APPLIED PSYCHOLOGY

Papers :	Name of Courses	Marks
Paper 'A':	Basic Concepts in Psychology (Written) :	75
Paper 'B':	Areas of Psychology (Written) :	75
Paper 'C':	Experimental Statistical Evaluation	50

PAPER-A BASIC CONCEPTS IN PSYCHOLOGY — Marks : 75

1. **Introduction to Psychology**

   Definition
   Brief historical background and schools of Psychology
   Careers & Specialization in psychology

2. **Research Methods in Psychology**

   Observation (Naturalistic and Field study)
   Case history Experimentation Survey
   Interview

3. **Biological Basis of Behavior**

   Brain Structure and Functions. Nervous System, Neurons, parts of Nervous System
   Endocrine glands

4. **Sensation and perception**

   a. Sensation: Characteristics of Sensation, Visual sensation: Structure and functions of the eye, Auditory Sensation Structure and Functions of the ear.

   b perception : Factors in perception, Types of perception, perceptual organization; perceptual problems Illusions and Hallucinations

5. **Motivation**

   Definition and Classification
   primary (Biogenic) Motives Secondary Motives
   Intrinsic and Extrinsic Motivation
   Theories of Motivation

6. **Emotion**

   Definition
   Components of Emotions
   Theories of Emotions
   Expression of Emotions and Psychological Well-being.

7. **Learning and Conditioning**

Definition and Types
Classical and instrumental conditioning
Learning through imitation
Cognitive learning

8. **Memory**

Definition
Types of Memory
Models of Memory
Memory processes: Retention, Recall, Recognition and Retrieval]
Forgettidng, Theories of Forgetting
Improving Memory: Mnemonics

9. **Thinking**

Definition
Types (Realistic' Autistic Thinking, Creativity, problem Solving)
Tools of Thinking
Imagery
Language
Concepts

10. **Intelligence**

Definition
Theories of Intelligence
Assessment of Intelligence

11. **Personality**

Definition
Theories of Personality
Assessment of Personality

RCECOMMENDED BOOKS

Birch, A.,& Malim, T. (1998). Introductory Psychology London: MacMillan Press Ltd.

Coon. D, (2001). Introduction to Psychology: Wordsworth Publications.

Feldman, R.S. (2000). Essentials of Understanding Psychology (4th ed) Boston: McGraw Hills Higher Education

Gleitman, H. Fridlund, A.J., D. (1999). Psychology (5th ed). New York : W. W. Norton & Company Ltd

Gray, p. ((2002) Psychology 4th ed. U.S.A.: Worth Publishers.

Lahey, B.B. (2002). Essentials of Psychology Boston: McGraw Hill Higher Education.

Lyle E. Boume, jr. Bruce R. Ekstrand, (1998). Psychology its Principles and Meanings.

Morris, C.G.& Maisto, A.A. (2001). Understanding Psychology (5th ed) New jersy: Prentice Hall, Inc.

Papalia, D. and Old S.W., (1998) Psychology (2nd ed) : U.S.A. McGraw Hills U.S.A.

Rosenberg, D., Gleitman, H & Fridlund, A.J. (2004). Psychology (6th ed). New York : W.W. Norton & Company Inc.

Scot. P & Spencer, C (1988) Psychology-A Contemporary Introduction Oxford: Blackwell publishers Ltd.

Smith, E. E; Bem, D. J; Hoeksema, S.N. (2001). Fundamentals of Psychology New York : Heart Court College Publishers.

Stemberg, R.J. (2001). Psychology-In search of the human mind (3rd ed). Orlando Harcourt College publishers

Weiren, W. (2001). Psychology-Themes and variations (5th ed). Thomson learning Inc. U.S.A.

PAPER-B

AREAS OF PSYCHOLOGY Marks: 75

1. **Psychometrics**

   Definition

   Characteristics of Psychological Tests: Application of Psychological tests Standardization, Objectivity, Reliability Types of Psychological Tests: Performance Tests, Ability Test and Personality Tests.

2. **Psychopathology and Clinical psychology** Concept of normality and abnormality Brief Introduction to Psychopathologies Assessment & Intervention

3. **Developmental Psychology**

   Introduction

   Longitudinal, Cross-sectional designs

   Aspects of Development : Physical, psychological, Social. Linguistic & Cognitive Phases of Development: prenatal, Birth, Infancy, Childhood, Adolescence, Adulthood, Old-age

4. **Educational Psychology** Introduction

Learner's Characteristics : Abilities, Motivation, Interest, Aptitude Teachers characteristics : Teacher's Personality, Communication skills, Teacher as a model.

Counseling and Vocational Guidance

Special Education : Physical Disability, Children with Special Needs Gifted children

5. **Social Psychology**

Introduction

Group Types: Primary group, Secondary group, Reference group, In and out group Attitude : Types of attitudes ; (Stereotypes, Prejudices) Nature and components. Leadership : Types and Characteristics Mass Communication : Electronic media and Print media

6. **Organizational Psychology**

Introduction

Personnel Selection and Placement: Work environment: Physical and Psychological

RECOMMENDED BOOKS

Coon. D, (2001) Introduction to Psychology: Wordsworth publications

Mcgrath j.E., Social Psychology: SAGE Publications London (1990)

Papaliatese. D.E., Olds, W. (1989). Human Develoment (4th ed): McGraw-Hills.

Stemberg, R. J. (2001). Psychology-In search of the human mind (3rd ed) Orlando : Harcourt College Publishers

PAPER - C :	EXPERIMENTS AND RESEARCH	MARKS 50
	Practical Note Book :	15
	Practical Examination :	25
	Viva Voce :	10

1. **STATISTICS**

(*i*) Definition and Importance of Statistics in Psychology

(*ii*) Graphic Representation

(*iii*) Measures of Central Tendency: Mean, Median and Mode.

(*iv*) Measures of Variability : Standard deviation

(*v*) Correlation : Pearson Product-moment & Rank Order

2. LIST OF EXPERIMENTS

1. Muller-Lyre Illusion
2. Transfer of Training
3. Memory using Meaningful vs Nonsense Syllables
4. Size Constancy
5. Personality Assessment (Projective technique)
6. Retroactive Inhibition vs Proactive Inhibition
7. Reaction Time

3. MINI RESEARCH

Students are required to perform mini research in group,

4. PRACTICAL EXAMINATION AND VIVA VOCE

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2. BOTANY

DETAIL OF COURSES

NOTE :

(*a*) HEC course of B.Sc. examination will be adopted as it which consists of four papers. Paper-A & B will be taught in the 3rd year and Paper - C & D in the 4th year.

(*b*) Each paper will be of 50 marks (35 for theory and 15 for practical).

(*c*) The 60% portion of question paper will be subjective type and 40% objective type. the question paper will be section wise and each question will be divided in parts.

(*d*) The choice in attempting the question will be minimized to some extent.

PAPER-A

DIVERSITY OF PLANTS

Definition, scope and classification of the kingdomes
Basic concepts of evolution in plant diversity

1. Viruses

(*a*) General structure, types and reproduction of viruses

(*b*) Viral diseases and their economic importance

2. Kingdom Monera/Prokaryotae (Bacteria and Cyanobacteria)

General structure, reproduction, classification and economic (such as Nitrogen Cycle and industrial role)

3. **Kingdom Protista/Protoctista : (Algae)**

(*a*) General structure, occurrence, reproduction and economic importance

(*b*) Classification of algae with specific examples

(*i*) Chlorophyta : Volvox

(*ii*) Charophyta : Chara

(*iii*) Vaucheriophyta : Vauchena

(*iv*) Bacillariophyta : Pinnularia

(*v*) Phaeophyta : Laminaria

(*vi*) Rhodophyta.-Batrachospermum/Polysiphonia

4. **Kingdom Fungi**

(*a*) General structure, life cycle, classification with specific examples :

(*i*) Plasmodiophoromycota	Plasmodiophora
(*ii*) Oomycota	Pythium
(*iii*) Ascomycota	Penicllium, Saccharomyces, Alternaria
(*iv*) Basidomycota	Ustilago, Puccinia and Agaricus

(*b*) Role of fungi in agriculture, diseases of major **economic crop Plants** : rusts, smuts, downy-and powdery mildews, damping off, root rots food and industry

Lichens

General account, structure and life history of *Physcia*

5. **Kingdom Plantae**

(*a*) **Bryophyta (Atracheophyta)**

General account, reproduction, classification, affinities and ecological importance with special reference to the life cycle of *Anthoceros, Porella* and *Polytricum.*

(*b*) **Pteridophyta (Tracheophyta)**

General account, structure, life cycle and biological importance with specific examples:

(*i*) Psilopsida ; *Psilotum*

(*ii*) Lycopsida : *Selaginella*

(*iii*) Sphenopsida : *Equisetum*

(*iv*) Pteropsida ; *Polypodium, Adiantum* and *Marsilea*

(*c*) **Gymnospermae (seed Plants)**

General account with reference to structure and life history of *Cycas, Pinus* and *Ephedra* and their affinities.

(*d*) **Angiospermae**

Introduction

Practical

General culturing, maintenance, Preservation and staining of micro-organisms. Study of the morphology and reproducticve structures of the types mentioned in theory paper. Identification of various types mentioned from prepared slides and fresh collection. Collection of diseased specimens of plants and their identification.

Recommended Books

1. Bold, H.C., Morphology of Plants, 2nd ed. Harper & Row, N.Y.
2. Hafiz, A. (1986). Plant Diseases, Pakistan Agricultural Research Council, Islamabad, Pakistan.
3. Lee, R.E. (1999). Phycology. Cambridge University Press. U.K.
4. Mauseth, J.D. ((1998). An Introduction to Plant Biology : Multimedia Enhanced. Jones and Bartlett Pub U.K.
5. Moore, R.C., W.D. and Vodopich, D.S. (1998). Botany. McGraw Hill Company, U.S.A.
6. Pandey, S.N. (1994). Text Book of Botany Vol. II. S. Chand & Co, New Dehli.
7. Raven, PX, Evert, R. E. and Eichorn, S. E. (1999). Biology of Platns. W. H. Freeman and Company Worth Publishers.
8. Ray, P. M, Sleeves, T. A. and Fultz, T. A. (1998). Botany. Saunders College Publishing, U.S.A.
9. Ross, F.C. (1994). Introduction to Microbiology. John Willy, U.S.A.

PAPER-B

PLANT SYSTEMATICS, ANATOMY AND DEVELOPMENT

Plant Systematics

1. Introduction to Plant systematics its aims, objectives and importance.
2. Classification : Importance, brief history, introduction, various systems of classification (Brief account of all the systems)
3. Brief introduction to nomenclature, importance of Latin names and binomial system with an introduction to international code of Botanical Nomenclature (ICBN).
4. Morphology and Phytography-a detailed account of various morphological characters of root, stem, leaf, inflorescence, flower, placentation and fruit types.

5. Diagnostic characters, economic importance and distribution pattern of the following families:

   1. Ranunculaceae
   2. Brassicaceae (Cruciferae)
   3. Fabaceae (Leguminosae)
   4. Rosaceae
   5. Euphorbiaceae
   6. Rutaceae
   7. Moraceae
   8. Chenopodiaceae
   9. Cucurbitaceae
   10. Solanaceae
   11. Lamiaceae (Labiatae)
   12. Asteraceae (Compositae)
   13. Liliaceae
   14. Poaceae (Gramineae)

Anatomy and Development

1. Cell wall; structure and chemical composition.
2. Tissue and Tissue System: Concept; structure and function of various tissues.
3. Structure and development of root, stem and leaf including various type of meristem, Primary and secondary growth of dicot stem.
4. Early development of Plant body (embryology) *Capsella bursa-pastoris* or *Arabidopsis*.

Practical.

1. Study of cross section of monocot and dicot stem.
2. Study of the simple and compound tissue in macerated and sectioned material.
3. Study of cross section of bifacial leaf.
4. To study the Prepared slides of secondary growth in dicot stem.
5. Identification of families given in syllabus with the help of keys.
6. Technical description of common flowering plants belonging to families mentioned in theory syllabus.
7. Field trips shall be undertaken to study and collect local plants, Students shall submit 40 fully identified herbarium specimens.

Recommended Books

1. Bold, H.C. (1997), Morphology of Plants. Harper & Row, N.Y.
2. Dickison, W.C. (2000). Integrative Plant Anatomy. Academic Press, UK.
3. Pahn, A. (1990) Plant Anatomy. Pergamon Press, U.K.
4. Mauseth, J.D. (1998). An Introduction to Plant Biology: Multimedia Enhanced Jones and Bartlett Pub, U.K.
5. Moore, R.C., W.D. Clarke and Vodopich, D.S. (1998). Botany McGraw Hill Company, U.S.A.
6. Raven, P.H., Evert. R.E. and Eichhorm, S.E. (1999). Biology of Plants. W.H. Freeman and Company Worth Publishers,
7. Ray, P.M. Steeves, T.A. and Fultz, T.A. (1998). Botany. Saunders College Publishing, USA.
8. Stuessy, T.F. (1990). Plant Taxonomy. Columbia University Press, USA.

PAPER-C

CELL BIOLOGY, GENETICS AND EVOLUTION

Cell Biology

1. Structures and Functions of Bio-molecules
   Carbohydrates
   Lipids
   Proteins
   Nucleic Acids
2. Cell: The Physico-chemical nature of Plasma membrane and cytoplasm.
3. The ultra structure of plant cell with a brief description and functions of the following organelles

   (*i*) Endoplasmic reticulum (ii) Plastids
   (*iii*) Mitochondria (*iv*) Ribosomes
   (*v*) Dictyosomes (*vi*) Vacuole
   (*vii*) Microbodies (Glyoxysomes + Peroxysomes)
4. Nucleus: Nuclear membrane, nucleolus, ultrastructure and morphology of chrosomes, karyotype analysis

1. Reproduction in somatic and embryogenic. cell, mitosis & meiosis, cell cycle
2. Chromosomal aberrations.

(i) Changes tin the number of chromosomes, Aneuptoidy and euploidy

(ii) Changes in the structure of chromosomes, deficiency, duplication, inversion and translocation.

Practical

1. Study of cell structure using compound microscope and elucidation of ultra structure from electron microphotographs
2. Measurement of cell size.
3. Study of mitosis and meiosis by smear/squash method and from prepared slides.
4. Study of chromosome morphology and variation in chromosome number.
5. Extraction and estimation of carbohdrate, protein, RNA, DNA from plant sources.

Genetics

1. Introduction scope and brief histosy of genetics. Mendelian inheritance; Laws of segregation and independent assortment, back cross, test cross, dominance and incomplete dominance.
2. Sex linked inheritance, sex linkage in. Drosophila and man (colour blindness. XO, XY, WZ mechanism, sex limited and sex linked characters, sex determination.
3. Linkage and crossing over : Definition, linkage groups, construction of linkage maps, detection of linkage.
4. Molecular genetics ; DNA replication- Nature of gene, genetic code, transcription, translation, protein synthesis, regulation of gene expression (e.g. *lac* operon).
5. Transmission of genetic material in Bacteria : Conjugation and gene recombination in *E. coli* transduction and transformation.
6. Principles of genetic engineering/biotechnology ; Basic genetic engineering techniques.
7. Application of genetics in plant improvement : Induction of genetic variability (gene mutation, recombination), physical and chemical mutagens, selection, hybridization and plant breeding techniques, establishment of varieties release of new varieties.
8. Introduction of genetic conservation
9. Evolution

Practical

1. Genetical problems related to transmission and distribution of genetic material.
2. Identification of DNA in plant material. Carmine, orcein staining.
3. Study of salivary gland chromosomes of Drosophila.

Recommended Books

1. Hoelzel, A.R. 2001. Conservation Genetics.Kluwar Academic Publishers.
2. Dyonsager, V.R. (1986). Cytology and Genetics. Tata and McGraw Hill Publication Co. Ltd., New Dehli,
3. Lodish, H. 2001. Molecular Cell Biology. W.H. Freeman and Co.
4. Sinha, U. and Sinha, S. (1988). Cytogenesis Plant Breeding and Evolution, Vini Educational Books, New Dehli.
5. Strickberger, M.V. (1988), Genetics, MacMillan Press Ltd,London.
6. Carroll, S.B., Grenier J.K. and Weinerbee, S.d. 2001. From DNA to Diversity-Molecular Genetics and the Evolution of Animal Design. Blackwell Science.
7. Lewin, R. 1997. Principles of Human Evolution. Blackwell Science.

PAPER-D

PHYSIOLOGY AND ECOLOGY

Physiology

1. Types and properties of solutions. Electrolytes and non-electrolytes. SI units for expressing concentration of solutions, acids, bases and salts, pH. Definition of buffers and their role in biological systems. Colloidal systems, their nature, properties, and biological significance.
2. Wafer relations (water potential, osmotic potential, pressure potential, matric potential) Absorption and translocation of water. Transpiration, factors affecting transpiration. Stomatal structure and functions.
3. Mineral nutrition : Soil as a source of minerals. Passive and active transport of nutrients. Essential mineral elements, their role and deficiency sympotoms with emphasis on N,K,P & Ca
4. Enzymes: Definition, nature, classification and properties.
5. Photosynthesis : The process ; absorption and action spectra. Mechanism : light reactions (electron transport and photophosphorylation) and dark reactions (Calvin cycle). Factors affecting this process ; concept of limiting factors, Products of photosynthesis.
6. Respiration : Definition and mechanism, Glycolysis. Krebs cycle. Electron transport system and oxidative phosphorylation. Anaerobic respiration. Respiratory substrates and respiratory quotients.
7. Nitrogen Metabolism : Biological nitrogen fixation.
8. Growth: Definition ; role of auxins, gibberellins, cytokinins, abscisic acid and ethylene in controlling growth, introduction to plant tissue culture.

9. Photoperiodism : Definition, historical background, short day, long day and day neutral plants. Role of phytochromes and hormones in photoperiodism,

10. Dormancy : Definition and causes of seed dormancy ; methods of breaking seed dromancy.

11. Vernalization : Annual and biennial forms, Hormonal concept and phasic development theory.

12. Plant Movements : Tropic movements - phototropism, gravitropism and their mechanisms. Nastic movements.

Practical

1. Preparation of solutions of specific normality of acids/bases, salts, sugars, molal and molar solutions and their standardization.

2. Determination of uptake of water by swelling seeds when placed in sodium chloride of different concentrations.

3. Measurement of leaf water potential by the dye method.

4. Determination of the temperature at which beet root cells lose their permeability.

5. Determination of the effects of environmental factors on the rate of transpiration of a leafy shoot by means of a photometer/by cobalt chloride paper method.

6. Tests for sugars (Reducing and non-reducing). Glucose, maltose, fructose.

7. Chemical tests for the following cell constituents:

   (*i*) Starch (*ii*) Cellulose
   (*iii*) Lignin (*iv*) Proteins

8. Extraction of chlorophyll from the leaves and separation of component pigments no a paper chromatogram. Study of absorption spectra using spectrophotometer,

9. Comparison of the effects of green, red and blue-coloured light on the amount of oxygen evolved by a photosynthesizing plant.

10. Estimation of oxygen utilized by a respiring plant by Winkler's method.

11. Extraction of amylase from germinating wheat seeds and study of its effect on starch breakdown.

12. Measurement of carbon dioxide evolution during respiration of germinating seeds by the titration method.
13. Determination of leaf area index.
14. Measurement of growth by leaf area increase method.
15. Study of different stages of seed germination.

Recommended Books

1. Ihsan Illahı (1995). Plant Physiology, Biochemical Processes in Plants, UGC Press.
2. Witham & Devlin. 1986 Exercises in Plant Physiology, AWS Publishers, Boston.
3. Taiz, L. and Zeiger, E. 1998. Plant Physiology. 2nd Ed. Sinauers Publ, Co .Inc.Calif.
4. Salisbury F.B. and Ross C. B. 1999. Plant Physiology. 5th Edition. Wadsworth Publisheing Co.Belmont CA.
5. W.B. Hopkins. 1999, Introduction to Plant Physiology. 2nd Ed. john Wiley& sans New York.

Ecology

1. **Concepts of Ecology**
2. **Brief history of Ecology (General., Pakistan)**
3. **Ecophysiology**

(a) **Light and temperature responses**

(*i*) **Quantity** of light

(*ii*) Variation in light (temperature)

(*iii*) Ecophysiological responses

(b) **Edaphology**

(*i*) Brief introduction of soil forming process

(*ii*) Texture, structure, and water

(*iii*) Chemicl Propererties

(*iv*) Biological components; Soil Organisms, Organic matters

(c) **Water**

(*i*) Precipitation; kinds, and affectivity.

(*ii*) Distribution of vegetation in relation to moisture.

(d) **Wind-Ecological importance of wind**

4. **Population Ecology:**

A brief introduction, history and background, Seed dispersal, Seed bank, demography, reproductive strategy.

5. **Community Ecology :**

(*i*) Concept of plant community-attributes

(*ii*) Sampling methods

(*iii*) Succession-history, concept, development and modern theories of succession

(iv) Brief concept of productivity.

(v) Local vegetation

6. **Ecosystem :**

(i) Definition aud background

(ii) Ecological energetic

(iii) Biogeochemical cycle (Hydrologic and nitrogen cycle).

7. **Applied Ecologoy**

Aridity, biodiversity, conservation, water logging and salinity. pollution, erosion. desertification. management.

Practical

1. Measurement of light and temperature.
2. Effect of light and temperature on seed germination
3. Determination of soil texture by hydrometer method
4. Determination of maximum water holding capacity.
5. Determination of carbonates. electrical conductivity and pH in Soil and Water.
6. Measurement of wind velocity.
7. Population demographic techniques.
8. Measurement of vegetation by Quadrat and plotless methods
9. Determination of productivity by harvest method
10. Several trips to ecologically diverse vegetations.

Recommended Books

1. Ricklefs. R.E. 2000. Ecology. W.H. Freeman & Co., U.K.
2. Ricklefs. E.R. 2001. The Economy of Nature W.H. Freeman & Co. U.K.
3. Barbour, M. G., J.H. Burke and W.D. Pitts. 1999. Terrestrial Plan Ecology, The Benjamin. Gumming Publishing Co. Palo Alto California. U.S.A.
4. Chapman, J.L. and Reiss M.J. Ecology: principles and application. Cambridge University Press,
5. Hassain F. 1989. Field and Laboratory Manual of Plan Ecology National Academy of Higher Education, Islamabad.
6. Krebs. C.J. 1997. Ecology. Harper and Row Publishers.

7. Moore, P.D. and S. B. Chapman. 1986. Methods in Plant Ecology Blackwell Scientific Publication, Oxford.

8. Smith, R.L. 1996. Ecology and Field Biology. Addison Wesley Longman Inc., New York.

9. Smith, R.L. 1998. Ecology of Elements. Harper & Row Publisher) New York.

10. Stiling, O.D. 1996. Ecology: Theories and applications. Prentice Hall, New Jersey.

11. Subrahmanyam, N.S. and Sambamurthy, A.V.S.S. 2000. Ecology Narosa Publishing Houese, New Delhi.

12. Townsend, C.R. Harper, J.L. and Begon M.E. 2000. Essentials Ecology. Blackwell Scientific Publications, UK.