toxicology	Chemistry	5	1	1	1	2	1	3	1	11
2	Chemistry	Chemistry	2	1	1	0	1	0	2	1	6
3	Physics	Physics	4	1	1	0	0	0	2	1	7
4	Ballistics	Physics	2	1	0	0	0	0	2	1	4
5	Biology	Zoology	4	1	1	1	2	1	2	0	9
6	Serology	Zoology	2	1	1	0	1	0	1	0	5
7	Lie-Detection	Psychology	1	0	0	0	0	0	0	0	1
8	Cyber Forensic	M Sc. in Computer Science or Master Degree in Computer Application or M Tech Computer Science & Engg. From the Institution recognised by UGC/AICTE	2	1	0	0	0	0	0	0	2
	Total		22	7	5	2	6	2	12	4	45

Note: Out of the above vacancies 01(one) post is reserved for Ex-servicemen and 02(Two) posts are reserved for PwD category candidates in the following benchmark disability:-

Category of PwD	Types of disabilities
Category-II	**Hard of hearing (with suitable aid)**
Category-III	**Locomotor disability (Mobility not restricted) such as Cerebral palsy, OL, BL,OA, leprosy cured, dwarfism, acid attack victims and muscular dystrophy.**

(b) Provision of assistance of Scribe

PwD candidates who have not less than 40% permanent disability and have limitation in writing shall have the option to use his own his/her own scribe. The intending candidates have to give option in the appropriate place while filling up online application form and also to submit the required certificate prescribed by the Commission as per **Advisory Notice No.3453/OSSC dated 24.10.2019** available in the website of the Commission "www.ossc.gov.in".

(c) The number of vacant posts to be filled up on the basis of this recruitment is subject to change without any prior notice as per discretion of the Commission, the Recruiting Authority and Government.

(d) Remuneration & Condition of Service:-

The appointment to these posts will be initially on contractual basis carrying a remuneration of **Rs.16,880/- per month (for 1st year) as per Govt. in G.A. & P.G. Department Notification No.19569/GA dtd.12.09.2017** and Condition of Service will be guided by the Government of Odisha from time to time as per **Odisha Group-B Posts (Contractual Appointment) Rules, 2013** notified vide Govt. in G.A. Department Notification No. 1147-GAD-SC-RULES-0061-2013/Gen. dated 17th January 2014 and **Odisha Forensic Science Service(Method of Recruitment & Condition of Service Rules, 1996** and subsequent amendments.

4. **Eligibility:**

4. a. **Age**:

The minimum age for the post is 21 years and the maximum age is 32 years as on 01.01.2019. The upper age limit is relaxable by 5 years for candidates belonging to SEBC, SC, ST & all Women candidates, 10 years for candidates belonging to PwD category & the total period of service rendered in defence service in case of Ex-servicemen. PwD candidates in the ST & SC category shall be entitled **to cumulative age relaxation** of ten years over & above the normal relaxation specified for the category. However, a candidate can only avail one type of age relaxation as per rule. **To be eligible, candidates not enjoying any relaxation of upper age limit must not have been born earlier than 2nd January, 1987 and not later than 1st January 1998.** The persons in Defence Forces having more than six months to retire/ discharge from the forces as on the date of the submission of online application are not eligible to apply as ex-serviceman for the post. Ex-Servicemen who are going to retire within six months from the closing date of online application may apply for the post by obtaining relevant certificate from the appropriate authority mentioning therein the date of appointment, date of retirement and years of service rendered in Defence Forces. However such candidates have to submit the discharge certificate on the date of certificate verification for considering their claims under Ex-Serviceman category.

Border Security Force, Indian Coast Guard, CRPF and other Para Military Forces are not within the definition of Ex-Servicemen.

Note: Once an Ex-Serviceman has joined the Govt. Service in civil side after availing the benefit as an Ex-Serviceman for his re-employment, his ex-serviceman status for the purpose of re-employment in Govt. Jobs shall cease to exist. He can avail age relaxation only. However as per clause-4 of the O.M. No. 36034/2014-Estt.(Res) dt.14 August,2014 of Ministry of Personnel, Public Grievances and Pensions, Department of Personnel & Training, Government of India, if an Ex-Serviceman applies for various posts before joining any civil employment, he/she can avail of the benefit of reservation as ex-serviceman for any subsequent employment, provided the applicant as soon as joins any civil employment, should give self declaration/undertaking to the concerned employer about the date-wise details of application for various posts for which he/she had applied for before joining. The applicant should furnish the copy of above declaration duly endorsed by the employer on the date of Document Verification for consideration of the claim under Ex-Serviceman category.

The upper age limit is relaxable for in-service contractual employees engaged by the Govt. or through manpower service provider agencies in the State Govt. offices or the State Govt. of Odisha who have completed at least one year of continuous service prior to commencement of "Odisha Group-B posts (Contractual appointment) Rules-2013 shall be eligible to apply for the post after availing age relaxation. As such they must be less than 45 years as on 01.01.2019. They should submit the required proof from their employer for availing age relaxation and submit/upload the required documents clause-7(xi) of this advertisement.

4.(b). Date of birth entered in the High School Certificate Examination by the Board of Secondary Education, Odisha or equivalent Certificate issued by the recognised Board/Council/by an Indian University as equivalent there to shall only be acceptable to the Commission.

5. (a) Educational Qualification:

I. Candidates must have passed Master Degree in Science (M Sc.)/M Tech/Master Degree in Psychology from recognised University with minimum 50% marks in aggregate in the subject mentioned against the respective division as detailed under Column-3 of Clause-3 of this advertisement.

II. The applicant must have Odia as one of the subjects in the HSC or passed examination in Odia equivalent to M.E. standard or passed in Odia as language subject in final examination of Class-VII or passed a test in Odia in M.E. School Standard conducted by Education Department Govt. of Odisha on the date of the Application.

5.(b) General Eligibility Criteria

In order to be eligible for appearing in the examination a candidate must satisfy the following conditions.

(i) The candidate must be a citizen of India.
(ii) Be able to speak, read & write Odia.
(iii) Be of good moral character & conduct.
(iv) Be of good mental condition and bodily health and free from any physical defect likely to interfere with the discharge of his duties in the service.
(v) If married, must not have more than one spouse living.
(vi) Candidate must have passed Middle School Examination with Odia as a language subject, or have passed High School Certificate Examination or equivalent examination with Odia as a subject/medium of examination in non-Language subject, or have passed in Odia as a language subject in the final examination of Class VII or above or have passed a test in Odia in M.E. School Standard conducted by the School & Mass Education Department.

Not fulfilling any of the eligibility criteria shall render the applicant's candidature invalid & rejected.

6. Examination Fee:

The candidates other than SC/ST/ Persons with Disabilities (PwD) category have to pay a non refundable examination fee of Rs.200/-. The fees can be deposited only through online mode using Internet Banking/ Debit Card/Credit card/UPI in SBI payment gateway linked with the online application form following procedure as detailed below:-

Online Fee Depositing process in State Bank of India (SBI) through State Bank Collect Portal
Important: Candidate other than **SC, ST & PwD** category needs to **"Make Online Payment" of Rs. 200/- for submission of online application form for the post. Once SBI Collect of State Bank of India portal is opened, then DO NOT click Refresh or Back Button.**
Steps to be followed in SB Collect portal for Online Payment 1. System will redirect you from online application form portal to State Bank Collect Portal after clicking on the '**Submit**' button. 2. Kindly preview the application to check & confirm the details shown on the screen i.e Application Sequence No., Date of Birth, Name, Mobile No, e-mail ID, post & category etc., before clicking **"Submit"** Button.

3. Select the Online Payment Option (Internet Banking/Rupay Debit Card/Credit Card/UPI) with bank charges as applicable mentioned therein. 4. Kindly make the online payment via Credit card or Debit card or Net Banking or UPI and retain the transaction slip for future reference.
Candidates are advised to keep with them the copy of the e-receipt as a token successful payment of required examination fee for future reference.
Candidates are advised to make required payment using SBI MOPS for final & successful submission of form.

Note:

Applications without payment of examination fee except SC/ST/PwD category candidates shall be liable for rejection.

7. **Certificates / documents to be submitted at the time of certificate verification on the date of Viva-Voce Test:-**

The certificates/documents as listed below need to be produced by the candidate in Original along with a set of self attested photocopies of the same and the copy of online application form during certificate verification on the date of Viva Voce Test.

(i) Copy of the registered online application form.

(ii) HSC certificate or equivalent certificate & mark sheet issued by the recognised Board/Council.

(iii)+2 or equivalent pass Certificate & Mark sheet.

(iv) Bachelors Degree in relevant discipline Certificate & Mark sheet.

(v) Masters Degree Pass Certificate & Mark sheet in respective discipline.

(vi) Candidates of SC/ST/SEBC category shall enclose self-attested photocopy of a valid caste certificate issued by competent authority on the date of Viva Voce Test.

(vii) Candidates have to submit a self-attested Photocopy of the certificate either of passing HSC examination with Odia as a compulsory subject, or in lieu thereof a certificate of passing a language test in Odia of M.E. standard/Class-VII issued by Principal/Head Master or any other competent authority.

(viii) Self-Attested photocopy of the certificate of disability issued from the concerned Medical Board of the concerned district in case of PwD candidates with permanent disability. For candidates with temporary disability, they shall have to produce recent disability certificate. Besides, PwD candidates may follow instructions issued Vide Commission's Advisory Notice No.3453/OSSC Dtd.24.10.2019 available in the website of the Commission to avail the benefits.

(ix) Copy of the e-receipt/transaction slip (except SC, ST & PWD Candidates) showing successful payment of **Rs.200/-** towards examination fees.

(x) Self attested photo copies of documents in support of claim against Ex-servicemen i.e. Discharge certificate, identity Card & P.P.O issued by the appropriate Authority indicating there in the Date of Entry, Date of Discharge & Period of Service rendered in Defence forces.

(xi) In-Service contractual employees claiming age relaxation and contractual In-service benefits must submit a Certificate from employer as per proforma prescribed by the Commission vide the **Advisory Notice No.3568/OSSC dated 01.11.2019** available in the website of the Commission "www.ossc.gov.in".(**Annexure-C** of this Advertisement)

8. Plan of examination: There shall be a written examination of 300 marks consisting of two papers followed by Viva-Voce test of 30 marks. The Commission at their discretion may adopt Computer Based Recruitment Test (CBRT).

Stage-I					
Exam Type	**Paper**	**Subject**	**Maximum marks**	**No. of Questions**	**Duration**
Written Examination (OMR Based or CBRT)	Paper –I	General Awareness	100 Marks	100 (Objective Type)	1 & ½ Hours
	Paper-II	Technical Paper	200 Marks	100 (Objective Type)	3 Hours
Stage-II					
Viva-voce Test	30 marks			Candidates numbering 3(Three) times the vacancies advertised from each category in order of merit shall be shortlisted for Viva Voce Test basing on the marks secured in the Written Examination.	
Total			**330 Marks**		

9. Syllabus of Written Examination:

Paper-I (General awareness):

The questions in this paper shall be to test the candidate's psychology and the general awareness. Questions on reasoning, aptitude and general awareness on science, current affairs, geography, history of India & Odisha, Indian constitution, Socio Economic Political Development, Human rights, fundamentals of Computer etc. The questions will be of graduation standard & objective type multiple choices to be answered in OMR sheet or the Commission at their discretion may adopt online test on this paper.

Paper II (Technical Paper):

There will be separate questions in the respective discipline viz. physics, Chemistry, Zoology & Psychology, and Computer Science. The candidates will have to appear the test on the specific subject as per their option exercised. The questions in this paper will be of objective type multiple choices to be answered in OMR sheet or the Commission at their discretion may adopt CBRT. The detail syllabus is annexed as **Annexure-D** of this advertisement.

10. PLACE AND DATE OF WRITTEN EXAMINATION:

The Date/Time/ Venue of the Written Examination will be informed to the eligible candidates in their Admission Letters, in due course. The admission letters shall only be downloaded by the eligible candidates by accessing the Commission's website by using their **'User ID' and 'Password'** from a date to be notified later on.

11. Admission letter/Hall Ticket:

Admission Letters/hall Ticket for the written examination & Viva Voce Test will be made available to the eligible candidates in the official website of the commission one week prior to the date of the examination carrying the photograph and signature of the eligible/qualified candidate and signature of the Secretary of the Commission. This will carry intimation about the date, time and venue of the written examination. Each eligible candidate shall have to download their Hall Ticket/Admission Letter well before the date of the examination by logging in to the official website of the Commission "www.ossc.gov.in". The date(s)/Time/Venue of the examination will be notified in local dailies (newspapers) and in the Commission's website for information of the candidates. Further, the message regarding the date of examination will be sent to the eligible candidates in his/her registered Mobile Number & e-Mail Id as mentioned by the applicant in the online Application form. No Admission letter will be send through post.

12. Select list:

A merit list of the eligible candidates, who have appeared the Viva Voce Test shall be prepared basing on the sum total of the marks secured by the candidates in the Written Examination and Viva Voce Test. Select list will be prepared from the said merit list category wise equal to the number of vacancy advertised in order of merit.

Note:

i. **Blue/Black ball point pen only should be used for answering (ovalling) in OMR Sheet. Whiteners/Erasers should not be used on the OMR Sheet. However, Commission may conduct Computer Based Recruitment Test (CBRT) at its discretion.**

ii. **The candidates are required to visit the website of the Commission the official website of the Commission 'www.ossc.gov.in' for detailed information about the programme of the examination etc., notice regarding rejection of the application, other important notices etc. and also keep track of publication of various notices of this recruitment to be published in the leading local daily news papers.**

iii. **The candidate should furnish correct Mobile Number and e-Mail Id for sending SMS and other relevant information relating to this recruitment. The Mobile No. & e-Mail Id should remain active till completion of the recruitment process to avoid any communication gap.**

WARNING

- **Mobile phone or any other electronics devices are strictly prohibited in the premises of the examination centre. The candidates are advised not to bring any such banned items to the examination centre. Any infringement of these instructions might entail debarment of the concerned candidate from the examination.**
- **Commission reserves the right to conduct Computer Based Recruitment Test (CBRT) in place of OMR based test for this recruitment if desires.**

By order of the Commission

Secretary

(13

Annexure-'A'

Self Declaration

(At the time of applying for different posts to be filled up through OPSC/OSSC/OSSSC)

I Smt./Sri_____ Daughter/Son of_____ Age (as per advertisement) _____Years_____months_____days, Caste (ST/SC/SEBC) _____Resident of Village_____P.O._____ P.S._____ Town (NAC/Municipality/Municipal Corporation)_____ Tahasil_____ District _____ Odisha, PIN Code _____, do hereby declare that the information given above is true to the best of my knowledge and belief . I am well aware of the fact that if the information given by me is proved false/not true, I will be liable for action as per law and all the benefits, if any, availed by me shall be summarily withdrawn.

Date :

Place:

Signature of the applicant

(Name of the applicant)

Annexure-'B'

ଆତ୍ମଘୋଷଣାନାମା

(ଓଡିଶା ଲୋକସେବା ଆୟୋଗ/ଓଡିଶା କର୍ମଚାରୀ ଚୟନ ଆୟୋଗ/ଓଡ଼ିଶା ଅଧସ୍ତନ କର୍ମଚାରୀ ଚୟନ ଆୟୋଗଦ୍ୱାରା ବିଭିନ୍ନ ପଦବୀ ପୂରଣ ପାଇଁ ଚୟନ ନିମନ୍ତେ ଆବେଦନ ସମୟରେ)

ମୁଁ(ଶ୍ରୀମତୀ/ଶ୍ରୀ).....ପିତା.....,ବୟସ (ବିଜ୍ଞାପନ ଅନୁଯାୟୀ)ବର୍ଷ.....ମାସ.....ଦିନ.....ଜାତି(ଅନୁସୂଚିତ ଜନଜାତି / ଅନୁସୂଚିତ ଜାତି / ସାମାଜିକ ଓ ଶିକ୍ଷାଗତ ପଛୁଆ ବର୍ଗ)....., ବାସସ୍ଥାନ ଗ୍ରାମ/ୱାର୍ଡ)....., ପୋ/ଅ.....ଥାନା....., ସହର (ବିଜ୍ଞାପିତ ଅଞ୍ଚଳ/ନଗରପାଳିକା / ମହାନଗର ନିଗମ)....., ତହସିଲ ....., ଜିଲ୍ଲା ....., ଓଡିଶା, ପିନ କୋଡ .....ଏତଦଦ୍ୱାରା ଘୋଷଣା କରୁଅଛି ଯେ ମୋ ଦ୍ୱାରା ଉପରୋକ୍ତ ପ୍ରଦତ୍ତ ସମସ୍ତ ତଥ୍ୟ ମୋର ଜ୍ଞାତସାର ଓ ବିଶ୍ୱାସ ଅନୁଯାୟୀ ସତ୍ୟ ଅଟେ । ମୁଁ ଭଲ ଭାବରେ ଅବଗତ ଯେ, ଯଦି ମୋ ଦ୍ୱାରା ପ୍ରଦତ୍ତ କୌଣସି ତଥ୍ୟ ଅସତ୍ୟ କିମ୍ବା ମିଥ୍ୟା ପ୍ରମାଣିତ ହୁଏ, ତେବେ ମୁଁ ଆଇନ ଅନୁଯାୟୀ ଦଣ୍ଡିତ ହେବି ଏବଂ ମୋ ଦ୍ୱାରା ଉପଲବ୍ଧ ସମସ୍ତ ସୁବିଧା ମୋ ଠାରୁ ସମ୍ପୂର୍ଣ ଭାବେ ପ୍ରତ୍ୟାହାର କରିନିଆଯିବ ।

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ସ୍ଥାନ.

ଦସ୍ତଖତ.....

ନାମ.....

Annexure-'C'

ODISHA STAFF SELECTION COMMISSION, UNIT-V, BHUBANESWAR.
Email: orissassc@gmail.com, Tel.0674-2392833, FAX-2396011

No.IIE-122 /2019 - 3568 /OSSC., Date:- 01.11.19

Advisory Notice to candidates claiming benefits available to in-service contractual employees under the In-service contractual appointment Rules while applying for different posts and services of Odisha Staff Selection Commission.

Pursuant to Rule-3,4,5 & 8 of Odisha Group-'C' & 'D' Posts (Contractual Appointment) Rules-2013 published vide G.A. & P.G. Department Notification No.32010/Gen dtd.12.11.2013, and Rule-3,4,5 & 8 of Odisha Group-'B' posts(Contractual Appointment) Rules-2013 published vide G.A. & P.G. Department Notification No.1147/Gen dtd.17.01.2014, it is notified that candidates while applying for different State cadre Posts and Services under Odisha Staff Selection Commission and claiming benefits available to in-service contractual employees under the above mentioned Rules are required to upload a certificate from the Employer/Appointing Authority in the format as prescribed in **Annexure-'A'** to this Notice.

No certificate other than in the prescribed format shall be accepted by the Commission and will lead to forfeiture of the claim of the candidate to avail the benefits under the above said Rules.

By order of Commission,

1.11.2019

Secretary

Annexure-A.

Format of certificate to be submitted by Contractual Employees under different offices of Government of Odisha claiming benefits under Contractual Appointment Rules-2013.

1. Certified that Ms/Mrs./Shri/Mr _____ S/O. _____resident At _____ Po_____, PS_____ , Dist_____ Date of Birth _____has been engaged in this Office as _____ (post held) in Group-'B'/Group-'C' post on contractual basis from _____ to _____ as per this office Order No._____ dtd._____.(Copy enclosed) and has completed total _____ year of continuous service.

2. It is further certified that Mr./Ms/Mrs./Shri _____ has been engaged against the contractual posts created with concurrence of Finance Department vide their Order No./UOR No._____ dtd._____ without following the recruitment procedure including ORV Act-1975.

   or

   It is certified that the engagement of Mr./Ms/Mrs./Shri _____ is through Man power Service Provider Agencies i.e. _____ with concurrence of Finance Department vide their Order No._____ dtd._____/UOR No._____ dtd._____

3. It is further certified that Mr./Ms/Mrs./Shri _____ has been engaged as _____(Post held), prior to commencement of Odisha Contractual Appointment Rules,2013 and he/she has not been engaged under Temporary Plan Scheme/Temporary Establishment/Tenure Based post in this office.

Signature of Appointing Authority/Employer

With seal

ANNEXURE-'D'
SYLLABUS FOR CHEMISTRY

NUCLEAR CHEMISTRY

a) General characteristics of radioactive decay, Decay kinetics, Parent –daughter decay growth relationship, α-decay, β-decay & $_{\gamma}$-emission.
b) Nuclear fission, Process of nuclear fission, Fission fragments and their mass distribution, Charge distribution, Ionic charge of fission fragments, Fission energy, Fission cross-sections and thresholds, Fission neutrons, Theory of nuclear fission. Fission.

TRANSTION METAL CHEMISTRY

THEORIES OF METAL-LIGAND BONDING

a) Crystal field theory (CFT): Splitting of d-orbital under the influence of octahedral, tetrahedral, tetragonal, square planar, trigonalbipyramidal and square pyramidal fields, Stereochemical and thermodynamic effect of CF splitting, CFSE and Jahn-Teller effect.
b) Molecular orbital theory (MOT): Sigma bonding in octahedral complexes: Classification of metal valence orbitals into sigma symmetry, formation of ligand group orbitals (LGOs) of sigma symmetry, Formation of molecular orbitals of sigma symmetry, construction of molecular orbital energy level diagram involving only sigma bond contribution from ligands, pi bonding in octahedral complexes, Classification of metal valence orbital into pi symmetry, Formation of LGOs of pi symmetry. Formation of pi MOs and construction of molecular orbital energy level diagram involving sigma and pi contribution from pi donor ligands, Sigma and pi bonding in tetrahedral complexes.
c) Ligand field theory (LFT) and adjusted crystal field theory (ACFT).

COMPLEX EQUILIBRIA

a) Complex Equilibria: Types of complex equilibria in solution and types of complex equilibrium constant (stability constant). The complex formation functions, Determination of stability constant by spectrophotometric method and pH titration method, Stabilization of unusual oxidation state.

STRUCTURE AND REACTIVITY

NATURE OF BONDING IN ORGANIC MOLECULES

Delocalized chemical bonding, Conjugation, Cross conjugation, Resonance, Hyper conjugation, Bonding in fullerenes, Tautomerism, Aromaticity in benzenoid and non-benzenoid compounds, Alternant and non-alternant hydrocarbons, Huckel's rule, energy levels of pi-molecular orbitals of simples systems, Annulenes, Anti-aromaticity, Homo-aromaticity, Bonds weaker than covalent addition compounds, Crown ether complexes and cryptands, inclusion compounds, Cyclodextrins, catenanes and rotaxanes.

REACTION MECHANISM: STRUCTURE AND REACTIVITY

Types of mechanisms, Types of reactions, Thermodynamic and kinetic requirements, Kinetic and thermodynamic control, Hammond's postulate, Potential energy diagrams, Transition states and intermediates, Methods of determining mechanisms, Hard and soft acids and bases.

Effect of structure on reactivity: Resonance and field effects, Steric effect, Quantitative treatment, The Hammett equation and linear free energy relationship, Substituent and reaction constants, Taft equation.

REACTION INTERMEDIATE

Non-classical carbocations, Free radicals, Carbenes, Nitrenes, Arynes.

GENERAL DISCUSSION ON THE FOLLOWING

Solvent effect, isotope effect, Kinetic salt effect, Stereoselective, Regioselective, Stereospecific and Regiospecific reactions, Stereo electronic factors in transition state stability.

STEREOCHEMISTRY

Chirality, Fischer projection and R and S notations, Threo and erythro nomenclature, E and Z nomenclature, Optical isomerism in biphenyls and allenes, Concept of Prostereoisomerism and Assymetric synthesis (including enzymatic and catalytic nexus), Conformation of a few acyclic molecules (alkanes, haloalkanes), Conformation of cyclic systems having one and two sp2 carbon atoms.

Dynamic stereochemistry: Conformation and reactivity, Selection of substrates, Quantitative correlation between conformation and reactivity, (Weinstein-Eliel equations and Curtin- Hammett principles), Conformational effects on stability and reactivity in acyclic compounds (ionic elimination, intramolecular rearrangements, NGP) and in cyclic systems, (Nucleophilic substitution reaction at ring carbon, Formation and Cleavage of epoxide rings, Addition reactions to double bounds, Elimination reactions).

THERMODYNAMICS

CLASSICAL THERMODYNAMICS

Brief resume of the concepts of laws of thermodynamics, Free energy, chemical potential and entropy, Third law of thermodynamics and determination of entropy, Entropy and probability, Boltzmann-planck equation, Partial molar properties (partial free energy, molar volume and molar heat content). Their significance and determination.Concept of fugacity and its determination.

THERMODYNAMICS OF LIVING SYSTEMS

Bioenergetics and thermodynamics, Phosphate group transfer and ATP, Biological oxidation-reduction reactions.

DYNAMICS

CHEMICAL KINETICS

Theories of reaction rates, Collision theory, Transition state theory, Arrehenius equation and the activated complex theory, Reaction between ions, Salt effect, Steady-state Kinetics, Kinetic and Thermodynamic concept of Reactions, Treatment of unimolecular reaction (Lindemann-Hinshelwood and Rice-Ramspeger-Kassel-Marcus (RRKM) theories), Dynamic chain (H_2 + Br_2 reaction, pyrolysis of CH_3CHO, Decomposition of ethane).

ELECTROCHEMISTRY

Interionic attraction theory and Debye- Huckel treatment, Derivation of Onsager limiting law and its verification and modification, Activities , activity coefficients, Debye- Huckel treatment, Debye- Huckel-Bronsted equation, Salt effect, Determination of activity coefficients from solubility method,Ion association, Determination of thermodynamic dissociation constant of weak electrolytes by Shedlovsky method and by EMF method, Nernst equation, redox systems, electrochemical cells.

BIO-INORGANIC CHEMISTRY

TRANSPORT AND STORAGE OF METALS

Metal ions in biology with special reference to Na, K, Mg, Ca,Fe,Zn,Co and Mo, The transport mechanism, Transport and storage of alkali and alkaline earth metal, Transport by neutral macrocycle, Transport by anionic carriers, sodium/ potassium pump, calcium pump, ionophores and their role as ion carrier, transport and storage of iron, Ferritin, transferrin (siderophilin), siderophores, Storage of copper and zinc, metellothioneines, transport of copper and zinc.

METALLOPORPHYRINS AND IRON-SULPHUR PROTEIN.

a) Iron porphyrins (Heme proteins): Hemoglobin (Hb), Myoglobine (Mb) their behaviour as oxygen carrier and oxygen uptake protein, O_2 affinity cooperativity and Bohr's effect, Heme protein as electron carrier with particular reference to cytochrome-c and cytochrome-450 and cytochrome oxydase.
b) Magnesium porphyrins (Chlorophyll): Photosynthesis, the light and dark reaction (Calvin cycle).
c) Non – heme iron – sulphur protein as electron carrier, rubredoxins and ferredoxins.

ORGANIC REACTION MECHANISM-1

The S_N2, S_N1, mixed S_N1 and S_N2 and SET mechanisms. The neighboring group mechanism, Neighboring group participations by sigma and pi bonds, anchimeric assistance. Classical and nonclassicalcarbocations, phenonium ions, norbornyl system, common carbocation rearrangements, application of NMR spectroscopy in the detection of carbocations.The S_N1 mechanism.Nucleophilic substitution at an allylic, aliphatic trigonal and a vinylic carbon. Reactivity effects of substrate structure, attacking nucleophile, leaving group and reaction medium, phase transfer catalysis, ambident nucleophile, regioselectivity.

a) Alipahatic Electrophilic Substitution mechanism: S_E1, S_E2 and S_E^1 mechanisms, Effect of substrate, leaving group and solvent, Reactions (hydrogen exchange, migration of double bonds, keto-enoltautomerism, halogenation, aliphatic diazonium coupling, stork –enamine reaction)
b) Aromatic electrophilic substitution mechanism: Structure reactivity relationship in mono-substituted benzene, ring isomer proportions, orientation in benzene ring with one or more than one substituent, Orientation in other ring systems, Vilsmeir-Haack reaction, Pechmann reaction.
c) Aromatic Nucleophilic Substitution mechanism: Introduction, to different mechanisms, Aromatic nucleophilic substitutions (S_NAr, S_N1 aryne) Effect of substrates, leaving groups, and nucleophile, Reactions: Nucleophilic displacement in areno-diazonium salts by different nucleophiles, Chichibabin reaction.
d) Free radical substitution: Reaction at sp^2 carbon, Reactivity in aliphatic substrates, Reactivity at bridge head position, Reactivity in aromatic substrates.

ORGANIC REACTION MECHANISM-II

a. Addition to carbon-carbon multiple bonds, Electrophilic, Nucleophilic and Free radical addition, Orientation and Reactivity, Addtion to cyclopropances, Reactions: Hydroboration, Michael reaction, Sharpless Asymmetric epoxidation.
b. Addition to carbon-heteroatom multiple bonds: Mechanism and reactivity, Reactions: Mannich reaction, $LiAlH_4$ reduction of carbonyl compounds, acids, esters, nitriles, addition of Grignard reagents- Reformatsky reaction, Aldol condensation, Knoevenagelcondersation, Perkin reaction, Tollens reaction, Witting reaction, Prins reaction, Benzoin condensation.

Elimination mechanism: E1, E2, E1CB and E2CB mechanisms, Orientation, Effect of substrate, base, leaving group and medium, Orientation of double bond, Sayetzeff and Hoffman rules, Pyrolytic elimination reaction, Oxidative elimination (oxidation of alcohol by chromium, Moffatt oxidation). Reactions: Cleavage of quaternary ammonium hydroxides, Chugaev reaction, Shapiro reaction.

REARRANGEMENTS

General mechanistic considerations- nature of migration, migratory aptitude, memory effects.
A detailed study of the following rearrangements, Wagner- Meerwein, Favorskii,Arndt- Eistert synthesis, Neber, Beckmann, Hofmann, Schmidt, Lossen, Curtius, Baeyer-villiger, Shapiro reaction, Von-Ritcher, Sommelet- Hasuser rearrangement.

SURFACE CHEMISTRY

PHASE RULE

Concept of Equilibrium between phases, Derivation of phase rule, Ideal Solution, Liver Rule, Brief concept on one and two component system, Application of phase rule to three component systems of both solids and liquids.

ADSORPTION

Surface tension, Capillary action, Adsorption, types of adsorption, Gibbs adsorption isotherm, Freundich's adsorption isotherm, Langmuir's adsorption isotherm and its limitations, BET adsorption isotherm and its applications, Heat of adsorption, estimation of surface areas of solids from solution adsorption studies, Brief concepts on micelle, reversed micelle and microemulsions.

MACROMOLECULES

Polymer-definition, Types of polymer, Number average and weight average macromolecules, determination of molecular weights of macromolecules (Osmometry, Viscometry, Diffusion and Light scattering method), Kinetics of polymerization, Donna Effect, Stereochemistry of polymerization.

INSTRUMENTAL METHOD OF ANALYSIS

SPECTROSCOPICAL METHOD

Chromatographical method: Principle and application of HPLC, GC, GC-MS, GPC

a. Atomic absorption and Flame emission spectral method and their application in quantitative analysis.
b. Molecular absorption and emission spectroscopy in quantitative analysis.
c. Light scattering technique including nephlometry and Raman spectroscopy.

ELECTRO ANALYTICAL METHOD

Polarography: Basic principle, instrumentation, theory of current-voltage curve, Theory of diffusion current, Ilkovic equation, polarography wave and half wave potential, Application of polarography, Cyclic voltammetry anodic stripping voltammetry, amperometry, conductrometry and ion selective electrodes.

THERMO ANALYTICAL METHODS

Thermo gravimetric analysis (TGA): Principle, instrumentation, factors affecting TGA curve, derivative thermo gravimetric analysis (DTGA) and application of thrmogravimetric analysis. Differential thermal Analysis (DTA), instrumentation of DTA and application of DTA. Simultaneous study of TGA, DTA with examples. Differential scanning calorimetry (DSC) and thermometric titration.

NATURAL PRODUCTS AND SPECTROSCOPY

NMR: Magnetic properties of nuclei, Theory of magnetic nuclear resonance with special reference to proton, Instrumentation, Chemical shift, Simple spin-spin interaction, shielding effects, Diamagnetic anisotropy, NOE, ^{13}C, ^{15}N, ^{19}F, ^{31}P NMR (preliminary idea).

a. Mass spectrometry: Introduction, Mass spectrum, Determination of molecular formulae, parent peak, Base peak, Use of molecular fragmentation, Mass spectra of some classes of compounds (hydrocarbons, alcohols, phenols, ketones, aldehydes, acids and esters).
b. Problems involving UV, IR, NMR and Mass spectroscopy.

SPECTROSCOPY

ELECTRON SPIN RESONANCE SPECTROSCOPY

Theory, instrumentation, g-values, hyperfine splitting, ESR spectra of systems with more than one unpaired electrons, double resonance, ENDOR and ELDOR techniques.

PHOTO ELECTRON SPECTROSCOPY

Basic principle, Instrumentation: the basic design of photoelectron spectrophotometer, X-ray photoelectron spectrophotometer, ultraviolet photoelectron spectrophotometer, chemical information from photoelectron spectroscopy, ultraviolet photoelectron spectra and their interpretation, application of X- ray photoelectron spectroscopy, auger lines.

MOSSBAUER SPECTROSCOPY

Principles of Mossbauer spectroscopy, Experimental methods, Theoretical aspects, Quadrupole splitting, Magnetic hyperfine interaction.

BIOMOLECULES

AMINO ACIDS AND PROTEINS

Classification and functions of amino acids and proteins, Chemical reactions of amino acids, alkali titration of amino acids, Synthesis of peptides, Primary, secondary, tertiary and quaternary structures of proteins.

LIPIDS

Classification and Function of lipids, Structural lipids in membranes, lipids with specific biological activities, Resolution and Analysis of lipids, Biological membrane and transport.

NUCLEIC ACIDS

Structure and Function of nucleotides and nucleic acids, Replication, Transcription and Translation processes, Sequencing of nucleic acids, Genetic code, Recombinant DNA.

COMPUTER APPLICATION IN CHEMISTRY

INTRODUCTION TO COMPUTERS

Basic structure of a computer: The CPU, the I/O devices, the internal memory, commonly used secondary storage media. Data representation: Overview of binary, octal and hexadecimal number system. The software: Concept of low level and high level languages, Compiler interpreter, editor, operating system concepts, salient features of MS-DOS. Windows operating systems.

PROGRAMME DEVELOPMENT PROCESS

Algorithm, Flowchart, Decision-table, elements of high level programming languages. Input output statements, conditional statements, control structure, concept of data file, file operation like searching, storing, with reference to Fortran/ C Programming.

Fortran 77/C: Types of data, variable, input and output statement, loop, Nested loop, subscript variable.

ORGANOMETALLIC COMPOUNDS AND HOMOGENEOUS CATALYTIC REACTIONS

Coordinating unsaturation, acids base behavior of metal complexes, oxidative addition reaction, stereochemistry and mechanism of addition, insertion reactions, intermolecular hydrogen transfer, isomerization, hydrogenation of alkenes, hydroformylation, Zigler-Natta polymerization, Alkene metathesis.

ANALYTICAL CHEMISTRY

RELIABILITY OF ANALYTICAL DATA

Errors in chemical analysis, classification of errors, significant figures, precision and accuracy, methods of expressing accuracy, absolute error and relative error, methods of expressing precision, average deviation, standard deviation, confidence limits, median value, range, coefficient of variation.

Sampling in analysis definition: Theory of sampling, technique of sampling, statistical criteria of good sampling and required size, stratified sampling, transition and storage samples.

SOLVENT EXTRACTION AND ION EXCHANGE

a. Solvent extraction: Basic principles, classification of extraction, mechanism of extraction, extraction equilibria, technique of extraction, applications in analytical chemistry.
b. Ion exchange: synthesis and characteristics of ion exchange, ion exchange equilibria, technique of ion exchange, application of ion exchange for separation.

ULTRAVIOLET AND VISIBLE SPECTROPHOTOMETRY

Introduction, nature of absorbing species, visual colorimetry, photo-electric cell and filters, Photoelectric filter photometry, errors in photoelectric photometry, spectrophotometry, working of spectrophotometer, simultaneous spectrophotometry, differential spectrophotometry, reflectance spectrophotometry, photometric titrations, composition of coloured complex Sandell's sensitivity, relative concentration and Ringbon's plot.

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SYLLABUS FOR PHYSICS

CLASSICAL MECHANICS:

The Kinematics of Rigid Body Motion. Definition of rigid body, degrees of freedom, orthogonal transformation and properties of transformation matrix. The Euler angles, TheCayley-Klein parameters and related quantities, Euler theorem on the motion of a rigid body. Finite and infinitesimal rotations.Rate of change of Vector. The coriolis force effect.

The rigid body equations of motion.Angular momentum and kinetic energy of motion about a point.Tensors and diadics.The inertia tensor and the moment of inertia. The Eigen values of the intertia tensor and the Principal axis transformation. Euler's equations of motion.Torque free motion of a rigid body. The heavy symmetric top with one point fixed.

The Hamilton equations of motion.Legendre transformation and the Hamilton equations of motion.Cyclic coordinates and conservation theorem.Routh's procedure and oscillation about steady motion.Derivation of Hamiltion's equations from a variationalprinciple.The principle of least action.

Canonical Transformation: The equations of canonical transformation and examples. Poisson's brackets and other canonical invariants. Equations of motion, infinitesimal canonical transformations and conservation theorems in the Poisson bracket formulation. The angular momentum Poisson brackets relations.

Hamiltion-Jocobi Theory: Hamiltion-Jacobi equations for i) Principal function ii) Characteristic functions Harmonic oscillator problem as an example of the Hamiltion-Jacobi method, separation of variables in the H-J equation. Action angle variables. The Kepler problem in action angle variables.

MATHEMATICAL METHODS:

Differential Equations and their solutions. Power series solution.

QUANTUM MACHANICS:

Scalar product vectors and their properties, adjoin operators, unitary operators. Expectation values of dynamical variables and physical interpretation. Hermitian operators. Eigen values and Eigenvectors, probability interpretation.

Representation of momentum operator in the position space and the energy eigenvalue equation, energy operators in the momentum space formulation, commutation relation between operators for position co-ordinate and momentum. Commutator algebra, uncertainty relation as a consequence of non commutability.

Time evolution of quantum states.

Operator method of solution of Harmonic oscillator problem.

Rotation and Orbital angular momentum

Spin angular momentum: spin ½ particle's pauli spin particles and their properties.

Total angular momentum.

Invariance & symmetry (Translations, rotations) and conservation laws, motion in a spherically symmetric field. The central force problem.

ELECTRODYNAMICS :

Potential formulation of electrodynamics. Magnetic vector potential A and scalar potential. The wave equation for the potentials Gauge transformations. Reflection and transmission of plane electromagnetic waves at the boundary of two linear media (oblique incidence) Dispersion. Free electrons in conductors and plasmas Guided waves: Wave guides TE waves in a rectangular wave guide.

Dipole radiation: Electric dipole radiation, Magnetic dipole radiation. Power radiated by a point charge.

ELECTRONICS:

a)Power electronics :SCR,FET, MOSFET, DIAC, TRIAC (principle, construction, operation with characteristics and application)

b) Oscillators: Klystron oscillator (Principle, description and operation) Multivibrator, Astable, Monastable, Bistable(Principle, Description and Operation)

Operational amplifier: Differential amplifier (Circuit configuration and properties, ideal operational amplifier input and output impedances)

Application of OP-AMP: inverting amplifier, Non inverting amplifier, adder, subtractor, integrator differentiator, logarithmic amplifier, comparator (Principle basic circuit operation and theory)

Single equation loops voltage, source constant voltage source, constant current source, Maximum power transfer theorem. Thevenins theorem Nortons theorem. (Digital Electronics) Number system.

Binary. Octal and hexadecimal numbers (basic characteristics and inter conversion) Gray Code(interconversion between Gray Code and Binary Code) binary algebra-addition subtraction multiplication and division.'

Logic operations: NOR gate NAND gate. Exclusive OR gate, Exclusive NOR gate (Logic symbol,truth table and circuit with operation)

Logic families: RTL, DTL, TTL (Description and operation) CMOS, Sequential circuit-SR flip-flop clocked SR flip-flop.

Different types of Radio wave propagation- Description and basic theory.

AM and FM transmitter (Block diagram study) FM receiver (Block diagram study) with emphasis on function of limiter and discriminator.

Antenna: Basic antenna action, current and voltage distribution in linear antenna, dipole antenna, power radiator, radiation resistance and directional pattern.

QUANTUM MECHANICS:

Normal and anomalous Zeeman Effect.

SOLID STATE PHYSICS:

Crystal Binding: Crystals of inert gases, ionic crystals, covalent crystals, metallic binding. Hydrogen bonded crystals.

Vibration of mono atomic and diatomic lattices. Dispersion relation, optic and acoustic modes, optical properties in the infrared.

Thermal properties of Insulators: Lattice heat capacity,anharmonic crystal interactions and thermal expansions, Thermal conductivity.

Free Electron Fermi gas: Energy levels and density of states in one-dimension, effect of temperature on Fermi-Dirac distribution function, free election gas in 3-dimensions, heat capacity of the electron gas.

Electrical and Thermal conductivity of metals, Dielectric response of an electron gas, Plasmon's, electrostatic screening Motion in magnetic field, cyclotron frequency, Hall effect.

Band Theory: Electrons in periodic potential, Bloch's theorem, Kroning-Penny model, origin of band gap.

Semiconductors: Intrinsic and impurity semiconductors, Band gap, law of mass action, intrinsic carrier concentration, impurity states, Energy bands in Si and Ge, P-N junctions.

Superconductivity: Meissner effect, Type-I and Type-II Superconductors, Thermodynamics of super conductors. Josephson Effect, flux quantization, Microwave quantum interference.

NUCLEAR AND PARTICLE PHYSICS:

Nuclear physics I

Nuclear force: Central and Non central force, Mirror nuclei

Nuclear Model: Liquid drop model fission, magic numbers, shell model.

Nuclear Physics II

Nuclear Reaction: energetic of Nuclear Reaction. Alpha decay. Fermi's theory of Beta decay.Particle Physics:

Basic forces, classification of elementary particle.

STATISTICAL MECHANICS:

Classical Statistical Mechanics: Postulate of classical statistical mechanics,Microcanonical ensemble. Derivation of thermodynamics, classical ideal gas, Gibb's paradox

Canonical ensemble and energy fluctuation, Grand canonical ensemble and density fluctuation.

SYLLABUS FOR MICROBIOLOGY

HISTROY AND DEVELOPMENT OF MICROBIOLOGY:- General features of microbes. Classification, Isolation, culture, and maintenance of microorganisms. Microbial growth. Factors influencing microbial growth, Role of microbes in agriculture and Industry.

METHODS IN MICROBIOLOGY:- Microscopy, microbial culture, pure cultures, sub-culture, stains used for microbes.

STRUCTURAL ORGANISAITON:- Prokaryotic micro organisms, structural details of prokaryotic cells. Difference between prokaryotic and Eukaryotic cells, Structure of bacteria and virus (Bacteriophage) and their multiplication (Lytic cycle and lysogenic Cycle)

Nutrition and reproduction of Eubacteria, Genetic recombination in bacteria (Transformation, conjugation and transduction).Cyanobacterial cell structure and reproduction.

VIRUS:- General characteristics and classification of viruses, nature, morphology and chemistry of virus, virus-vector relationship, replication of Bacteriophage.

Plant virus- TMV, structure, transmission pathogenicity and reproduction.

Animal viruses- HIV structure, transfusion, pathogenicity and replication.

Treatment and preventation by antivirals and vaccine,virons and prions.

Microbial toxins: types, mode of actions and pathogenecity.

Bacterial toxins- Endo and exotoxins

Fungal toxins- Toxins of aspergillus, pencillium, fusarum and Alternaria.

Algal toxins- Gynotoxins and dinotoxins

Chemotherapeutic agents- Antibiotics and their mode of action, bacterial drugs (pencillin, fluoroquinolones, tetracycline and aminoglycosides.

Application and Importance of microbiology- Bacterial diseases in man (microbes in water and soil), Air borne, Food borne, water borne, soil borne, Sexually transmitted and contact diseases, viral diseases in man, Industrial microbiology, Biomineralization (microbial leaching).

GENETICS

Mendel's experiments and laws of inheritance, gene interactions,Mendeliandihybrid ratio, masking gene action, supplementary gene action, duplicate gene action, complementary gene action.

Multiple alleles in human (ABO blood group), eye colour in Drosophila, self incompatibility in plants,Polygenic inheritance, pleiotrophy, Maternal effects and cytoplasmic inheritance, mitochondrial and chloroplast genome.Sex-chromosomes, chromosomal sex-determination.

Meiotic behaviour of chromosomes:- primary and secondary non-disjuction. Genic balance theory of sex-determination, sex determination in humans and Drosophila, lethal genes.

Sex linkage:- Sex-linked gene in man, sex chromosomal disorder in man, sex influence dominance by sex-linked gene expression.Sex-determination in plants with special reference to melandrium.

Linkage groups: complete and incomplete linkage

Crossing over : Relationship between genetic and cytological crossing over, relationship between crossing over and chaismaformation, molecular mechanism of crossing over. Detection of linkage and linkage maps:- Test cross, test for linkage on the basis of F2 generation, gene mapping, three point test cross in Drosophila, Construction of linkage maps, identification of particular linkage groups with specific chromosome, physical distance and map distance Interference and coincidence, Mitotic recombination, Recombination within gene.

Structural and numerical alteration of chromosomes, Spontanuous and induced mutations, physical and chemical mutagens, chromosomal aberrations, meiotic behaviours of deletion , duplication, inversion and translocation. Euploids and aneuploids, - classification, origin, induction, role of polyploidy in evolution.

Population Genetics-Hardy- Weinbrg's law, genetics of qualitative traits in population. Chromosomal disorders, some common human syndromes.

Twin study, multiple births, Genetic counselling, Amniocentesis.

Nature and function of genetic material, chemical compounds causing genetic damage.

Testing of genetic toxicity – Various experimental methods of harvesting cells (tests, bone Mauna

Preparation of Chromosomes and analysis.

BIO-CHEMISTRY

Amino Acids: Classification and properties, acid base properties, the peptide bond ionizations, behaviour of peptides, biologically active peptides.

Levels of protein structure, Determination of primary structure of protein. Three dimension structure of proteins (Secondary, tertiary and quarternary structures, structural pattern motifs and domains) ,protein denaturation and folding.

Amino acid catabolism (transamination, oxidative deamination and urea cycle) protein degradation (Proteosomal pathway) and solid phase synthesis of peptides.

CARBOHYDBRATES: - Classification configuration and confirmation of mono saccharides. Sugar derivatives, important disaccharides, Disaccharides, glucoaminoglycans, proteoglycans, glycoprotein and glycolipids.

Carbohydrate Metabolism- Glycolysis, TCA cycle, pentose-phosphate pathway, Glucogenesis, glycogen metabolism, regulation of carbohydrate metabolism, oxidative phosphorylation, electron transport and ATP synthesis.

Enzymes- General properties.

Mechanism of Enzyme action :- Nomenclature, classification, extraction and assay of enzymes, Michael's Menten Kinetics and its significance, Bigg'sHalden modification, determination of Vmax and Km,

Enzyme inhibition: Competitive, non-competitive inhibition, allosteric regulation, covalent modification.

Lipids:- Classification, storage lipids, structural lipids (Glycerophospholipids and sphingolipids) signaling lipids, cofactors,terpenes and pigments, Coenzymes and vitamins.

Biosynthesis and oxidation of fatty acids, regulation of fatty acid metabolism.

ANIMAL DIVERSITY (Non chordates and chordates) AND ANIMAL BEHAVIOUR.

Invertebrates

Nutrition in protozoa- Types and mode of feeding, protozoan parasites in brief(Trypanosoma, plasmodium)

Canal system in sponges

Coral reef formation and its significance

Polymorphism in coelenterates

Excretory structure and function of annelids

Helminthe parasites (Taenia and Ancylostoma)

Vision of insects,

Non-Chordates and Proto chordates

Torsion in gastropods, norvous system in cephalopods, water vascular system in Echinoderms, Reproduction and development of Echinoderms and its evolutionary significance, General character and interrelationship of proto chordates siphon mechanism in tunicates

ANIMAL BEHAVIOUR

Classification and analysis of behaviour pattern, Tools and technique in behaviour study, Neural and hormonal control of behavior, communication in animals, social organization in insects and mammals

Biological rhythms,parental care, orientation and navigation, migration of fish and birds.

PHYSIOLOGY AND ENDOCRINOLOGY:

PHYSIOLOGY

Composition of blood, Blood cells, blood groups, mechanism of platelet plug formation and blood coagulation. The lymphatic system.

The cardiac cycle and its regulation.

Pulmonary ventilation: - Respiratory surface and gas exchange, regulation of respiration, transport of gases, Acid base balance.

Excretory system- Urine formation, glomerular filtration, tubular function, renal mechanism of concentrating and diluting urine.

Osmoregulation :- Fresh water, marine and terrestrial vertebrates.

Nutrition :- Micro and macro nutrition.

Diversity in vertebrate digestive structures

Structure of neurone, neuronal conduction, synapse and neuronal integration.

ENDOCRINOLOGY

Chemical messengers, hormones and their feed- back system, mechanism of hormone action (Fixed membranereceptors and mobile receptors), hormone signaling. Pineal, Thymus and Gastrointestinal hormones, Anatomy, of the pituitary gland , Chemistry and biological action of adenohypophysial and neurohypophysial hormones.

Thyroid gland - Anatomy, biosynthesis and function of thyroid hormones.

Parathyroid gland - Anatomy and function and parathyroid hormone.

Endocrine pancreas- Anatomy, Biosynthesis, chemistry and functions of pancreatic hormones.

Adrenal gland:- Anatomy, biosynthesis, functions of cortical and medullar hormones,

Gonads :- Anatomy, and biological actions of gonadal hormones.

General idea about hormones influencing carbohydrate metabolism.

Some hormones of invertebrate

CELL BIOLOGY

Cell theory :- variability, size, shape, complexity and functions, general organisation of prokaryotes and Eukaryotes

Plasma member- Composition and dynamics, memberance carbohydrates and their role in cell organisation.

Social context of cells: Cell junction, cell adhesion and extra- cellular matrix

Cell motility -Cillia and flagella of prokaryotes and eukaryotes.

Cytoskeleton - microtubules, intermediate filaments and microfilaments,

Cell wall- structure, functions, biogenesis, growth

Cell inclusions – Pigment molecules and nutritive materials

Structure - orientation and behaviour of chromosomes, Cell cycle, cell signaling

Nucleus- structure and function of nuclear envelope, nucleolus, and chromatin organisation and its packaging, role of nuclear matrix in chromosome, organisation and function, matrix binding proteins, lamp brush chromosome polygene chromosome, Telecentric chromosome, interphase chromatin, Euchromatin and hetero chromatin, karyotype and its significance.

Molecular Mechanism s of cell division –

Mitosis (behaviour of chromosomes, formation of mitotic spindle, sister chromatid separation), cytokinesis (role of mitotic spindle in determining cytoplasmic cleavage site .

Meiosis : Events and mechanism –

Plasmodesmata-= Structure, roll in movement of molecules and macromolecules, comparison with gap junctions.

Plant vacuoles- Tonoplast membrane, ATPases, transporters and storage organelles.

Chloroplasts- Structure, genome organisation, gene expression, RNA editing, nucleo-chloroplastic interaction.

Mitochondria- Structure, genome organisation, biogenesis.

Transport across cell membrane-

Major types of membrane transport, Active transport, Co-transport, symport, Autoport, Ion channels, Osmosis.

Macromolecular trafficking into and out of nucleus.

Protein Sorting – Transport of proteins into mitochondria and lysosomes

Vesicular traffic- coated and uncoated vesicles, transport of secretary materials, endocytosis

Cell cloning and its application

Geneticanalysis in cell biology

MOLECULAR BIOLOGY

DNA Replication:- Replication in prokaryotes, replication fork, Replication in eukaryotes, D-Loop model of DNA, replication in single stranded DNA, rolling circle replication. DNAsynthesis by reverse transcription

DNA Repair: Mismatch repair, base excision, nucleotide excision, direct repair , SOS-repair.

Prokaryotic transcription:- Mechanism of transcription, principle of gene regulation, The operon concept, lac and trp-operon, processing of t-RNA and r- RNA.

Eukaryotic transcription and regulation:

RNA polymerases: Structure and assembly, Eukaryotic promoters and enhancers,

General and specific transcription factors, transcriptional repressor. Mechanism of transcription regulation, gene silencing(transcriptional and post-tansciptional).

Modification in RNA:- 5' cap formation, transcription termination, 3'end processing and polyadenylation, splicing, editing, synthesis and processing of non-cording RNAs, Prokaryotic and eukaryotic translation.

The translation machinery, mechanism of initiation, elongation and termination Co and post – translation modification of proteins,

Cell signalling: Signalling and signal receptors, second messengers, G-Protein coupled receptors, activation of gene transcription by G-Protein coupled receptors.

Scope of genetic engineering –

Milestones in Genetic Engineering

Molecular tools :- Enzymes (Nucleases, restriction endonucleases) Phosphomonoesterases, alkaline phospatases, polynucleotide kinase, DNA ligase, DNA polymerases, reverse transcriptase, terminal deoxynucleotidyltransferase, poly A polymerase) Hosts (E, Coli, yeast,

animal cells and plant cells) and Vectors (Plasmids, Bacteriophages, cosmids, ophagemids, and artificial chromosomes) Physio-Chemical Properties of nucleic acids, DNA double helical structure, types, structure and modifications, size, sequence and organization in chromatin. The types of RNA, mRNA synthesis, RNA dependent synthesis of DNA, Genetics Code Protein synthesis.

INSTRUMENTATION AND ANALYTICAL TECHNIQUE IN BIOLOGY

Microscopy :- Principles of working of light, Fluorescent and electron microscopes,, Microtomy.

Chromosome analysis:- Karyotyping and karyomorphmetrical analysis, Taxidermy.

Centrifugation:-Principle of sedimentation, methods in preparatory ultracentrifugation (Differential and density gradient centrifugation)

Chromatography- Principle and application of exclusion Chromatography, Ion exchange Chromatography, Affinity Chromatography, Gas liquid Chromatography, HPLC (High pressure liquid chromatography)

Electrophoresis- Principle and application of electrophoretic separations, types of solid support used (Cellulose acetate, starch, agar, agarose and PAGE) and its importance, Isoelectric focussing.

Spectronphotometry: Principle and application of ultraviolet and visible spectrophotometry and sepectrofluorimetry.

X-ray diffraction crystallograpohy, Radioactivity techniques: Nature of radioactivity, application of radioactivity in Biology (Carbondating, liquid scintillation counting, autoradiography)

BLOTTING TECHNIQUES (Southern, Northern, Western)

Computer application:- Introduction to digital computers, low-level and high –level languages, Binary number system, Flowchart and programming technique, Introduction to MS-Office software (ward processing, spread sheds and presentation software), Introduction to internet and its applications.

BIOSTASTISTICS:- Definition and scope of Biostatistics, Measurement of central tendency (Mean, median, mode), Measurement of dispersion, co-efficient of variation , Equationsfor linear and exponential relation , Elementary idea of probability, Normal poison, Binomial distribution, tests of significance (t and Chi-square tests) Simple correlation, sample techniques (Random Sampling etc) Analysis of variance (Simple factor design and their application in Zoology).

IMMUNOLOGY AND CANCER BIOLOGY

Phylogeny of immune system, Innate and acquired immunity, Hematopoiesis and differentiation. Cells of Immune system-B-lymphocytes, T-lymphocytes, Macrophages, Dendritic cells, Natural killer cells, Eosinophil's, Neutrophils and mast cells, Organization and structure of lymphoid organs, MALT, CALT, NALT, BALT ,Nature and biology of antigen and super antigens, structure and function of antibody molecule, Antigen-Antibody interaction (Antibody affinity, Radial and Double immunodiffusion, Radioimmunoassay, ELISA- Indirect, Direct, Sandwich, ELISPOT, Compentitive, Western blotting).

Major histocompatibility complex and MHC restriction, Antigen processing and presentation, Generation of humoral and cell mediated immune response, BCR and TCR, generation of diversity, Complement system (Classical Alternate and lectin pathway) Cytokines-Type and their role in immune regulations.

Activation and regulation of B and T lymphocytes, Cell-mediated cytotoxicity and Antibody dependent cell mediated cytotoxicity, Hypersensitivity, Auto-immunity and Transplantation.

Biology of cancer cell, Genetic basis of cancer: Proto-oncogenes, Viral and cellular oncogenes. Tumor suppressor genes.

Structure, function and mechanism of action of p^{RB} and p^{53} tumor suppressor proteins. Role of carcinogens and DNA repair in cancer.

DEVELOPMENTAL BIOLOGY

History of Developmental Biology (Contributions of Spemann, Hilde Mangold, Holtfreter, Needham, Waddington, Spratt, Briggs and King)

1) Gametogenesis
   a) Spermatogenesis
   b) Oogenesis
   Fertilization
   a) Fertilization morphological aspects
   b) Biochemical aspects of placentation

2) Embryonic adaptations
a) Placentation and implantation in mammals
b) Biochemical aspects of placentation

Organogenesis

3) a) Embryonic induction
b) Movement of cells over long distance (Neural crest and primordial germ cells)
4) Growth: at cellular, intracellular and orgaanismic levels and growth curves.
Regeneration in invertebrates and vertebrates, Role of nervous system in regeneration.
5) Metamorphosis
Biochemical aspects of metamorphosis in (insects and amphibians)
Nucleo-cytoplasmic interactions
Nuclear transplantation in vertebrate embryos
Homeotic genes and homeotic transformation in anuran tadpoles.

Adaptive Physiology: Adaptation: Mechanisms of adaptation, Physiological adaptations in different environments, Ecological factors (Temperature and light), Parasitic adaptation, Basis concept of environmental stress and strain: Stress resistance, stress avoidance and stress tolerance. Adaptation, Acclimation and Accilimitization, Concept of homeostasis, Physiological adaptation to osmotic and ionic stress, [Mechanism of cell volume regulation]

TAXONOMY,BIOSYSTEMATICS AND PALEOZOOLOGY

Definition and basic concepts of Biosystematics and Taxonomy, Importance and Applications of biosystematics in biology, Dimensions of speciation and taxonomic characters. Species concept Theories of biological classification, Hierarchy of categories.
Procedure keys in taxonomy, Taxonomic procedures: Taxonomic collections, preservation, curetting, process of identification, International code of Zoological Nomenclature Formation of scientific names of various taxa.

Taxonomic publications: Strategy, Documentation, Kinds of publication, Major features and Preparation of manuscripts for publication.
Evaluation of biodiversity indices: Shannon-Winner Index, Dominance Index, Similarity and Dissimilarity Index.
Traditional taxonomy and newer trends in systematic
Chemo and serotaxonomy, Cytotaxonomy, Numerical taxonomy, Cladistics, Molecular systematic and DNA bar coding.

PALEONTOLOGY: Fossils and their significance: modes of fossilization, Study of morphology, range and broad classification of major invertebrate fossils, Introduction to micro fossils, Paleobotany, Origin of Jaws: The First sharks, Classa Acanthodii. The Spiny Skinhs, Achaeopteryx, Flightless Birds, Division Palaeognathae, Ice Age Extinction of Large Mammals. Survey of life through different geological era. Formation and types of fossils.

CHORDATES, EVOLUTION

Chordates

Affinities of Balanoglossus, Reproduction and colony formation in Urochordates, Amphioxus and its special status, Cyclostomes and their affinities,. Migration in fishes, Parental care and Luminous organin fishes, Air breathing fishes.

Evolution of Amphibia,Origin of Reptilia, Classification of reptiles.

Origin and Migration of birds, Plumage and colouration, Nesting habit in birds, Origin and early history of mammals, Systematic position of prototherians, Adaptive radiation in Marsupials, Evolution of primates(excluding man), Dentition in mammals.

Evolution

Evolutionary evidences and theories, Variation and selection as underlying mechanisms of evolution,Typesand rates of mutation in population, Mechanism of isolation, Origin of species. Evolutionary trends (micro, macro and mega patterns of evolution) Molecular and genomic evolutionGeneflow, Gene duplication and mosaic evolution. Modes of specification. Biological and cultural evolution of man.

ECOLOGY

ENVIRONMENTAL BIOLOGY

ECOSYSTEM:-Components, Energy sources and Energy flow in ecosystems, Food chains and food webs, Trophic levels, Biological Pyramids, Concepts of ecological niche, Ecological factors (temperature and light) Carbon and Nitrogen cycle.

ii) **RESOURCE BIOLOGY**:- Concept and classification of resources, Non-renewable Resources-Mineral resources, Renewable resources.

iii) **ECOLOGICAL SUCCESSION**:-Microbes in decomposition and recycling process, Aquatic biology, Physiochemical and biological properties of water, primary productivity. Waste utilization, Harmful effect of insecticides and pesticides, Biogas, Biomass, Solar energy, Coal wind mills, Concept of Habital and Niche.

iv) **ENVIRONMENTAL POLLUTION:-**

a) Air, Water, and Soil Pollution
b) Solid Water Pollution
c) Global Warming,
d) Ozone layer depletion

e) Hazardous wastes and Toxic chemicals Noise pollution, Acid rains and green house effect.

SYLLABUS FOR PSYCHOLOGY

Learning : Classical conditioning, Operant conditioning, observational learning, cognitive learning, theories: Tolman, Seligman and Kohler

Memory : Processes of memory Encoding, storage, Retrieval, models of memory, Stages of memory: sensory memory, STM, LTM. Forgetting : Theories, improving memory

Thinking : concepts, making decisions, problem solving, Reasoning, Creative thinking.

Perception: (b) Pattern Recognition, Visual Pattern Recognition, Bottom- Up versus Top- Down processing, Template Matching, Feature Analysis, Prototype Matching, The role of the perceiver in pattern recognition

Attention:(a) Nature of attention, Bottleneck theories of attention, Filter theory, Attenuation theory and late selection theory

(b) Alternative to filter theories – Capacity models, demanding stimuli, and automaticity.

Emotion : Theories of emotion and physiological changes during emotion

Personality: Theories of personality, Psycho-analytic-Freudian, Neo-Freudian, Modern Psychoanalytic theory, Behaviouristic, Humanistic

Intelligence: Artificial intelligence, Theories of intelligence, Spearman, Gardner, Sternberg, Nature Vs. Nurture, Mental retarded-ness, Giftedness

Physiology :Structure and function of neuron, structure and function of Central Nervous system: Brain and spinal cord, structure and function of Autonomic Nervous system, endocrine system, Methods of studying brain functions and cerebral localisations

Concept of cognitive Psychology: Origin and current status of modern cognitive psychology, Cognitive models, and the computer metaphor and human cognition

Neuro-recognition**:** Cognitive Psychology and Neuroscience, the nervous system- the neuron, the brain- anatomy of the brain, neuro-physiological sensing techniques, relationship between the left and right hemispheres.

Perception**:** (a) Perception of sensory signals, Sensation and Perception, Signal Detection Theory, Perceptual span, Iconic and Echoic Storage, Functions of Sensory stores.

Life Span Perspective on Heredity and Environment: Genetics of Life Span Development and Environmental Influences, The working of Individual heredity, Studying Genetic and Environmental influences- Genes, environment and individual differences in traits.

(a) Development of Perceptual Processes: during Infancy, Childhood, Adolescence, and Adulthood.

(b) Development of Intelligence, Creativity and Wisdom.

Development of Learning and Memory: during infancy, childhood, adolescence and adulthood.

Development of Self and Personality: Theories of personality development (Freud andErickson), Development of Personality through infancy, childhood, adolescence and adulthood, and development of the emotional self.

Statistics: Normal Probability Curve, Characteristics and Applications, Logic of Hypothesis Testing, Type I and Type II Errors, Power of Statistical Tests.

(b)'t' test, product moment correlation and simple regression.

(a) One way and Two way ANOVA, Randomized block design

(b) Multiple Comparisons - (Newman – Keuls, Tukey test, scheffe test, Duncan's Multiple Range Test.)

Rank order correlation, Sign test, Median test, Chi-square test.

Mann – Whitney 'U' test, Kruskal – Wallis One way ANOVA, Friedman's Two – way ANOVA.

Perspectives of Social Psychology: Cognitive, multicultural, biological and evolutionary

(a) Attribution: Understanding the causes of other's behaviour.

(b) Impression formations and management: Combining and managing social information, basic aspects of social thought.

Attitude: Attitude Formation & Development; Change of Attitude, and Attitude Measurement.

Interpersonal Attraction: Interpersonal Attraction and Liking; Attachment and Interdependent Relationships

Prejudice and discrimination: (a) Definition and nature of prejudice and discrimination, how they differ, Origin of Prejudice, Prejudice based on gender- its nature & effect; (b) Countering, reducing and coping with prejudice.

Current paradigms on Psychopathology: Biological, Psychoanalytic, humanistic, and existential, learning and cognitive

Stress- clinical reaction to stress, adjustment disorder, acute stress disorder, Dissociative disorder, treating stress related problems

Personality disorder: Eccentric behaviour, Paranoid, and schizoid personality disorder, Histrionics and narcissistic disorder, anti-social behaviour, Treatment of personality disorder anxiety disorder,

Applying Social Psychology to media and criminal justice: Introduction, How does media violence affect us? Does political news coverage affect us? The crime and criminal – The social psychology of crime, the origin of criminal behaviour, the response to the criminal-justice system, - the police investigation, the courtroom and the prison setting.

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SYLLABUS FOR COMPUTER SCIENCE

1. FUNDAMENTALS OF COMPUTER HARDWARE AND MULTIMEDIA

Fundamentals of computers Hardware and accessories – development of hard disk, physical construction, CHS(Cylindrical Head Sector) and LBA(Logical Block Addressing) addressing, Master Boot Record, Primary and Extended partition Tables. Memory and processor. **Multimedia**: multimedia data (Audio, video, image, text) representation, Multimedia compressions. Methods of storing multimedia data.

2. DATA/FILE STRUCTURES & ALGORITHMS

Data, Information, Definition of data structure, Arrays, stacks, queues, linked lists, trees, graphs, priority queues and heaps.

File Structures: Fields, records and files, Sequential, direct, index-sequential and relative files, Hashing, inverted lists and multi-lists, B trees and B^+ trees.

Algorithms: Asymptotic analysis, Searching and Sorting, Amortized Analysis, Advanced Data structure, Dynamic Programming, Greedy Algorithm.

3. COMPUTER ORGANIZATION&OPERATING SYSTEMS

Registers and Shift Registers, Counters, Decoders, Multiplexers, Programmable Logic Devices (PLDs), Programmable Array Logic (PAL), Complex Programmable Logic Devices (CPLDs), Field-Programmable Gate Array (FPGA), Basic Machine Instruction Types, Addressing Mode, Memory System, Internal Organization of Memory Chips, Read-Only Memories, Secondary Storage.

Main functions of operating systems, Multiprogramming, Multiprocessing, and Multitasking.

Memory Management: Virtual Memory, Paging, Fragmentation.

Concurrent Processing: Mutual exclusion, Critical regions, lock and unlock.

Scheduling: CPU scheduling, I/O scheduling, Resource scheduling, Deadlock and scheduling algorithms, Banker's algorithm for deadlock handling.

4. DATABASES & COMPUTER NETWORKS

ER diagrams and their transformation to relational design, normalization – 1NF, 2NF, 3NF, BCNF, 4NF. Limitations of 4NF and BCNF.

SQL: Data Definition Language (DDL), Data Manipulation Language (DML), Data Control Language (DCL) commands, Database objects like – Views, indexes, sequences, synonyms, data dictionary.

Network fundamentals: Local Area Networks (LAN), Metropolitan Area Networks (MAN), Wide Area Networks (WAN), Wireless Networks. Reference Models: The OSI model, TCP/IP model.

Data link control: Channel capacity, Transmission media - twisted pair, coaxial cables, fiber-optic cables, wireless transmission – radio, microwave, infrared and millimeter waves, Light wave transmission, Telephones – local loop, trunks, multiplexing, switching, narrowband ISDN, broadband ISDN, ATM, High speed LANS, Cellular Radio, Communication satellites - geosynchronous and low-orbit, Switch/Hub, Bridge, Error detection and correction, Flow control.

Internetworking: Router, Gateways, Concatenated virtual circuits, Tunneling, Fragmentation, Firewalls. Routing: Virtual circuits and datagrams, Routing, Congestion control and avoidance, TCP Congestion management policy.

Protocols of network applications:, Domain Name System (DNS) - Electronic Mail and World Wide Web (WWW), The DNS, Resource Records, Name servers, E-mail-architecture and Servers, Web server, HTTP, SHTTP

5. CRYPTOGRAPHY: Data Encryption and decryption methods. Private and public key cryptosystem, digital signature (RSA and Hash based signature)

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