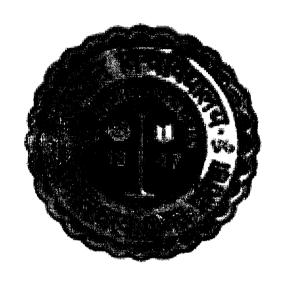
राजस्थान विश्वविद्यालय जयपुर University of Rajasthan



FACULTY OF EDUCATION
SYLLABUS

Integrated Programme of

B.Sc.- B.Ed. Degree (Four Year)

Annual Scheme

Academic Session 2018-19 Examination B.Sc B.Ed Part - I (2019)

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NOTICE

- 1. Change in syllabus/ordinance/rules/regulations/ syllabi and books may from time to time, be made by amendment or remaking and a candidate shall, accept in so far as the university determines otherwise comply with any change that applies to years he/she has not completed at time of change.
- 2. All court cases shall be subject to the jurisdiction of Rajasthan University head quarter Jaipur only and not any other place.

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B.Sc B.Ed PART - I CONTENTS

SCHEME OF EXAMINATION

SYLLABUS

- 1. GENERAL ENGLISH (COMPULSORY PAPER)*
- 2. CHILDHOOD AND GROWING UP (COMPULSORY PAPER)
- 3. CONTEMPORARY INDIA AND EDUCATION (COMPULSORY PAPER)
- 4. INSTRUCTIONAL SYSTEAM AND EDUCATIONAL EVALUATION (GROUP A)
- 5. OPTIONAL PAPER PCM AND PCB GROUP (GROUP B)
 - I. CHEMISTRY
 - II. BOTANY
 - III. ZOOLOGY
 - IV. PHYSICS
 - V. MATHEMATICS

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Ordinance and Regulations related to the Integrated B.Sc.-B.Ed.

Degree

01. The Objective and the Learning outcomes of the Integrated B.Sc.-B.Ed. Degree are-

Objectives:

- To promote capabilities for inculcating national values and goals as mentioned in the constitution of India.
- To act as agents of modernization and social change.
- To promote social cohesion, international understanding and protection of human rights and right of the child.
- To acquire competencies and skills needed for teacher.
- To use competencies and skills needed for becoming an effective teacher.
- To become competent and committed teacher.
- To be sensitive about emerging issues such as environment, population general equality, legal literacy etc.
- To inculcate logical, rational thinking and scientific temper among the students.
- To develop critical awareness about the social issues & realities among the students.
- To use managerial organizational and information & technological skills.

Learning outcomes:

- 1. Competence to teach effectively two school subjects at the Elementary & secondary levels.
- 2. Ability to translate objectives of secondary education in terms of specific Programmes and activities in relation to the curriculum.
- 3. Ability to understand children's needs, motives, growth pattern and the process of learning to stimulate learning and creative thinking to faster growth and development.
- 4. Ability to use-
- 5. Individualized instruction
- 6. Dynamic methods in large classes.
- 7. Ability to examine pupil's progress and effectiveness of their own teaching through the use of proper evaluation techniques.

- 8. Equipment for diagnosing pupil progress and effectiveness of their own teachings through the use of proper evaluation techniques.
- 9. Readiness to spot talented and gifted children and capacity to meet their needs.
 - 10. Ability to organize various school programmes, activities for pupil.
 - 11. Developing guidance point of view in educational, personal and vocational matters.
 - 12. Ability to access the all round development of pupils and to maintain a cumulative record.
 - 13. Developing certain practical skill such as:
 - a. Black board work
 - b. Preparing improvised apparatus
 - c. Preparing teaching aids and ICT.
 - 14. Interest and competence in the development of the teaching profession and education Readiness to participate in activities of professional organizations.

Integrated Programme of B.Sc.-B.Ed. Degree Shall Consist of

- i) First Year B.Sc.-B.Ed.
- ii) Second Year B.Sc.-B.Ed.
- iii) Third Year B.Sc.-B.Ed.
- iv) Final Year B.Sc.-B.Ed.

Duration of the Course - Four Years

Examinination after each session in theory papers

Scheme of Examination against each subject separately.

Compulsory Papers:

Year	Paper
Ist Year	Gen. English
II nd Year	Gen. Hindi
III rd Year	Computer Application (ICT)
IV th Year	Environmental Education

^{*}ELIGIBILITY CRITERION ON PASSING MARKS BUT MARKS SHALL NOT BE INCLUDED IN DIVISION.

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Group - A: - Subject Specialisation:

	Year	Paper
Ĺ	I st Year	Instructional System &
		Educational
	II nd Year	Peace Education
	III rd Year	Guidance and Counselling in
		School
	IV th Year	Physical Education & Yoga

Group-B: Content of Science Subject: - A Student has to opt PCB & PCM Group select any three optional subject (papers) from group B which two must be the school teaching subjects.

Chemistry	I, II & III	
Botany	I, II & III	
Zoology	I, II & III	
Physics	I, II & III	
Mathematics	I, II & III	

Group C: Pedagogy of School Subject 08 A/B: Pedagogy of a School Subject IIIrd Year and IVth Year (candidate shall be required to offer any two papers from the following, for part-III & part-IV).

Pedagogy of Chemistry Pedagogy of Biology
Pedagogy of Physics
Pedagogy of Mathematics
Pedagogy of General Science

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- ❖ In all the subjects the student has to study a minimum of 12 papers in 1st year. 12 Paper in IInd Year. 12Paper in IIIrd Year and 7 Paper in IVth Year (Total 43Papers).
- ❖ Each theory paper will carry 100 marks and content base paper 05, 06, 07 (G-B) will carry 150 marks. (With practical part). Distribution of marks in mathematics is according to their marking scheme in page no.7.

Scheme of Instruction for B.Sc. - B.Ed Courses

Details of course and scheme of study, titles of the papers, duration etc. for B.Sc.B.Ed Course are provided in Tables given below:-

Four Years Integrated Course Scheme of B.Sc.-B.Ed. Ist Year

Theory	Course	Title of the Paper	I	Evaluation		
Paper	Code		External	Internal	Practical	Total
1	B.Sc B.Ed. 01	Gen. English(Compulsory)*	100	-	-	100
II	B.ScB.Ed. 02	Childhood and Growing Up	80	20	-	100
III	B.ScB.Ed.	Contemporary India and Education	80	20	-	100
VIII	B.ScB.Ed. 04 (G-A)	Instructional System & Educational Evaluation	80	20	-	100
V VI & VII	B.ScB.Ed 05, 06 & 07 (G-B)	Content (PCB & PCM Group) (Select any Three) 1. Chemistry(I,II,III) 2. Botany (I,II,III) 3. Zoology(I,II,III) 4. Physics (I,II,III) 5. Mathematics(I,II,III)	33+33+34 33+33+34 33+33+34 40+40+40		50 50 50 50 30	150 150 150
					30	7 50

^{*}ELIGIBILITY CRITERION ON PASSING MARKS BUT MARKS SHALL NOT BE INCLUDED IN DIVISION.

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Four Years Integrated Course Scheme of B.Sc.-B.Ed. IInd Year

Theory	Course	Title of the Paper	E	valuation		
Paper	Code		External	Internal	Practical	Tota
I	B.ScB.Ed.	Gen. Hindi (Compulsory)*	100	-	<u> </u>	100
	01					100
IJ	B.ScB.Ed.	Knowledge and curriculum	80	20	<u> </u>	100
	02					100
III	B.ScB.Ed.	Learning and Teaching	80	20	_	100
	03				j	100
IV	B.ScB.Ed	Peace Education	80	20		100
	04				-	100
	(G-A)					
V	B.ScB.Ed	Content				
ΙV	05,	(PCB & PCM Group)				
&	06	(Select any Three)				
	&	1. Chemistry(I,II,III)	33+33+34		50	150
VII	07	2. Botany (I,II,III)	33+33+34		50	
1	(G-B)	3. Zoology(I,II,III)	33+33+34		50	150
		4. Physics (I,II,III)	33+33+34		1	150
		5. Mathematics(I,II,III)	40+40+40		50	150
			40+40+40		30	150
VIII	B.Sc B.Ed	OPEN AIR / SUPW CAMP				
ĺ		1. Community Service		25	i	100
		2. Survey (Based on		25		100
		social and educational				
		events)				
		3. Co-Curricular		25		
		Activities				
		4. Health and Social		25		
į		awareness programme				
		(DISASTER				
		MANAGEMENT AND CLEANINESS)				
						
					ĺ	85T

^{*}ELIGIBILITY CRITERION ON PASSING MARKS BUT MARKS SHALL NOT BE INCLUDED IN DIVISION.

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Four Years Integrated Course Scheme of B.Sc.-B.Ed. IIIrd Year

Theory	Course	Title of the Paper	F	Cvaluation		·
Paper	Code		External	Internal	Practical	Tota
Ī	B.Sc B.Ed.		60		40	
:	01	Communication				100
		Technology(ICT)			(30+10)	
<u> </u>		(Compulsory)*				
II	B.ScB.Ed.	Language Across the Curriculum	80	20	-	100
	02				_	100
IV	B.ScB.Ed-	Guidance and Counseling	80	20		
	04		80	20	-	100
	(G-A)	in School				
V	B.ScB.Ed	Content				
VI	05,	(PCB & PCM Group)				
&	06	(Select any Three)				
	&	1. Chemistry(I,II,III)	33+33+34			
VII	07	2. Botany (I,II,III)	33+33+34		50	150
	(G-B)	3. Zoology(I,II,III)	33+33+34		50	150
		4. Physics (I,II,III)	33+33+34		50	150
VIII	08(a,b)	5. Mathematics(I,II,III)	40+40+40		50 30	150
}	00(4,0)	Pedagogy of a School Subject	80	20	30	150
		(part-1), lst & IInd	(<i>(</i>	טטנ
Ì		Year(candidate shall be required			•	
		to offer any two papers from the			; ;	
		following for part-1 & other for			į	
		part-2).				
		1. Chemistry				
	ļ	2. Biology				
		3. Physics				
		4. Mathematics				
		5. General Science				
acticum		- moral science				
		Special Training Programme				
		 Micro Teaching 				
		Practice Lesson			10	100
						100
					50	



				950
	Final Lesson	100		100
	/Seminar/ Workshop			
	Attendance			
	Criticism Lesson		10	
>	Lesson		20	:
	Technology Based	1	05	
	Observation Lesson		05	

^{*}ELIGIBILITY CRITERION ON PASSING MARKS BUT MARKS SHALL NOT BE INCLUDED IN DIVISION.

Four Years Integrated Course Scheme of B.Sc.-B.Ed. IVth Year

Theory	Course	Title of the Paper	Evaluation			
Paper	Code		External	Internal	Practical	Total
I	B.ScB.Ed.	Environmental	100			
	01	Education(Compulsory)*			_	100
II	B.Sc - B.Ed.	Creating and inclusive school	80	20		
	02		80	20	- !	100
Ш	B.Sc B.Ed.	Understanding Disciplines and Subject	80			
	03	prints and Subject	80	20	•	100
IV	B.ScB.Ed.	Physical Education & Yoga	80	20		
	04(G-A)	Togu	80	20	-	100
V	B.Sc -B.Ed.	Gender, School and Society	80	20		
	05		80	20	-	100
VI	B.Sc -B.Ed.	Assessment for Learning	90			
	06		80	20	-	100



V 111	R'2c-R'Fq'	Pedagogy of a School Subject (part-2)	80	20	-	100
	08(a,b)	, Ist & IInd Year(candidate shall be				
- 		required to offer any two papers from				
		the following for part-1 & other for				
		part-2).				
		1. Chemistry				
·		2. Biology				•
		3. Physics				•
-		4. Mathematics				
		5. General Science				
Practicum		1. Practice teaching		50		
		2. Block Teaching (Participation in		20		
		School Activities Social Participation in				1
		Group)		10		
		3. Report of any feature of school /				
		case study/action research		20		100
		4. Criticism Lesson				!
		Final Lesson	100			
			100			100
						800

^{*}ELIGIBILITY CRITERION ON PASSING MARKS BUT MARKS SHALL NOT BE INCLUDED IN DIVISION.

Four Years Integrated Course Scheme of B.Sc.-B.Ed.

Compulsory Papers*

Year	Paper
Ist Year	Gen. English
II Year	Gen. Hindi
III Year	Computer Application (ICT)
IV Year	Environmental Education

Compulsory Paper

Year	Paper
Ist Year	1. Childhood and Growing Up
	2. Contemporary India and

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		Education
II nd Year	3.	Knowledge and curriculum
	4.	Learning and Teaching
III rd Year	5.	Language Across the Curriculum
IV th Year	6.	Creating and inclusive school
	7.	Understanding Disciplines and
!		Subject
	8.	Gender, School and Society
	9.	Assessment for Learning

Group - A: - Subject Specialisation:

Year	Paper
Ist Year	Instructional System &
	Educational
II nd Year	Peace Education
III rd Year	Guidance and Counselling in School
IV th Year	Physical Education & Yoga

Group B: (PCB and PCM Group) (Select any three)

- 1. Chemistry (I, II, III)
- 2. Botany (I, II, III)
- 3. Zoology (I, II, III)
- 4. Mathematics (I, II, III)
- 5. Physics (I, II, III)

Group C: Pedagogy of School Subject 08 A/B: Pedagogy of a School Subject IIIrd Year and IVth Year (candidate shall be required to offer any two papers from the following, for part-III & part-IV).

Pedagogy of Chemistry
Pedagogy of Biology
Pedagogy of Physics
Pedagogy of Mathematics
Pedagogy of General Science

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- ❖ In all the subjects the student has to study a minimum of 12 papers in 1st year, 12 Paper in IInd Year. 12Paper in IIIrd Year and 7 Paper in IVth Year (Total 43Papers).
- ♣ Each theory paper will carry 100 marks and content base paper 05, 06, 07 (G-B) will carry 150 marks. (With practical part). Distribution of marks in mathematics is according to their marking scheme in page no.7.

Scheme of Instruction for B.Sc. - B.Ed Courses

Details of courses and scheme of study, titles of the papers, duration etc. for B.Sc.B.Ed Courses are provided in Tables given below:-

Years	Papers	Marks
l Year	12Paper +Practical	600 +150= 750
II Year	12Paper +Practical +Practicum	600 +150+100= 850
III Year	12Paper +Practical + Practicum +Final Lesson	600 +150+ 100 +100 = 950
IV Year	7 Paper +Practical + Practicum +Final Lesson	600+ 100 +100= 800
Total	43Papers	2400 +550+200 +200= 3350

O. 321 The objectives of the practical work prescribed for the Integrated Programme of B.Sc.-B.Ed. Degree (Four Year) are follows:

PART II

Practical Work

Objectives:

To develop the ability and self-confidence of pupil teachers:

- 1. To be conscious of sense of values and need for their inculcation in children through all available means including one's own personal life.
- 2. Possess a high sense of professional responsibility.
- 3. Develop resourcefulness, so as to make the best use of the situation available.
- 4. Appreciate and respect each child's individuality and treat him as independent and integrated personality.
- 5. Arouse the curiosity and interest of the pupils and secure their active participation in the educative process.



- 6. Develop in the pupil's capacity for thinking and working independently and guide the pupils to that end.
- 7. Organize and manage the class for teaching learning.
- 8. Appreciate the dynamic nature of the class situation and teaching techniques.
- 9. Define objectives of particular lessons and plan for their achievements.
- 10. Organize the prescribed subject- matter in relation to the needs, interest and abilities of the pupils.
- 11. Use the appropriate teaching methods and techniques.
- 12. Prepare and use appropriate teaching aids, use of the black board and other apparatus and material properly.
- 13. Convey ideas in clear and concise language and in a logical manner for effective learning.
- 14. Undertake action research.
- 15. Give proper opportunity to gifted pupils and take proper care of the back-ward pupils.
- 16. Co-relate knowledge of the subject being taught with other subjects and with real life situations as and when possible.
- 17. Prepare and use assignments.
- 18. Evaluate pupil's progress.
- 19. Plan and organize co curricular activities and participate in them.
- 20. Co-operates with school teachers and administrators and learns to maintain school records and registers.

Practical skill to teach the two school subjects offered under Theory papers VIII A/B and the following:

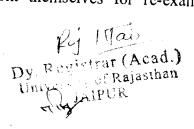
- 1. Observation of lesson delivered by experienced teachers and staff of the college.
- 2. Planning units and lessons.
- 3. Discussion of lesson plans, unit plans and lessons given (including criticism lesson)
- 4. Organization and participation in co-curricular activities.
- 5. Setting follows up assignment.
- 6. Evaluation in terms of educational objectives use of teachers made tests & administration of standardized tests.
- 7. Black-board work.

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- 8. Practical work connected with school subjects.
- 9. Preparation and use of audio visual aids related to methods of teaching.
- 10. Experimental and laboratory work in chemistry, botany, zoology, physics, and mathematics subjects of experimental and practical nature.
- 11. Study of the organization of work and activities in the school.
- 12. Observation and assistance in the health education programme.
- 13. Observation and assistance in the guidance programme.
- 14. Maintenance of cumulative records.
- 15. Techniques of teaching in large classes.
- O. 322 A candidate has to deliver at least 40 lessons (20 Lessons of one teaching subject in 3rd year & 20 Lessons of other teaching subject in 4th year) in a recognized school under the supervision of the staff of the college shall be eligible for admission to the examination for the degree of B.Sc.-B.Ed.

Notes :-

- i. Teaching subject means a subject offered by the candidate at his/her running B.Sc-B.Ed. course either as a compulsory subject or as an optional subject provided that the candidate studied it for at least two years. Thus the qualifying subjects like General English, General Hindi, Education and Environment Education. Prescribed for running B.Sc-B.Ed. course of the University or a subject dropped by candidates at the part I stage of the degree course shall not be treated as teaching subjects.
- ii. Only such candidate shall be allowed to offer General Science for the B.Sc B.Ed Examination who had studied Chemistry and any one subject of life science i.e. Biology, Botany or Zoology.
- O.323 No candidate shall be allowed to appear in the Integrated B.Sc/B.Ed examination I,II,III & IV Year unless he/she has attended (80% for all course work & practicum. and 90% for school internship)
- O.324 The examination for Integrated B.Sc.-B.Ed. for Four Year shall be in two parts- part 1st comprising theory papers & part 2 practice of teaching in accordance with the scheme of examination laid down from time to time.
- O.325 Candidates who fail in Integrated B.Sc-B.Ed examination in part 1 or part 2 the theory of education may present themselves for re-examination there in at a



subsequent examination without attending a further course at an affiliated training college.

Provided that a candidate who fails in any one of the theory papers and secures at least 48% marks in the aggregate of the remaining theory papers may be allowed to reappear in the examination in the immediately following year in the paper in which he/she fails only. He/she shall be declared to have passed if he secures minimum passing marks prescribed for the paper in which he appeared and shall be deemed to have secured minimum passing marks only prescribed for the paper (irrespective of the marks actually obtained by him) for the purpose of determining his division in accordance with the scheme of examination. The candidate shall have to repeat the whole examination in subsequent year in case he fails to clear the paper in which he failed.

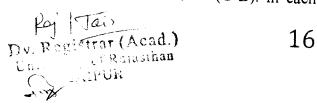
- Candidates who fail in the Integrated B.Sc-B.Ed. examination part 1 and part 2 only O.326 in the practice of teaching may appear in the practical examination in the subsequent year provided that they keep regular terms for four calendar months per year and give at-least 40 lessons(20 in part 1& 20 in part 2) supervised lessons.
- O.326 A: A candidate who complete a regular course of study in accordance with the provision laid down in the ordinance, at an affiliated teacher's training college for four academic year but for good reasons fails to appear at the Integrated B.Sc-B.Ed. examination may be admitted to a subsequent examination as an Ex-student as defined in O.325 or O.326 Above.
- O.326 B: No candidate shall be permitted to appear as an Ex-student at more than one subsequent examination. The Integrated B.Sc-B.Ed programme shall be of duration of four academic years, which can be completed in a maximum of five years from the date of admission to the Integrated B.Sc.-B.Ed. Degree.

Regulation 42:-

Scheme of Integrated B.Sc-B.Ed Four Year Examination

The Integrated B.Sc-B.Ed. (Four years) will consist of the following components:

Part I- Main theory papers at B.Sc-B.Ed. I, In Integrated B.Sc.-B.Ed I Paper nos. are 02, 03 & 04 in each session are of three hours carrying 100 marks (80 for theory + 20 for sessional) each. Compulsory paper* 01 of 100 marks and optional Paper 05, 06, 07 (G-B). in each

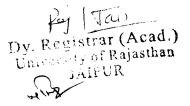


session are three hours carrying 150 marks (100 marks theory + 50 marks practical). Distribution of marks in mathematics is according to their marking scheme in page no.7.

Part II- Practice Teaching - Micro Teaching, Internship, Practice Teaching of 20 weeks (10 at B.Sc.-B.Ed Year III & 10 at B.Sc.-B.Ed Year IV) Block Teaching, Criticism and Final Lesson in III & IV Year per teaching subject.

Organization evaluation of practice teaching:

- 1. Every candidate will teach at-least 40 lessons (20 in III Year & 20 in IV Year) during practice teaching session. At least ten lessons in each subject should be supervised.
- 40 (20+20) lessons as desired in the syllabus should be completed as full period class room lesson. Micro teaching lesson to be used in addition to those 40 lessons for developing certain teaching skills.
- 3. A minimum of ten lessons in each subject will be supervised evaluated by the subject specialist or a team of specialists of the subjects.
- 4. By and large, the evaluation of the performance in the practical teaching will be based on the last ten lessons in the subject when the student has acquired some competence and skills of teaching.
- 5. The internal assessment in practice of teaching will be finalized by the principal with the help of members of the teaching staff and the same will be communicated to the university before the commencement of the practical each year.
- 6. At Integrated B.Sc-B.Ed III Year each candidate should be prepared to teach one lessons at the final practical examination. At the Integrated B.Sc-B.Ed IV Year exam candidate should be prepared to teach two lessons (one in each subject). The external examiners may select at-least 10% of the candidates to deliver two lessons in Integrated B.Sc-B.Ed IV Year.



- 7. There will be a board of Examiners for the external examination for each college which will examine each candidate in at-least one lesson and a minimum of 15% in two lessons (one in each of the two subjects).
- 8. The board of Examination will consist of:
 - (a) The principal of the college concerned.
 - (b) A principal or a senior and experienced member of the teaching staff of another training college, affiliated to University of Rajasthan.
 - (c) An external examiner from outside the University of Rajasthan or a senior member of the teaching staff of an affiliated training college.
 - (d) The board as far as possible will represent Social science, language and science.
- 9. Approximately 50 lessons will be examined by the board each day.

Working out the result and awarding the division:

- (1) A candidate in order to be declared successful at the Integrated B.Sc-B.Ed. I, II, III & IV Year Examination shall be required to pass separately in Part I (Theory) and Part II (Practice of Teaching).
- (2) For a passing in Part I (Theory) a candidate shall be required to obtain at-least (a) 30 percent marks in each theory paper and sessionals (24 marks out of 80 and 6 marks out of 20); (b) 30% marks in each theory paper and sessional (11 marks out of 35 & 4 marks out of 15) (c) 36 percent marks in the aggregate of all the theory papers.
- (3) For passing in Part II (school internship Practice of Teaching) a candidate shall be required to obtain separately at-least-
 - ❖ 40 percent marks in the external examination.
 - ❖ 40 percent marks in internal assessment.

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(4) The successful candidates at Integrated B.Sc.-B.Ed Four Year Examination obtaining total marks will be classified in three divisions and shall be assigned separately in theory and school internship Practice of teaching as follows:

Division	Theory	Practice of Teaching
I	60%	60%
II	48%	48%
Pass	36%	40%

The practical work record shall be properly maintained by the college and may be made available for work satisfaction of external examiner in school internship (practice teaching), those are expected to submit a report regarding this separately.

Dy Registrar (Acad.)
University of Rajasthan
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Duration: 3 hrs.

Max. Marks: 100

Minimum Pass Marks: 36

The syllabus aims at achieving the following objectives:

- introducing students to phonetics and enabling them to consult dictionaries for correct pronunciation (sounds and word stress)
- 2 Reinforcing selected components of grammar and usage
- 3. Strengthening comprehension of poetry, prose and short-stories
- 4. Strengthening compositional skills in English for paragraph writing. CVs and job applications.

The Pattern of the Question Paper will be as follows:

Unit A: Phonetics and Translation (20 ma	rks)
Phonetic Symbols and Transcription of Words	
III Translation of 5 Simple sentences from Hindi to	(05) English (05)
from English t	
IV Translation of 05 Words from Hindi to English	
from English to Hindi	(2)2,

Unit B: Grammar and Usage (10 periods)		(25 marks)
Li Fransformation of Sentences Direct and Indirect Narration	(05) (05)	Poj Trus Asthau

(00)

III Tense

(05)

IV Punctuation of a Short Passage with 10 Punctuation Marks 1051

(As discussed in Quirk and Greenbaum)

Unit C: Comprehension

(25 marks)

Following Essays and Stories in Essential Language Skills revised edition compiled by Macmillan for University of Rajasthan General English B. V. B. Com. B. Sc.

Candidates will be required to answer 5 questions out of ten questions from the prescribed texts. Each question will be of two (2) marks.

(10)

Sulata Bhatt Voice of the Unwanted Girl Ruskin Bond Night Train for Deoli M.K. Gandhi The Birth of Khadi J.L. Nehru A Tryst with Destiny A.P.J. Abdul Kalam Vision for 2020

The candidates will be required to answer 5 questions from an unseen passage.

(10)

One vocabulary question of 10 words from the given passage.

(5)

Unit D: Compositional Skills

(30 marks)

(15 periods)

I Letters-Formal and Informal (10) II CV's Resume and Job Applications and Report (10)III Paragraph Writing

v. caking-r roundation Books, 2005.

Nawhney, Panja and Verma eds. English At the Workplace. Macmillan 2003.

Singh, R.P. Professional Communication, OUP, 2004

Ludith Leigh, CVs and Job Applications, OUP, 2004

Arthur Waldhorn and Arthur Zeiger, English Made Simple, Upa and Co.

Gunashekar ed. A Foundation English Course for Undergraduates. Book I. CIEFL. Hyderabad.

Quirk and Greenbaum: A University Grammar of English Longman, 1973

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B.Sc-B.Ed - 02

Childhood and Growing up

Marks-100

Objectives:

After completing the course the students will be able-

- 1. To develop an understanding of the basic concepts, methods and principles of psychology.
- 2. To develop an understanding of the nature and process of development.
- 3. To understand the different periods of life with Psycho-Social Perspective.
- 4. To develop an understanding of the nature and process of learning in the context of various learning theories and factors.
- 5. To understand the critical role of learning Environment.
- 6. To acquaint them with various Psychological attribute of an individual.
- 7. To reflect on the changing roles of children in contemporary society.

Unit I: Role of psychology to understand the child

- Psychology: Meaning, nature & branches of psychology,
- Methods of psychology: case study and experimental, Edu. Psychology;

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- Meaning, nature, scope, educational implication of psychology in new Era,
- Child psychology; meaning, concept

init II: Multi dimensional development

- Growth and development- concept, stages principles, dimensions, Factors in influencing development- genetic, biological, environmental and physical
- Theories of development:
 - a) Piaget's vgotsky cognitive development
 - b) Freud's psycho- sexual development
 - c) Erikson's psycho social development
 - d) Linguistic development
 - e) Kohlberys' gilligan's moral development
 - f) Bandura's social developments
 - g) Gessel's maturation theory

Unit 3: Child Growing up

- Childhood: Meaning, concept and characteristics, effects of family, schools, neighbourhood and community on development of a child
- Adolescence: meaning, concept, characteristics, effects of family, school, pear group, social climate and social media.
- Personality: concept and nature, theories of personality, assessment of personality
- Individual differences: concept, areas (With Special Educational needs-Concept) and educational implication.
- Stress: meaning, types and coping strategies with special reference to personality of adolescent.

Unit 4: Learning to Learn

- Concept and beliefs about learning:-Defining misconception, Brain's role in learning
- Memory and forget, Behaviouristic learning theories (Thorndike, Skinner, Pavlov), Gestalt, Cognitive and Field theory, Information processing theory, Social Constructive approach, Types of learning by Gagne.
- Motivation:-Concept and Maslow's Hierarchy need theory, Creating and maintaining a productive Classroom Environment:-Dealing with misbehavior Multi-Enforcement.

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Changing roles and responsibilities in contemporary Indian society with regarding educational psychology.

Unit 5: Psychological Attributes of an individual

- Intelligence Meaning, Types of intelligence Social, Emotional and Spiritual
 Intelligence, theory of intelligence, Gardner's Multi intelligence theory, Measurement
 of intelligence, Creativity Meaning, Components, ways of enhancing creativity,
 relation with intelligence and other factors, Measurement of creativity, Higher Level
 thinking skills critical thinking, reasoning, problem solving, Decision making.
- Socialization and Mental health: Process of Socialization Group dynamics Theory
 of Kurt lewin's, Leadership and its styles (Kimble young), social prejudice, Mental
 Health Common problems related to child Attention deficit hyperactivity disorder
 (ADHD), depression, Learning disabilities, dealing with a problematic child.

Test and Assignment:-

Class Test

10 Marks

Project (Any one of the following) 10 Marks

Comparative study of developing pattern's of children with reference to different in SES.

Collecting and analyzing statistics on the girl child with reference to gender ratio.

Administration of an experiment on learning, span of attention, memory Administration and interpretation of an individual group test of intelligence.

References:

- 1. Agarwal, Reetu, Shukla Geeta (2014). Bal Vikas evam Manovigyan, Rakhi Prakashan, Agra
- 2. Aggarwal, J.C., (1981). Essential of Educational Psychology, Delhi, Doaba Book
- 3. Arora, Dr. Saroj, Bhargava, Rajshri (2014). Bal Manovigyan, Rakhi Prakashan, Agra
- 4. Bigge, M.L. (1982). Learning Theories for Teachers. New York: Harper and Row
- 5. B.P. (2000). Personality theories, Bosten: Allyn and Bacon House.
- 6. Chauhan, S.S. (2001). Adanaced educational psychology, New Delhi: Vikas Publishing House.

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- Diane E. Papalia, Sally Wendkos olds, Ruth Durkin Feldman, Ninth Edition, Human Development, Tata Mcgraw Hill Publishing company Limited, New Delhi.
- 8. Helen Bee Denise Boyd, First Indian Reprint 2004. The Developing Child, Published by Pearson Education Pre. Ltd. Indian Branch Delhi, India
- 9. Jack Snooman, Robert Biehler Ninth Edition. Psychology Applied to Teaching, Houghton Miflin Company, Bosten New York (http://www.coursewise.com)
- 10. Ormrod Ellis Jenne, Third Edition, Educational Psychology Developing Learners Multimedia Edition (http://www.prenhall.com/ormrod)
- 11. Sarswat Kuldeep (2015). Bal Vikas evam Bachpan, Published by Rakhi Prakashan, Agra
- 12. Woolfolk, A. (2004). Educational Psychology published by Dorling Kindersley (India) Pvt. Ltd., Licensees of Pearson Education in South Asia.

B.Sc-B.Ed - 03

Contemporary India and Education

MARKS-100

Objectives:-

After completing the course the students will be able to:

- 1. To promote reflective thinking among students about issues of education related to contemporary India.
- 2. To develop an understanding of the trends, issues and challenges faced by contemporary education in India.
- 3. To appreciate the developments in Indian education in the post independence era.
- 4. To understand the Commissions and committees on education constituted from time to time.
- 5. To understand issues and challenges of education and concern for the underprivileged section of the society.
- 6. To develop awareness about various innovation practices in education.
- 7. To develop and understanding of self teaching technical devices.

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8. To understand the constitutional values and provisions for education.

Course Content

Unit I Education as an Evolving Concept

- Education: Meaning, concept and nature, Ancient to present education as an organized and institutionalized form, formal and state sponsored activities.
- Aims of Education: Historicity of aims of Education, changing aims of education in the context of globalization, sources of aims of Education: Educational aims as derived from the constitution of India influence of aims of education on the curriculum and transactional strategies. Idea of educational thinkers such as Gandhi, Tagore, Aurobindo, Dewey Krishnamurthy, Friere and Illich.

Unit - II: Issues and Challenges

- Diversity, Inequality, Marginalization:- Meaning, Concept, Levels with special reference to Individual, Region, Language, Caste, Gender.
- Role of education in multicultural and multilingual society for Equalization and Improvement of Marginalization groups.
- Hindrances of Education in India: Quality, Facilities, Access, Cost, Political unwillingness, Youth unsatisfaction, Moral Crisis.

Unit - III: Constitution and Education

- Study of the Preamble, fundamental rights and duties of citizens, Directive Principles for state and constitutional values of Indian Constitution.
- Constitutional provisions for education and role of education in fulfillment of the constitutional promise of Freedom, Equality Justice, Fraternity.
- Education and politics, Constitutional vision related to aims of education, Peace Education, Role of Education, School and Teachers as agents for Imparting Culture, Education and Development. Education and Industrialization.

Unit - IV: Programme and Policies

• Overview the development of education system in India from 1948 to 2010 University Education Commission-1946-48, Secondary Education Commission-1952-53, Indian Education Commission-1964-66, National Education Policy-1986 for Tax

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- Rammurthy Committee (1990), Yashpal Committee Report (1993) Revised National Education Policy (1992) NCF-2005, NKC-2006, NCFTE-2009, RTE-2010.
- SSA, MLL, RMSA, CCE, Navodaya Vidyalaya, Kasturba Gandhi Balika Vidyalaya, Model School.

Unit – V: Innovative Practices

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- Concept, Need of innovation in view of technological and social change, Obstacles in innovation, Role of Education in bringing innovations,
- Education through interactive mode of teaching: Computer, Internet, Tally and Video-Conferencing, Eduset, Smart Class Room, Role of E-learning, E-content, E-magazines and E-journals, E-library.
- Yoga Education, Life Skill Education, Education and Competence in life regarding Social inclusion.

Test and Assignments:-

1. Class Test

10 marks

2 Any one of the following: -

10 marks

- Debate or Organize a one day discussion on the topic related to the subject and submit a report.
- Critical appraisal on the report or recommendations of any commission and committee.
- Organize collage, Poster Making activity in your respective institution.
- Collection of at least three handouts of related topics of the subject.

REFERENCES:-

- 1. Agnihotri, R. (1994) Adhunik Bhartiya Shiksha Samasyaye Aur Samadhan, Jaipur: Rajasthan Hindi Granth Academy
- Agrawal, J.C: Land Marks in the History of Modern Indian Education, New Delhi 2.
 Brubecher, John.S: A History of the Problems of Education
- 3. Altekar, A. S.(1992) Education in Ancient India, Varanasi: Manohar Prakashan
- 4. Dev, A., Dev, T.A., Das, S. (1996) Hilman Rights a Source Book New Delhi. MCERT, Pp. 233.
- 5. Dubey, S.C. (1994) Indian Society, New Delhi, NBT, Pp.

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- 6. Education and National Development: Report of the Kothari Commission on Education, New Delhi, 1966.
- 7. अग्निहोत्री, रवीन्द्र : आधुनिक भारतीय शिक्षा समस्याएँ और समाधान, राजस्थान हिन्दी ग्रंथ अकादमी।
- 8. Gore. M. S. (1982) Education and Modernization in India, Jaipur: Rawat Publications
- 9. Ghosh, S.C. (1995) The History of Education in Modern India (1757-1986), New Delhi: Orient Longman Ltd.
- 10. J.F. Brown: Educational Sociology
- 11. Kabir, H. (1982) Education in New India, London: George Allen an Unwin.
- 12. Kashyap Subhash C., Our constitution: An Introduction to India's constitution and constitutional laws, National Book Trust India, 2011.
- 13. Keay, F.E: Indian Education in Ancient and later Times
- 14. M.N. Srinivas: Social Change in Modern India
- 15. Mookerji, R. K. (1947) Ancient Indian Education (Brahmanical and Buddhist), London: Mac Milan and Co. Ltd.
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- 17. Naik, J. P., Nurullah, S.(1974) A Student's History of Education in India, (1800-1973), New Delhi: Orient Longman Ltd.
- 18. Nayar, P. R. Dave, P.N. Arora, K. (1983) The Teacher and Education in Emerging Indian Society, New Delhi: Orient Longman Ltd
- 19. National Curriculum Framework. (2005).
- 20. National curriculum Framework for teacher education (2004).
- 21. Rama Jois, M. (1998) Human Rights and Indian Values, New Delhi: N.C.T.E.
- 22. Rusk, R. R. (Scotland, J. Revised) (1979) Doctrines of the Great Educators, Delhi, Dublin, New York: The Mac Milan Press Ltd.,
- 23. Saiyidain. K.G. (1966) The Humanist Tradition in Indian Education Thought, New Delhi: Aria Publishing House
- 24. Shukla, R.P. (2005). Value Education and Human Rights, New Delhi: Samp & Sons.
- 25. Varghese, A. (2000) Education for the Third Millennium, Indore: Satprachar Press
- 26. अल्तेकर, अ.स. : प्राचीन भारतीय शिक्षा पद्वति।
- 27. ओड, एल. के. : शिक्षा के नूतन आयाम, राजस्थान हिन्दी ग्रंथ अकादमी, जयपुर।



- 28. गुप्ता, एस. पी एवं अलका गुप्ता : भारत में शिक्षा प्रणाली का विकास, शारदा पुस्तक प्रकाशन, इलाहाबाद।
- 29. रावत, प्यारे लाल : भारतीय शिक्षा का इतिहास, आगरा।
- 30. जोशी, सुषमा : भारत में शिक्षा प्रणाली का विकास एवं समस्याएं, शारदा पुस्तक भवन, इलाहाबाद।
- 31. लाल रमन बिहारी : मारतीय शिक्षा और उसकी समस्याएं, रस्तोगी पब्लिकेशन्स, मेरठ।
- 32. साथिन संदर्भ सामग्री पुस्तिका : महिला एवं बाल विकास विमाग, राज, सरकार, जयपुर।

B.Sc.- B.Ed. 04

Instructional System and Educational Evaluation

MARKS-100

Objectives:

This course will enable the student teacher to:

- Explain the need, importance and characteristics of educational evaluation.
- Describe the approaches to educational evaluation.
- Discuss the role of educational evaluation in Teaching Learning Process.
- Explain the nature of tools and techniques of educational evaluation.
- Describe the need and importance of psychological testing,
- Explain the nature of learners' evaluation and need for continuous comprehensive educational evaluation in schools.

Unit I: Instructional System

- Educational Objectives and instructional objectives.
- Relationship between educational objectives and instructional objectives
- Classification of educational objectives (Cognitive, affective and psychomotor)
- Functioning of educational objectives
- Usefulness of the taxonomical classification.

Unit II: Need, importance and characteristics

- Teaching Learning process and role of evaluation
- Need and importance of Evaluation
- Definition of Evaluation

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- Evaluation, Assessment and Measurement.
- Characteristics of good evaluation.

Unit III: Approaches to Evaluation

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- Formative evaluation and summative evaluation
- Difference between summative and formative evaluation
- External evaluation and internal evaluation, advantages and disadvantages.
- Norm referenced evaluation
- Criterion referenced evaluation.

Unit IV: Role of Evaluation in Teaching-Learning Process.

- The relationship between instructional objectives, entering behavior, learning experiences and Performance assessment.
- Diagnosis to over come deficiency in learning.
- Importance of results of evaluation to students, teachers, institutions with special reference to help in determining the effectiveness of a course, programme and functioning of a school.

Unit V: Nature of tools and techniques of evaluation

- Nature of test and Purposes of testing with reference to:
- Instructional purpose b) Guidance purpose c) Administrative purpose
- Administration of Test and Interpreting test result.
- Meaning of Norms, types of Norms, age, Grade, Percentile and standard score. 4. Norms and interpretation of test scores.
- Concept of grade system. Absolute grading, comparative grading and its advantages and disadvantages.

Test and Assignments:

1. Class Test

10 marks

2 Any one of the following: -

10 marks

- Develop a portfolio for assessment of 2 school students
- Prepare an advanced tool for evaluation.
- Develop a tool for self-assessment.
- Develop an achievement test and its blue print.

References:

1. Anastasi, Anne, (1976), Psychological Testing, 4m ed., New York; Macmiflan Publishing Co. Inc.

2. Bertrand, Arthur and Cebula, Joseph P., (1980): Tests, Measurement and Evaluation, A Developmental Approach, Addision-Wesley, U.S.A.

3. Bloom, Benjamin S., Et.al., (1971): Handbook on formative and Summatice Evaluation in Student Learning, McGraw Hill, USA.

4. Ebel, Robert, L. (1996): Measuring Educational Achievement, Prentice-Hall of India, New Delhi. 27

 Ferguson, G A (1974), "Statistical Analysis in Psychology and Education", McGraw Hill Book Co., New York,

6. Freeman, Frank S., (1962), Theory and Practice of Psychological Testing, New Delhi, Oxford and IBH Publishing Co.

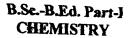
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 Noll, V.C (1957). Introduction to Educational Measurement, Houghton Miffline Company, Boston.

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Scheme:

Max Marks: 150

Paper I	Duration (hrs.)	Max. Marks 33	Min. Pass Marks
Paper-II Paper-III	3	33	36
Practical	5	34 50	18

Note: Ten (10) questions are to be set taking two (02) questions from each unit. Candidates have to answer any 5 questions selecting at least one question from each unit.

Paper I: Inorganic Chemistry (2 hrs or 3 periods/ week)

Objectives: After completion of Inorganic Chemistry Course the student will have significant

the basic concepts of Bonding and application of various theories.

general properties of s- and p-block elements and effect of periodicity in properties.

Chemistry of some Important Compounds of p-block Elements and Nobel gases.

Fundamentals of Nuclear Chemistry and applications of Radiation Chemistry

Unit-I

Ionic Solids: Ionic structures, radius ratio effect and coordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy and Born Haber cycle. solvation energy and solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule.

Metallic bond: free electron, valence bond and band theories.

Weak Interactions: Hydrogen bonding, van der Waals forces.

Upit-II

Covalent Bond: Valence bond theory and its limitations, directional and shapes of simple inorganic molecules and ions. Valence shell electron pair repulsion (VSEPR) theory to NH₃. H_3O^+ SF₄, CIF₃, ICl₂, H_2O .

Molecular Orbital Theory: homonuclear and heteronuclear (CO and NO) diatomic molecules. Multicenter bonding in electron deficient molecules, bond strength and bond energy, percentage ionic character from dipole moment and electronegativity difference.

Unit-III

s-Block Elements: Comparative study, diagonal relationships, salient features of hydrides. solvation and complexation tendencies including their function in biosystems, an introduction to alkyls and aryls.

Periodicity of p-block elements: Periodicity in properties of p-block elements with special reference to atomic and ionic radii, ionization energy, electron affinity, electronegativity.

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diagonal relationship, catenation.

UNIT-IV

Some Important Compounds of p-block Elements: Hydrides of boron, diborane and higher boranes, borazine, borohydrides, fullerenes, carbides, fluorocarbons, silicates (structural principle), tetrasulphurtetranitride, basic properties of halogens, interhalogens and polyhalides. Chemistry of Noble Gases: Chemical properties of the noble gases, chemistry of Xenon, structure and bonding in Xenon compounds.

Unit- V

Nuclear Chemistry: Fundamental particles of nucleus (nucleons); Concept of nuclides and its representation; Isotopes, Isobars and Isotones (with specific examples); Forces operating between nucleons (n-n, p-p, & n-p); Qualitative idea of stability of nucleus (n/p ratio).

Radioactive displacement law; Radioactivity decay rates; Half life and average life; Nuclear binding energy, mass defect and calculation of defect and binding energy; Nuclear reactions. Spallation, Nuclear fission and fusion.

Paper II : Organic Chemistry (2 hrs or 3 periods / week)

Objectives: After completion of Organic Chemistry Course the student will have significant knowledge of the following -

- Primary knowledge of basic concepts of Organic reaction mechanism and application
- Isomerism and Stereochemistry, including various types of representation of organic molecules.
- Nomenclature, classification, methods of preparation, physical & chemical properties of alkanes, cycloalkanes, alkenes, cycloalkenes, dienes, arenes, alkyl & aryl halides.
- Polyhalogen compounds
- Concept of aromaticity and aromatic electrophilic substitution

Unit-I

Mechanism of Organic Reactions: Homolytic and heterolytic bond cleavage. Types of reagents, electrophiles and nucleophiles. Reactive intermediates - carbocations, carbanions, free radicals, carbenes, arynes and nitrenes (with examples). Types of organic reactions. Energy considerations. Methods of determination of reaction mechanism (product analysis, intermediates, isotope effects, kinetic and stereochemical studies).

Unit-II

Stereochemistry of Organic Compounds: Concept of isomerism, Types of isomerism, Difference between configuration and conformation, Flying wedge and Fischer projection formulae.

Optical Isomerism: Elements of symmetry, molecular chirality, enantiomers, stereogeniccentre, optical activity. Properties of enantiomers, chiral and achiral molecules with two stereogeniccentres. Diastereomers, threo and erythro isomers, meso compounds. Resolution of

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enantiomers. Inversion, retention and racemization (with examples).

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Relative and absolute configuration, sequence rules, D / L and R / S systems of nomenclature.

Geometric Isomerism: Determination of configuration of geometric isomers - cis / trans and E / Z systems of nomenclature. Geometric isomerism in oximes and alicyclic compounds.

Conformational Isomerism: Newman projection and Sawhorse formulae, Conformational analysis of ethane. *n*-butane, cyclohexane.

Unit-III

Alkanes and Cycloalkanes: IUPAC nomenclature of branched and unbranched alkyl group, classification of carbon atoms in alkanes. Methods of formation (with special reference of Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids). Physical properties and chemical reactions of alkanes. Mechanism of free radical halogenation orientation, reactivity and selectivity. Cycloalkanes - nomenclature, methods of formation, chemical reactions. Baeyer's strain theory and its limitations. Theory of strainless rings.

Alkenes, Cycloalkenes, Dienes and Alkynes: Methods of formation. mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides. Regioselectivity in alcohol dehydration - the Saytzeff rule, Hoffmann elimination. Physical properties and relative stabilities of alkenes. Chemical reactions of alkenes - mechanisms involved in hydrogenation, electrophilic and free radical additions. Markownikoff's rule, hydroboration-oxidation, oxymercuration-reduction. Epoxidation, ozonolysis, hydration, hydroxylation and oxidation with KMnO₄. Polymerization of alkenes. Substitution at the allylic and viriylic positions of alkenes.

Classification and Nomenclature of isolated, conjugated and cumulated dienes. Structure of allenes and butadiene. Methods of formation, properties, Chemical reactions - 1,2- and 1,4-additions, Diels-Alder reaction and polymerization.

Structure and bonding in alkynes. Methods of formation. Chemical reactions - acidity of alkynes; mechanism of electrophilic and nucleophilic addition reactions; hydroboration-oxidation; metal-ammonia reduction, oxidation and polymerization.

Unit-IV

Arenes and Aromaticity: Nomenclature of benzene derivatives. The aryl group, aromatic nucleus and side chain. Structure of benzene: molecular formula and Kekule structure. Stability and carbon-carbon bond lengths of benzene, resonance structure, MO diagram.

Aromaticity: the Huckel rule, aromatic ions - three to eight membered.

Aromatic electrophilic substitution: General pattern of the mechanism, role of sigma and picomplexes. Mechanism of nitration, halogenation, sulphonation, mercuration. Friedel-Crafts reactions and chloromethylation. Energy profile diagrams. Activating and deactivating substituents. Directive influence - orientation and ortho/para ratio. Side chain reactions of benzene derivatives. Birch reduction.

I mit-V

Alkyl and Aryl Halides: Methods of formation of alkyl halides, chemical reactions. Mechanisms of nucleophilic substitution reactions of alkyl halides SN2 and SN1 reactions with energy profile diagrams.

Polyhalogen compounds: Chloroform, carbon tetrachloride.

Methods of formation of aryl halides, nuclear and side chain reactions. The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl, allyl, vinyl and aryl halides.

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Paper IH: Physical Chemistry (2 hrs. or 3 Periods/week)

Objectives: After completion of Organic Chemistry Course the student will have significant knowledge of the following -

- Basic Mathematical Concepts required for understanding the concepts of physical chemistry
- properties of matter in different physical states liquid, gaseous, solid and colloidal states
- primary concepts of chemical kinetics and applications to reaction mechanism including radioactive decay as first order phenomenon.

UNIT-I

Mathematical Concepts: Logarithmic relations, curve sketching, linear graphs and calculations of slopes, differentiation of functions like k_x , e^x , x^n , sinx and log x; maxima and minima, partial differentiation and reciprocity relations, integration of some useful/relevant functions: permutations and combinations, factorials, probability.

Liquid State: Intermolecular forces, structure of liquids (a qualitative description). Structural differences between solids, liquids and gases. Liquid crystals: Difference between liquid crystal. solid and liquid. Classification, structure of nematic and cholestric phases. Thermography and seven segment cell.

UNIT- II

Gaseous States: Postulates of kinetic theory of gases, deviation from ideal behavior, van der Waals equation of state.

Critical Phenomenon: PV isotherms of real gases, continuity of states, the isotherms of van der Waals equation, relationship between critical constants and van der Waals constants, the law of corresponding states, reduced equation of state.

Molecular velocities: Root mean square, average and most probable velocities. Qualitative discussion of the Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter. Liquification of gases (based on Joule-Thomson effect.)

UNIT- III

Solid State: Definition of space lattice, unit cell.

Laws of crystallography- (i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Law of symmetry. Symmetry elements in crystals.

Basic concept of X-ray diffraction by crystals. Derivation of Bragg's equation Determination of Crystal structure of NaCl and CsCl (Laue's method and powder method) band theory of solids.

UNIT IV

Colloidal State: Definition of colloids, classification of colloids.

Solids in liquids (sols) properties- kinetic, optical and electrical, stability of colloids. Protective action, Hardy-Schulze law, gold number.

Liquids in solids (gels): classification, preparation and properties, inhibition, general applications of colloids.

Liquids in liquids (emulsions): types of emulsions, preparation. Emulsifier

UNIT V

Chemical Kinetics: Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction, concentration, temperature, pressure, solvent, light, catalyst. Concentration dependence of rates, mathematical characteristics of simple chemical reactions- zero order, first order, second order; pseudo order, half-life and mean-life. Determination of the order of reaction- differential method, method of integration, method of half-life period and isolation method.

Radioactive decay as a first order phenomenon.

Experimental methods of chemical kinetics: conductometric, potentiometric, optical methods. polarimetry and spectrophotometry. Theories of chemical kinetics. Effect of temperature on rate of reaction, Arthenius equation, concept of activation energy.

Simple collision theory based on hard sphere model transition state theory(equilibrium hypothesis). Expression for the rate constant bases on equilibrium constant and thermodynamic aspects.

Suggested Books:

- 1. Principles of Physical Chemistry: B. R. Puri and L. R. Sharma.
- 2. A Text Book of Physical Chemistry: A. S. Negi and S. C. Anand.
- 3. Ira N. Levine, Physical Chemistry.
- 4. Physical Chemistry, Pt. I & II: C. M. Gupta, J. K. Saxena and M. C. Purohit.

B.Sc. Part-I **Chemistry Practical** (4 hrs or 6 periods / week)

Inorganic Chemistry

Separation and identification of six radicals (3 cations and 3 anions) in the given inorganic mixture including special combinations.

Organic Chemistry

(i) Laboratory Techniques

Determination of melting point (naphthalene, benzoic acid, urea, etc.); boiling point (methanol, ethanol, cyclohexane, etc.); mixed melting point (urea-cinnamic acid. etc.).

Crystallization of phthalic acid and benzoic acid from hot water, acetanilide from boiling water, naphthalene from ethanol etc.; Sublimation of naphthalene, camphor, etc.

(ii) Qualitative Analysis

Element Detection (N, S and halogens). Functional group determination (unsaturation, phenolic. alcoholic, carboxylic, carbonyl, ester, carbohydrate, amine, amide, nitro) in simple organic solids and liquids.

Physical Chemistry

(One of the following experiments should be given in the examination)

Chemical Kinetics:

- 1. To determine the specific reaction rate of the hydrolysis of methyl acetate/ ethyl acetate catalyzed by hydrogen ions at room temperature.
- 2. To study the effect of acid strength on the hydrolysis of an ester.
- 3. To compare the strengths of HCl and H₂SO₄ by studying the kinetics of hydrolysis of ethyl acetate.
- 4. To study kinetically the reaction rate of decomposition of iodide by H₂O₂.

Viscosity, Surface Tension:

- 1. To determine the viscosity/surface tension of a pure liquid (alcohol etc.) at room temperature. (Using the Ostwald viscometer/stalagmometer).
- 2. To determine the percentage composition of a given binary mixture by surface tension method (acctone & ethyl methyl ketone).
- 3. To determine the percentage composition of a given mixture (non-interacting systems) by viscosity method.
- 4. To determine the viscosity of amyl alcohol in water at different concentration and calculate the excess viscosity of these solutions.

(Instructions to the Examiners) B.Sc. Part I **Chemistry Practical**

Max.	Marks: 50	Duration of Exam: 5 hrs.	M	_
Inorg	anic Chemistry	- Landi of Exam. 5 ms.	Minimum Pass Mar	ks: 18
Ex.1		ntification of 3 cations and 3 anions	in the mixture	12
Ex.2	Laboratory Technic	ques		_
Ex. 3	Qualitative Analys	S - Detection of element and datast		5
Ex. 3 Qualitative Analysis - Detection of element and detection of functional group Physical Chemistry			8	
Ex. 4 Ex. 5	Perform one of the Viva-voce	experiments mentioned in the syllal	ous.	12
	Record			8
				5
				50

Sessional Work (Max. Marks 25)

Any one of the following -

- 1. Life sketch, important achievements and contributions of A Eminent Indian Chemist.
- 2. Importance of Chemistry in Daily life
- 3. Demonstration of use of Models for concepts of stereochemistry
- 4. History and Applications of chemical fertilizers.

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Theory Course

- Basic Inorganic Chemistry F.A. Cotton. G. Wilkinson and P.L. Caus. Wiley.
- Concise Inorganic Chemistry, J.D. Lee, ELBS
- Inorganic Chemistry, A.G. Sharpe, ELBS
- Organic Chemistry, Morrison and Boyd, Prentice Hall.
- Organic Chemistry, L.G. Wade. Prentice Hall. 5.
- Fundamentals of Organic Chemistry, Solomons, John Wiley.
- Organic Chemistry Vol. I, II, III S.M. Mukherji, S.P. Singh and R.P. Kapoor, Wiley Eastern Ltd. (New Age International)
- Organic Chemistry, F.A. Carey, McGraw Hill, Inc.
- Physical Chemistry, G.M. Barrow. International Student Edition, McGraw Hill.
- 10. The Elements of Physical Chemistry, P.W. Atkins, Oxford.
- 11. Principles of Physical Chemistry: B. R. Puri Sharma and M. S. Pathania.
- 12. A Text Book of Physical Chemistry: A. S. Negi and S. C. Anand.
- 13. A Text Book of Physical Chemistry: Kundu and Jain.

(Laboratory Courses)

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- Vogel's Textbook of Quantitative Inorganic Analysis (revised), J. Bassett. R.C. Deney, G.H. Jeffery and J. Mendham. ELBS.
- Experimental Organic Vol I & II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata 2. McGraw Hill.
- Laboratory manual in Organic Chemistry, R.K. Bansal, Wiley Eastern. 3.
- Vogel's Textbook of Practical Organic Chemistry, RS. Furniss, Hannaford, V. Rogers. 4. P.W.G. Smith and A.R. Tatchell, ELBS.
- Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House. 5.
- Advanced Experimental Chemistry, J.N. Gurtu, S. Chand & Co. 6.

D.JC.- B.LG.- V,VI,VII

Scheme

Min. Pass Marks: 36 Paper Max Marks: 100 3 hrs. Duration Paper II Max. Marks 33 3 hrs. Duration Paper III Max. Marks 33 3 hrs. Duration Practical Min. Marks: 18 Max. Marks 34 4 hrs. Duration Max. Marks 50

Note:

There will be 5 questions in each paper. All questions are compulsory. Candidate has to answer all questions in the main answer book only.

2. Q. No. 1 will have 8 (Paper I and II) and 9 (Paper III) very short answer type Questions (not more

than 20 words) of one marks covering entire syllabus.

Each paper is divided into four units. There will be one question from each unit and Q. No. 2 to

B.Sc.- B.Ed. (Botany)

Paper I

Cell Biology, Genetics and Plant Breeding

- 1. Students will understand the structure of cell organelles and nuclear material.
- 2. Students will apply their knowledge of cell biology in selected examples.
- To understand the Mandelian and non-Mendelian modes of inheritance that govern passage of genetic traits across generation and categorise, predict geneotype and phenotype.
- To understand the basic structure of DNA and chromosomes.
- To improve the charactristics of plant so that they become more desirable agronomically and economically.

Paper-I Cell Hinlagy, Genetics and Plant Breeding (2 lars /week)

Unit-F

Cell organelles and Nuclear material: Ultrastructures and functions of different cell organelles (cell wall, plasma membrane, nucleus, mitochondria, chloroplast, ribosome, peroxisomes, lysosome, golgi bodies and endoplasmic reticulum), Chromatin structure and Chromosome organization: eukaryotic and prokaryotic. Chromosome morphology; specialized types of chromosomes (sex chromosomes, lampbrush chromosome, polytene chromosome); transposons.

Unit-II

Cell divisions: Cell cycle, mitosis: stages, structure and functions of spindle apparatus; anaphasic chromosome movement; Meiosis: its different stages: Meiosis I, Meiosis II, synaptonemal complex, chasmata formation and crossing over.

Basis of genetic material: Griffith's transformation experiment and The Hershey and Chase blender experiment to demonstrate DNA as the genetic material. Concept of Gene: Neurospora genetics, idea about prokaryotic and eukaryotic structure of gene = operon concept, exons and introns.

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Extra nuclear genome: Mitochondrial and chloroplast genome, plasmids;

Chromosomal aberrations: Deletion, duplication, translocation, inversion, aneuploidy and polyploidy.

Unit-III

Genetic inheritance: Mendel's laws of inheritance and their exceptions; allelic (incomplete and co-dominance, lethality) and non-allelic (complementary interactions of genes, epistasis and duplicate genes). Quantitative inheritance: grain color in wheat, corolla length in *Nicotiana tabacum*.

Cytoplasmic inheritance-Maternal influence, shell coiling in snails, kappa particles in Paramaecium, multiple allelism: ABO blood groups in mean.

Unit-IV

Plant Breeding: Introduction and objectives of plant breeding; general methods of plant breeding in self-pollinated, cross-pollinated and vegetatively propagated crop plants. Introduction and acclimatization, selection, hybridization, hybrid vigour and inbreeding depression. Role of mutation and polyploidy in plant breeding. Famous Indian and international plant breeders and their contribution. National and International agricultural research institutes.

Plant breeding work done on wheat and rice in India, Green revolution

Suggested Laboratory Exercises:

- Study of cell structure in Onion, Hydrilla and Spirogyra.
- Study of cyclosis in Tradescantia spp.
- Study of plastid for pigment distribution in Lycopersicom, Cassia and Capsicum.
- Study of electron microphotographs of eukaryotic cells for various cell organelles.
- Study of electron microphotographs of virus, bacteria and eukaryotic cells for comparative study of cellular organization.
- Study of different stages of mitosis and meiosis in root-tip cells and flower buds respectively of onion.
- To solve genetic problems based upon Mendel's laws of inheritance: Monohybrid, Dihybrid, Back cross and test cross.
- Permanent slides/photographs of different stages of mitosis and meiosis, sex chromosomes, polytene chromosome and salivary gland chromosomes,
- Emasculation, bagging and tagging techniques
- Cross pollination techniques

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Suggested Readings:

- Choudhary, H.K. (1989). Elementary Principles of Plant Breeding. Oxford and IBM Publishing Co., New Delhi.
- Gupta, P.K. (2016). Cytology, Genetics, Evolution. and Plant Breeding, Rastogi Publications, Mecrut.
- Miglani, G.S. (2000). Advanced Genetics, Narosa Publishing House, New Delhi.
- Russel, P.I. (1998). Genetics. The Benejamins/Cummings Publishiking Co., Inc. U.S.A.
- Shukla, R.S. and Chandel, P.S. (2000). Cytogenetics, Evolution and Plant Breeding, S. Chand and Co. Ltd., New Delhi.
- Singh, R.B. (1999). Text Book of Plant Breeding, Kalyani Publishers, Ludhiana.
- Dnyansagar, V.R. (1986). Cytology and Genetics, Tata McGraw-Hill Pub. Co. Ltd. New Delhi.
- Roy, SC. and De, K.K. (1999). Cell Biology, New Central Book Agency (P) Ltd. Calcutta.
- Verma, PS. and Agarwal, V.K. (2012). Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand and Co. Ltd. New Delhi.

Paper II

Microbiology, Mycology and Plant Pathology

- 1. To know the economic importance of fungi
- 2. To study the diseases or disorders caused by biotic and abiotic agents
- 3. To study the interaction between plant and pathogen in relation to the overall cuvironment.

Paper II

Microbiology, Mycology and Plant Pathology

(2 hrs /week)

Unit-I

Microbiology: Meaning and scope, history and development in the field of microbiology. Concept of quorum sensing and biofilm

Eubacteria: General account, occurrence, morphology (structure, shapes), flagella, capsule, nutritional types, endospore, reproduction (binary fission, transformation, conjugation,

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transduction), economic and biological importance.

Mycoplasma: occurrence, morphology, reproduction and importance.

Unit-H

Virus: General characteristics and importance. Structure of TMV and Pox virus, Structure and multiplication of Bacteriophage.

Fungi: General characters, occurrence, thallus organization, reproduction, economic importance. Classification of fungi (Alexopoulos and Ainsworth's).

Plant diseases: Biotic and abiotic diseases, important symptoms caused by fungi, bacteria, viruses and MLOs (blights, mildews- downy and powdery, rusts, smuts, canker, mosaic, little leaf, gails etc.).

Unit-III

Brief account, structure, importance and life history and/or disease cycle and control of the following:

Albugo and white rust; Sclerospora and Downy mildew/Green ear disease of Bajra; Aspergillus; Claviceps and Ergot; Peziza.

Unit-IV

Brief account, structure, importance and life history and/or disease cycle and control of the following:

Puccinia and Black rust of wheat; Ustilago and loose smut of wheat and covered smut of barley; Agaricus, Alternaria and early blight of potato.

Suggested Laboratory Exercises:

- 1. Study of bacteria using curd or any other suitable material by Gram's staining.
- 2. Study of Mycoplasma, TMV, Poxvirus, bacteriophage (photographs/ 3-D models)
- Study of symptoms of plant diseases—Downy mildew of Bajra, Green ear of bajra, Powdery mildew, Mosaic of bhindi.
- Study of specimen, permanent slides and by making suitable temporary slides: Albugowhite rust; Sclerospora- downy mildew, green ear, Aspergillus; Claviceps- ergot; Ustilago- loose smut of wheat, covered smut of barley, Puccinia- Black rust of wheat; Agaricus; Peziza and Alternaria- early blight of potato.
- 5. Media preparation: potato dextrose agar, Nutrient agar
- 6. Culture techniques of fungi and bacteria.

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Suggested Books:

- Alexopoulos, C.J. and Minss, C.W. (2000). Introductory Mycology, John Wiley and Sons, New York,
- Dube, H.C. (1989). Fungi, Rastogi Publication, Mecrut.
- Sarabhai, R.C. and Saxena, R.C. (1990). A text book of Botany, Rastogi Publication,
- Sharma, O.P.(2000). Fungi, Today and Tomorrow Printers and Publishers, New Delhi.
- Vashihsta, B.R. (2001). Botany for Degree Students -Fungi, S. Chand and Co., New
- Bilgrami, K.S. and Dube, H.C.(2000). A text book of Modern Plant Pathology, Vikas Publications, New Delhi.
- Biswas, S.B. and Biswas, A. (2000). An Introduction to Viruses, Vikas Publications, New
- Clifton, A. (1985). Introduction of Bacteria, McGraw Hill Co. Ltd., New York.
- Madahar, C.L.(1978). Introduction of Plants Virus, S. Chand and Co., New Delhi.
- Palzar M.J Jr. Chan, E.C.S. and Krieg, N.R. (2001). Microbiology, McGraw Hill Edu. Pvt. ltd., London.
- Parohit, S.S. (2002). Microbiology, Agro. Bot. Publication, Jodhpur.
- Sharma, P. D. (2003). Microbiology and Pathology, Rastogi Publication. Meerut.
- Singh, V. and Srivastava V. (1998). Introduction of Bacteria, Vikas Publication.
- Cappuccino, J. and Sherman, N. (2013) Microbiology: A Laboratory Manual (10thEd.), Benjamin Cummings.
- Aneja, K.R. (2017). Experiments in Microbiology, Plant Pathology Biotechnology New Age International (P) Ltd., Publishers, New Delhi.
- Mehrotra, R.S. and Aggarwal, Ashok (2003). Plant pathology, Tata McGraw-Hill

Paper III Algae, Lichens and Bryophyta

1. To know the major classes of Algae, Lichens and Bryophyata.

2. To identify general characteristics of Algae, Lichens and Bryophyta.

3. To know the economic importance of Algae, lichens and Bryophyta

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Paper III Algae, Lichens and Bryophyta (2 hrs/week)

Unit-I

General characters, Classification (Smith). Diverse Habitat. Range of thallus structures, photosynthetic pigments and Food reserves. Reproduction (Vegetative, Asexual, Sexual). Types of the life cycle, Economic importance.

Unit-II

Type Studies
Cyanophyceae - Oscillatoria, Nostoc
Chlorophyceae-Volvox, Chara.
Xanthophyceae-Vaucheria.
Placophyceae-Ectocarpus.
Rhodophyceae-Polysiphonia.

Unit-III

General characters, Origin, and evolution of Bryophtyes, Classification (Exciter); Habitat, Range of finiles structure, Reproduction (Vegetative and Sexual); Alternation of generations; Economic importance.

Type Studies: Hepaticopsida - Riccia, Marchantia

Unit-IV

Type Studies: Anthocerotopsido-Anthoceros, Bryopsido-Funaria

Lichens- General characters, habitat, structure, reproduction and economic and ecological importance of lichens.

Suggested Laboratory Exercises

- 1. Study of class work material by making suitable temporary slides and study of permanent slides of, Oscillatoria, Nostoc, Volvox, Chara, Vaucheria, Ectocarpus, Polysiphonia.
- 2. Study of external morphology and preparation of suitable sections of vegetative/reproductive parts of *Paccia, Marchantia, Anthoceros, Funaria*.
- 3. Study of lichens.

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Suggested Readings

- 1. Bold, H.C. Alexopoulous, G.J. and Deleveryas, T.(1980). Morphology of Plant and Fungi (4th Ed.) Harper and Foul Co., New Work.
- Ghemawat, M.S., Kapoor, J.N. and Narayan, H.S.(1985). A text book of Algae, Ramesh Book Depot, Jaipur.
- 3. Gilbart, M. Smith (1985). Crypogamic Botany, Vol. I and II (2nd Ed.) Tata McGraw Hill. Publishing Co., Ltd., New Delhi.
- 4. Kumar, H.D. (1988). Introductory Phycology, Affiliated East—West Press, Ltd. New York
- 5. Puri. P. (1985). Bryophytes, Atmaram and Sons. Delhi, Lucknow.
- 6. Sarabhai. R.C. and Saxona, R.C. (1980). A text book of Botany. Vol I and II, Ratan Prakashan Mandir, Meerut.
- 7. Singh, V., Pande, P.C. and Jain, D.K. (2001). A text book of Botany, Rastogi, and Co., Meerut.
- 8. Vashista, B.R. (2002). Botany for Degree Students (Algae, Bryophytes) S. Chand and Co., New Delhi.

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BOTANY PRACTICAL EXAMINATION

SKELETON PAPER

MLML 50

TIME: 4 Hours

S. No.	THEE, 4 LINES				
	Practical	Regular	Ex N		
l(a)	Prepare the acetocarmine stained slide of the material "A" provided to you. Draw a well labelled diagram of any one stage of nuclear division. Identify it giving reasons.	4	4		
1(b)	Comment and solve the problem on Genetics allotted to you along with reasons.	4	4		
2	Make suitably stained glycerine-preparation of any one alga from the given mixture "B". Draw its labelled diagrams; assign it to its systematic position giving reasons.	4	4		
3	Make suitable preparation of the reproductive structure of material "C"(Fungi). Draw labelled diagrams, Identify giving reasons.	4	4		
4	Make suitable stained preparation of material "D" (Bryophyta (vegetative/ reproductive). Draw labelled diagrams. Identify giving reasons.	4	4		
5	One Microbiology experiment for comments. Or Gram's staining.	4	4		
6	Comment upon spots (1-4)	8			
7	Viva-Voce	•	12		
8	Practical Record	4	4		
	Translat Record	4	•		
	TOTAL	40	40		

Sessional Work (Botany)

10 Marks (3+4+3)

3

- 1. Prepare temporary semi-permanent slides of algae, fungi and bryophyte. (2 each) 3
- 2 Prepare an Article, Poster on any topic of biology.
- 3. Preservation of three diseased plants to prepare specimens.

Syllabus: B.Sc. Part-1

University of Rajasthan

Syllabus: B.Sc. - B.Ed Part-I

Zoology

(2018-19)

Scheme:

Max. Marks 100

Min. Pass Marks: 36

Paper I

: 3 Hrs duration

33 Marks

Paper II

: 3 Hrs duration

33 Marks

Paper III

: 3 Hrs duration

34 Marks

Practicals

: 4 Hrs. duration

50 Marks

NOTE:

There will be two parts of every theory question paper with a total duration of 3 hours. First part of question paper will comprise of question No. 1 containing 9 (Paper I & II) or 10 (Paper III) to attempt. Questions should be evenly distributed covering the entire syllabus. Second part of question paper will be of long answer type questions having three sections. There will be total 9 questions (Q. No. 2 to 10) in this part, i.e., three from each unit /section out of which candidate unit section. Each question will carry 6 marks.

The candidate has to answer all questions in the main answer book only.

PAPER - I: Z-101

DIVERSITY OF ANIMALS

Section - A

Biosystematics and Taxonomy

General principles of taxonomy, concept of five kingdom scheme, international code of nomenclature, cladistics, molecular taxonomy.

Concept of Protozoa and Metazoa, and levels of organization.

3. Taxonomy and basis of classification of non-chordata and chordata: symmetry, coelom, segmentation and embryogeny.

Detailed classification of Non-chordata and Chordata (up to suborders with examples).

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Habitat, Habit, Morphology, Structure, *Locomotion, Organs and Systems (Digestive, Excretory, Respiratory.*Osmoregulation. Nervous & Reproductive).Life Cycle.*Affinities and *Adaptations.

Note: * indicates wherever required

- Protozoa : Amoeba. Entamoeba. Paramaecium, Euglena, Plasmodium, Trypanosoma and Leishmania.
- Porifera: Sycon and Leucosolenia. Coelentrata: Obelia and Aurelia.

Section -C

Systems Organs and Structure, *Locomotion, Digestive. Excretory. Respiratory. Nervous & Reproductive). Life Cycle. * Affinities and * Adaptations.

Note: * indicates wherever required

- Ctenophora: Beroe
- Platyhelminthes; Fasciola hepatica and Taenia solium. 1. 2.
- Aschelminthes: Ascaris, Dracunculus and Wuchereria.
- Annelida: Neries and Leech.

PAPER - II: Z-162 CELL BIOLOGY AND GENETICS

Section - A

Cell Biology

- Introduction to cell: Morphology, size, shape, characteristics and structure of prokaryotic and eukaryotic animal cell: basic idea of virus and cell theory.
- Cell membrane: Characteristics of cell membrane molecules, fluid-mosaic model of Singer and Nicholson, concept of unit membrane.
- Cell membrane transport: Passive (diffusion and osmosis, facilitated, mediated) and active 3 transport.
- Cytoplasmic organelles: 4.
 - Structure and biogenesis of mitochondria: electron transport chain and generation of ATP (1)
 - Structure and functions of endoplasmic reticulum, ribosome (prokaryotic and eukaryotic) (ii) and Golgi complex.
 - Structure and functions of lysosome, microbodies and centrioles. tilij
 - Structure and functions of cilia, flagella, microvilli and cytoskeletal elements.

Section - B

Nuclear Organization:

- Structure and function of nuclear envelope, nuclear matrix and nucleolus.
- Chromosomes: Morphology, chromonema, chromomeres, telomeres, primary and secondary constrictions, chromatids, prokaryotic chromosome.
- Giant chromosome types: Polytene and Lampbrush.
- Chromosomal organization: Euchromatin, heterochromatin and folded fiber model and nucleosome concept.

Nucleic Acids:

- DNA structure, polymorphism (A. B and Z types) and replication (semi conservative mechanisms experiments of Messelson and Stahl: elementary idea about polymerases. topoisomerases, single strand binding proteins, replicating forks (both unidirectional and bidirectional), leading and lagging strands, RNA primers and Okazaki fragments. elementary idea about DNA repair.
- RNA structure and types (mRNA, rRNA and tRNA) and transcription. (i i)
- Genetic code and translation: Triplet code, characteristics of triplet code, protein synthesis translation;

Cell in reproduction:

- Interphase nucleus and cell cycle: S. G-1, G-2 and M phase.
- Mitosis: Different stages, structure and function of spindle apparatus; anaphasic 1111 movement.
- Meiosis: Different stages, synapses and synaptonemal complex, formation of chiasmata and significance of crossing over.

Section - C

Genetics

- Mendelism. Brief history of genetics and Mendel's work; Mendelian laws, their significance and current status, chromosomal theory of inheritance.
- Chromosomal mutations: Classification, translocation, inversion, deletion and duplication: Variations in chromosome numbers; haploidy diploidy, polyploidy, aneuploidy, euploidy and polysomy.
- Linkage and crossing over elementary idea of chromosome mapping.
- Genetic interaction: Supplementary genes, complementary genes, duplicate genes, epistasis, inhibitory and polymorphic genes.
- Multiple gene inheritance: ABO blood groups and Rh factor and their significance.
- 6 Cytoplasmic inheritance.
 - Sex determination in Drosophila and man, pedigree analysis.
- Genetic disorders: Down's, Turner's and Klinefelter's syndromes, color blindness. Hemophilia. S Phenylketonuria.
- Q Concept of gene: Recon, muton and cistron.

PAPER - III: Z-103 GAMETE AND DEVELOPMENTAL BIOLOGY

Section - A

Developmental Biology: Scope and Early Events

- Historical review, types and scope of embryology.
- 2 Gametogenesis:
 - (i) Formation of ova and sperm.
 - viii Vitellogenesis.
- 3. Fertilization: Activation of ovum, essence of activation: Changes in the organization of the egg extoplasm.
- Parthenogenesis.

Section - B

Developmental Biology: Pattern and Processes

- Cleavage. Definition, planes and patterns of cleavage among non chordates and chordates, significance of cleavage, blastulation and morulation.
- 2 Fate maps, morphogenetic cell movements, significance of gastrulation.
- Embryonic induction, primary organizer, differentiation and competence.
- Development of chick up to 96 hours stage
- Embryonic adaptations:
 - Extra embryonic membranes in chick, their development and functions.
 - Placentation in Mammals: Definition, types, classification on the basis of morphology and histology, functions of placenta.
 - (iii) Paedogenesis and neoteny.

Section - C

Dimensions in Developmental Biology

- ... Regeneration.
- Various types of stem cells and their applications.
- 3 Cloning of animals:
 - (i) Nuclear transfer technique.
 - (ii) Embryo transfer technique.
- 4 Teratogenesis (Genetic and Induced).
- 5 Biology of aging.
- 6 Cell death.

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University of Rajasthan B. C. Part-I (2018-2019)

Practical – Zoology

Min. Marks: 18

4 Hrs. / Week

Max. Marks: 50

I. Microscopic Techniques:

- Organization and working of Optical Microscope: Dissecting and compound microscopes.
- General methods of microscopic slide preparations: Narcotization: fixing and preservation: washing: staining: destaining: dehydration; clearing and mounting.
- 3 General idea of composition, preparation and use of:
 - (i) Fixatives: Formalin, Bouin's fluid.
 - (ii) Stains: Aceto-carmine, Aceto-orcein, Haematoxylin, Eosin.
 - (iii) Common reagents: Normal saline, Acid water, Acid alcohol and Mayer's albumin.
- Collection and Culture Methods:
 - Collection of animals from their natural habitat during field trips such as Amoeba, Paramecium, Euglena, Daphnia, Cyclops, etc.
 - (ii) Culture of *Paramecium* in the laboratory and study of its structure. life -processes and behavior in live state.

II. Study of Microscopic Slides and Museum Specimens:

Protozoa

Amoeba. Euglena. Trypanosoma. Giardia, Entamoeba. Elphidium (Polystomella). Foraminiferous shells, Monocystis. Plasmodium. Paramecium. leishmania, Paramecium showing binary fission and conjugation. Opalina, Nyctotherus, Balantidium. Vorticella.

Porifera

Leucosolenia, Euplectella, Spongilla, T. S. Sycon, Spicules, Spongin fibers, Gemmules

Coelenterata

Millepora. Physalia, Velella, Aurelia, Alcyonium, Gorgonia. Pennatula. Sea anemone, Stone corals, Obelia colony and medusa.

Ctennophora

Any Ctenophore

Platyhelminthes

Taenia, Planaria, Fasciola (WM), T. S. body of Fasciola, Miracidium, Sporocyst, Redia and Cercaria Larvae of Fasciola. Scolex. T. S. mature proglottid of Taenia, gravid proglottid. Cysticercus larva.

Aschelminthes

Ascaris. Wuchereria, Dracunculus

Annelida

Neries, Heteroneries, Arenicola, Aphrodite, Chaetopterus, Tubifix,

Glossiphonia, Pontobdella, Polygordius

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III. Anatomy:

Earthworm External features, general viscera, alimentary canal, reproductive

system and nervous system.

Leech

External features, alimentary canal, reproductive and nervous

system.

Study of the Following Through Permanent Slide Preparation: Paramecium. Euglena. Foraminiferous shells. Sponge spicules. Spongin fibres, Gemmule. Hydra. Obelia colony and Medusa Parapodium of Nereis and Heteronereis; Earthworm-ovary, testes, septal nephridia and brain ring: Leech-ovary, testes sac and salivary glands.

V . Exercises in Cell Biology:

- Squash preparation for the study of mitosis in onion root tip, permanent slides of mitosis (all stages).
- Squash preparation for the study of meiosis in grasshopper or cockroach testes. permanent slice of meiosis (all stages).
- Study of giant chromosomes in salivary glands of Chironomous or Drosophila larva. 3
- Study of cell permeability using mammalian RBC's.

VI. Exercises in Genetics:

- A Study of Drosophila:
- 1. Life cycle and an idea about its culture
- 2. Identification of male and female
- 3. Identification of wild and mutants (yellow body, ebony, vestigial wing and white eye)
- Study of permanent prepared slides: Sex comb and salivary gland chromosomes.
- Numerical problems based on monohybrid and dihybrid cross.
- Identification of blood groups (A, B, AB, O & Rh factor)

VII. Developmental Biology:

- Study of development of frog/toad with the help of Charts/Slides/Models:
 - Eggs. cleavage. blastula, gastrula, neurula, tail-bud, hatching. mature tadpole (i) larvae, metamorphic stages, toadlet / froglet.
 - Histological slides: Cleavage, blastula, gastrula, neurula and tail-bud stage. (ii)
- Study of development of chick with the help of whole mounts/ Charts/Slides/Models
 - 18 hrs, 21 hrs, 24 hrs, 33 hrs, 48 hrs, 72 hrs and 96 hrs of incubation. (i)
 - Primitive streak stage in living embryo, if possible, after removal of the blastoderm (ii)from the egg.
 - Study of the embryo at various stages of incubation in vivo by making a window in (iii) the egg-shell may also be demonstrated.
 - Study of various foetal membranes in a 10-12 day old chick em (IV)

University of Rajasthan 15 Ed 30' B.Sc. Part - I

Scheme of Practical Examination and Distribution of Marks

Tir	me: 4 Hrs. M	Min Pass Marks: 18	Max. Marks: 50	
			Regular	Ex. /N.C. Students
:	Anatomy (any system)		6	5
2.	Permanent Preparation		4	7
3	Cell Biology and Genetics		4+4	6+6
÷.	Developmental Biology		6	5
5.	Identification and commen	its on Spots (1 to 8)	16	16
5.	Viva Voce		5	5

Notes:

Class Record

- 1. Anatomy: Study of systems of the prescribed types with the help of dissection.
- 2. With reference to microscopic slides, in case of non-availability, the exercise should be substituted with diagrams / photographs.
- 3. Candidates must keep a record of all work done in the practical class and submit the same for inspection at the time of the practical examination.
- 4. The candidates may be asked to write detailed methodology wherever necessary and separate marks may be allocated for the same.
- 5. Mounting material for permanent preparations would be as per the syllabus or as available through collection and culture methods.
- 6. It should be ensured that animals used in the practical exercises are not covered under the wild life act 1972 and amendments made subsequently.



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University of Rajasthan, Jaipur B.Sc. B.Ed. (Physics Syllabus) 2018-21

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B.Sc. B.Ed. Part I

1. PHYSICS

Scheme.	-	· · · · · · · · · · · · · · · · · · · ·		
Min. Pass Marks: 36		Max. Marks: 100		
Paper I Paper II Paper III Practical	3 hrs. duration 3 hrs. duration 3 hrs. duration 5 hrs. duration	Max. Marks: 33 Max. Marks: 33 Max. Marks: 34 Max. Marks: 50	Min. Pass marks 12 Min. Pass marks 12 Min. Pass marks 12 Min. Pass marks 18	

Paper-I: Mechanics & Oscillations

Work Load: 2 hrs. Lecture /week

Examination Duration: 3 Hrs.

Scheme of Examination: First question will be of nine marks comprising of six parts of short answer type with answer not exceeding half a page. Remaining four questions will be set with one from each of the unit and will be of six marks each. Second to fifth question will have two parts namely (A) and (B) each carrying 3 marks. Part (A) of second to fifth question shall be compulsory and Part (B) of these questions will have internal choice.

Unit - 1

Physical Law and frame of Reference

- inertial and non-mertial frames. Transformation of displacement, velocity, reservation between different frames of reference involving translation.
- Coriolis Force: Transformation of displacement, velocity and acceleration between rotating trame. Pseudo forces. Coriolis force, Motion relative to earth. Focult's pendutum
- Conservative Forces: Introduction about conservative and non-conservative forces. Rectilinear motion under conservative forces. Discussion of potential energy curve and motion of a particle.

Unit - II:

Centre of Mass

Introduction about Centre of Mass. Centre of Mass Frame: Collision of two particles in one and two dimensions (elastic and inelastic). Slowing down of neutrons in a moderator. Motion of a system with varying mass. Angular momentum concept, conservation and charge particle scattering by a nucleus Rigid body



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Equation of a motion of a rotating body, Inertial coefficient. Case of J not parallel to sometic energy of rotation and idea of principal axes. Processional motion of a spinning top

Unit - III:

Motion under Central Forces

introduction about Central Forces. Motion under central forces. Gravitational interaction. Inertia and gravitational mass. General solution under gravitational interaction. Keplets as as. Discussion of trajectories. Cases of elliptical and circular orbits. Rutherford scattering.

Damped Harmonic Oscillations

introduction about oscillations in a potential well. Damped force and motion under damping. Damped Simple Harmonic Oscillator. Power dissipation. Anharmonic oscillator and simple pendulum as an example.

Unit - IV:

Driven Harmonic Oscillations

Driven narmonic oscillator with damping, Frequency response, Phase relation, Quality factor, Resonance, Series and parallel of LCR circuit, Electromechanical system-Ballistic Gaivanometer

Coupled Oscillations

Equation of motion of two coupled Simple Harmonic Oscillators. Normal modes, motion in mixed modes. Transient behavior, Dynamics of a number of oscillators with neighbor interactions

Text books:

- · Mechanics NE Charles Kittel
- difficulties to Classical mechanics, TMH
- · The Physics of Waves & Oscillations, Bajaj
- H. Goldstein Classical mechanics.
- L N Hand, J.D. Finch, Analytical mechanics (Cambridge, 1998).
- · L Landau, E. Lifshitz, Mechanics,

Paper - II (Electromagnetism)

Work Load: 2 hrs. Lecture /week

Examination Duration: 3 Hrs.

scheme of Examination: First question will be of nine marks comprising of six parts of short answer type with answer not exceeding half a page. Remaining four questions will be set with one from each of the unit and will be of six marks each. Second to fifth question

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oil have two parts namely (A) and (B) each carrying 3 marks. Part (A) of second to fifth possition shall be compulsory and Part (B) of these questions will have internal choice.

Unit I: Scalar and Vector Fields

of the Scalar and Vector Fields. Gradient of scalar field. Physical significance of the Smith Condition. Divergence and Curl of a vector field Cartesian continuous stem. Problems based on Gradient. Divergence and curl operators

solution of Solid angle. Gauss divergence and Stoke's theorem. Gauss law from inverse solutions. Differential, form of Gauss law.

I nit il : Field of stationary and moving charges

Potential energy of system of (i) Discrete N-charges (ii) Continuous charge distribution. Energy required to built a uniformly charged sphere, classical radius of electron. Electric field age to a short electric dipole. Interaction of electric dipole with external uniform and morantic rm electric field, potential due to a uniformly charged sphericl shell.

Process and Laplace equations in Cartesian co-ordinates and their applications to solve the problems of electrostatics

In uniance of charge. Gaussian and SI units and their inter coversions. Electric field measured in moving frames. Electric field of a point charge moving with constant seasons.

Unit III: Electric field in matter

Manage expansion, defination of moments of charge distribution. Dielectrics, Induced allow moments, polar non polar molecules. Free and bound charges, Polarization, Manuel polarizability, electric displacement vector, electric susceptibility, dielectric mostant relation between them

somere—at the surface of the sphere (iii) inside the sphere. Electric field due to a electric sphere (b) inside the sphere (b) inside the sphere (b) inside the sphere receive field due to a charge placed in dielectric medium and Gauss (aw charses). Mossotti relation in dielectrics.

Unit IV: Maxwell's Equations and Electromagnetic Waves

Displacement current. Maxwell's Equations, 1D and 3D wave equation. Transverse states in a stretched string, elastic waves in solids. Pressure waves in a gas column, spherical waves. Fourier's Theorem and its application to square and saw tooth waves. Phase and group velocities. Dispersion of waves, Electromagnetic waves, Energy density become agree waves. Electromagnetic waves in an Isotropic and Dispersive medium. Spectrum of Electromagnetic waves.

References:

Electricity & Magnetism : A.S. Mahajan & Abbas A. Rangwala, Tata McGraw-Hill



and the rectrodynamics in David J. Griffith, Prentice Hall

1 Berkley Physics Course . Vol. II

- Indiamental University Physics Vol II. Fields and Waves: M. Alonso and Ed. Finn. Radisor-Wesley Publishing Company.

Paper III OPTICS

Work Load: 2 hrs. Lecture /week

Examination Duration: 3 Hrs.

Scheme of Examination: First question will be of nine marks comprising of six parts of short answer type with answer not exceeding half a page. Remaining four questions will be set with one from each of the unit and will be of six marks each. Second to fifth question will have two parts namely (A) and (B) each carrying 3 marks. Part (A) of second to fifth question shall be compulsory and Part (B) of these questions will have internal choice.

Unit - 1 Interference:

The negative of Spatial and Temporal Coherence, coherence length, coherence time. Definition and the negative state a wave front Huygen's principle of secondary wavelets. Young's Double slit coherence if you of interference, interference by division of wavefronts: Fresnel's Biprism. Measurement it vavelength k and thickness of a thin transparent sheet. Interference by division an pullade interference in thin films of constant thickness in transmitted and reflected waves of crierence produced by a wedge shaped film. Newton's rings. Determination of wavelength and refractive states a by Newton's Rings fringes of equal inclination (Haidinger tringes) and thickness. Fizeau fringes). Michelson's Interferometer, shape of fringes. Measurement of configuration afforms between two spectral lines and thickness of a thin transparent sheet.

Unit - 2 Diffraction:

and a rectangular slit. Zone plate. Multiple foci of zone plate, comparison between zone plate and a circular aperture, straight equality and a rectangular slit. Zone plate. Multiple foci of zone plate, comparison between zone plate and a circular aperture. Fraunhoter diffraction by a parallel slits with two slits as a special case. Missing order, Plane diffraction grating and its use in determining wavelength. Dispersion by a grating. Rayleigh's criterion of tesofution. Resolving power of a Telescope and a Grating.

Unit - 3 Polarization:

Plane polarized light (ii) Circularly polarized light and (iii) Elliptically Plane 2 (2nt. Production of Plane polarized light; (i) by reflection (ii) by retraction in the



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The art of mana way by dichroism (Polaroid). Identification of polarized light, imagen is a construction of retraction. Production of Circularly and Elliptically Polarized light (have to explain that wave plates. Analysis of polarized light. Optical activity. Laws at optical activity. Experimental verification of Fresnel's Specific rotation. Polarimeter. Types of Polarimeter: (i) Laurent's half shade admitted and it Biquartz polarimeter.

1 nit - 4 Quantum Optics & Photonics

Laser: No mane as and simulated emission. Einstein's A & B coefficients, Energy acts it radiation as a result of stimulated emission and absorption, population as a result of stimulated emission and absorption, population are in Methods of optical pumping, energy level schemes, He-Ne, Ruby, co-lasers Holography: Basic concepts of Holography, principle of holography. Theory,

construction and reconstruction of image, application of holography

Fiber Optics: Introduction of Optical Fiber, Necessity of Cladding, Optical fiber seems place fiber caple. Total internal Reflection, Explanation of Propagation of light time agn an optical fiber

Reference:

miles of Brit Lal & Subramanium, S. Chand.

2 Option DP Khandelwal

2. Principles of optics by B. K. Mathur.

- Introduction to Modern Optics by A. K. Ghatak.

5 Minduction to Modern Optics by G. R. Fowels.

h cosemias of Lasers by Allen

Dy Fogus of Rajasihan
University of Rajasihan
JAIPUR

SYLLABUS

SCHEME OF EXAMINATION AND COURSE OF STUDY

B.Sc. B. Ed. MATHEMATICS (ANNUAL SCHEME)

EXAMINATION 2019 ONWARDS

Rej Jai



Teaching: 3 Hours per Week per Theory Paper. 2 Hours per Week per Batch for Practical

(20 candidates in each batch)

Examination:

Scheme:	Min.Pass Marks Science – 54		Max. Marks
Paper - I	Discrete Mathematics	Duration 3 hrs.	Max.Marks 40 (Science)
Paper – II	Calculus	3 hrs.	40 (Science)
Paper – III	Analytic Geometry and Optimization Theory	3 hrs.	40 (Science)
Practical	Optimization Techniques	2 hrs.	30 (Science)
Note:			Asis

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- 1 Common paper will be set for both the Faculties of Social Science and Science. However, the marks obtained by the candidate in the case of Faculty of Social Science will be converted according to the ratio of the maximum marks of the papers in the two Faculties.
- 2. Each candidate is required to appear in the Practical examination to be conducted by internal and external examiners. External examiner will be appointed by the University and internal examiner will be appointed by the Principal in consultation with Local Head/Head. Department of Mathematics in the college.
- 3. An Internal/external examiner can conduct Practical Examination of not more than 100 (Hundred) Candidates.(20 candidates in each batch)
- Each candidate has to pass in Theory and Practical examinations separately 4.

Paper - 1: Discrete Mathematics Teaching: 3 Hours per Week Duration of Examination: 3 Hours

Max. Marks: 40 (Science)

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

Unit 1: Sets, Cardinality, Principal of inclusion and exclusion, Mathematical induction. Relations and Functions- Binary relations, Equivalence relations and Partitions, Partial ordered relations and Lattices. Chains and Antichains, Pigeon Hole principle.

Unit 2: Boolean Algebras- Lattices and Algebraic structure, Duality, Distributive and Complemented Lattices. Boolean Lattices. Boolean functions and expressions. Fundamental theorem of arithmetic, divisibility in Z. Congruences, Chinese Remainder Theorem, Euler's -function, primitive roots.

Unit 3: Logic and Propositional Calculus, Propositions, Simple and compound. Basic Logial operations, Truth tables, Tautologies and contradictions, Propositional Functions,

Discrete numeric functions and Generating functions. Recurrence relations and Recursive Linear Recurrence relations with constant coefficients. Homogeneous solutions. Particular solution. Total solution. Solution by the method of generating

Unit 4: Graphs - Basic terminology, Multigraphs, Weighted graphs, Paths and circuits. Shortest paths, Introduction to Eulerian and Hamiltonian Graphs, Travelling Salesman problem. Union, Join, Product and composition of graphs. Planar graphs and Geometric

Unit 5: Trees - Properties, Spanning tree, Binary and Rooted tree. Digraphs - Simple digraph, Asymmetric digraphs, Symmetric digraphs and complete digraphs. Digraph and Binary relations. Matrix representation of graphs and digraphs.

Reference Books:

 i_{j}

- 1. V.K.Balakrishnan, Introductory Discrete Mathematics, Prentice-Hall, 1996.
- 2. N. Deo, Graph Theory with Applications to Computer Science, Prentice-Hall of
- 3. S. Wiitala, Discrete Mathematics: A Unified Approach, McGraw-Hill Book Co.
- 4. J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill Book Co., 1995.
- 5. Ian Anderson, A First course in Combinatorial Mathematics, Springer, 1989
- 6. C.L. Liu, Elements of Discrete Mathematics, (Second Edition), McGraw Hill, International Edition, 1986.
- 7. Kenneth H. Roson, Discrete Mathematics and Its Applications, Tata Mc-Grave Hiils, New Delhi, 2003.

Paper- II: Calculus

Teaching: 3 Hours per Week

Duration of Examination : 3 Hours

Max. Marks: 40 (Science)

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

Unit 1: Series - Infinite series and Convergent series. Tests for convergence of a series -Comparison test, D'Alembert's ratio test, Cauchy's n-th root test, Raabe's test, De-Morgan-Bertrand's test, Cauchy's condensation test, Gauss's test, (Derivation of tests is not required). Alternating series. Absolute convergence. Taylor's theorem. Maclaurin's theorem. Power series expansion of a function. Power series expansion of sinx, cosx, ex. $\log_e(1+x), (1+x)^n$

Unit 2: Derivative of the length of an arc. Pedal equations. Curvature - Various formulae, Centre of curvature and Chord of curvature. Partial differentiation. Euler's theorem for homogeneous functions. Chain rule of partial differentiation. Total differentiation, Differentiation of implicit functions.

Unit 3: Envelopes and evolutes, Maxima and Minima of functions of two variables. Lagrange's method of undetermined multipliers. Asymptotes Multiple points. Curve tracing of standard curves (Cartesian and Polar curves).

Unit 4: Beta and Gamma functions. Reduction formulae (simple standard formulae). Double integrals in Cartesian and Polar Coordinates, Change of order of integration Triple integrals. Dirichlet's integral.

Unit 5: Areas, Rectification, Volumes and Surfaces of solids of revolution.

Reference Books:

- 1. Chandrika Prasad and Gorakh Prasad, A Text Book on Differential Calculus, Pothishala Pvt. Ltd., Allahabad, 1992.
- 2. Chandrika Prasad and Gorakh Prasad, A Text Book on Integral Appliculus, Pothishala Pvt. Ltd., Allahabad, 1992.
- 3. Shanti Narayan and P.K. Mittal, Differential Calculus, S. Chand & Co., N. D.,
- 4. Shanti Narayan and P.K. Mittal, Integral Calculus, S. Chand & Co., N. D., 2013
- 5. H.S.Dhami, Differential Calculus, Age Int. Ltd., New Delhi, 2012.
- 6. M. J. Strauss, G. L. Bradley and K. J. Smith, Calculus (3rd Edition), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education), Delhi, 2007
- 7. H. Anton, I. Bivens and S. Davis, Calculus (7th Edition), John Wiley and sens (Asia), Pt Ltd., Singapore, 2002.
- 8. G.B. Thomas, R. L. Finney, M. D. Weir, Calculus and Analytic Geometry, Pearson Education Ltd, 2003.

Paper-III: Analytic Geometry and Optimization Theory

Teaching: 3 Hours per Week

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Duration of Examination: 3 Hours

Max. Marks: 40 (Science)

Note: This paper is divided into FIVE Units. TWO questions will be set from each Unit. Candidates are required to attempt FIVE questions in all taking ONE question from each Unit. All questions carry equal marks.

Unit 1: Polar equation of conics, Polar equation of tangent, normal and asymptotes, chord of contact, auxiliary circle, director circle of conics

Unit 2: Sphere, Cone.

Unit 3: Cylinder, Central Conicoids - Ellipsoid, Hyperboloid of one and two sheets. tangent lines and tangent planes. Direct sphere, Normals.

Unit 4: Generating lines of hyperboloid of one sheet and its properties. Reduction of a general equation of second degree in three-dimensions to standard forms.

Unit 5: The linear programming problem. Basic solution. Some basic properties and theorems on convex sets. Fundamental theorem of L.P.P. Theory of simplex method only Duality, Fundamental theorem of duality, properties and elementary theorems on duality only.

Reference Books:

- S.L. Loney, The Elements of Coordinate Geometry, Macmillan and co-fiendon,
- 2. R.J.T. Bell, Elementary Treatise on Co-ordinate geometry of three dimensions, Macmillan India Ltd., 1994.
- 3. N.Saran and R.S.Gupta. Analytical geometry of Three Dimenssions. Pothishala Pvt. Ltd., Allahabad, 1992.
- 4. P.K. Jain and Khalil Ahmed, A Text Book of Analytical geometry of Three Dimenssions, Wiley-Eastern Ltd., 2000.
- 5. G. Hadley, Linear Programming, Narosa Publishing House, New Delhi, 2002
- 6. Hamdy A. Taha, Operations Research, An Introduction (9th edition): Prentice-Hall, 2010.

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Practical: Optimization Techniques Teaching: 2 Hours per Week

Examination:				
Scheme			Duration: 2 Hours	
Max Marks	Science Science			
Min.Pass Marks		30 10		Arts
Distribution of Marks:				40
Two Practicals one from each	ch group			13
io Marks each	= Broth	20 Marks	4.5	
Practical Record Viva-voce	=	05 Marks (13 Marks each)	(13 Marks each)	26
	:2	05 Marks		07
Total Marks	1	30 Marks		07
Crons A No.				40

Group A: Modelling of industrial and engineering problems into LPP and its dual and their

Group B: Modelling of industrial and engineering problems into Assignment Problems and Note: ı

- Problems will be solved by using Scientific Calculators (non-Programmable)
- Candidates must know about all functions and operations of Scientific Calculator 3
- Fach Candidate (Regular non-Collegiate) has to prepare his/her practical record
- Each Candidate has to pass in Practical and Theory examinations separately.