MAHARAJA SURAJMAL BRIJ UNIVERSITY

BHARATPUR

SYLLABUS

B. Sc. Part-I, Examination

Faculty of Science

1. Physics
2. Chemistry
3. Zoology
4. Botany
5. Mathematics
6. Economics
7. Geography
8. Psychology

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भरतपुर (राज.)

CONTENTS

Syllabus B.Sc. Part-I :

DISTRIBUTION OF MARKS

Compulsory Subjects

Sr. No	Name of the Subject	No. of Paper	Duration	Max. Marks	Total Marks	Min. Pass Marks
1	*2*	3	4	5	6	7
1	*सामान्य हिन्दी (General Hindi)*	One Paper	3hrs.	100	100	36
2	General English(Communication Skill in English)	One Paper	3hrs.	100	100	36
3	Environmental Studies Theory	Theory	2 hrs.	100	100	36
4	Elementary Computer Application	Theory	2 hrs.	60	100	36
		Practical	**2 hrs.**	**40**		

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Sr. No	Name of the Subject	No. of Paper	Duration	Max. Marks	Total Marks	Min. Pass Marks
1.	Physics	Paper I	3 hrs.	33	150	36
		Paper II	3 hrs.	33		
		Theory Paper III	3 hrs.	34		
		Practical Paper III	5 hrs.	50		18
2.	Chemistry	Paper I	3 hrs.	33	150	36
		Paper II	3 hrs.	33		
		Theory Paper III	3 hrs.	34		
		Practical Paper III	5 hrs.	50		18
3.	Zoology	Paper I	3 hrs.	33	150	36
		Paper II	3 hrs.	33		
		Theory Paper III	3 hrs.	34		
		Practical Paper III	5 hrs.	50		18
4.	Botany	Paper I	3 hrs.	33	150	36
		Paper II	3 hrs.	33		
		Theory Paper III	3 hrs.	34		
		Practical Paper III	5 hrs.	50		18
5.	Mathematics	Paper I	3 hrs.	40	150	54
		Paper II	3 hrs.	40		
		Theory Paper III	3 hrs.	40		
		Practical Paper III	2 hrs.	30		
6.	Economics	Paper I	3 hrs.	~~50~~ 75	~~150~~ 200	~~72~~
		Paper II	3 hrs.	~~50~~ 75	~~150~~	~~54~~ 54
		Practical Paper III	3 hrs.	50		
7.	Geography	Paper I	3 hrs.	50	150	54
		Paper II	3 hrs.	50		
		Practical Paper III	3 hrs.	50		
8.	Psychology	Paper I	3 hrs.	50	150	54
		Paper II	3 hrs.	50		
		Practical Paper III	3 hrs.	50		

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SCHEMEOF EXAMINATION

B.Sc. (Pass Course) Part- I

The number of paper and the maximum marks for each paper together with the minimum marks required for a pass are shown in the scheme of examination against each subject separately. It will be necessary for a candidate to pass in theory part as well as the practical part of a subject / paper, wherever prescribed, separately. Classification of successful candidates shall be as follows:

First Division	60%	Of the aggregate prescribed at (a) part First Examination excluding those obtained in the Compulsory subject (b) part second Examination Taken together.
Second Division	48%	

All the rest will be declared to have passed the examination, if they obtain a minimum pass mark in each subject viz. 36%. No division shall be awarded at the Part I and Part II Examinations.

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3a

सामान्य हिन्दी

पूर्णांक 100 | समय 3 घण्टे | न्यूनतम उत्तीर्णांक 36

नोट : 36 से कम अंक आने पर छात्रों को उत्तीर्ण नहीं किया जायेगा। इस प्रश्न–पत्र में प्राप्त अंकों को श्रेणी निर्धारण हेतु नहीं जोड़ा जायेगा।

अंक विभाजन – प्रश्न पत्र में दो भाग होंगे – 1. साहित्य खण्ड एवं 2. व्याकरण खण्ड। साहित्य खण्ड में दो भाग होंगे– गद्य भाग एवं पद्य भाग। प्रत्येक भाग के लिए 25 अंक निर्धारित हैं।

		50 अंक
क	दो व्याख्या पद्य से (प्रत्येक में विकल्प देना है)	5 x 2 = 10 अंक
ख	दो व्याख्या गद्य से (प्रत्येक में विकल्प देना है)	5 x 2 = 10 अंक
ग	आलोचनात्मक प्रश्न पद्य से (विकल्प देना है)	7½ x 2 = 15 अंक
घ	आलोचनात्मक प्रश्न गद्य से (विकल्प देना है)	7½ x 2 = 15 अंक

व्याकरण / व्यावहारिक हिन्दी खण्ड		25 अंक
i.	निबंध लेखन – शब्द सीमा 300 शब्द	8 अंक
ii.	कार्यालयी लेख – शासकीय–अर्द्धशासकीय पत्र, परिपत्र, अधिसूचना, कार्यालय ज्ञापन, विज्ञप्ति,कार्यालय आदेश।	4x2 = 8 अंक
iii.	संक्षेपण (विकल्प देना है)	5 अंक
iv.	पल्लवन (विकल्प देना है)	4 अंक
v.	शब्द निर्माण की प्रविधि – उपसर्ग, प्रत्यय, संधि, समास	5 अंक
vi.	वाक्य शुद्धि / शब्द शुद्धि	5 अंक
vii.	मुहावरे	5 अंक
viii.	पारिभाषिक शब्दावली	5 अंक
ix.	व्याकरणिक कोटियां –संज्ञा, सर्वनाम, विशेषण, क्रिया,क्रिया विशेषण	5 अंक

साहित्य खण्ड : गद्य–पद्य की निर्धारित रचनाएँ

गद्य भाग – निम्नांकित पाठ निर्धारित हैं –

1.	कहानी	:	बड़े घर की बेटी (प्रेमचंद)
2.	संस्मरण	:	प्रणाम (महादेवी वर्मा)
3.	रेखाचित्र	:	बाईस वर्ष बाद (बनारसीदास चतुर्वेदी)
4.	विज्ञान	:	शनि सबसे सुन्दर ग्रह (गुणाकर मुळे)
5.	निबंध	:	गेहूँ और गुलाब (रामवृक्ष बेनीपुरी)
6.	निबंध	:	सूखे चेहरों का भूगोल (मणिमधुकर)
7.	निबंध	:	मजदूरी और प्रेम (सरदार पूर्ण सिंह)
8.	निबंध	:	राजस्थान की सांस्कृतिक धरोहर (अगरचंद नाहटा)
9.	निबंध	:	राष्ट्र का स्वरूप (वासुदेव शरण अग्रवाल)
10.	व्यंग्य	:	ठिठुरता हुआ गणतंत्र (हरिशंकर परसाई)

पद्य भाग –

1. कबीर– 1. मन रे ! जागत रहिये भाई
   2. हमारे राम रहीम करीमा केसौ, अलह राम सति सोई।
   3. काजी कौन कतेब बखानै।
   4. मन रे! हरि भजि, हरि भजि हरि भजि भाई।
   5. है मन भजन कौ प्रवान

   संदर्भ : कबीर ग्रंथावली–श्यामसुंदरदास
2. सूरदास 1. किलकत कान्ह घटुरुवनि आवत
   2. मुरली तऊ गोपालहिं भावत
   3. देखौ माई सुन्दरता कौ सागर

4. जसोदा बार बार यौं भाखै
5. चित दै सुनौ स्याम प्रवीन

3. तुलसीदास
   1. कबहुँक अंब अवसर पाई
   2. अबलौं नसानी अब न नसैहौं
   3. मोहि मूढ़ मन बहुत बियोगौ
   4. ऐसौ को उदार जग मांही
   5. मन पछितैहैं अवसर बीते

   संदर्भ : विनय पत्रिका, गीता प्रेस गोरखपुर

4. रहीम
   पद
   1. छवि भावन मोहनलाल की
   2. कमल दल नैननि की उनमानि

   दोहा
   1. प्रीतम छवि नैननि बसी
   2. बसि कुसंग चाहत कुसल
   3. रहिमन अंसुआ नैंन ढरि
   4. रहिमन ओछे नरन सौं बैर भलौ ना प्रीति
   5. रहिमन निज मन की बिथा
   6. काज परै कछु और है
   7. खैर खून खाँसी, खुसी बैर प्रीति मदपान
   8. दादुर मोर किसान मन लग्यो रहे घन माँहि
   9. पावस देखि रहीम मन कोइल साधै मौन
   10. रहिमन बिगरी आदि को बनै न खरचे दाम।

   संदर्भ : रहीम ग्रन्थावली, विद्यानिवास मिश्र

5. पदमाकर : कवित्त
   1. कूलन में केलिन में कछारन में कुंजन में
   2. और भाँति कुंजन में गुंजरित भौंर भीर
   3. पात बिनु कीन्हे ऐसी भांति गुन बेलिन के
   4. चितै चितै चारों ओर चौंकि चौंकि परै त्योंहीं

   सवैया
   5. या अनुराग की लखौं जहँ.....
   6. फाग के भीर अभीरन में गहि गोविन्द लै गई भीतर गोरी।

6. मैथिलीशरण गुप्त
   साकेत – अष्टमसर्ग से
   कैकेयी का अनुताप
   तदनन्तर बैठी सभा उटज के आगे .....
   सौ बार धन्य वह एक लाल की माई।

7. प्रसाद : कामायनी, श्रद्धासर्ग – कहा आगन्तुक ने सस्नेह ..विजयिनी मानवता हो जाय।

8. पंत : 1. प्रथम रश्मि छन्द 1–13
   2. भारत माता

9. निराला: 1. भारती जय विजय करे
   2. बादल राग –1
   3. दलित जन पर करो करुणा
   4. फिर नभ घन घहराये।

10. रामधारी सिंह दिनकर –रश्मिरथी–तृतीय सर्ग –आरंभिक अंश
    सच्चे शूरमा
    सच है विपत्ति जब आती है ..... क्या कर सकती चिनगारी है।

B. A. / B. Sc. / B. Com. Part I

2. General English

Duration: 3 hrs. **Max. Marks: 100**

Minimum Pass Marks: 36

Objectives of the Syllabus:

1. Strengthening the vocabulary of the students.
2. Reinforcing selected components of grammar and usage.
3. Enabling the students' comprehension skills of poetry, prose and short stories.
4. Develop compositional skills.

The pattern of the question paper will be as following:

SECTION 1

Vocabulary: 20 Marks

Note: The students will be required to answer any four out of five options

i.	Synonyms	05 Marks
ii.	Antonyms	05 Marks
iii.	Homonyms	05 Marks
iv.	One Word Substitution	05 Marks
v.	Phrasal Verbs	05 Marks

Section 2

Grammar and Usage **20 Marks**

Note: The students will be required to answer any four out of five options

i.	Sequence of Tense	05 Marks
ii.	Prepositions	05 Marks
iii.	Modal Auxiliaries	05 Marks
iv.	Articles	05 Marks
v.	Transformation of Sentences (Narration, Voice, Interchange of Degrees of Comparison)	05 Marks

1. लता शर्मा 2. सुरेश शर्मा 3. [illegible] 4. [illegible]

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Section 3

Comprehension **30 Marks**

Note: *A. There will be an extract from the prescribed texts for comprehension.* **10 Marks**

B. There will be seven questions (based on the prescribed texts) to be answered in three to five lines. The students will be required to answer any five. **20 Marks**

i.	William Wordsworth:	Three Years She Grew in Sun and Shower
ii.	Rupert Brooke:	The Soldier
iii.	R K 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.	C V 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

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

1. लता शर्मा 2. [illegible] 3. [illegible] 4. [illegible]

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3. COMPULSORY PAPER OF ENVIRONMENTAL STUDIES

Compulsory in I Year for all streams at undergraduate level

Scheme of examination

Time	Min Marks	Max. Marks
3 hrs	36	100

This paper will contain 100 multiple choice questions. Each question will carry 1 mark.

Students should be encouraged to visit places of Environmental Importance including Natural and Manmade Habitat.

Note:

1. The marks secured in this paper shall not be counted in awarding the division to a candidate.
2. The candidates will have to clear this compulsory paper in three chances.
3. Non-appearing or absence in the examination of compulsory paper will be counted as a chance.

Unit.1: The Multidisciplinary nature of environmental studies

Definition, scope and importance- Relationship between Environmental Studies and other branches of science and social sciences.

Need for Environmental awareness, Environmental education in present day context.

Unit.2: Natural Resources and Challenges

a. Natural resources and associated problems, Classification of resources: renewable resources,non renewable resources, classes of earth resources, resources regions: Definition and criteria, resource conservation.

b. Forest resources: Use and over- exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.

c. Water resources: Use and over-utilization of surface and groundwater, floods, drought conflicts over water, dams-benefits and problems.

d. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

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e. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticides problems, water logging, salinity, case studies.

f. Energy resources: Growing energy need, renewable and nonrenewable energy sources, use of alternate energy sources. Case studies.

g. Land resources: Land as a resource, Land degradation man induced Landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Unit 3: Ecosystems, Concepts, Structure, Functions and Types

- Concept of an ecosystem
- Structure and function of an ecosystem
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids
- Introduction, types characteristics features, structure and function of the following ecosystem:

a. Forest ecosystem, Tropical Temperate and Alpine Ecosystem
b. Grassland ecosystem and Their Types
c. Desert ecosystem with emphasis on Thar Desert
d. Aquatic ecosystems(ponds, streams, lakes, rivers, oceans, estuaries) and Wet Lands

Unit 4: Biodiversity and its conservation

- Introduction –Definition, genetic, species and ecosystem diversity
- Biogeographically classification of India
- Value of biodiversity :consumptive use, productive use, social ethical., aesthetic and option values
- Biodiversity at global, National and local level
- India as a mega-diversity nation
- Hot-sport of biodiversity
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts
- Endangered, Threatened and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity
- Red Data Book

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Unit 5 : Environmental Pollution and Control Measures

Definition

- Causes, effects and control measures of:

a) Air Pollution
b) Water Pollution
c) Soil Pollution
d) Marine Pollution
e) Noise Pollution
f) Thermal Pollution
g) Nuclear Hazards

- Solid waste management" Causes, effects and control measures of urban and industrial wastes
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods earthquake, cyclone and landslides

Unit 6 : Social issues, Environment, Laws and Sustainability

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies
- Environmental ethics: Issues and possible solution.
- Climate change, global warming, acid rain ozone layer depletion, nuclear accidents and holocaust. Case studies
- Wasteland reclamation.
- Consumerism and waste product.
- Environmental Protection Act.
- Air (Prevention and Control of Pollution)Act
- Wild life protection Act
- Forest Conservation Act
- Biological Diversity Act
- Issues involved in enforcement of environmental legislation
- Public Awareness.

Unit 7: Human Population and the Environment

- Population growth, variation among nations
- Population explosion-Family Welfare Programme
- Environment and Human health
- Human Rights
- Value Education
- HIV/AIDS
- Women and Child Welfare
- Role of Information Technology in Environment and human healt
- Case Studies

Suggested Readings:-

1. Chauhan, Surendra Singh. 2001. Biodiversity, Biopiracy and Biopolitics: The Global Perspectives, Kalinga Publications, New Delhi.
2. Chauhan, Surendra Singh. 2004. Environmental Protection and Management: From Stockholm to Rio and After, Kalinga Publications, New Delhi.
3. Diwan A.P. and Arora D.K.1995. Human Ecology Anmol Publication Pvt.Ltd.,New Delhi.
4. Dubey, R.M.1992. Human Ecology and Environmental Education,Chaugh Publications,Allahabad.
5. Goudie,Andrew.The Human Impact.
6. Husain Maxia.1994 Human Geography,Rawat Publication,Jaipur.
7. Johnston, R.J.Ed.1986 Dictionary of Human geography,National Publication,New Delhi.
8. Malik,S.L.and Bhattacharya D.K.1986. Aspects of Human Ecology,Northern Book Center,New Delhi.
9. Mishra,R.P and Bhooshan,B.S.1979.Human Settlements in Asia.Public,Polices and programmes Haritage publisher,New Delhi.
10. Nathawat, G.S.1985. Human Ecology,An Indian perspective,Indian Human Ecology Council,Jaipur.
11. Russel, Bartrand, 1976.Impact of Science of society Unwin,Publisher,Indian. (paper back).
12. Sinha Rajiv, 1996.Gloobal Biodiversity Ina.,Shri publication,Jaipur.
13. Sinha Rajiv K., 1994. Development without Desertrction
14. Environmentalist,Jaipur. Sinha Rajiv K., 1996.Environmental Crises and Human at Risk,In A Shri Publication,Jaipur.
15. Smith, Dlanne, 1984.Urban Ecology,George Allen,London.
16. Swarnkar, R.C.1985.Indian Tribes.Printwell publisher,Jaipur.
17. Tivy,Joy and O'Hugegreg,1985.Human Impact on the Ecosystem Edinburgh George Allen Boyd.
18. United Nations Development Report, 1996.Human Development Report, 1996.Oxford University Press,Delhi.
19. Vannathony & Rogers Paul, 1974. Human Ecology and World Development,Flehum Press,New York.

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4. Syllabus of Elementary Computer Applications (B.Sc.)

Work load: Teaching: 2 hours per week.
Practical: 2 hours per week.
Max Marks: 100 (Main University Exam: Theory -60 Marks Practical-40 Marks)

Each candidate has to pass in Theory and Practical Examinations separately.

Main University Examination: Question pattern for Theory paper Max Marks: 60

Part -1 (very short answer) consists 10 questions of one marks each with two questions from each unit. Maximum limit for each question is up to 20 words.

Part – II (short answer) consists 5 question of two marks each with one questions from each unit. Maximum limit for each questions is up to 40 words.

Part-III (Long answer) consists 5 questions of eight marks each withy one questions from each unit with internal choice maximum limit for each question is up to 400 words.

Unit- 1

Introduction to information Technology. Evolution and generation fo computers, type of computer, micro mini mainframe and super computer . Architecture of a computer system CPU ALU, Memory (RAM.ROM families) cache memory. Input /output device, pointing devices.

Concept of Operating system need types of operating systems, batch single user, multi-processing distributed and timeshared operating system. Introduction to Unix, Linux, Windows Windows NT Programming languages ow level and high level languages,generation of languages, 3 GL and 4 GL languages, Graphics User Interfaces

Unit –II

Word Processing Tool. Introduction C reating, Saving. Copy, Move and Delete. Checking Spelling and Grammer. Page 1 ayout ,interface, toolbars, ruler menus ,keyboard shortcut, editing. Text Formatting insert header and footer, Bullets and Numbering, Find and Replace etc, Insert Table and Picture, Micro, Mail Merge.

Power point: Creating and viewing a presentation managing slide shows.navigating through a presention using hyperliks advanced navigation with action setting and action buttons. Organizing formats with Master Slides applying and modifying designs, adding graphics, multimedia and special effects.

Unit-III

Electronic Spreadsheet Worksheet basics , create , save and open a worksheet. Entering data text. Numbers and formula in a worksheet. Inserting and deleting cells formatting inserting rows and columns in worksheet formatting worksheet using various formula and inbuilt functions update worksheets using special tools like speel check and auto correct etc Margins of worksheets for printing, Format the data in the worksheet globally or selectively. Creating charts. Enhance worksheets using charts, multiple worksheets concepts.

Unit IV

The Internet and Functions of the Internet, working with Internet, Web Browser, Word Wide Web Uniforms Resource Locater and Domain Names, Uses of Internet, Search fro Information , Email, Chatting , Instant messenger sevices, News Group, Teleconferecing, Vedio- Conferencing, E- Commerce and M-Commerce

Manage an E-mail Account, E-mail Address configure E-mail Account.log to an E-mail, Receive E-mail, Sending mails, sending files an attachments and address Book. Downloading Files. Online form filling, E-Service – E-anking and E- Learning.

Unit- V

Social, Ethical and Legal Matters- Effects on the way we: Work Socialise, Operate in other areas.

Cyber crime, prevention of crime. Cyber law : Indian IT Act, Intellectual property, Software piracy. Copyright and Patent. Software licensing, Proprietary software. Free and Open souce software.

Network Security. Risk assessment and security measures, Assets and types (data applications. System and network), Security threats and attacks (passive, active), types and effect (e.g Identity theft. Denial of service. Computer virus etc), Security issues and security measures (Firewalls, encryption/decryption),Prevention.

Question Paper pattern for main University Practical Examination Max Marks: 40

Practical

The Practical exercises will be designed to help in the understading of concepts of computer and the utilization in the areas in the theory syllabus. The emphasis should be on practical usage rather than on theoretical concepts only

The practical examination scheme should be as follows

- Three Practical Exercise (including Attendace & Record performance) 30 marks
  - Operating system
  - Ms Word
  - Ms Excel
  - Ms power point
  - Internet
- Viva-voce 10 marks

B.Sc. Part I

1. Physics

Scheme

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 34	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 fifth 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.

Special theory of Relativity: Postulates of Special theory of relativity, Lorentz transformation, transformation of velocity and acceleration, Length contraction and time dilation with experimental verification

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

Unit – II

Centre of Mass:

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

Rigid body

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

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, Rutherford scattering.

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.

Coupled Oscillations

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

Reference Books:

1. Mechanics: Berkeley Physics Course Vol- I, Charles Kittel
2. Mechanics: H S 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).

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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.

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.

Invariance of charge, Electric field measured in moving frames, Electric field of a point charge moving with constant velocity.

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 (i) outside the sphere (ii) at the surface of the sphere (iii) 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

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due to a charge placed in dielectric medium and Gauss law, Clausius-Mossotti relation in dielectrics, Transient behaviour 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 (i) outside (ii) at the surface and (iii) 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 behaviour of series L-R Circuit with a DC Source.

Atomic magnet, Gyromagnetic ratio, Bohr-magneton, Larmor frequency, induced magnetic moment and dia-magnetism, spin magnetic moment, para and ferro magnetism, 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 & Magnetism; AS Mahajan & Abbas A Rangwala, Tata McGraw-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 EJ Finn: Addrson-Wesley Publishing Company.

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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-I

Interference:

Concept of Spatial and Temporal Coherence, coherence length, coherence time, Types of interference, interference by division of wave fronts: Fresnel's Biprism, Measurement of wavelength λ and thickness of a thin transparent sheet, 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 λ and refractive index μ 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

Diffraction:

Fresnel's diffraction, Half period zones, Fresnel's diffraction at a circular aperture, straight edge and a rectangular slit, Zone plate, Multiple foci of zone plate, comparison between zone plate and convexlens, Fraunhofer diffraction by single slit and a circular aperture, 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.

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 and half shade Polarmeters and their comparison.

(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, Energy level schemes. He-Ne, Ruby, CO_2 lasers.

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

Unit -4

Wave motion:

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

Reference Books:

1. Optics by Brij Lal & 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 Modem Optics by G. R. Fowels.
6. Essentials of Lasers by Allen.

Practical

Work Load: Four hours laboratory work per week

Examination Duration: Four hours

Minimum Experiments: Total sixteen taking eight from each section.

Section A

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 behaviour 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.
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 behaviour 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.

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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 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 Calendar 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 and find the period of energy exchange between the two oscillators,
14. To study variation of surface tension with temperature using Jaegger s method.
15. To study the specific-rotation of sugar solution by polarimeter

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Blueprint for setting question *paper I & II* 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 हैं, जिनमें से कोई भी 9 प्रश्न हलं 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)	(vii)	(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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20.

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

First question is compulsory and is of ten 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 दस भागों के उत्तर दीजिए।

(i)	(ii)	(iii)	(iv)
(v)	(vi)	(vii)	(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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21.

B.Sc. Part I, CHEMISTRY SYLLABUS
SESSION 2018-2019
(Annual Scheme) Examination 2019 Approval

2. CHEMISTRY

Scheme:
Max Marks: 150

	Duration (hrs.)	Max. Marks	Min. Pass Marks
Paper I	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 structures, radius ratio effect and coordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy and Born Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule.

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

Weak Interactions: Hydrogen bonding, vander Waals forces.

Unit-II

Covalent Bond: Valence bond theory and its limitations, directional and shapes of simple inorganic molecules and ions. Valence shell electron pair repulsion (VSEPR) theory to NH_3, H_3O^+, SF_4, ClF_3, ICl_2, H_2O.

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

Unit-III

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

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

UNIT-IV

Some Important Compounds of p-block Elements: Hydrides of boron, diborane and higher boranes, borazine, borohydrides, fullerenes, carbides, fluorocarbons, silicates (structural principle), tetrasulphur tetranitride, basic properties of halogens, interhalogens and polyhalides.

2nd
08/02/18

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

Unit- V

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

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

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. Methods of determination of reaction mechanism (product analysis, intermediates, isotope effects, kinetic and stereochemical studies).

Unit-II

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

Optical Isomerism: Elements of symmetry, molecular chirality, enantiomers, stereogeniccentre, optical activity. Properties of enantiomers, chiral and achiral molecules with two stereogenic centres. Diastereomers, threo and erythro isomers, meso compounds. Resolution of enantiomers. Inversion, retention and racemization (with examples).

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

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

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

Unit-III

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

Alkenes, Cycloalkenes, Dienes and Alkynes: Methods of formation, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides. Regioselectivity in alcohol dehydration - the Saytzeff rule, Hoffmann elimination. Physical properties and relative stabilities

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of alkenes. Chemical reactions of alkenes - mechanisms involved in hydrogenation, electrophilic and free radical additions. Markownikoff's rule, hydroboration-oxidation, oxymercuration-reduction. Epoxidation, ozonolysis, hydration, hydroxylation and oxidation with $KMnO_4$. Polymerization of alkenes. Substitution at the allylic and vinylic positions of alkenes.

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

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

Unit-IV

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

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

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

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.

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

Relative reactivities of alkyl, allyl, vinyl and aryl halides.

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; permutations and combinations, factorials, probability.

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

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UNIT- II

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

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

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

UNIT- III

Solid State: Definition of space lattice, unit cell.

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

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

UNIT IV

Colloidal State: Definition of colloids, classification of colloids.

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

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

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

UNIT V

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

Radioactive decay as a first order phenomenon.

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

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

Practical: CH -104: Laboratory Course -I

(4 hrs or 6 periods / week)

INORGANIC CHEMISTRY

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

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ORGANIC CHEMISTRY

Laboratory Techniques

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

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

Qualitative Analysis

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

PHYSICAL CHEMISTRY

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

(i) **Chemical Kinetics:**

(a) To determine the specific reaction rate of the hydrolysis of methyl acetate/ ethyl acetate catalyzed by hydrogen ions at room temperature.

(b) To study the effect of acid strength on the hydrolysis of an ester.

(c) To compare the strengths of HCl and H_2SO_4 by studying the kinetics of hydrolysis of ethyl acetate.

(d) To study kinetically the reaction rate of decomposition of iodide by H_2O_2.

(ii) **Viscosity, Surface Tension:**

(a) To determine the viscosity/surface tension of a pure liquid (alcohol etc.) at room temperature. (using the Ostwald viscometer/stalagmometer).

(b) To determine the percentage composition of a given binary mixture by surface tension method (acetone & ethyl methyl ketone).

(c) To determine the percentage composition of a given mixture (non- interacting systems) by viscosity method.

(d) To determine the viscosity of amyl alcohol in water at different concentration and calculate the excess viscosity of these solutions.

(Instructions to 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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महाराजा सूरजमल बृज विश्वविद्यालय
भरतपुर (राज.)

3. 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
Practicals	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 6 marks.
2. The candidate has to answer all question in the main answer book only.

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 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 question in the main answer book only.

Section - A

Diversity of Animals

1. Zoogeographical distribution: Principal zoogeographical regions of the world with special reference to their mammalian fauna.
2. Diversity of fauna of India and the world.
3. Adaptation of animal and their modes of life and the environment.
4. Reason of depletion of biodiversity and conservative measures of biodiversity wherever required.
5. Continental drift.

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Section - B

Biosystematic and Taxonomy

1. General Principles of taxonomy, concept of five kingdom scheme, international code of nomenclature,(ICZN) cladistics, molecular taxonomy.
2. Concept of Protozoa and Metazoa, and levels of organisation.
3. Taxonomy and basis of classification of non-chordata and chordate: symmetry, coelom, segmentation and embryogeny.
4. Detailed classification of non-chordata and Chordata (up to sub orders with examples).
5. Phylogeny of major invertebrate phyla (Sponges, Crustacea, Echinodermata & Hemichordata).

Section - C

Evolution

1. History of evolutionary thoughts(Lamarckism and Darwinism).
2. Natural selection, speciation.
3. Variation, isolation and adaptations.
4. Paleontology: Fossils, geological division of the Earth's crust, imperfection of the geological record.
5. Study of extinct forms: Dinosaurs, Archaeopteryx.

PAPER - II: Z-102
CELL BIOLOGY AND GENETICS

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. Cell membrane transport; Passive (diffusion and osmosis, facilitated, mediated) and active transport.
4. 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.

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(iii) Structure and function of lysosome, microbodies and centrioles.
(iv) Structure and function of cilia, flagella, microvilli and cytoskeletal elements.

Section - B

1. **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.
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 structure and types (mRNA, rRNA and tRNA and transcription.
3. **Genetic code and translation:** Triplet code, characteristics of triplet code, protein synthesis (translation).
4. **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. Chromosomal mutations; Classification, translocation, inversion, deletion and duplication: Variations in chromosome numbers: haploidy, polyploidy, aneuploidy, euploidy and polysomy.
3. Linkage and crossing over, elementary idea of chromosome mapping.
4. Genetic interaction: Supplementary genes, complementary genes, duplicate genes, epistasis, inhibitory and polymorphic genes.
5. Multiple genes inheritance, ABO blood groups and Rh factor and their significance.
6. Cytoplasmic inheritance.
7. Sex determination in Drosophila and man, pedigree analysis.
8. Genetic disorders; Down's Turner's and Klinefelter's syndromes, color blindness, Hemophilia, Phenylketonuria.
9. Concept of genes, Recon, muton and cistron.

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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. Historical review, type and scope of embryology.
2. Gametogenesis:
   (i) Formation of ova and sperm.
   (ii) Vitellogenesis.
3. Fertilisation: Activation of ovum, essence of activation: Changes in the organization of the egg cytoplasm.
4. 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. Development of chick up to 96 hours stage.
5. 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.

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. Teratogenesis (Genetic and induced).
5. Biology of aging.
6. Cell death.

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.

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 Euglena, Foraminiferous shells, Sponge spicules. Spongin fibres, Gemmule, Hydra, Obelia colony and Medusa; Parapodium of Neries 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
1.	Study of Biodiversity	06	4
2.	Permanent Preparation	04	7
3.	Cell Biology and Genetics	4+4	6+6
4.	Developmental Biology	6	6
5.	Identification and Comments on Spots (1 to 8)	16	16
6.	Viva Voce	5	5
7.	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/CD-ROMs, multimedia computer based simulations including computer assisted learning (CAL) and other softwares.
2. With reference to permanent preparations and microscopic slides, in case of non-availability, the exercise should be substituted with diagrams, photographs, models, charts etc.
3. 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.
4. The candidates may be asked to write detailed methodology wherever necessary and separate marks may be allocated for the same.
5. Mounting material for permanent preparation would be as per the syllabus or as available through collection and culture methods.
6. 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.
4. Colbert EH: Evolution of the Vertibrates 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.

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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 M P: Molecular Cell Biology 6th edition W.H. Freeman and Company, New Yark, 2008.
12. Lodish H, Berk A. Keiser CA, Kriser M, Bertscher
13. 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.
14. 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.
15. Morgan DD The Cell Cycle: Principal of Control, Sinauer/Panima Books 2007.
16. Petsko GA and Ringe D: Protein structure and function Sinauer/Panima Books 2004.
17. Rao KV Development Biology: A Modern synthesis. Oxford and IBH publishing 1994.
18. Rastogi VB Animal Distribution, Evolution and development Biology. Kedar Nath Ram Nath Educational Publisher.
19. Rastogi VB Evolutionary Biology Kedar Nath Ram Nath Educational Publisher.
20. Singh SP and Tomar BS: Cell Biology 10 th edition Rastogi , Publication Meerut New Delhi. 1971
21. Snustad DP and Simmons MJ. Principle of genetics 4 th eddition John Wile & Sons Inc. 2005.
22. Verma PS. A manual of Practical Zoology: invertebrates. S. Chand & Co Ltd New Delhi 1971.
23. Verma PS & Agrawal VK: Chordate Embrylogy: Development Biology. S. Chand & Com Ltd 2012.
24. Verma PS & Agrawal VK: Cell Biology, Genetic Molecular Biology. Evolution and Ecology. 14 th addition S. Chand 2004.
25. Winchester AM: An introduction to genetics Barners & Noble. Canada, 2002.
26. Winchester AM: Genetics: A survey of principal of Ileredity Oxford & IBH Publishing Co. 1967.
27. Winchester AM: Human Genetics: Ohio Charles E. Merrill Publishing Co. 1971.
28. Trigunayat, M.M & Kritika Trigunayat, A manual of practical Zoology, Part-I Scientific Publishers, Jodhpur.
29. एम.एम. त्रिगुणायत व कृतिका त्रिगुणायत, प्रायोगिक मैन्युअल भाग–1 साईंटिफिक पब्लिशर्स जोधपुर (राज.)

4. Botany

B.Sc. Part- I

Scheme:

Max. Marks: 100 Min. Pass Marks: 36

Paper I	3 Hrs duration	33 Marks
Paper II	3 Hrs duration	33 Marks
Paper III	3 Hrs duration	34 Marks
Practicals:	4 Hrs. duration	50 Marks

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.

M.S.B. UNIVERSITY, BHARATPUR
B.Sc. Part I
Paper- I
ALGAE, LICHEN AND BRYOPHYTA

Unit- I

General characters, Classification (Smith). 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, Nostoc*
Chlorophyceae- *Volvox, Oedogonium , Chara.*
Xanthophyceae - *Vaucheria*
Phaeophyceae - *Ectocarpus.*
Rhodophyceae- *Polysiphonia.*

Unit-3

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

Unit-4

Type Studies

Hepaticopsida - *Riccia, 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

Bold .H.C. Alexopoulous. C.J. and Delivoryas, T Morphology of Plant and Fungi (4th Ed.) Harper & Foul Co, New work, 1980.
Ghemawat, M.S. Kapoor, J.N. and Narayan, H.S. A text Book of Algae, Ramesh Book Depot, Jaipur, 1976.
Gilbart, M;.Smith. Crypogamic Botany, Vol. I & II (2nd Ed.) Tata McGraw Hill. Publishing Co., Ltd., New Delhi, 1985.
Kumar, H.D. : Introductory Phycology, Affiliated East- West Press, Ltd. New York, 1988.
Puri. P. : Bryophytes, Atmaram & Sons. Delhi, Luchnow, 1985.
Sarabhai. R.C. and Saxana, R.C. : A text book of Botany. Vol I & II, Ratan Prakashan Mandir, Meerut, 1980.
Singh, V., Pande, P.C. and Jain, D.K.: A text book of Botany, Rastogi, & Co., Meerut, 2001.
Vashista, B.R.: Botany for Degree Students (Algae, Bryophytes) S.Chand & Co., New Delhi, 2002.

Paper II
Microbiology, Mycology and Plant Pathology
Unit-I

Microbiology: Meaning and scope, history and development in the field of microbiology. concept of quorum sensing and biofilms.
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, Structure and multiplication of Bacteriophage.

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Unit-II

Fungi: General characters, occurrence, thallus organization, reproduction, economic importance. classification of fungi (Alexopoulos).

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; *Ustilago* and loose smut of wheat and covered smut of barley; *Agaricus; 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 and root knot disease. A brief account of principles of plant protection.

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.

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.

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- 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.

M.S.B. UNIVERSITY, BHARATPUR
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, peroxisomes, Lysosome, Golgi bodies and Endoplasmic Reticulum). Chromatin structure and chromosome organisation: eukaryotic and prokaryotic, Transposons.

Unit-2: Cell divisions

Cell Cycle, Mitosis: stages, structure and functions of spindle apparatus; anaphasic chromosome movement; Meiosis: its different stages- meiosis I, meiosis II, synaptonemal complex. chiasmata formation and crossing over.
Basis of genetic material: Griffith's transformation experiment and the Hershey and Chase blender experiment to demonstrate DNA as the genetic material.
Concept of Gene: *Neurospora* genetics: one gene one enzyme hypothesis.
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). Quantitative inheritance: grain colour in wheat, corolla length in *Nicotiana tabacum.*

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

Unit-4 : Plant Breeding

Introduction and objectives of plant breeding ; general methods of plant breeding- in self-pollinated, cross- pollinated and vegetatively propagated crop plants.

Introduction and acclimatization. selections, hybridizations, hybrid vigour and inbreeding depression. Role of mutation and polyploidy in plant breeding. Famous Indian and international plant breeders and their contribution. National and International agricultural research institutes.

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

Suggested Laboratory Exercises:

- Study of cell structure 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.
- 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.

अकादमिक प्रभारी

B. A./B. Sc. Part I Examination - 2019

5. MATHEMATICS

Teaching : 3 hours per week per theory paper

2 hours per week per batch for practical

(20 candidates in each batch)

Examination Scheme :

	Min. Pass Marks	Max. Pass Marks
Science	54	150
Arts	72	200

		Duration	Max Marks
Paper – I	Discrete Mathematics	3 hrs	40 (Science) 53 (Arts)
Paper – II	Advanced Calculus	3 hrs	40 (Science) 53 (Arts)
Paper – III	Coordinate Geometry and Vector Calculus	3 hrs	40 (Science) 54(Arts)
Practical		2 hrs	30 (Science) 40 (Arts)

Note :-

1. Syllabus of each of three papers is divided into FIVE units.
2. Each paper is divided into THREE sections A, B & C.
3. **Section-A :** TEN short answer type questions will be set taking two questions from each unit. Each question will carry 1 mark for Science and 1.5 mark for Arts. All questions will be compulsory .
4. **Section-B :** TEN questions will be set taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt ONE question from each unit
5. **Section-C :** FIVE questions will be set taking one questions from each unit. Each question will carry 5 marks for Science in all three papers and 6 marks for Arts in paper I & II and 6.33marks in paper III. Student has to attempt ANY THREE Questions.
6. Common paper will set for Faculty of Science and Faculty of Social Science .

(page-2)

7. Each candidate is required to appear in the practical examination to be conducted by internal and external examiners. External examiner will be appointed by the University and internal examiner will be appointed by the principal in consultation with the head, department of Mathematics in the college.
8. An internal/external examiner can conduct practical examination of not more than 100 (one hundred) candidates (20 candidates in each batch).
9. Each candidate has to pass in theory and practical examinations separately.

Paper – I Discrete Mathematics

Teaching : 3 hrs per week

Duration of Examination : 3 hrs **Max. Marks 40 (Science)**

53 (Arts)

Note: *This paper is divided into THREE Sections A, B, & C. **Section-A** consists TEN short answer type questions. Each question is of 1 mark for Science and 1.5 mark for Arts. All questions are compulsory .**Section-B** consists TEN questions taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt FIVE questions selecting ONE question from each unit. **Section-C** consists FIVE questions taking one questions from each unit. Each question will carry 5 marks for Science and 6 marks for Arts. Student has to attempt any THREE questions.*

Unit – I : Algebraic Structures – Binary operations, Definition and examples of groups, Elementary properties of groups, Order of an element, Cyclic groups, properties of cyclic groups, Permutation: product of two permutations, even and odd permutations, inverse of permutations, cyclic permutations, Permutation groups.

Unit – II: Graph theory – Introduction, definition of graph, degree of vertex, Directed graphs, finite and infinite graphs, hand shaking property, Regular graphs, Bipartite graphs, Operations on graphs, Isomorphism, Sub graphs, Connected and Disconnected graphs, Euler circuit and Euler graphs, Hamiltonian cycles and Hamiltonian graphs, Weighted graphs, Shortest path problem, Dikstra algorithm.

Unit – III : Planner and non planner graphs, Euler's formula, Detection of planarity, Dual of planner graphs, Graph colouring, Chromatic number, Map colouring, Five colour theorem, Matrix representation of graphs. Trees, properties of trees, rooted tree, binary tree, Spanning tree, Spanning tree in weighted graphs, Kruskal's algorithm and Prim's algorithm to find minimal spanning tree in a weighted graph.

Unit – IV : Boolean Algebra- Definition, duality, properties of Boolean algebra, Ordered relation in Boolean algebra, Lattices, Homomorphism, Boolean functions and expressions, Conjunctive an Disjunctive normal forms. Fundamental theorem of arithmetic, divisibility in Z, Congruences, Chinese Remainder Theorem.

Unit – V : Generating functions – Discrete numeric function, ordinary generating function, Convolution of sequences, Summation using convolution, counting techniques, Partition of integers, Exponential generating function. Recurrence Relation - First order relation, second order linear homogeneous relation, Third and higher order linear homogeneous relations, Linear non homogeneous relations of second and higher order, Solution of recurrence relations using generating functions. Logic and propositional calculus- propositions, basic logical operations, truth tables, tautologies and contradictions, quantifiers.

Paper – II Advanced Calculus

Teaching : 3 hrs per week

Duration of Examination : 3 hrs **Max. Marks 40 (Science)**

53 (Arts)

Note: *This paper is divided into THREE Sections A, B, & C.* ***Section-A*** *consists TEN short answer type questions. Each question is of 1 mark for Science and 1.5 mark for Arts. All questions are compulsory .* ***Section-B*** *consists TEN questions taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt FIVE questions selecting ONE question from each unit.* ***Section-C*** *consists FIVE questions taking one questions from each unit. Each question will carry 5 marks for Science and 6 marks for Arts. Student has to attempt ANY THREE questions .*

Unit – I : Convergence and Divergence of Infinite Series- Introduction, Tests for convergence, Comparison test, D' Alembert ratio test, Cauchy's n^{th} root test, Raabe's test, De Morgan and Bertrand test, Cauchy's condensation test.
Successive Differentiation- n^{th} 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, Pedal equation of Cartesian and polar curves. Derivatives of arcs- – Cartesian and polar forms. Curvature – Definition, radius of curvature for Cartesian, polar and parametric curves, curvature at the origin, centre of curvature, circle of curvature, chord of curvature. . Partial differentiation, Euler's theorem on homogeneous functions, Total differentiation.

Unit – III : Envelopes – Family of curves, Definition of envelope, Envelopes of Cartesian, polar and parametric curves. Asymptotes – Definition, methods to find asymptotes of Cartesian and polar curves, Intersection of curve and its asymptotes. Maxima and Minima of functions of two or three variables — Lagrange's condition for two independent variables, Lagrange's method of undetermined multipliers. Singular points, double point, Tracing of Cartesian and polar curves.

Unit – IV : Gamma and Beta functions – Definition, Transformations of Gamma functions, Relation between Beta and Gamma functions, Euler's functional equation, Double multiple formula. Double Integral- Evaluation of double integrals, Change of order of integration, Triple integrals – Evaluation of triple integrals, Dirichlet's formula for triple integrals.

Unit – V : Rectification- Meaning, lengths of Cartesian and polar plane curves. Quadrature – Areas bounded by plane curves (Cartesian and polar), Use of double integrals to find areas. Volume and Surfaces of solids of revolution, Puppus theorem, Use of triple integrals to find volumes.

Paper – III Coordinate Geometry and Vector Calculus

Teaching : 3 hrs per week

Duration of Examination : 3 hrs **Max. Marks 40 (Science)**

54 (Arts)

Note: *This paper is divided into THREE Sections A, B, & C.* ***Section-A*** *consists TEN short answer type questions. Each question is of 1 mark for Science and 1.5 mark for Arts. All questions are compulsory .****Section-B*** *consists TEN questions taking two questions from each unit. Each question will carry 3 marks for Science and 4 marks for Arts. Student has to attempt FIVE questions selecting ONE question from each unit.* ***Section-C*** *consists FIVE questions taking one questions from each unit. Each question will carry 5 marks for Science and 6.33 marks for Arts. Student has to attempt ANY THREE questions .*

Unit – I : Two Dimensional Coordinate Geometry – Conic sections, Parabola , Ellipse and Hyperbola, Intersection with straight lines, Condition of tangency, Tangent and Normals, Pair of tangents, Chord of contact, Pole and Polar lines, diameter, Parametric coordinates.

Unit–II : Three Dimensional Coordinate Geometry– Sphere, Plane sections of sphere, Intersection of a sphere with a line, Tangent plane, Plane of contact, Pole and Polar planes, Orthogonality of two spheres, Radical plane, Radical line and Radical centre of sphere. Cone – Definition and equation, Enveloping cone , Representation of cone by a general equation second degree, Tangent plane, Reciprocal cone, Right circular cone.

Unit-III: Cylinder – Definition and Equation of cylinder, Enveloping cylinder, Right circular cylinder. Central Conicoid – Definition and standard equation, Tangent lines and tangent planes , Director sphere, Pole and Polar planes, Enveloping cone and enveloping cylinder, Normals to conicoids, Diameter and diametral planes.

Unit – IV: Generating lines of conicoids- condition for a straight line to be a generator, system of generating lines, properties of generating lines of hyperboloid. Reduction of general equation of second degree- principal planes and principal directions, centre of a conicoid , canonical forms, transfer of origin and rotation of coordinate axes for canonical form.

Unit –V: Vector Calculus – Differentiation and Integration of vector point function, Gradient of scalar point function, Divergence and Curl of vector point functions, Identities on gradient, curl, divergence. Gauss and Stock's theorems(no proofs are required) and their applications.

Practical

Teaching : 2 hours per week

Examination Scheme: **Duration - 2 hours**

	Science	Arts
Maximum Marks	**30**	**40**
Minimum Pass Marks	**11**	**14**

Distribution of Marks:

Two Exercises one from each group

10 marks each	=	20 marks	13 marks each	=	26 marks
Practical record	=	05 marks			07 marks
Viva-voce	=	05 marks			07 marks
Total Marks	=	**30 marks**			**40 marks**

Group – A : Graphs of some standard functions- x^n (for different value of n), e^x, $\log_e x$, $\log_a x$ ($a<1$ and $a>1$), sin x, cos x, tan x, cot x, cosec x, secx.

Tracing of Cartesian and polar two dimensional curves.

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

Classification of conicoid representing by general equation of second degree $ax^2 + by^2 + cz^2 + 2fyz + 2gzx + 2hxy + 2ux + 2vy + 2wz + d = 0$

Note :- Each candidate (Regular/Non-collegiate) has to prepare his/her record.

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6. ECONOMICS

Scheme	Max. Marks	Mini. Marks	Time
For B A	200	72	
For B Sc	150	54	
Two Papers For B A			
Paper-I	100	36	3 Hours
Paper-II	100	36	3 Hours
Two Papers For B Sc			
Paper-I	75	27	3 Hours
Paper-II	75	27	3 Hours

Note: A candidate will be required to attempt five questions in all, selecting at least one question from each section and one compulsory multiple choice/objective type question. Each question will consist of 15 marks.
The multiple choice/objective type questions will consist of 15 questions of one mark each.

PAPER –I : ECONOMIC CONCEPTS AND METHODS

Duration: 03 Hrs Max. Marks: 100

Section – A

Nature and Scope of Economics, Basic Economic problems. Assumptions in Economic analysis, Forms of economic analysis, Rationality in consumer's behavior (including ceteris paribus). Stock and flow variables. Positive and normative analysis. Equilibrium – partial and general.
Utility Analysis-Cardinal and ordinal approach, Law of Demand, Elasticity of demand, Properties of Indifference Curves, Properties of different market-perfect competition, monopoly, Oligopoly and monopolistic competition.

Section – B

Concept of National Income, Circular flow of Income, Measurement of National Income.
Money-Nature, Functions and Importance, Inflation and Deflation, Concepts of Demand and Supply of Money, Velocity of circulation of Money. Functions of Central Bank and Commercial Banks. Characteristics of Capitalism, Socialism and Mixed Economy.

Section – C

Concepts of Total, Average and Marginal-cost, Revenue and Production. The concept & interpretation of slopes of curves.
Definition, Nature, Importance & Limitations of Statistics. Collection and Tabulation of data-Primary and Secondary data, Census and Sampling method. Measures of Central Tendency-mean, Median and Mode.

Recommended Books:

1. Laxminarayan Nathuramka: Basic Concepts of Economics, College Book House, Jaipur.
2. Dan Ewert : Basic Concepts of Economics
3. H.L. Ahuja-Macro Economics, S. Chand and Company, New Delhi.
4. K.N. Nagar- Sankhiki ke Mool Tatva, meenakshi Prakashan, Meerut.

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PAPER –II : INDIAN ECONOMY

Section – A

Basic Characteristics of Indian Economy, Natural Resources: land, Minerals, Water, Forests and Power Resources. Population: Size and Growth, Labour Force, Occupational Distribution and Population Policy. Human Resource Development Indicators. (i.e., Literacy, health, Nutrition etc.) Agriculture: Role and Importance of Agriculture in the Indian Economy; land Reforms, Irrigation and Irrigational Policy, Use of Fertilizers and Fertilizer Policy, Institutional Credit for Agriculture, marketing of Agricultural Goods – Support Price and Public Distribution System.

Section – B

Industry: Role, Strategy and Challenges, SMEs, Public and Private Sector Industries, Industrial Finance- Role of Financial Institutions and Commercial Banks: Industrial Policy- Pre and Post Reform Period, Recent Industrial Policy, New Economic Policy and Disinvestment of Public Sector Undertaking.

Foreign trade: Size, Composition and Direction; Recent Trends in India's Foreign Trade; Foreign Trade Policy.

Section – C

Planning in India: Objectives of Five Year Plans, Review of Economic Progress under the plans. A Comprehensive Study of the latest Five Year plan. NITI Aayog, National Development Agenda. Problems of Poverty; Unemployment, Inflation and Regional Inequalities; Rural Development Programmes and Policy; Sectoral Reforms in Infrastructure after 1991.

Recommended Books: (latest edition)

1. Dutt and Sundaram: Indian Economy, Ashwani Mahajan and Gaurav Dutt (Hindi & English) S.Chand, 72 nd English Edition 55 th Hindi Edition, New Delhi.
2. S.K. Mishra and V.K. Puri: Indian Economy, Himalaya Publishing House, New Delhi.
3. A.N. Agrawal: Indian Economy, Vikas Publishing Co., New Delhi.
4. Government of India: Economic Survey (Hindi & English).
5. Government of India: Five Year Plan (Latest)

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B.A Part -I

7. Geography

Schemes of Examination

Faculty	Min Pass Marks	Max Marks
Arts/Social Science	72	200
Science	54	150
Paper I	Physical Geography	Arts 75 Science 50
Paper II	Geography of Rajasthan	Arts 75 Science 50
Practical	18	Arts 50 Science 50

Notes

1. Students are permitted to use 'the stencils, simple calculator and log tables wherever needed in both theory and practical examinations. Each theory paper will have a teaching of 4 hours per week.
2. There will be a common paper for Arts and Science.
3. Q.1 will be compulsory and will cover the entire course of the paper.
   Q No 1 of 20% marks of the maximum marks be set in two parts.
   (a) Part (a) will have ten items for locating on a map (to be supplied by examination centre) carrying 10% marks of the maximum marks and candidates shall attempt any five items.

   (b) Part (b) will have 10 short answer questions carrying 10% marks of the maximum marks and candidates shall attempt any five items.
4. Remaining 9 questions carrying equal marks will be set with three questions from each section of the syllabus.
5. Candidate will attempt 5 questions in all including question No. 1 selecting at least one question from each section.
6. Practical examination will be conducted by the board of examiners.
7. The candidate will have to pass in theory and practical separately.
8. The non-collegiate candidates will have to attend a practical training camp of 48 hours at a college affiliated to the University of Rajasthan, Jaipur notified by the University from time to time in which Geography subject is taught on payment of fee fixed by the University. The candidates appearing at examination from any examination centre located in Jaipur City will attend the practical camp at the University Post Graduate Department on payment of fee fixed by the University. The candidate will procure Certificate of successful completion of practical training camp from the College/Department of Geography and produce the same at the time of practical examinations

11.08.2018

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PAPER - I : PHYSICAL GEOGRAPHY

Section A

Definition scope and development of physical geography, geological history of the Earth; zoning of Earth's interior, rocks, origin of continents and oceans; continental drift theory and plate tectonics; concept of isostasy: views of Airy, Pratt, Joly and Holmes. Earth movement: epeirogenic and organic; mountain building theories: Kober, Jeffreys, Daly, Joly and Holmes and plate tectonics; denudation, cycle of erosion: views of W.M Davis and W. Penck, erosional and depositional topographies: river, under groundwater, glacier, wind and oceanic waves.

Section B

Composition and structure of the atmosphere, insulation, air temperature, air pressure, pressure belts and planetary winds, monsoon and local winds, humidity, classification of clouds and precipitation, air masses, fronts and cyclones: tropical and temperate, classification of the world climates: Koppen and Thorthwaite, general climate classification.

Section C

Surface configuration of oceans bottom: Pacific, Atlantic and Indian oceans, ocean deposits, horizontal and vertical temperature of oceans, oceanic salinity, tides, oceanic waves and currents, coral reefs and their origin: views of Darwin and Dana, W.M. Davis, Murray, classification of marine resources, biosphere and its components, ecosystems, plant community and animal kingdom, biomes, equatorial rainforest, monsoon, savanna and temperate grasslands.

Recommended Readings:

चौहान वी.एस. व गौतम, ए. 2005 भौतिक भूगोल (जीवमण्डल सहित) । रस्तौगी पब्लिकेशन्स, मेरठ।

दयाल, पी. 2012, भौतिक भूगोल। राजेश पब्लिकेशन, नई दिल्लीं ।

गौतम, अल्का, 2012 : भौतिक भूगोल। रस्तोगी पब्लिकेशन, मेरठ ।

Hussain, M, 2001, Fundamentals of Physical Geography, Rawat Publication, Jaipur Hess, D. 2012: Physical Geography: A Landscape Appreciation. PHI Learning Private Limited, New Delhi, Mckmight's Tevtt Edition.

Khullar, D.R.2012: Physical Geography, Kalyani Publishers, New Delhi

सिंह, सविन्द्र, 2005 : भू-आकृति विज्ञान । तारा पब्लिकेशन, वाराणासी ।

सिंह, सविन्द्र, 2011: भौतिक भूगोल का स्वररूप । प्रयाग पुस्तक भवन, इलाहाबाद ।

शर्मा, एच, एस, शर्मा, एम, एल, एण्ड मिश्रा आर, एन, 2008: भौतिक भूगोल । पंचशील प्रकाशन जयपुर ।

Sharma, R.C and Vatal M. 1999: Oceanography for Geographers. Chaitanya Publishing House, Allahbad.

Strahler, A.N and Strahler, A.H 1989: Elements of Physical Geography, John wiley & Sons, New York.

Tikkha, R.N 1999: Physical Geography, Kedar Nath Ram Nath & C, Meerut

11.9.18

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PAPER II : GEOGRAPHY OF RAJASTHAN

Section A

Physical aspects of Rajasthan: geological structure, relief, climate. drought, drainage, natural vegetation. Environmental pollution-causes and types; desertification, soils, soil erosion and conservation; availability, problems and conservation of water resources.

Section B

Mineral resources: distribution and production; Power and energy resources: distribution and production (hydro-electricity, coal, petroleum, solar energy and bio-energy) irrigation sources, irrigation intensity, crop wise irrigation, quality of irrigation water problems, irrigation projects: detailed study of Indira Gandhi canal project, Chambal valley project, Mahi Bajaj Sagar projects on physical and socio-economic aspects, agriculture development under five year plans, problems of agriculture development, general land use, live stock and dairy development, minerals.

Industries: textile, sugar, cement, marble and granite, fertilizer, zinc and copper smelting. Transport & trade, development of tourism, desert development programme, tribal areas development programme, Aravali hill development programme.

Section C

Cultural and development aspects: population-number, growth, distribution and density, rural and urban, male and female population, literary status, occupational structure, schedule castes and schedule tribes, population problems, study of bhil, means and garasia. Settlement pattern: types of settlements, building materials and house types in Rajasthan with examples, factors affecting settlement.

Recommended Readings:

नाथुरामका, एल.एन., 2012,13 राजस्थान की अर्थव्यवस्था । कॉलेज बुक हाउस जयपुर ।

साईवाल, स्नेह 2012,13: राजस्थान का भूगोल । कॉलेज बुक हाउस जयपुर ।

Bhalla, L.R. 1996-97: Geography of Rajasthan. Kuldeep Publications, Jaipur.

Gujar, R.K 1992: Geography of Indira Gandhi Canal. Rajasthan Hindi Granth Academy.

Lodha, R & Maheshwari, D 2001: Geography of Rajasthan Shahitya Bhawan Publication, Hospital Road, Agra.

Mishra, V.C 1967: Geography of Rajasthan. National Book trust of India, New Delhi.

Sing, R.L 1971 (ed.): India A Regional Geography NGSI, Varanasi.

Attar Singh. 1992: Flood Prone Areas of India. Aviskar Publishers Jaipur

Sharma H.S. and M.L. Sharma 2014: Geography of Rajasthan. Panchcil Publisher, Jaipur

सक्सैना, एच, एम, 2012: राजस्थान का भूगोल । राजस्थान हिन्दी ग्रन्थ अकादमी, जयपुर।

11.9.18

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B.A. / B.Sc. Pass Course Part-I

8. PSHYCHOLOGY –

Scheme of Examination –

Faculty	Max. Marks	Min. Passing Marks
Arts	200	72 (Th. 54 Pr. 18)
Science	150	54 (Th. 36 Pr. 18)

Paper	Nomenclature	Duration	Max. Marks	
			Arts	Science
I	Basic Psychological Processes	3 Hrs.	75	50
II	Social Psychology	3 Hrs.	75	50
III	Practical	3 Hrs.	50	50

NOTE –

1- There will be three papers in Psychology. It will be common for Arts and Science. Each paper will be of 3 hours and would contain the entire course content of the paper.

Section A - will contain 10 questions of 20 marks each. Each question will be 1.5 marks for Arts students and 1 mark for Science students. Thus, Part-A will be of 15 marks for Arts students and of 10 marks of Science students.

Section B – will contain 7 questions of 50 words each, out of which students are required to attempt 5 questions. Each question will be of 3 marks for Arts students and of 2 marks for Science students. Thus, Part-B will be of 15 marks for Arts student and of 10 marks for Science students.

Section C – will contain 3 long questions each with internal choice each question will be 15 marks for Arts students and 10 marks for Science students. Thus, Part-C will be of 45 marks for Arts students and 30 marks for Science students.

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For clarification the distribution of marks is tabulated as below –

ARTS			
Section	**No. of Questions**	**Marks**	**Total**
A	**10**	**1.5**	**15**
B	**5 (Out of 7)**	**03**	**15**
C	**3 (with internal choice)**	**15**	**45**
		Total Marks	**75**

SCIENCE			
Section	**No. of Questions**	**Marks**	**Total**
A	**10**	**01**	**10**
B	**5 (Out of 7)**	**02**	**10**
C	**3 (with internal choice)**	**10**	**30**
		Total Marks	**50**

2- Use of simple calculator will be allowed for statistical portions of all papers.

Paper – I

Basic Psychological Processes –

Section-A

1. **Introduction** – Definition and Goals of Psychology: History Structuralism, Functionalism, Behaviourism, Gestalt and Psychoanalysis; Modern Perspectives Biological, Psychodynamic, Behavioural, Cognitive, humanistic, Evolutionary and Socio cultural; Methods Observation, Case Study, Survey and Experimental.
2. **Biological Basis of Behaviour–** The Nervous System –Structure and Functions of Neuron. Structure and Functions of Central nervous System and Peripheral Nervous System.
3. **Sensation and Perception**: Sensation – Meaning, Sensory Receptors, Sensory Thresholds, Habituation and Sensory Adaption. Perception- Meaning, ~~Constacies~~ Constancies Size, Shape and Brightness, Gestalt Principles, Factors Influencing Perception.

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Section-B

4. **Learning: Definition and Theories**– Classical Conditioning, Operant Conditioning, Cognitive Learning, Observational Learning.
5. **Memory: Definition:** Encoding, Storage and Retrival Processes; Models Level of Processing, Parallel Distributed Processing and Information Processing – Sensory, Short Term and Long Term Memory; Forgetting – Nature and Causes.
6. **Motivation and Emotion:** Meaning and Approaches – Instict, Drive reduction, Arousal, Incentive and Humanistic. Emotion Elements: Physiology, Expression and Subjective Experience: Theories – Cannon – Bard, james – Lange, Schachter – Singer, Opponent-Process.

Section-C

7. **Cognition**– Thinking Mental Imagery and Concepts; Problem Solving Trail and Error, Algorithms, Heuristics, Insight; Barriers to Problem Sloving.
8. **Intelligence**– Definition and Theories – Spearman, Guilford, Cattell, Sternberg, Gardner; Meaning of IQ; Intelligence Tests.
9. **Personality**– Definition; Type Theories and Trait Theories – Allport, Cattell, McCrac and Costa; personality assessment – Self Inventories, Projective Test and Behavioural Assessment.

Books Recommended:

- Baron R.A. (2003) Psychology, Allyn and Bacon. New Delhi Prentice Hall India.
- Gerrig, R.J. and Zimbardo, P.G. (2005). Psychology and Life. New Delhi Pearson Education.
- Ciccarelli, S.K. and Meyer, G.E. (2006). Psychology. New Delhi, Pearson Education.
- सिंह, अरूण कुमार (2002): आधुनिक सामान्य मनोविज्ञान, नई दिल्ली, मोतीलाल बनारसीदास।

Paper – II **Social Psychology**

Section-A

1- **Introduction:** Meaning, Nature, Scope and Goals of Social Psychology. Methods of Social Psychology: Experimental and Non-experimental Methods.

2- **Social Perception and Person Perception:** Social Perception, Meaning and Nature; Perceptual Defense, Perceptual Accentuation and Subliminal Perception. Person Perception: Meaning and Nature, Role of Non-verbal Cuse; Perceiver's Characteristics and Role of Ongoing Interaction.

3- **Attitudes:** Nature, Functions, Formation, Change and Measurement.

Section-B

4- **Prejudice and Discrimination:** Nature and Origin: Reduction of Prejudice and Discrimination.

5- **Interpersonal Attraction:** Proximity and Affective Basis, Acquaintance and Need to Affiliate; Effects of Observable Characteristics, Similarity and Mutual liking.

6- **Leadership:** Definition and Functions: Types of Leadership, Trait, Situational and Contingency Approaches.

Section-C

7- **Communication:** Meaning, Nature and Types: Verbal and Non-verbal, barriers in Communication.

8- **Pro-Social Behaviour:** Personal, Situational and Socio-Cultural Determinants. Explaining Pro-Social Behaviour: Empathy, Altruism Hypothesis, Negative-State Relief Model, Empathic Joy Hypothesis and Genetic Determinism Model.

9- **Aggression and Social Problems**: Aggression-Theories, Determinants, Prevention and Control; Social Problems – Meaning and Nature; Types of Social Problems Poverty, Deprivation, Population Explosion, Economic Development; Solutions of Social Problems.

अकादमिक प्रशाखी

Books Recommended:

- Baron, R.A. and Byrne D. (1998): Social Psychology, New Delhi, Prentice Hall.
- Myers, David G (1994): Exploring Social Psychology, New York; McGraw Hill.
- अरूण कुमार सिंह (2002): समाज मनोविज्ञान की रूपरेखा मोतीलाल बनारसीदास, दिल्ली।

Paper-III

Practical –

1. Human Maze Learning
2. Measurement of Intelligence (Performance Test)
3. Experiment of Memory (Meaningful and Non-sense syllabus through Memory Drum)
4. Measurement of Personality
5. Measurement of Emotions by Facial Expression
6. Measurement of Attitude
7. Measurement of Leadership
8. Measurement of Aggression
9. Measurement of Altruism
10. Assessment of Social Support

Shanta

अकादमिक [illegible]