



**KARNATAKA NURSING & PARA MEDICAL BOARD REGULATING AUTHORITY  
(ACT-2012)**

**Para Medical Board, Bengaluru**

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PMB/ /17-18

Date: 29.12.2017

**NOTIFICATION**

**Sub: New Syllabus for 1<sup>st</sup> year Diploma Courses (Previously 1<sup>st</sup> year Certificate Courses).**

The new curriculum is designed for the academic year 2017-18, as per the recommendation of syllabus committee 2013. According to the new curriculum there is no certificate course. The course now renamed as Diploma I, Diploma II and Diploma III. In the new carry over system candidate can carry forward all the subjects and should clear six months before the final exam.

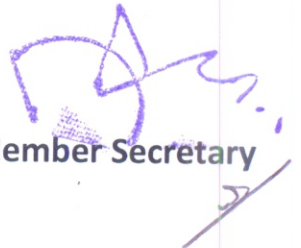
A new syllabus for the subjects Physics, Chemistry, Biology and English for 1st year Diploma courses students (Previously 1<sup>st</sup> year Certificate Courses) has been announced in the Board's website. ([www.pmbkarnataka.org](http://www.pmbkarnataka.org))

The model question papers for the all four subjects will be announced in the Board's website after Feb 2018.

The new syllabus is framed as per Govt. of India's guidelines. Accordingly, the duration of each course is 2 ½ Year for PUC (2 Years + 6months internship) and 3 ½ Year for SŚLC (3 Years + 6months internship).

The Internal Assessment (IA) marks will not be considered for passing marks. IA marks will only be eligibility criteria for the appearing for the examination.

The IA marks of 50% and 75% attendance are compulsory for taking the Examination.

  
Member Secretary

**Government of Karnataka**



**PARA MEDICAL BOARD**

**Revised Syllabus**

**of**

**Physics**

**I Year Diploma Courses (previously  
first year certificate courses)**

**2017**

# **SYLLABUS [TOTAL HOURS=80HOURS]**

## **SECTION A**

### **UNIT I: INTRODUCTION TO PHYSICS (UNITS & DIMENSIONS).**

**(Only Definition & brief information)**

**3 HOURS**

- Definitions of units (SI, CGS, MKS)
- Derived units
- Definitions of Dimensions
- Physical quantities and uses of Dimensions
- General terms used in the physics: Velocity, Acceleration, work, power, Pressure, Frequency, Capacitance, Energy, Temperature, Displacement, Force, Electric Charge, Magnetic Flux, Luminous flux, Electrical resistance.

### **UNIT II: DYNAMICS**

**12 HOURS**

- Concept of Particle, motion of particle. **(Definition & Brief explanation)**
- Definitions of speed, uniform and variable velocity, Acceleration, centrifugal & centripetal forces. **(Definition & Brief explanation)**
- Law of conservation of momentum and its illustrations **(Statement & Brief explanation)**
- Concept of Friction. **(Definition & Brief explanation)**
- Uniform Circular motion. **(Definition & Brief explanation)**
- Centrifugal & Centripetal forces, illustrations. **(Definition & Brief explanation)**
- Newton's law of gravitation. **(Statement, Examples & Brief explanation)**
- Acceleration due to gravity. **(Brief explanation)**
- Elasticity – Stress, strain, modulus of elasticity. **(Definition & Brief explanation)**
- Work, Power, energy, Kinetic & Potential energy. **(Definition)**

### **UNIT III: FLUID DYNAMICS & MECHANICS**

**8 HOURS**

- Fluid thrust & pressure. **(Definition, Examples & Brief introduction)**
- Atmospheric pressure. **(Definition, Examples & Brief introduction)**
- Pascal's law. **(statement, Examples & Brief introduction)**
- Archimedes principle. **(Statement, Examples & Brief introduction)**
- Floatation. **(Statement, Examples & Brief introduction)**
- Osmosis, Diffusion, Convection. **(Definition, Examples & Brief introduction)**
- Streamline flow. **(Definition, Examples & Brief introduction)**
- Turbulent flow. **(Definition, Examples & Brief introduction)**
- Bernoulli's Theorem & its applications. **(Statement, Examples & Brief introduction)**

#### **UNIT IV: SURFACE TENSION & VISCOSITY    5 HOURS**

- Surface energy, Surface tension. **(Definition, Examples & Brief introduction)**
- Viscosity. **(Definition, Examples & Brief introduction)**
- Cohesion & Adhesion. **(Definition, Examples & Brief introduction)**
- Cohesive & Adhesive forces. **(Definition, Examples & Brief introduction)**
- Angle of contact. **(Definition, Examples & Brief introduction)**
- Capillarity, Capillary action. **(Definition, Examples & Brief introduction)**
- Brief introduction on Medical gases- storage and central pipeline system

#### **UNIT V: HEAT & TEMPERATURE    12 HOURS**

- Heat & Temperature. **(Definition, Examples & Brief introduction)**
- Thermometer principle, its types & Uses.
- Expansion of Gases & Gas Laws. **(Statement, Examples & Brief introduction)**
- Isothermal & adiabatic processes. **Definition, Examples & Brief introduction)**
- Mode of heat transfer. **(Brief explanation)**
- Conduction of heat. **(Brief explanation)**
- Thermal conductivity & Applications.

## **SECTION – B**

### **UNIT VI: GEOMETRICAL OPTICS**

**12 HOURS**

- Composition & Properties of light. **(Brief Introduction)**
- Rectilinear propagation. **(Brief Introduction)**
- Mirror & its types. **(Definition, Examples & Brief explanation)**
- Laws of Reflection. **(Statement, Examples & Brief introduction)**
- Laws of Refraction. **(Statement, Examples & Brief introduction)**
- Refractive index. **(Brief Explanation)**
- Critical angle & total internal reflection, Fibre Optics. **(Definition, Examples & Brief explanation)**
- Lens, types & Uses. **(Definition, Examples & Brief explanation)**
- Image formation. **(Brief Explanation)**
- Real & virtual image. **(Brief Explanation)**
- Refraction through lens. **(Brief Explanation)**
- Dispersion. **(Brief Explanation)**
- Beer & Lamberts Law. **(Statement)**
- Colorimeter & Spectrophotometer. **(Brief Introduction & Applications)**
- Auto-refractometer & lasers **(only Brief introduction)**
- Interference of Light. **(Brief Explanation)**
- Introduction to Microscope.

### **UNIT VII: WAVES & SOUND**

**6 HOURS**

- Oscillations, Periodic motion. **(Definition, Explanation)**
- Simple harmonic motion **(Definition, types & characteristics)**
- Period, frequency, amplitude. **(Only Definitions)**
- Waves & its Classification. **(Definition, Explanation)**
- Longitudinal & transverse wave formation with examples. **(Definition, Explanation)**
- Origin & properties of sound. **(Definition, Explanation)**
- Ultrasonography. **(Principle, Working & applications: in Brief)**

### **UNIT VIII: ELECTROSTATICS & CURRENT ELECTRICITY** 10 HOURS

- Electrostatics, Charge. **(Definition)**
- Coulombs law. **(Statement)**
- Electric intensity, potential, field. **(Definition)**
- Capacitor- capacitors in series and parallel. **(Definition, Explanation)**
- Current. **(Definition)**
- Potential difference. **(Definition)**
- Ohms law. **(Statement)**

- Resistors connected in series and parallel. **(Definition, Explanation)**
- Voltmeter, ammeter. **(Brief introduction, Uses)**
- Thermistors & uses. **(Brief introduction, Uses)**

## **UNIT IX: MODERN PHYSICS**

**12 HOURS**

- Introduction to Atomic physics. (electron, nucleus, proton, neutron etc) **(Only Definitions)**
- Cathode rays, properties and uses. **(Definition, Explanation)**
- Photocell, Uses & types. **(Definition, Explanation, uses)**
- Radioactivity. **(Definition, Explanation with types and uses)**
- Alpha, Beta, Gamma Rays & X-rays. **(Definition, Explanation, properties, uses)**
- NMR, CT. **(Brief Introduction)**
- Radioactive Safety measures & Symbols. **(Only Basic symbols)**
- Conductors, semiconductors & Insulators. **(Definitions & Examples)**
- P- Type, N- Type semiconductor, PN junction diode, Forward & reverse bias. **(Brief Explanation)**
- PNP & NPN semiconductors. **(Brief Explanation)**

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**Government of Karnataka**



**PARA MEDICAL BOARD**

**Revised Syllabus**

**of**

**Chemistry**

**I Year Diploma Courses (previously first  
year certificate courses)**

**2017**

## SUB: CHEMISTRY

THEORY - 80 HRS

### SECTION-A

#### 1. Some Basic concepts of Chemistry

Importance of chemistry. Nature of matter, properties of matter & their measurement. Laws of chemical combinations Dalton's Atomic Theory. Names of important elements and their symbol valency, writing the formula of certain compounds, SI units, Drawing the relation between SI and non SI units, Atomic & molecular masses, percentage composition. Writing the dimension for physical quantities like volume pressure force area viscosity surface tension 2 Hours

#### 2. Structure of an atom:

Sub-atomic particles, Atomic models, Bohr's model for Hydrogen atom. Atomic weight, Molecular weight, Equivalent weight of an element – definition, determination of equivalent weight of magnesium by hydrogen displacement method and copper by oxide method. 3Hours

3. **Acids, bases and salts. Examples for each type. Indicators mentioning the colour change at the end point. Acidity, Basicity, equivalent mass calculation, oxidizing and reducing agent examples : Normality, Molarity, Molality, PPM, volumetric analysis,  $V_1N_1 = V_2N_2$  - problems** 3Hours

4. **Hydrogen peroxide** -Preparation properties and uses. 1 Hour

5. **Sulphuric acid**-Properties and uses. 1Hour

6. **Nitric acid**-Manufacture, properties and uses. 2Hours

7. **Halogens** : comparative study of preparation, properties and uses. Fluorocarbons and their applications. 3Hours

8. **Co-ordination compounds. Examples and applications of co-ordination compounds in biological reactions.** 2 Hours

9. **Radioactivity** - Natural radioactivity - properties of alpha, beta and gamma particles. Half life period, Isotopes -applications of  $Co^{60}$ ,  $p^{32}$ ,  $I^{131}$ ,  $Na^{24}$  3Hours

10. **Caustic soda manufacture, properties and uses. Sodium carbonate(washing soda) preparation,properties and uses.** 3Hours

11. **Calcium compounds including plaster of paris, Bone composition & Uses.** 1 Hour



**12. X-Rays production and its applications.**

**1Hour**

**13. Colloids** – Differences between colloids and crystalloids. Classification of colloids –methods of preparation of sols, dialysis-Tyndall effect and Brownian movement – applications of colloids in medicine food. Cottrell's electrical precipitator. Role of sodium, potassium, calcium chloride, bicarbonate ions in the fluid.

**4 Hours**

**14. Electro chemistry** - Electrolytes and non electrolytes, example for each. Lowry and Bronsted concept of acids and bases. Hydrogen ion concentration, meaning of  $p^H$  &  $pOH$ .  $p^H$  values of biological fluids and their importance. Buffer solutions-definition, different types of buffers and examples for each. Henderson's equation determination of  $p^H$  by buffer solution method. Importance of buffer in medicine

**5 Hours**

**15. Classification of elements and periodicity in properties.**

Development of periodic table. Modern and long form periodic table. Periodic trends in atomic radii, Ionic radii, Ionization energy, electron gain, enthalpy, electro negativity, valency & Hydrogen bonding. Anomalous properties of water.

**- 06 Hrs.**

## **SECTION-B**

- 16. Hydrocarbons** – saturated and un saturated: Alknes –methane, ethane – preparation, properties and uses. Alkene –ethene-preparation, properties and uses. Alkyne-acetylene-preparation, properties and uses. **3Hours**
- 17. Ethyl alcohol** – manufacture from molasses- properties and uses. preparation of bleaching powder, Iodoform, Chloroform, Benzyl alcohol, two chemical properties and uses . **2Hours**
- 18. Phenol** –manufacture from coal tar – properties, anisole, salol, cresols. **2Hours**
- 19. Aldehydes** – Formaldehyde, acetaldehyde, benzaldehyde- preparation, properties and uses. **2Hours**
- 20. Acetone** –preparation & three important properties and uses. **1Hour**
- 21. Properties of carboxylic acids. Acids strength on the basis of  $p^{ka}$  values.** **1Hours**
- 22. Diethyl ether** – preparation , properties and uses. Amines, classification. Basicity on the basis of  $p^{kb}$  values. **2Hours**
- 23. Carbohydrates:** Classification, open and ring structures of glucose, fructose. Ring structure of Maltose, sucrose and lactose. Partial representation of structure of cellulose, starch , and glycogen. Carbohydrates as a source of energy. **4Hours**
- 24. Proteins: Amino acids** – Classification. Formulae of amino acids such as glycine, alanine, serine, cysteine, aspartic acid, lysine & tyrosine. Peptide bond. Functional properties of proteins such as enzymes, antibodies, transport agents & biochemical messengers (Hormones) **3 Hours**
- 25. Nucleic acids**-DNA and RNA –purine and pyrimidine bases. Biological importance of nucleic acids **2Hours**
- 26. Enzymes:**Examples of different types of enzymes, their function in biological reactions. **2Hours**
- 27. Environmental chemistry:** Pollution of air, water, soil, major atmospheric pollutant, smog, acid rain effect on Ozone layer. Global warming. Strategies to control environmental pollution **- 4 Hrs.**

## 28. Basic principles and technique in organic chemistry:-

Qualities and quantitative analysis. IPUAC naming. Electronic displacement in co-valent bond. Inductive, electrometric, resonance and hyper conjugation effect. Homolytic and Heterolytic fission of covalent bond. Free radicals, carbonations, carbocations, electrophiles and nucleophiles. -05 Hrs.

## 29. Chemical equilibrium.

Rate of a reaction, rate equation expression factors influencing the rate. The law of mass action. Equilibrium constant. Reversible reaction with example, writing  $K_c$  and  $K_p$  for the reactions. Ammonia, phosphorus, penta chloride and hydrogen iodide. Discussion of Le Chatelier's principles to the synthesis of sulphur trioxide, problems. - 3Hrs.

## 30. Aromatic Hydro carbons, preparation and isolation of Benzene and Toluene. Important properties of Benzene and Toluene. Friedel-Crafts reaction. - 2 Hrs.

## 31. Chemical bonding: octet rule, co-valent bond, examples. Ionic or electrovalent bond, bond length, $sp^1$ , $sp^2$ and $sp^3$ hybridization. Example for each type. Ethyne, ethane and methane. Writing the structure of $NH_3$ and water molecule. - 2 Hrs

### PRACTICALS

20 HOURS

1. Preparation of standard solution (Sodium carbonate or oxalic acid)
2. Estimation of sodium hydroxide using standard hydrochloric acid
3. Estimation of potassium permanganate using standard oxalic acid
4. Estimation of Iodine using standard sodium thiosulphate (hypo)
5. Qualitative tests for carbohydrates
6. Qualitative tests for proteins
7. Qualitative analysis of simple inorganic salts
8. Purification of an organic compound.
9. Determination of melting point of a organic samples and comparing it with the standard value.
10. Determination of boiling point of a organic liquid and explaining the correction to be applied.
11. To find the pH of ferric chloride, sodium carbonate and potassium chloride. Classifying them into acid, neutral and basic salts on the basis of pH

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**PARA MEDICAL BOARD**

**Revised Syllabus  
of  
Biology  
I Year Diploma Courses (previously  
first year certificate courses)**

**2017**

# **BIOLOGY**

## **Theory- 80 hours**

### **Demonstration- 20 hours**

#### **SECTION-A**

##### **I) INTRODUCTION TO BIOLOGY** **HOURS-1**

Branches of biology- cell biology(cytology), Anatomy, Physiology, Histology, Biochemistry, Developmental biology( Embryology), Genetics, Bio technology, Bio physics.

##### **II) CELL: STRUCTURE & FUNCTIONS** **HOURS-3**

Definition of cell, types of cell-prokaryotic and eukaryotic, Structure of cell.

**Cell components**-plasma membrane, cytoplasm, nucleus

**Cell organelles (structure and function with diagram)**

- Endoplasmic reticulum
- Golgi complex
- Lysosomes
- Peroxisomes
- Mitochondria
- Ribosomes
- Centrosomes

##### **III) CELL CYCLE & CELL DIVISION** **HOURS-3**

Types of cell division- Mitosis, meiosis

Difference between mitosis and meiosis, its significance

##### **IV) VIRUSES** **HOURS-3**

- General structure of viruses
- Diseases caused by viruses- Japanese encephalitis, polio, mumps, measles, small pox, AIDS

##### **V) BACTERIA** **HOURS-3**

- General structure of bacteria
- Types of bacteria based on shape.
- Brief account of bacterial diseases- diphtheria, cholera, gonorrhoea, syphilis, plague, pneumonia, tetanus, typhoid, tuberculosis.

## **VI) TISSUE**

**HOURS-5**

Structure and functions of basic tissue

- Epithelium
- Connective tissue- Aerolar tissue, edipose tissue, cartilage, bone, blood.
- Muscular tissue
- Nervous tissue

## **VII) GENETICS**

**HOURS-8**

- Definition of chromosomes
- Structure of chromosomes
- Types of chromosomes based on position of centromere
- Function of chromosomes
- Sex determination
- Autosomes
- Allosomes
- Bar bodies
- Human blood group-(A, B, AB, O) And Rh factor.

## **VIII) BIOTECHNOLOGY**

**HOURS-10**

- Nucleic acid (Definition)
- Types of nucleic acid
- Function of nucleic acid
- Basics of gene cloning
- Basics of genetic finger printing
- Basics of genetic engineering – advantages & disadvantages
- Recombinant DNA Technology & its applications
  - Brief Account of
    - a. DNA fingerprinting
    - b. Gene Therapy
    - c. Human Genome project
    - d. Monoclonal bodies

## **IX EMBROYOLOGY**

**HOURS-4**

- a. Brief account of fertilization-Definition
- b. Structure and function of placenta. Types- External & Internal

## **SECTION B**

### **IX) ORGAN AND ORGAN SYSTEM**- Definition, structure and their function (with diagram)

#### **Digestive system** **HOURS-4**

Mouth

Buccal cavity

Tongue

Oesophagus

Stomach

Intestine

Digestive glands (salivary gland, pancreas, liver)

#### **Circulatory system** **HOURS-5**

Structure of heart

Blood vessels (Artery and vein)

Mechanism of working of heart

Blood pressure

Heart beat

Heart sound

#### **Respiratory system** **HOURS-5**

Larynx

Pharynx

Lungs

Alveoli

Diaphragm

Mechanism of respiration:

i Breathing(inspiration & expiration

ii. External respiration(exchange of oxygen & CO<sub>2</sub> between alveoli & blood

#### **EXCRETORY SYSTEM** **HOURS-5**

Structure of Kidney, Structure of Nephron. Functions of kidney.

#### **NERVOUS SYSTEM** **HOURS-5**

Structure of neuron

Basic structure and Functions of human brain and spinal cord.

## **REPRODUCTIVE SYSTEM**

### **Male reproductive system**

**HOURS-4**

Testes, Vas deferentia, epididymis, vas deferens, Cowper's gland, seminiferous tubules, seminal vesicle, urethra, structure of sperm

### **Female reproductive system**

**HOURS-3**

Uterus, Ovary, Fallopian tube, Graafian follicle

## **SEXUALLY TRANSMITTED DISEASES**

**HOURS-2**

Meaning, causative organisms, mode of infection, symptoms & preventive measures of gonorrhoea, syphilis & AIDS

### **X) SPECIAL SENSE ORGANS**

**HOURS-3**

Brief account of sense organs and functions.

Structure of Eye.

### **X GLANDS**

**HOURS-4**

Types of glands- Endocrine and Exocrine

Secretion of exocrine glands and function

Secretion of Endocrine (pituitary, thyroid, adrenal) glands and their function

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## DEMONSTRATIONS

HOURS-20

Study of microscope

Microscopic study of typical cell

Study of common medical devices( stethoscope, sphygmomanometer, thermometer, oxygen cylinder)

Charts and models of organs an organ system( digestive, respiratory, circulatory, reproductive, excretory, nervous)

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**PARA MEDICAL BOARD**

**Revised Syllabus**

**of**

**English**

**I Year Diploma Courses (previously first  
year certificate courses)**

**2017**

## ***Importance of English in paramedical courses***

English is the basic language which is a necessity of all the subjects as the students have to take up the examination in English only. It not only helps them in academics but also in their everyday life to communicate and interact with the people around and can have a good vocabulary and command over the language. Hence it is mandatory for every student to know and learn the basics in English so that he/she will understand the other core subjects and be able to write in the Board examination and in turn pass and complete his/her opted course.

## SECTION-A

### **ENGLISH SYLLABUS Total Hours of Teaching – 80hrs**

<b>UNIT- 1.Basic concepts in English</b>	<b>10hrs</b>
1.1 Phonetics-Vowel sounds and consonant sounds.	2hrs
1.2 Parts of speech-Noun, pronoun, verb, adverb, adjective, preposition, conjunction and interjection.	3hrs
1.3 Sentences and their types.	1hr
1.4 Genders and their types.	1hr
1.5 Opposites.	1hr
1.6 Plurals- formation of plurals with rules.	2hrs
<b>UNIT- 2. Articles and their types----(03hrs)</b>	
2.1 Definite article- THE	1hr
2.2 Indefinite Article- a and an.	1hr
2.3 Uses of articles.	1hr
<b>UNIT- 3. TENSES (04hrs)</b>	
3.1. Types of tenses.	1 hr
3.2. Past tense and their types with example.	1 hr
3.3. Present tense and their types with example.	1 hr
3.4. Future tense and their types with example.	1 hr
<b>UNIT- 4. Active voice and passive voice_</b>	<b>03hrs</b>
4.1. Simple sentences to be transformed from active voice to passive voice and passive voice to active voice.	
<b>UNIT- 5. DIRECT AND INDIRECT SPEECH</b>	<b>03 hrs</b>
<b>UNIT- 6. LINKERS AND THEIR USAGE</b>	<b>02hr</b>

<b>UNIT- 7. PARAGRAPH WRITING</b>	<b>(02 hr)</b>
<b>UNIT- 8. REPORT WRITING</b>	<b>(02 hr)</b>
<b>UNIT- 9. E-mail.</b>	<b>(01 hr)</b>
<b>UNIT-10. ESSAY WRITING</b>	<b>(10 hrs)</b>

10.1 Short essay and long essay

**Essay topics to be taught are as follows;**

- AIDS
- Prevention is better than cure
- Hospital waste management
- First aid
- Dog bite
- Snake bite
- Blood donation
- Eye donation
- Tuberculosis
- Health check up camp
- Role of Technicians in Hospital
- Malaria
- Dengue
- Swine flue(H1N1)
- Polio
- Dental hygiene
- Epidemic diseases.

## SECTION-B

**UNIT- 11. SPOKEN ENGLISH THROUGH LANGUAGE LABORATORY-** 12hrs

**UNIT- 12.LETTER WRITING AND THEIR TYPES** 10 hrs

12.1. Official letters

12.2. Personal letters

12.3. Advertisements

**UNIT- 13.CONVERSATION DEPENDING ON THE SPECIALISATION** 18 hrs

13.1. Comprehension (Passages must be given) 4hrs

13.2. Creative writing (picture writing Situational preferably  
medical based) 4hrs

13.3. Medical Terminology 5 hrs

13.4. Medical encyclopedia 5 hrs

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