Maharaja Surajmal Brij University

Bharatpur (Rajasthan)

Syllabus

Faculty of Education

B.Ed. Integrated Programme (Four Year)

1st Year B.Sc. B.Ed.

Session (2024-25)

Dr. Surendra Singh

Dr. Farbat Singh
Asstt. Registrar
Acad.I

NOTICE

1. Change in syllabus/ordinance/rules/regulations/ syllabi and books may from time to ti ne, 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 Maharaja Surajmal Brij University head quarter Bharatpur only and not any other place.

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B.Sc. B.Ed PART - IV

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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 method 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.

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

Subject	Course Code	Title of the Paper	Evaluation			
			External	Internal	Practical	Total
01	B.Sc.- B.Ed. 01	Gen. English(Compulsory)*	100	-	-	100
02	B.Sc.-B.Ed. 02	Childhood and Growing Up	80	20	-	100
03	B.Sc.-B.Ed. 03	Contemporary India and Education	80	20	-	100
04	B.Sc.-B.Ed. 04	Instructional System & Educational Evaluation	80	20	-	100
05(i,ii,iii),06(i,ii,iii),,07(i,ii,iii)	B.Sc.-B.Ed 05, 06 & 07	Content (PCB & PCM Group) (Select any Three)				
		1. Chemistry (I,II,III)	33+33+34		50	150
		2. Botany (I,II,III)	33+33+34		50	150
		3. Zoology(I,II,III)	33 +33+34		50	150
		4. Physics (I,II,III)	33+33+34		50	150
		5. Mathematics(I,II,III)	40+40+40		30	150
						750

*ELIGIBILITY CRITERIAN & 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

Subject	Course Code	Title of the Paper	Evaluation			
			External	Internal	Practical	Total
08	B.Sc.-B.Ed. 08	Gen. Hindi(Compulsory)*	100	-	-	100
09	B.Sc.-B.Ed. 09	Knowledge and curriculum	80	20	-	100
10	B.Sc.-B.Ed. 10	Learning and Teaching	80	20	-	100
11	B.Sc.-B.Ed 11	Peace Education	80	20	-	100
12(i,ii,iii), 13(i,ii,iii), 14(i,ii,iii),	B.Sc.-B.Ed 12,13,14	Content (PCB & PCM Group) (Select any Three)				
		1. Chemistry(I,II,III)	33+33+34		50	150
		2. Botany (I,II,III)	33+33+34		50	150
		3. Zoology(I,II,III)	33+33+34		50	150
		4. Physics (I,II,III)	33+33+34		50	150
		5. Mathematics(I,II,III)	40+40+40		30	150
15 Practicum	B.Sc. - B.Ed ((Practicum)	OPEN AIR / SUPW CAMP				
		i. Community Service		25		100
		ii. Survey (Based on social and educational events)		25		
		iii. Co-Curricular Activities		25		
		iv. Health and Social awareness programme (DISASTER MANAGEMENT AND CLEANINESS)		25		
						750+100

*ELIGIBILITY CRITERIAN 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

Subject	Course Code	Title of the Paper	Evaluation			
			External	Internal	Practical	Total
16	B.Sc.- B.Ed. 16	Information & Communication (ICT)(Compulsory)*	100	-	-	100
17	B.Sc.- B.Ed.17	Language Across the Curriculum	80	20	-	100
18	B.Sc.-B.Ed 18	Guidance and Counseling in School	80	20		100
19(i,ii,iii), 20(i,ii,iii)., 21(i,ii,iii).	B.Sc.-B.Ed 19,20,21	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 33+33+34 40+40+40		 50 50 50 50 30	 150 150 150 150 150
22	B.Sc.-B.Ed 22	Pedagogy of a School Subject (candidate shall be required to offer any one papers from the following) 1.Mathematics 2. Physics 3. Chemistry 4. Biology 5. General Science	80	20		100
Practicum 23	B.Sc.-B.Ed 23	Special Training Programme • Micro Teaching • Practice Lesson • Observation Lesson • Technology Based Lesson • Criticism Lesson • Attendance /Seminar/ Workshop			 10 50 05 05 20 10	100
24	B.Sc.-B.Ed 24	Final Lesson	100			100
						750+100+100

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

Subject	Course Code	Title of the Paper	Evaluation			
			External	Internal	Practical	Total
25	B.Sc .-B.Ed.	Environmental Education(Compulsory)*	80	20	-	100
26	B.Sc - B.Ed. 26	Creating and inclusive school	80	20	-	100
27	B.Sc B.Ed. 27	Understanding Disciplines and Subject	80	20	-	100
28	B.Sc .-B.Ed. 28	Physical Education & Yoga	80	20	-	100
29	B.Sc -B.Ed. 29	Gender, School and Society	80	20	-	100
30	B.Sc -B.Ed. 30	Assessment for Learning	80	20	-	100
31	B.Sc- B.Ed. 31	Pedagogy of a School Subject (candidate shall be required to offer any one papers from the following) 1.Chemistry 2. Biology 3. Physics 4. Mathematics 5. General Science	80	20	-	100
Practicum 32	B.Sc- B.Ed. 32	1. Practice teaching 2. Block Teaching (Participation in School Activities Social Participation in Group) 3. Report of any feature of school / case study/action research 4. Criticism Lesson		50 20 10 20		100
33	B.Sc- B.Ed. 33	Final Lesson	100			100
						100

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

Compulsory subjects

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

Group – A	Group – B (PCB & PCM Group) (Select any Three subjects)
1. Instructional System & Educational 2. Peace Education 3.Guidance and Counseling in School 4. Physical Education & Yoga	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: Pedagogy of a School Subject IIIrd Year and IVth Year(candidate shall be required to offer any one papers in both year in following subjects).

Chemistry
Botany
Zoology
Physics
Mathematics

- In all the subjects the student has to study 7 subjects (1-7)in Ist year, 8 subjects(8-15) in IInd Year,9 subject (16-24)in IIIrd Year and 9 subjects(25-32) in IVth Year.
- Each theory paper will carry 100 marks and content based paper will carry 150 marks.(including practical part).

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	Subject	Marks
I Year	6 subjects (2-7)+Practical	600 +150= 750
II Year	6subjects(9-14)+Practical + SUPW(15)	600 +150+100= 850
III Year	6 subjects(17-22)+Practical + Practicum(23) +Final Lesson (24)	600 +150+ 100 +100= 950
IV Year	6 subject 26-31) + Practicum (33)+Final Lesson (34)	600+ 100 +100= 800
Total	33 subjects)	2400 +450+300 +200= 3350

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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 YearB.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

Examination after each session in theory papers

Scheme of Examination against each subject separately.

Compulsory Papers:

Year	Paper
Ist Year	Gen. English
IInd Year	Gen. Hindi
IIIrd Year	Elementary Computer Application (ICT)
IVth Year	Environmental Studies

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

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Group -A: - Subject specialisation :

Year	Paper
Ist Year	Instructional System & Educational
IInd Year	Peace Education
IIIrd Year	Guidance and Counselling in School
IVth Year	Physical Education & Yoga

Group-B: Content of Science Subject: - A Student has to opt 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

- In all the subjects the student has to study a minimum of 12 papers in Ist 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 :-

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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 curi· ity 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 pup ls.
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.

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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.
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 sciences, home-science, Geography and other 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, General Education, History of Indian Civilization and Culture. 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.

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ii. Only such candidate shall be allowed to offer Social Studies for the B.Sc.-B.Ed. Examination as have taken their running B.Sc.- B.Ed. course with any two subjects out of History, Political Science/Public Administration, Economics, Geography, Sociology, Philosophy / Psychology.

iii. A candidate who has offered Political Science or Public Administration at his Bachelor's or the Master's Degree Examination shall be deemed eligible to offer Civics as a teaching subject in the Integrated B.Sc.-B.Ed. Examination.

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 I 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.

O.326 Candidates who fail in the Integrated B.Sc.-B.Ed. examination part I and part 2 only 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.

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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 & II Year Paper nos. are 01, 02, 03, 04, 05 A/B, 06 A/B , 07 A/B. and (08* A/B only in III & IV Year) in each session are of three hours carrying 100 marks (80 for theory + 20 for sessional) each. II, II, IV Year.

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 and Criticism and Final Le on 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.
2. 40(20120) 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.S -B.Ed III Year each candidate should be prepared to teach one lessons at the final practice 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).

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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.

(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.

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B. A. Part I

1. English Literature

First Paper

Poetry and Drama

Duration: 3 hrs.

Max. Marks: 100
Minimum Pass Marks: 36

Objectives of the syllabus:

1. Developing an insight of brief background of the literary age and literary terms prescribed in the syllabus.
2. Interpretation and Appreciation of selected texts from the poetic works of the different poets of the given era.
3. Understanding the dramatic text & techniques and developing dramatic skill.

The pattern of question paper will be as follows:

1. There will be 10 (Ten) Questions in the paper. Each question will carry 20 (Twenty) Marks. Students will be required to answer any 05(Five) questions,
2. Question Nos, one and two will be compulsory and students will be required to answer three more questions selecting one question from each section (Sections 2.3 & 4)
3. Question no I will contain 10 short answer type questions based on Section I only. The students will be required to answer a y five (05) questions (carrying 04 marks each) in three to five lines.
4. Question no two will be based on Section two and three. The students will be required to explain any four out of eight extracts (carrying 05 marks each) with reference to context adding critical notes wherever necessary.

Section 1

1. History of English Literature from 1500 - 1745 (Social, political and economic background; major literary movements and chief characteristic features of the period: major writers and their works)
2. Literary terms: Sonnet, Lyric. Epic. Simile, Metaphor, Alliteration, Personification, Hyperbole, Conceit.

Section 2

1. Christopher Marlowe: The Passionate Shepherd to His Love
2. Edmund Spenser: Ice and Fire (Sonnet No. 30)
3. William Shakespeare: The Quality of Mercy is Not Strained
4. John Donne: The Sunne Rising

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5. John Milton: On His Blindness
6. Andrew Marvell: To His Coy Mistress
7. Alexander Pope: A Little Learning is a Dangerous Thing

Section 3

1. Sri Aurobindo Ghose: The Dreamboat
2. Toru Dutt: Our Casuarina Tree
3. Rabindra Nath Tagore: Leave This Chanting
4. Sarojini Naidu: Palanquin Bearers

Section 4

1. William Shakespeare: As You Like It (Non -Detailed Study)

Recommended Readings:

1. Arvind Singh : Galaxy of English Poetry Part-I
2. Hudson W. H: An Outline History of English Literature; G. Bell & Sons Limited, London.
3. Nayar Pramod K: A Shori History of English Literature; Foundation Books.
4. Abrams M. H. : A Glossary of Literary Terms.
5. Ford Boris ed: Pelican Guide to English Literature.

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B. A. Part 1

English Literature

Second Paper

Prose and Fiction

Duration: 3 hrs.

Max. Marks: 100

Minimum Pass Marks: 36

Objectives of the syllabus:

1. Reinforcing selected components of grammar and usage.
2. Interpretation and Appreciation of selected texts from the prose works of the different writers.
3. Understanding the fictional texts (Short and long) and techniques,

The pattern of question paper will be as follows:

1. There will be 10 (Ten) Questions in the paper. Each question will carry 20 (Twenty) Marks. Students will be required to answer any 05(Five) questions.
2. Question Nos. one and two will be compulsory and students will be required to answer three more questions selecting one from each section (Sections 2. 3 &4).
3. Question no 1 will be based on Section 1 only. The students will be required to answer any four (04) questions (carrying 05 marks each).
4. Question no two will be based on Section two and three. The students will be required to explain any four out of eight extracts (carrying 05 marks each) with reference to context adding critical notes wherever necessary.

Section 1

i. Basic knowledge of Parts of Speech (*Noun, Pronoun. Adjective. Verb. Adverb, Conjunction, Interjection, Preposition*)

ii. Punctuation

iii. Articles and Determiners

Section 2

1. Francis Bacon: Of Marriage and Single Life
2. Joseph Addison: Sir Roger at Home, Westminster Abbey
3. Richard Steele: The Spectator Club
4. Abraham Cowley: Of Avarice

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Section 3

1. Munshi Premchand: Poos Ki Raat
2. Edgar Allen Poe: The Black Cat
3. Leo Tolstoy: God Sees the Truth But waits
4. R N Tagore: Kabuliwala (The Fruitseller From Kabul)

Section 4

Daniel Defoe: Robinson Crusoe

Recommended Readings:

1. Arvind Singh : Galaxy of English Poetry Part-I
2. Hudson W. H: An Outline History of English Literature; G. Bell & Sons Limited, London.
3. Nayar Pramod K: A Short History of English Literature, Foundation Books
4. Ford Boris ed: Pelican Guide to English Literature
5. A. S. Hornby: A Guide to Patterns and Usage
6. Vandana R. Singh: The Written Word, OUP.

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i. William Wordsworth: Three Years She Grew in Sun and Shower
ii. Rupert Brooke: The Soldier
iii. RK Narayan: Dasi the Bridegroom
iv. Leo Tolstoy: How Much Land Does a Man Need?
v. O Henry: The Gift of the Magi
vi. A G Gardiner: All About a Dog
vii. John Bright: Peace

Section 4

Composition 30 Marks

Note: The Students will be required to answer any three out of four options.

i. CV and Job Application 10 Marks
ii. Letter Writing (Formal and Informal) 10 Marks
iii. Paragraph Writing 10 Marks
iv. Notice and Advertisement Writing 10 Marks

Described Book : A Pattern to General English by Arvind Singh & Shailendra

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7. 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.

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2. बी.ए. प्रथम वर्ष : हिन्दी साहित्य : प्रथम प्रश्न पत्र

आदिकाल एवं भावि काल

पूर्णांक : 100

अवधि : 3 घण्टे

1. विद्या पति – सम्पादक डॉ शिव प्रसाद सिंह, लोक भारती प्रकाशन, इलाहाबाद पद सं. 5, 8, 10, 19, 26, 36, 40
2. कबीर दास – कबीर प्रथांवली सं. श्याम सुन्दर दास, घाणी प्रकाशन सुमिरण कौ अग, प्रथम 20 साखी

   पद – 1 संतों भाई आई ग्वान आँधी

   2 मन रे जागति रहिये भाई

   3 पंडित वाद बवते झूठा

   4. काजी कौन कते बचानै

   5 मन रे तन कागद का पुतला

   6 अब मोहि राम भरोसा तेरा
3. जायसी – जासयी ग्रंथावली सम्पादक राम चन्द्र शुक्ल

   नागरी प्रचारिणी सभा पदनावत् से नागमती – संदेश खण्ड
4. सूरदास – भ्रमर गीतसार सम्पादक रामचन्द्र शुक्ल

   पद–7, 8, 10, 15, 20, 21, 36, 40, 42, 45, 52, 58, 64, 67, 71, 75, 116, 116, 120, 130
5. तुलसीदास – विनय पत्रिका – कला प्रेस गोरखपुर

   पद सं. 76 से 96 पल

   कवितावली अवेच्या काण्ड 7, 8, 9, 13, 18, 19, 20 पद
6. नन्ददास – भवरमीत

अंक विभाजन : व्याख्या – कुल चार (एक कवि से एक ही व्याख्या पूछी जायेगी आंतरिक विकल्प देय है। (4 x 10 = 40) अंक

ऑलोचनात्मक प्रश्न कुल चार (4 x 15 = 60) अंक। अंतिम प्रश्न टिप्पणीपरक होगा। कुल दो टिप्पणियाँ 7½ — 7½ अंको की पूछी जायेंगी। आन्तरिक विकल्प देय होगा।

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बी.ए. प्रथम वर्ष : हिन्दी साहित्य : द्वितीय प्रश्न पत्र
गद्य साहित्य – कहानी , नाटक एवं एकांकी

पूर्णांक : 100 अवधि : 3 घण्टे

1. कहानीचन्द्र घर शर्मा गुलेरी

उसने कहा था	–	चन्द्र धर शर्मा गुलेरी
पूस की रात	–	प्रेम चन्द्र
आकाश दीप	–	जय शंकर प्रसाद
खेल	–	जैनेन्द्र
परदा	–	अमर कांत
दोपहर का भोजन	–	यशपाल
चीफ की दावत	–	भीष्म कहानी
भूख	–	चित्रा गुद्गल
गदल	–	शंघेय राघव

2. नाटक — वीर शिरोमणि महाराजा सूरज मल (ऐतिहासिक नाटक) लेखक कुँबर पुष्कर सिंह, प्रकाशक भगवती प्रकाशन, पुराने बिजली घर के सामने, सरतपुर

3. एकाकी

कॉदी महोत्सव	–	राम कुमार वर्मा
उपेन्द्र नाथ अश्क	–	तौलिए
जगदीश चन्द्र नाथुर	–	भोर का तारा
लक्ष्मी नारायण लाल	–	व्यक्तिगत

भुवनेश्वर – श्यामा : एक वैवाहिक विडम्बना

अंक विभाजन : व्याख्या – कुल चार व्याख्याऐं (एक पाठ से एक ही व्याख्या अनिवार्य है) आंतरिक विकल्प देय है। (4 x 10 = 40) अंक आलोचनात्मक प्रश्न–कुल चार (4 x 15 = 60) अंक। आलोचनात्मक अंतिम प्रश्न टिप्पणीपरक होगा। कुल दो टिप्पणियाँ 7½ — 7½ अंको की पूछी जायेंगी। आन्तरिक विकल्प देय होगा।

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सहायक पुस्तकें –

रामचन्द्र तिवारी	–	हिन्दी का गद्य साहित्य
रामविलास शर्मा	–	प्रेमचन्द और उनका युग
ानवर सिंह	–	कहानी नयी कहानी
देवी शंकर अवस्थी	–	हिन्दी कहानी संवर्ग और प्रकृति
रामकुमार वर्मा	–	एकांकी कला
दशरथ ओझा	–	हिन्दी नाटक उद्‌भव और विकास
जगन्नाथ शर्मा	–	जयशंकर प्रसाद के नाटकों का शास्त्रीय अध्ययन

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B.A. - B.E.d - 02
Childhood and Growing up

Objectives: Marks - 100

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;
- Child psychology; meaning, concept

Unit 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

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
- Personality: concept and nature, theories of personality, assessment of personality
- Individual differences: concept, areas

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Unit 4: Learning to Learn

- 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 misbehaviour.

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. 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, 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
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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)

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B.A.-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.
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
- 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.

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.

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.

Unit - IV: Programme and Policies

- Overview the development of education system in India from 1948 to 2010 University Education Commission-1946-48, Secondary Education

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Commission-1952-53, Indian Education Commission, 1964-66, National Education Policy- 1986

- Rammurthy Committee (1990), Yashpal Committee Report (1993) Revised National Education Policy (1992) NCF-2005, NKC-2006, NCFTE- 2009, RTE-2010.

Unit -V : Innovative P~actices

- 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 VideoConferencing, Eduset, Smart Class Room, Role of E- learning, E- content, E-magazines and E-journals, E- library.

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.

REFERENCES :

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2. Agrawal, J.C: Land Marks in the History of Modern Indian Education, New Delhi 2. Brubeche1, 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)'Human Rights a Source Book, New Delhi, NCERT, Pp. 233.
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7. अग्निहोत्री रवीन्द्र '-आधुनिक भारतीय शिक्षा समस्याएँ और समाधान राजस्थान हिन्दी ग्रन्थ 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.
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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.
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19. National Curriculum Framework. (2005).
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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.
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25. Varghese, A. (2000) Education for the Third Millennium, Indore: Satprachar Press
26. अल्तेकर, अ.स. : प्राचीन भारतीय शिक्षा पद्धति।
27. ओड, एल. के. : शिक्षा के नूतन आयाम, राजस्थान हिन्दी ग्रंथ अकादमी, जयपुर।
28. गुप्ता, एस. पी एवं अलका गुप्ता रू 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 : भारतीय शिक्षा और उसकी समस्याएं, रस्तोगी पब्लिकेशन्स, मेरठ। साथिन संदर्भ सामग्री पुस्तिका : महिला एवं बाल विकास विभाग, राज. सरकार, जयपुर।

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B.A.- 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 psycho motor)

Unit II: Need, importance and characteristics

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

Unit III: Approaches to Evaluation

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

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

- 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:

  a) Instructional purpose b) Guidance purpose c) Administrative purpose
- Meaning of Norms, types of Norms, age, Grade, Percentile and standard score.

4. Norms and interpretation of test scores.

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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 an achievement test and its blue print.

References:

1. Anastasi, Anne, (1976), Psychological Testing, 4m ed., New York; Macmillan 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.
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B.Sc. Part I, Session 2020-21
Chemistry

Scheme:

Max Marks: 150

	Duration (hrs.)	Max. Marks	Min. Pass Marks
Paper1	3	33	
Paper-II	3	33	36
Paper-III	3	34	
Practical	5	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.

CH-101 Paper I : Inorganic Chemistry
(2 hrs or 3 periods/ week)

Unit-I

Ionic Solids: Ionic s ictures, 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.

Unit-II

Covalent Bond: Directional and Shapes of simple inorganic molecules and ions. Valence shell electron pair repulsion (VSEPR) theory to NH_3, H_3O^+, SF_4, ClF_3, ICl_2^-, H_2O.

Molecular Orbital Theory: Homonuclear and heteronuclear (CO and NO) diatomic molecules, bond strength and bond energy, percentage Ionic character from dipole moment. electronegativ y difference.

Unit-III

S-Block Elements: Comparative study, diagonal relationships, salient features of hydrides, solvation, an introduction of 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, electro negativity, diagonal relationship, catenation.

Unit-IV

Some Important Compounds of p-block Elements: Hydrides of boron, diborane and higher hornnes, horazine, borazine, fullerenes, carbides, (structural principle), basic properties of halo ns, interhalogens.

Chemistry of Noble Gases: Chemical properties of the noble gases, chemistry of Xenon, structure and bonding in Xenon compounds.

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Unit- V

Nuclear Chemistry: Fundamental particles of nucleus (nucleons); Concept of nuclides and its representation; Isotopes, Isobars and Isotones (with specific examples);

Radiochemistry: Natural and artificial radioactivity; Radioactive disintegration series; Radioactive displacement law; Radioactivity decay rates: Half life and average life; Nuclear binding energy, Nuclear fission and fusion.

CH-102 Paper II : Organic Chemistry

(2 hrs or 3 periods / week)

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.

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. Chiral and achiral molecules with two stereogenic centres. Diastereomers, threo and erythro isomers, meso compounds. Resolution of enantiomers. Inversion, retention and racemization (with examples).

Relative and Geometric Isomerism determination of Configuration of Geometric Isomers cis/trans and E / Z systems of nomenclature.

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

Unit-III

Alkanes and Cycloalkanes : 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, Chemical reactions of alkenes - mechanisms involved in hydrogenation, electrophilic and free radical additions. Markownikoff's rule, hydroboration-oxidation, oxymercurarion-reduction. Epoxidation, ozonolysis, hydration, hydroxylation and oxidation with $KMnO_4$ Polymerization of Alkenes.

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Unit-IV

Arenes and Aromaticity: 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 pi-complexes. Mechanism of nitration, halogenation, sulphonation. Friedel-Crafts reactions and chloromethylation. Activating and deactivating substituents. Directive influence - orientation and ortho/para ratio.

Unit-V

Alkyl and Aryl Halides: Methods of formation of alkyl halides, chemical reactions. Mechanisms of nucleophilic substitution reactions of alkyl halides S_N2 and S_N1 reactions with energy profile diagrams.

Polyhalogen compounds: Chloroform, carbon tetrachloride.

CH-103 Paper III: Physical Chemistry

(2 hrs. or 3 Periods/week)

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 :

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

Unit- II

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

Critical Phenomenon: PV isotherms of real gases, the isotherms of van der walls equation, relationship between critical constants and van der walls 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. 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 Determinatioin of Crys. structure of NaCl and powder method.

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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 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 reactions - differential method, method of integration, method of half-life period and isolation method.

Theories of chemical kinetics. Effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy. Simple collision theory based on hard sphere model transition state theory (equilibrium hypothesis).

Practical: CH-104: Laboratory Course -I

(4 hrs or 6 periods / week)

(Instructions of the Examiners)

CHY 104 : Chemistry Practical (Pass Course)

Max. Marks : 50 **Duration of Exam : 5 hrs.** **Minimum Pass Marks : 18**

Inorganic Chemistry		
Ex.1.	Separation and identification of 3 cations and 3 anions in the mixture	15
Organic Chemistry		
Ex.2	Laboratory Techniques	3
Ex.3	Qualitative Analysis Detection of element and detection of functional group	10
Physical Chemistry		
Ex.4	Perform one of the experiments mentioned in the syllabus	12
Ex.5	Viva-voce	5
Ex.6	Record	5
	Total	50

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B.Sc. Part-I
BOTANY

Scheme:

Max Mark: 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
Duration of examination of each theory paper		3 hours
Duration of examination of practicals		4 hours

Note:

1. 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 20 very short answer type Questions (not more than 20 words) of half marks each covering entire syllabus.
3. Each paper is divided into four units. There will be one question from each unit. These Q.No. 2 to 5 will have internal choice.

B.Sc. Part 1
Paper-I
ALGAE, LICHEN AND BRYOPHYTA

Unit-I

General characters, Diverse Habitat. Range of thallus structure, Photosynthetic pigments and Food reserves. Reproduction (Vegetative, Asexual, Sexual), Types of life cycles: Economic Importance.

Unit-2

Type Studies

Cyanophyceae - Oscillatoria

Chlorophyceae- Volvox, Chara.

Xanthophyceae

Phaeophyceae - Ectocarpus.

Rhodophyceae- Polysiphonia.

Unit-3

General characters, Habitat, Range of thallus structure. Reproduction (Vegetative and Sexual); Alternation of generations; Economic importance.

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Unit-4

Type Studies

Hepaticopsida - Marchantia.

Anthocerotopsida - Anthoceros.

Bryopsida - Funaria

Lichens- General characters, Habitat, Structure, Reproduction, Economic and Ecological importance of Lichens.

Suggested Laboratory Exercises :

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

Suggested Readings :

1. Bold.H.C. Alexopoulous. C.J. and Delivoryas, T Morphology of Plant and Fungi (4th Ed.) Harper & Foul Co, New work, 1980.
2. Ghemawat, M.S. Kapoor, J.N. and Narayan, H.S. A text Book of Algae, Ramesh Book Depot, Jaipur, 1976.
3. Gilbart, M; Smith. Crypogamic Botany, Vol. I & II (2nd Ed.) Tata McGraw Hill. Publishing Co., Ltd., New Delhi, 1985.
4. Kumar, H.D. : Introductory Phycology, Affiliated East-West Press, Ltd. New York, 1988.
5. Puri. P.: Bryophytes, Atmaram & Sons, Delhi, Luchnow, 1985.
6. Sarabhai. R.C. and Saxana, R.C. : A text book of Botany. Vol I & II, Ratan Prakashan Mandir, Meerut, 1980.
7. Singh, V., Pande, P.C. and Jain, D.K.: A text book of Botany, Rastogi. & Co., Meerut, 2001.
8. Vashista, B.R.: Botany for Degree Students (Algae, Bryophytes) S.Chand & Co., New Delhi, 2003

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Paper II

Microbiology, Mycology and Plant Pathology

Unit-I

Microbiology: Meaning and scope,

Eubacteria: General account, occurrence, morphology (structured and shapes), flagella, capsule, nutritional types, endospore, reproduction (binary fission, transformation, conjugation, transduction), economic and biological importance.

Mycoplasma and Phytoplasma: occurrence, morphology, reproduction and importance.

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

Unit-II

Fungi: General characters, occurrence, thallus organization, reproduction, economic importance.

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, Peziza.

Unit - III

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

Puccinia and Black rust of wheat: loose smut of wheat and covered smut of barley: Alternaria and early blight of potato.

Unit-IV

Causes and symptoms of plant diseases with special reference to green ear disease of Bajra, smut of wheat, citrus canker, little leaf of brinjal.

Suggested Laboratory Exercises:

1. Study of bacteria using curd or any other suitable material, Gram's staining of bacteria.
2. Study of Mycoplasma, TMV, bacteriophage (Photographs/3-D models).
3. Study of symptoms of plant diseases- Downy mildew of Bajra, Green ear of bajra, Powdery mildew.
4. Study of specimen, permanent slides and by making suitable temporary slides. Albugo white rust; Sclerospora-downy mildew, green ear; Aspergillus; Claviceps- ergot; Peziza, Ustilago-Loose smut of wheat, covered smut of barley, Puccinia- Black rust of wheat: Agaricus 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 Mims, C.W. : Introductory Mycology, John Wiley and Sons, New York, 2000.
- Dube, H.C.:Fungi Rastogi Publication, Meerut, 1989.
- Sarabhai, R.C. and Saxena, R.C.: A Text book of Botany, Rastogi Publication, Meerut, 1990.
- Sharma, O.P: Fungi, Today and Tomorrow Printers and Publishers, New Delhi, 2000.
- Vashihsta. B.R. Botany for degree students- Fungi, S.Chand & Co. New Delhi. 2001.
- Bilgrami, K.S. and Dube, H.C.: A Text book of modern plant Pathology, Vikas Publications, New Delhi 2000.
- Biswas, S.B. and Biswasa: An Introduction to Viruses, Vikas Publications, New Delhi 2000
- Clifton, A.: Introduction of Bacteria, McGraw Hill co. Ltd., New York, 1985.
- Madahar. C.L.. Introduction of Plants Virus. S.Chand and Co., New Delhi. 1978.
- Palzar M.J. Jr. Chan, E.C.S. and Krieg, N.R.: Microbiology, McGraw hill Edu. Pvt. Ltd., London 2001.
- Purohit, S.S : Microbiology, Agro. Bot. Publication, Jodhpur 2002.
- Sharma, P.D. : Microbiology and Pathology, Rastogi Publication, Meerut, 2003.
- Singh. V. and Srivastava V. : Introduction of Bacteria. Vikas Publication, 1998.
- Cappuccino, J. and Sherman, N.: Microbiology: A Laboratory Manual (10 Th Ed.), Benjamin Cummings, 2013
- Aneja. K.R. Experiments in Microbiology, Plant Pathology and Biotechnology New age International (P) Ltd., Publishers, New Delhi 2003.
- Mehrotra, R.S. and Aggarwal, Ashok: Plant Pathology, Tata McGraw-Hill Education, 2003.

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B.Sc. Part-I

BOTANY: PAPER III- CELL BIOLOGY, GENETICS AND PLANT BREEDING

Unit I: Cell organelles and Nuclear material:

Ultrastructure and function of different cell organelles (cell wall, plasma membrane, nucleus, mitochondria, chloroplast, ribosome). Chromatin structure and chromosome organisation: eukaryotic and prokaryotic, Transposons.

Unit-2: Cell divisions

Cell Cycle, Mitosis: stages, structure and functions of spindle apparatus, anaphasic chromosom movement; Meiosis: its different stages- meiosis I, meiosis II, synaptonemal complex.

Basis of genetic material: Griffith's transformation experiment and the Hershey and Chase blender experiment to demonstrate DNA as the genetic material.

Extra nuclear genome: Mitochondrial and chloroplast genome, plasmids.

Chromosomal aberrations: Deletion, Duplication, Translocation, Inversion, Aneuploidy and Polyploidy.

Unit-3: Genetic Inheritance

Mendel's laws of inheritance and their exceptions: allelic (incomplete and co-dominance, lethality) and non-allelic interactions complementary genes, epistasis and duplicate genes).

Cytoplasmic inheritance: Maternal influence, shell coiling in snails.

Unit-4 : Plant Breeding

Introduction and objectives of plant breeding, general methods of plant breeding-in selfpollinated, cross-pollinated and vegetatively propagated crop plants. Introduction and acclimatization, selections, hybridizations, hybrid vigour and inbreeding depression. Role of mutation and polyploidy in plant breeding. Famous Indian and international plant breeders and their contribution.

Suggested Laboratory Exercises:

- Study of cell structure from Onion, Hydrilla and Spirogyra
- Study of cyclosis in Tradescantia spp.
- Study of plastid for pigment distribution in Lycopersicon, 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.

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- 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 & Tagging techniques.
- Cross pollination Techniques.

Suggested Readings:

- Choudhary, H.K. (1989), Elementary Principles of Plant Breeding. Oxford and IBM Publishing Co, New Delhi.
- Gupta. P.K. (2009) Cytology, Genetics Evolution and Plant Breeding, Rastogi Publications, Meerut.
- Miglani, GS (2000), Advanced Genetics, Narosa Publishing House, New Delhi.
- Russel, PI.(1998). Genetics The Benejamins/Cummings Publishing Co., Inc. U.S.A.
- Shukla, R.S and chandel, P.S. (2000) Cytogenetics, Evolution and Plant Breeding, S.Chand & Co. Ltd. New Delhi.
- Singh, R.B.(1999), Text Book of Plant Breeding, Kalyani Publishers, Ludhiana.
- Dnyansagar. VR. (1986). Cytology and Genetics, Tata McGraw Hill Pub. Co. Ltd. New.
- Roy.SC. and De. KK. (1999) Cell Biology. New Central Book Agency (P)Ltd.Calcutta.
- Verma. PS and Agarwal, VK (2012) Cell Biology, Genetics, Molecular Biology, Evolution and Ecology, S.Chand and Co. Ltd. New Delhi.

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B.Sc. Part I
ZOOLOGY

Scheme:

Max Mark: 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
Practical	4 Hrs duration	50 Marks

NOTE:

1. 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) very short answer (Maximum 25 Marks) type questions, each of 1 mark. This part is compulsory to attempt Question 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 will be required to attempt any 4 questions selecting at least one question from each unit/section. Each question will carry 5 marks.
2. The candidate has to answer all question in the main answer book only.

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PAPER - I: Z-101
DIVERSITY OF ANIMAL AND EVOLUTION NOTE:-

1. 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) very short answer (Maximum 25 Marks) type questions, each of mark. This part is compulsory to attempt Question 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 will be required to attempt any 4 questions selecting at least one question from each unit/section. Each question will carry 6 marks.
2. The candidate has to answer all question in the main answer book only.

Section - A

Diversity of Animals

1. Adaptation of animal and their modes of life and the environment. Reason of depletion of biodiversity and conservative measures of biodiversity wherever required.

   Continental drift.

Section - B

Biosystematic and Taxonomy

1. Concept of Protozoa and Metazoa, and levels of organisation.
2. Taxonomy and basis of classification of non-chordata and chordate: symmetry, coelom, segmentation and embryogeny.
3. Detailed classification of non-chordata and Chordata (up to sub orders with examples).

Section - C

Evolution

1. History of evolutionary thoughts(Lamarckism and Darwinism).
2. Natural selection, speciation.
3. Variation, isolation and adaptations.
4. Study of extinct forms: Dinosaurs, Archaeopteryx.

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PAPER - II: Z-102
CELL BIOLOGY AND GENI

NOTE:

1. There will be two parts of this theory question paper with a total duration of 3 hours. First part of question paper will comprise of question No. 1 containing 9 very short Answer (Maximum 25 Marks) type questions, each of 1 mark. This part is compulsory to attempt Question 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 will be required to attempt any 4 questions selecting at least one question from each unit/section. Each question will carry 6 marks.
2. The candidate has to answer all questions in the main answer book only.

Section - A

Cell Biology

1. Introduction to cell; Morphology, size, shape, characteristics and structure of prokaryotic and eukaryotic animal cell; basis idea of virus and cell theory.
2. Cell membrane; Characteristics of cell membrane molecules, fluid-mosaic model of Singer and Nicholson, concept of unit membrane.
3. Cytoplasmic organelles:
   (i) Structure and biogenesis of mitochondria; electron transport chain and generation of ATP molecules.
   (ii) Structure and function of endoplasmic reticulum, ribosome (prokaryotic and eukaryotic) and Golgi complex.
   (iii) Structure and function of lysosome, microbodies and centrioles.
   (iv) Structure and function of cilia, flagella, microvilli and cytoskeletal elements.

Section - B

Nuclear Organization:

(i) Structure and function of Nuclear envelope, nuclear matrix and nucleolus.
(ii) Chromosoms; Morphology, chromonema, chromomers, telomeres, primary and secondary constrictions, chromatids, prokaryotic chromosome.
(iii) Giant chromosome types; Poletene and Lampbrush.
(iv) Chromosomal organisation; Euchromatin, heterochromatin and folded fiber model and nucleosome concept.

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2. **Nucleic Acids:**
   (i) DNA structure, polymorphism (A, B and Z types) and replication (semi conservative mechanism) experiments of Messelson and Stahl; elementary idea about polymerases, topoisomerases, single strand binding proteins, replicating forks (both unidirectional bidirectional). leading and lagging strands, RNA primers and Okazaki fragments, elementary idea about DNA repair.
   (ii) RNA structur' and types (mRNA, rRNA and tRNA and transcription.

3. **Cell in reproduction**
   (i) Interphase nucleus and cell cycle: S, G-1, G-2 and M phase.
   (ii) Mitosis: Different stages, structure and function of spindle apparatus; anaphasic movement.
   (iii) Meiosis: Different stages, synapses and synaptonemal complex, formation of chiasmata and significance of crossing over.

Section - C

Genetics :

1. Mendelism: Brief history of genetics and Mendel;s work; Mendelian laws. their significance and current status, chromosomal theory of inheritance.
2. Linkage and crossing over, elementary idea of chromosome mapping.
3. Multiple genes inheritance, ABO blood groups and Rh factor and their significance.
4. Cytoplasmic inheritance.
5. Sex determination in Drosophila and man, pedigree analysis. Genetic disorders; Down's Turner's and Klinefelter's syndromes, color blindness. Hemophilia, Phenylketonuria.

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PAPER - III: Z-103
GAMETE AND DEVELOPMENTAL BIOLOGY

NOTE:

1. There will be two parts of this theory question paper with a total duration of 3 hours. First part of question paper will comprise of question No. 1 containing 9 very short Answer (Maximum 25 Marks) type questions, each of 1 mark. This part is compulsory to attempt Question 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 will be required to attempt any 4 questions selecting at least one question from each unit/section. Each question will carry 6 marks.
2. The candidate has to answer all questions in the main answer book only.

Section - A

Developmental Biology: Scope and Early Events

1. Gametogenesis:
   (i) Formation of ova and sperm.
   (ii) Vitellogenesis.
2. Fertilisation: Activation of ovum, essence of activation: Changes in the organization of the egg cytoplasm.
3. Parthenogenesis.

Section - B

Developmental Biology Pattern and Processes

1. 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.
3. Embrynonic induction, primary organizer, Differentiation and competence.
4. Embryonic adaptations:
   (i) Extra embryonic membranes in chick, their development and functions.
   (ii) Placentation in Mammals: Definition, types, classification on the basis of morphology and histology, functions of placenta.
   (iii) Paedogenesis and neoteny.

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Section - C

Dimensions in Developmental Biology

1. Regeneration.
2. Various type of stem cells and their applications.
3. Cloning of animals
   (i) Nuclear transfer technique.
   (ii) Embryo transfer technique.
4. Biology of aging.

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Zoology Practical

Min. Marks: 18 | 4 Hrs./Week | Max. Marks:50

I Microscopic Techniques:

1. Organisation and working of Optical Microscope, Dissecting and Compound microscopes.
2. General methods of microscopic slide preparations; narcotization; fixing and preservation; washing; staining; destaining; dehydration; clearing and mounting; General idea of composition, preparation and use of:
   (i) Fixatives: Formalin, Bouin's fluid.
   (ii) Stains: Aceto-carmine, Aceto-orcein, Haematoxylin-Eosin, Giemsa.
   (iii) Common reagents: Normal saline, Acid water, Acid alcohol and Mayer's albumin.
3. Collection and Culture Methods:
   (i) Collection of Animals from their natural habitat during field tips such as Amoeba, Paramecium, Euglena, Planaria, Daphnia, Cyclops, etc.
   (ii) Culture of Paramecium in the laboratory and study of its structure life - process and behavior in live state.
   (iv) Vermicomposting (Theory and Practice).

II. Study of Microscopic Slides and Museum Specimens:

Protozoa: Amoeba, Euglena, Trypanosoma, Giardia, Entamoeba, Elphidium(Polystomella). Foraminiferous shells, Monocystis, Plasmodium, Paramecium, 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.

Platyhelmninthes: Taenia, Planaria, Fasciola, (W.M.) T.S. body of Fasciola through various regions. Miracidium, Sporocyst, Redia, Cercaria and Metacercaria Larvae of Fasciola, Scolex, T.S. mature proglottid of Taenia. Cysticercus larva.

Aschelminthes: Ascaris, Wuchereria, Dracunculus.

III. Biodiversity: Appliances used in Biodiversity study.

Nature trails, water sieving.

Discovery hunt in college campus/university campus/Forest reserves/sanctuaries/National Park.

Biodiversity survey:

Insect count on vegetation; Bird counts with general information on survey methods. Preparation of fact sheet of common wild life found in your campus/area.

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IV. Fields visits/Excursion to wild life areas.

(i. A candidate is expected to submit a written report of the visit. ii. No protected animal be harmed in any way).

V. Study of the following Through Permanent Slide Preparation: Paramecium Eug ena, Foraminiferous shells, Sponge spicules. Spongin fibres, Gemmule, Hydra, Obelia colony and Medusa; Parapodium of Nerics and Heteronereis, Cyclops, Daphnia.

VI. Exercise in Cell Biology:

1. Squash preparation for the study of mitosis in onion root tip.
2. Squash preparation for the study of meiosis in grasshopper or cockroach testis.
3. Study of giant chromosomes in salivery glands of chironomous or Drosophila larva,
4. Study of cell permealibillity using mammalian R.B.C.
5. Permanent slides of mitosis and meiosis (all stages).

VII. Exercise 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).
4. Study of permanent prepared slides: Sex comb and salivary gland chromosomes.

VIII. Developmental Biology:

1. Study of development of frog/toad with the help of Chart/ Slides/Models:

(i) Eggs, cleavage, blastula, gastrula, neurula, tail-bud, hatching, mature tadpole larvae, metamorphic stages, toadlet/ froglet.

(ii) Histological slides: Cleavage, blastula, gastrula, neurula and tail-bud stage.

2. Study of development of chick with the help of whole mounts/Charts/Slides/Models.

(i) 18 hrs. 21 hrs, 24 hrs, 33 hrs, 48 hrs, 72 hrs and 96 hrs of incubation.

(ii) Primitive streak stage in living embryo, if possible, after removal of the blastoderm from the egg.

(iii) Study of the embryo at various stages of incubation in vivo by making a window in the egg-shell.

(iv) Study of various foetal membranes in a 10-12 day old chick embryo.

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Scheme of Practical Examination and Distribution of Marks

Time: 4 Hrs. **Min Pass Marks: 18** **Max. Marks : 50**

	Regular	Ex./N.C. Student
Study of Biodiversity	06	4
Permanent Preparation	04	7
Cell Biology and Genetics	4+4	6+6
Developmental Biology	6	6
Identification and Comments on Spots (1 to 8)	16	16
Viva Voce	5	5
Class Record	5	-
	50	50

Notes:

1. With reference to study of museum specimens and developmental Biology. candidate must be well versed in the study of various systems with the help of chart/models/CDROMs, multimedia computer based simulations including computer assisted learning (CAL) and other softwares.
2. With reference to permanent preparations and microscopic slides, in case of nonavailability, the exercise should be substituted with diagrams. photographs, models, charts etc. Candidates must keep a records of all work done in the practical class and submit the same fro the inspection of the time of the practical examination.
3. The candidates may be asked to write detailed methodology wherever necessary and separate marks may be allocated for the same.
4. Mounting material for permanent preparation would be as per the syllabus or as available through collection and culture methods. It should be ensure that animal used in the practical exercises are not covered under the wild life act 1972 and amendments made subsequently.

Recommended Books:

1. Balinsky B. I. and Fabain BC Intoduction to Embryology. CENGAGE Learning 2012.
2. Barrington EJW: The Biology of Hemichordata and Protpchordata. Oliver & Boyd. London 1965.
3. Berril N J: Development Biology. Tata McGraw Hill 1971.

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4. Colberts EH : Evolution of the Vertebrates:2nd edition John Wiley & Sons. New York 1969.
5. Colbert EH. Morales M. Minkoff EC. Colberts Evolution of the Vertebrates: A History of the Backboned Animal Through Time 5th edition Wiley Liss 2001.
6. Costanzo LS: Physiology. 4th edition Saunders Inc 2009.
7. Davenport R: An outline of Animal Development Addison-Wesley Longman Inc 1979.
8. De Robertis EDP and De Robertic Jr EMF, Cell and Molecular Biology. 8th edition Lippincor Williams & Wilkins 2006.
9. Gasque: CD Manual of Laboratory, Experience Cell Biology Mc Graw-Hill Professional publishing 1989.
10. Gilbert SF and Singer SR: Development Biology. Sinauer Associates: 9th addition 2010.
11. Lodish H, berk A, Kaiser CA, Krieger M, Bertscher A, Ploegh H, Amon A, scott MP: Molecular Cell Biology 6th edition W.H. Freeman and Company, New Yark, 2008.
12. Lodish H, Berk A. Keiser CA, Kriser M, Bertscher Lodish H, Berk A. Matsudaira, P, Kaiser CA, Krieger M, Scott MP, Zipursky SL, Darnell J: Molecular Cell Biology.5th addition W.H. freeman and Company. New York 2004.
12. Lodish H, Berk A, Zipursky SL, Matsudaira P, Baltimore D., Darnell J: Molecular Cell Biology 4 th addition W.H. freeman and Company. New York 2000.
14. Morgan DD The Cell Cycle: Principal of Control, Sinauer/Panima Books 2007.
15. Petsko GA and Ringe D: Protein structure and function Sinauer/Panima Books 2004.
16. Rao KV Development Biology: A Modern synthesis. Oxford and IBH publishing 1994.
17. Rastogi VB Animal Distribution, Evolution and development Biology. Kedar Nath Ram Nath Educational Publisher.
18. Rastogi VB Evolutionary Biology Kedar Nath Ram Nath Educational Publisher.
19. Singh SP and Tomar BS: Cell Biology 10th edition Rastogi , Publication Meerut New Delhi. 1971
20. Snustad DP and Simmons MJ. Principle of genetics 4th eddition John Wile & Sons Inc. 2005.

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21. Verma PS. A manual of Practical Zoology: invertebrates. S. Chand & Co Ltd New Delhi 1971.
22. Verma PS & Agrawal VK: Chordate Embrylogy: Development Biology. S. Chand & Com Ltd 2012
23. Verma PS & Agrawal VK: Cell Biology, Genetic Molecular Biology. Evolution and Ecology. 14th addition S. Chand 2004.
24. Winchester AM: An introduction to genetics Barners & Noble. Canada, 2002.
25. Winchester AM: Genetics: A survey of principal of Ilcredity Oxford & IBH Publishing Co. 1967.
26. Winchester AM: Human Genetics: Ohio Charles E. Merrill Publishing Co. 1971.
27. Trigunayat, M.M. & Kritika Trigunayat, A manual of practical Zoology, Part-I Scientific Publishers, Jodhpur.
28. एम.एम. त्रिगुणायत व कृतिका त्रिगुणायत, प्रायोगिक मैन्युअल भाग-1 साईंटिफिक पब्लिशर्स जोधपुर (राज.)

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B. A./B. Sc. Part I Examination - 2021

MATHEMATICS

Paper-I Discrete Mathematics (Topics to be deleted)

Unit-I: Permutation: product of two permutations, even and odd permutations, inverse of permutations, cyclic permutations, Permutation groups.

Unit-II: hand shaking property, Operations on graphs, Isomorphism, Hamiltonian cycles and Hamiltonian graphs, Dikstra algorithm.

Unit-III: Graph colouring, Chromatic number, Map colouring, Five colour theorem Spanning tree in weighted graphs, Kruskal's algorithm and Prim's algorithm to find minimal spanning tree in a weighted graph.

Unit-IV: Fundamental theorem of arithmetic, divisibility in Z, Congruences, Chinese Remainder Theorem.

Unit-V: **Logic and propositional calculus-** propositions, basic logical operations, truth tables, tautologies and contradictions, quantifiers.

Paper-II Advanced Calculus (Topics to be deleted)

Unit-I: **Successive Differentiation-** n" derivative of single variable functions, Leibnitz's theorem, Expansion of functions Using Maiclaurin's theorem.

Unit-II: **Polar Coordinates** - Angle between radius vector and tangent, length of perpendicular from pole to the tangent, polar sub tangent and subnormal,

Unit-III: **Maxima and Minima of functions of two or three variables-** Lagrange's condition for two independent variables, Lagrange's method of undetermined multipliers.

Unit-IV: **Triple integrals** - Evaluation of triple integrals, Dirichlet's formula for triple integrals.

Unit-V: **Volume and Surfaces of solids of revolution,** Puppus theorem, Use of triple integrals to find volumes.

Paper-III Coordinate Geometry and Vector Calculus (Topics to be deleted)

Unit-I: Ellipse and Hyperbola

Unit-II: Representation of cone by a general equation second degree, Tangent plane, Reciprocal cone, Right circular cone.

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Unit-III: Pole and Polar planes, Enveloping cone and enveloping cylinder, Normals to conicoids, Diameter and diametral planes.

Unit-IV: **Reduction of general equation of second degree**-principal planes and princi al directions, centre of a conicoid , canonical forms, transfer of origin and rotation of coordinate axes for canonical form.

Unit-V: Gauss and Stock's theorems(no proofs are required) and their applications.

Practical (Topics to be deleted)

Group-A: Tracing of Cartesian and polar two dimensional curves.

Group-B: Classification and Tracing of conics representing by general equation of second degree $ax^2+2hxy+by^2+2gx+2fy+c=0$

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B.Sc, Part 1

1. Physics

Paper I	Exam. 3 Hours Duration	Max. Marks 33	Min. Pass Marks 12
Paper II	Exam. 3 Hours Duration	Max. Marks 33	Min. Pass Marks 12
Paper III	Exam. 3 Hours Duration	Max. Marks 33	Min. Pass Marks 12
Practical	Exam. 5 Hours Duration	Max. Marks 50	Min. Pass Marks 18

Paper-I (Mechanics)

Work Load: Two hours lecture per week

Examination Duration: 3 Hrs.

Scheme of Examination: Five questions shall be set and all are compulsory First question shall contain 12 short answer type questions (3 questions from each unit) of one mark each with answer to each question not exceeding 50 words Candidates have to attempt any nine questions out of these 12 questions. Remaining four questions will be of 6 marks each and will be set with one question from each unit Second to fitin questions will have 100% internal choice.

Unit - I

Physical Law and frame of Reference:

Inertial and non-inertial frames: Transformation of displacement, velocity, acceleration between different frames of reference involving translation, Galilean transformation and invariance of Newton's laws.

Coriolis Force: Transformation of displacement velocity and acceleration between rotating frame, Pseudo forces, Coriolis force. Motion relative to earth.

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 inclastic). Slowing down of neutrons in a moderator, Angular momentum concept, conservation and charge particle scattering by a nucleus.

Rigid body

Equation of a motion of a rotating body, Inertial coefficient. Case of not parallel to ω Kinetic energy of rotation and idea of principal axes. Determination of moment of inertia of symmetric bodies using inertial coefficients.

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Unit-III

Motion under Central Forces :

Introduction about Central Forces, Motion under central forces, Gravitational interaction Inertial and gravitational mass, General solution under gravitational interaction, Keplers Laws, Discussion of trajectories, Cases of elliptical and circular orbits.

Elastic Properties of Matter

Elastic constants and relations among them, Elastic theorems, Bending of beams and cantilever, Torsion of a cylinder, Experimental determination of Y by bending of beam; η by Maxwell's needle, Y, η and σ by Searle's method & η by static method.

Unit - IV

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.

Driven Harmonic Oscillations

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

Reference Books:

1. Mechanics Berkeley Physics Course Vol-1, Charles Kittel
2. Mechanics HS Hans S P Puri, Tata McGraw-Hill
3. The Physics of Waves & Oscillations. N.K. Bajaj, Tata McGraw-Hill
4. Analytical Mechanics L N Hand, J.D. Finch (Cambridge University Press)

Paper - II (Electromagnetism)

Work Load: Two hours lecture per week

Examination Duration: Three hours

Scheme of Examination: Five questions shall be set and all are compulsory. First question shall contain 12 short answer type questions (3 questions from each unit) of one mark each with answer to each question not exceeding 50 words. Candidates have to attempt any nine questions out of these 12 questions. Remaining four questions will be of 6 marks each and will be set with one question from each unit Second to fifth questions will have 100% internal choice.

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Unit I

Scalar and Vector Fields Concept of Field, Scalar and Vector Fields :

Gradient of scalar field, Physical significance and formulism of Gradient, Divergence and Curl of a vector field in Cartesian co-ordinates system, Problems based on Gradient, Divergence and curl operators.

Concept of Solid angle, Gauss's divergence and Stokes theorem, Differential and integral form of Gauss's law, Ampere's law and Faraday's law.

Unit II

Fields of stationary and moving charges

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

Poisson's and Laplace equations in Cartesian co-ordinates and their applications to solve the one dimensional problems of electrostatics.

Unit - III

Electric field in matter

Multipole expansion, definition of moments of charge distribution, Dielectrics, Induced dipole moments, polar & non polar molecules, Free and bound charges, Polarization, Atomic polarizabilty, electric displacement vector, electric susceptibility, dielectric constant, relation between them.

Electric potential and electric field due to a uniformly polarized sphere (1) outside the sphere (ii) at the surface of the sphere (ill) inside the sphere, Electric field due to a dielectric sphere placed in a uniform electric field (a) outside the sphere (b) inside the sphere, Electric field.

due to a charge placed in dielectric medium and Gauss law, Transient behavior of series R-C Circuit with a DC Source.

Unit IV

Magnetostatics and magnetic field in matter

Lorentz force, properties of magnetic field. Ampere's law, magnetic field due to a current carrying solid conducting cylinder outside (i) at the surface and (1) inside the cylinder, Ampere's law in differential form. Introduction of Magnetic Vector potential, Poisson's equation for vector potential, Deduction of Bio-Savart law using Magnetic Vector potentials, Differential form of Ampere's law, Transient behavior of series LR Circuit with a DC Source.

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Intensity of Magnetization, Magnetic permeability and Susceptibility, free and bound current densities, Magnetic field due to a uniformly magnetized material and Non-uniformly magnetized material

Reference Books:

1. Electricity & Ma gnetism, AS Mahajan & Abbas A Rangwala, Tata McGra w-Hill
2. Introduction to electrodynamics, David J Griffith Prentice Hall
3. Berkley Physics Course Vol II
4. Fundamental University Physics Vol II: Fields and Waves M. Alonso and E.J Finn: Addrson-Wesley Publishing Company.

Paper III OPTICS

Work Load: Two hours lecture per week

Examination Duration: Three hours

Scheme of Examination: Five questions shall be set and all are compulsory. First question shall contain 12 short answer type questions (3 questions from each unit) of one mark each with answer to each question not exceeding 50 words Candidates have to attempt any ten questions out of these 12 questions. Remaining four questions will be of 6 marks each and will be set with one question from each unit Second to fifth question will have 100% internal choice.

Unit 1

Interference:

Interference by division of amplitude: Interference in thin films of constant thickness in transmitted and reflected waves Interference produced by a wedge shaped film, Newton's rings, Determination of wavelength and refractive index u by Newton's Rings: fringes of equal inclination (Haidinger fringes) and equal thickness (Fizeau fringes), Michelson's Interferometer, shape of fringes, Measurement of wavelength, difference between two spectral lines and thickness of a thin transparent sheet.

Unit -2

Fresnel's Diffraction:

Fraunhofer diffraction by N 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 resolution, Resolving power of a Telescope and a Grating.

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Unit - 3

Polarization:

Polarization, Plane, Circular and Elliptically Polarized light, Polarization by reflection Double refraction and Huygens explanation of double refraction. Production and detection of Plane, Circular and Elliptically Polarized light: Quarter wave and Half wave plates, optical activity. Specific rotation, Biquartz.

(i) LASER: Spontaneous and Stimulated emission Einstein's A&B coefficients Energy density of radiation as a result of stimulated emission and absorption, population Inversion. Methods of Optical pumping, Ruby.

(ii) Holography: Basic concepts of holography, Principle. Theory. Construction and reconstructio · of image. Application of holography.

Unit -4

Wave motion:

ID and 3D wave equation, Transverse waves in a stretched string Elastic waves in solids Pressure waves in a gas column, spherical waves. Phase and group velocities. Dispersion of waves. Electromagnetic waves, Energy density of Electromagnetic waves, Electromagnetic waves in an Isotropic and Dispersive medium.

Reference Books:

1. Optics by Brij La' & Subramanium, S. Chand.
2. Optics by D P Khandelwal.
3. Principles of optics by B K. Mathur.
4. Introduction to Modem Optics by A K. Ghatak.
5. An introduction to Modent Optics by G.R Fowels.
6. Essentials of Lasers by Allen.

Practical

Work Load Four hou s laboratory work per week

Examination Duration: Four hours

Minimum Experiments: Total sixteen taking eight from each section.

Perform Any Six experiments from section A/B

1. To study the variation of power transfer by two different loads by a DC source and to verify maximum power transfer theorem.
2. To study the variation of charge and current in a R-C circuit with a different time constant (using a DC source).
3. To study the behavior of a R-C circuit with varying resistance and capacitance using at mains as a power Source and also to determine the impedance and phase relations.

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4. To study the rise and decay of current in an L-R circuit with a source of constant emf.
5. To study the voltage and current behavior of an L-R circuit with an AC power source. Also determine power factor, impedance and phase relations.
6. To study the characteristics of a semi-conductor junction diode and determine forward and reverse resistances.
7. To study the magnetic field along the axis of a current carrying circular coil. Plot the necessary graph and hence find radius of the circular coil.
8. To determine the specific resistance of a material and determine difference between two small resistance using Carey Fosters Bridge.
9. To convert a galvanometer into an ammeter of a given range.
10. To convert a galvanometer into a voltmeter of a given range.

Section B

1. To study the random decay and determine the decay constant using the statistical board.
2. Using compound pendulum study the variation of time period with amplitude in large board angle Oscillations.
3. To study the damping using compound pendulum.
4. To study the excitation of normal modes and measure frequency splitting using two coupled oscillators.
5. To study the frequency of energy transfer as a function of coupling strength using coupled oscillators,
6. To study the viscous fluid damping of a compound pendulum and determining damping coefficient and Q of the oscillator.
7. To study the electromagnetic damping of a compound pendulum and to find the variation of damping coefficients with the assistance of a conducting lamina.
8. To find J by Callendar and Barne's Method.
9. To determine Youngs modulus by bending of beam.
10. To determine Y, σ and η by Searle's method'.
11. To ensure Curie temperature of Monel alloy.
12. To determine modulus of rigidity of a wire using Maxwell's needle.
13. Study of normal modes of a coupled pendulum system, Study of oscillations in mixed modes ar find the period of energy exchange between the two oscillators.
14. To study variation of surface tension with temperature using Jaeggers method.
15. To study the specific-rotation of sugar solution by polarimeter.

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Blue print for setting question paper I & II for B.Sc. part I Physics Examination - 2018

First question is compulsory and is of 10 marks. This question contains 12 short answer type

questions of one mark each. Candidates have to attempt any 10 questions with answer not more than 50 words Second to fifth questions are of six marks each with internal choice.

प्रथम प्रश्न अनिवार्य है और यह 10 अंक का है। इस प्रश्न के अन्तर्गत 12 लघुत्तरात्मक प्रश्न है जिनमें से कोई भी 10 प्रश्न हल करने है जिनका उत्तर 50 शब्दों से अधिक न हो। प्रश्न संख्या 2 से 5 तक प्रत्येक प्रश्न 6 अंक का है जिसमें आन्तरिक विकल्प है।

1. पचास शब्द सीमा में नौ भागों के उत्तर दीजिए।

(i)	(ii)	(iii)	(iv)
(v)	(vi)	(vi)	(viii)
(ix)	(x)	(xi)	(xii)

Unit – I प्रथम इकाई

2. (a)
   (b)

Or/अथवा

   (a)
   (b)

Unit – II द्वितीय इकाई

3. (a)
   (b)

Or/अथवा

   (a)
   (b)

Unit – III तृतीय इकाई

4. (a)
   (b)

Or/अथवा

   (a)
   (b)

Unit – IV चतुर्थ इकाई

5. (a)
   (b)

Or/अथवा

   (a)
   (b)

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Blueprint for setting question paper III for B.Sc. part I Physics Examination - 2018

First question is compulsory and is of 9 marks. This question contains 12 short answer type

questions of one mark each. Candidates have to attempt any 9 questions with answer not more than 50 words Second to fifth questions are of six marks each with internal choice.

प्रथम प्रश्न अनिवार्य है और यह 9 अंक का है। इस प्रश्न के अन्तर्गत 12 लघुत्तरात्मक प्रश्न है जिनमें से कोई भी 9 प्रश्न हल करने है जिनका उत्तर 50 शब्दों से अधिक न हो। प्रश्न संख्या 2 से 5 तक प्रत्येक प्रश्न 6 अंक का है जिसमें आन्तरिक विकल्प है।

1. पचास शब्द सीमा में नौ भागों के उत्तर दीजिए।

(i)	(ii)	(iii)	(iv)
(v)	(vi)	(vi)	(viii)
(ix)	(x)	(xi)	(xii)

Unit – I प्रथम इकाई

2. (a)
   (b)

   Or/अथवा

   (a)
   (b)

Unit – II द्वितीय इकाई

3. (a)
   (b)

   Or/अथवा

   (a)
   (b)

Unit – III तृतीय इकाई

4. (a)
   (b)

   Or/अथवा

   (a)
   (b)

Unit – IV चतुर्थ इकाई

5. (a)
   (b)

   Or/अथवा

   (a)
   (b)

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