

# UNDERGRADUATE PROGRAMME IN HOME SCIENCE

## Paper No-13: PHYSICAL SCIENCES

### THEORY

### SEMESTER V

Paper No:13

Max.Marks-100

Credits-4

Teaching periods- 4 + 1 student presentation/week

Total Teaching periods- 56 periods+14 periods /Semester

### SECTION A -CHEMISTRY

#### Objectives

The aim of this course is to provide students adequate and broad based background and exposure to biomolecules linked to daily life.

#### Content

#### Periods

#### Unit I Carbohydrates

14

Classification, Monosaccharides – Fischer's structure of aldoses and ketoses, ring structure of sugars, anomers and epimers, oxidation of sugars, reduction of sugars, reducing properties of sugars, formation of disaccharides, reducing and non-reducing disaccharides, Polysaccharides – homo and heteropolysaccharides.

#### Unit II Lipids

4

Building blocks of lipids – fatty acids, glycerol; Storage lipids – triacyl glycerol, glycerophospholipids

#### Unit III Amino acids

6

Structure and classification, peptide linkage, zwitter ion, Ninhydrin test, Sangers test ; Protein structure – Levels of organization – primary, secondary, tertiary and quaternary structure; Denaturation of proteins. Enzyme and Concept of Lock & Key and Induced Fit Theory.

#### Unit IV Colloid Chemistry

4

Distinction between true solutions, colloids and suspensions, Classification of colloids, Properties, Emulsions, Application of colloids.

## Recommended Readings

1. Morrison, R. T. and Boyd, R. N. (1992) Organic Chemistry, 6<sup>th</sup> Ed. Prentice Hall.
2. Graham Solomon, T.W. Organic chemistry 10<sup>th</sup> Ed. (2009) John Wiley and sons, Inc.
3. Voet, D and Voet, J., Principles of Biochemistry, 4<sup>th</sup> edition (2011) by John Wiley and sons.
4. Nelson, D.L. and Cox, M.M., Lehninger's principles of Biochemistry, 6<sup>th</sup> edition, (2012) W.H. Freeman.
5. Atkins, P.W. and Paula, J.D. Physical chemistry, 9<sup>th</sup> Ed., Oxford University Press (2011).
6. Berg, J. M., Tymoczko, J.L. and Stryer, L. (2012). Biochemistry 7<sup>th</sup> Ed., W. H. Freeman.

## SECTION B - PHYSICS

### Objectives

- To enable the students to get basic knowledge of concepts of physics in all branches
- To develop a scientific temper

### Content

### Periods

#### Unit I: Mechanics

9

- Need for measurement, units of measurement, system of units, SI units, fundamental and derived units, Length, Mass & Time measurements, errors in measurement, significant figures.
- Dimensions of Physical Quantities.
- Types of Motion, Equations of Motion, Newton's Laws of Motion.
- Gravity and Newton's Law of Gravitations, earth's satellites and escape velocity.
- Friction – rolling, sliding, limiting.
- Machines – Mechanical Advantage, velocity ratio and efficiency. Lever, Pulley, inclined Plane etc.

#### Unit II: Heat

7

- Temperature and its measurement. Diff, Types of Thermometers – Clinical, Platinum Resistances Thermocouple.
- Calorimeter, change of state, specific heat & Latent Heat, Casseroles & Thermos Flask.
- Heat Transfer: Modes and examples.
- Hygrometry: Humidity Relative humidity Dew pt, & Atmosphere Phenomenon.

#### Unit III: Optics

6

- Reflection, Refraction and Diffusion.
- Dispersion of Light – Absorption & Emission Spectra, Solar Spectrum, Colour of Bodies.
- Optical Instruments: Eye, simple & compound Microscope, Telescope.
- Common sources of Light: Incandescent Bulb, Fluorescent Bulb, Florescent Tube, CFL.

## Unit IV: Electricity

6

- Concept of Current, A.C.&.D.C. Voltage & Resistance.
- Conductors & Insulators.
- Sources of Current: Primary & Secondary Cells, Inverter, Generator.
- Safety Features: Fuse, MCB Ear thing.
- Effect and Prevention of Electric Shocks.
- Concept of Transformer & efficient Transmission of electricity.
- Basic Household gadgets- Electric Iron, Toaster and geyser

### Recommended Readings

1. Lal, S. (1995). Fundamentals Physics, Pradeep Publications, Delhi.
2. Peet, L.J., Pickett, M.S. & Arnold, M.G. (1979). Household Equipment, John Wiley and Sons, USA.
3. Partab, H. (1987). Electrical Gadgets, Dhanpat Rai & Sons.
4. Sharma, S.K. & Jerath, R. (2013). Dinesh New Millenium Physics. Vol. I and Vol. II.
5. Khan, N. (2008). Physics. Oxford University Press (2008).

## PHYSICAL SCIENCES

### PRACTICAL

Paper no	:	
Max.marks	:	50
Credits	:	2
Teaching load	:	14 practicals /semester (2 periods each)

### Section A - CHEMISTRY

#### I. Titrimetric analysis

6

1. Concept of strength, molarity, normality, molality of solutions.
2. Preparation of standard solutions (Concept of primary and secondary standards).
3. Acid base titration (Determination of free alkali present in soaps)
4. Precipitation titration (Strength of sodium chloride solution using silver nitrate solution)

#### II .Qualitative tests for carbohydrates-

4

Monosaccharides, disaccharides and polysaccharides.

#### III. Qualitative test for presence of anions and cations

4

- a) anions (borate, carbonate) and cations (lead, zinc, ferric)
- b) zinc in talcum powders, lead and ferric in metal polishes

### Recommended Readings

1. Vogel, A. I. A Textbook of Quantitative Inorganic Analysis, ELBS.
2. Ahluwalia, V. K., Dhingra, S., Gulati, A., College Practical Chemistry.

## SECTION –B PHYSICS

### PRACTICALS

Paper no	:	
Max.marks	:	50
Credits	:	2
Teaching load	:	14 practicals /semester (2 periods each)

Contents	Practicals
1.Measuring volume of cylinder ,cube, cuboid using vernier calipers	2
2.Measuring thickness of thin plates and diameter of wire using screw gauge	2
3.Verify laws of reflection	1
4. Verify laws of refraction	1
5. Verify principles of moments	1
6. Weight of unknown body by principles of moments	1
7. Determine 'g' by simple pendulum	2
8. Focal length -1 pin method	1
9. Verify Ohm's law and determine resistance by graph method	1
10.Verify the relation between $^{\circ}\text{C}$ and $^{\circ}\text{F}$ scales of temperature by graph method	2