SOLAPUR UNIVERSITY, SOLAPUR
Semester Pattern Syllabus
B.Sc. Part I
Physics
(w. e. f. June 2010)

N. B.:-

i) There will be two theory papers, each of 50 marks. (Paper I and paper II for first semester and Paper III and paper IV second semester) Annual practical examination will be 50 marks. The total marks for physics subject will be 250.

ii) There shall be 2.5 periods per paper i.e. 5 periods per week for theory and 4 periods per week for each batch of 20 students for practical.

iii) The duration of theory examination for each paper will be 2 Hours each and that for practical will be 6 Hours there will be two sessions for practical examination each of 3 hours

iv) The theory examination of Paper-I & II will be held at end of Semester I.

v) The theory examination of Paper-III & IV will be held at end of Semester II.

vi) The practical examination of both terms will be held at the end of semester II. Every student will have to perform two experiments one each from Group I and Group II.

Semester-I

Paper I: [Mechanics, Properties of matter]
1. Moment of Inertia: (8)

Analogy of rotational motion with translational motion, Moment of Inertia of spherical shell, Solid cylinder, Motion of bodies rolling down an inclined plane,

2. Pendulums: (8)

Theory of compound pendulum, Kater's Pendulum, Tostional pendulum and Bifilar' pendulum,

3. Motion under Central force: (8)

Newton's law of gravitation, Gravitational field, Potential due to spherical shell and solid sphere.

4. Surface tension: (6)

Surface tension, Angle of contact, Wettability, Relation between S.T., excess of pressure and radius of curvature.

5 Viscosity (12)

General concept of fluid flow, The equation of continuity, Bernoulli's equation, Flow of liquid through capillary tube, Poiseullie's equation, Experimental determination of viscosity of liquid by Poiseullie's method, Effect of temperature and pressure on viscosity of liquid.

Paper-II: Optics
6. Geometrical optics: (6)
Fermat's principle, Deduction of Laws of reflection and refraction from Fermat's principle, Velocity of light by Focault's method,

7 Optical Instruments: (10)
Types of aberrations, Chromatic aberration, Achromatic combination of two lenses in contact, Spherical aberration, Methods to minimize spherical aberration, Entrance and Exit pupils, Need of multiple lens eye piece, Common types of eye pieces, Huygen's eye piece, Ramsden's eye piece and Guass eye piece.

8. Interference: (8)
Interference in thin parallel films, Wedge shaped film, Newton's rings.

9. Diffraction: (10)
Types of diffraction, Fraunhofer diffraction at a single slit, Elementary theory of plane diffraction grating (Qualitative treatment only), Experimental determination of wavelength by plane diffraction grating, comparison between prism spectrum and grating spectra,

10. Polarisation: (8)
Polarisation of light, Plane of vibration and Plane of polarization, Polarisation by reflection and refraction, Brewster's Law, Pile of plates.

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Semester-II

Paper III: Classical Thermodynamics

1. Real Gas: (6)

Review of Van Der Waal's forces and equation of states, Andrew's curves, critical constants, Relation between critical constants and Van Der Waal's constants, Reduced equation of states.

2 Liquefaction of Gases: (6)

Liquefaction of gases BY Joule Thomson cooling, Linde's method of Liquefaction of air, Cooling by adiabatic demagnetization and expression for fall in temperature, Experimental setup for adiabatic demagnetization of paramagnetic substances, properties of liquid helium.

3.Transport Phenomena: (10)

Molecular collisions, Mean free path and collision cross section, Estimate of molecular diameter and mean free path (elementary method), Clausius and Maxwell's equations for mean free path (without derivation), Transport of Momentum (viscosity), Energy (thermal conduction), Transport of Mass(diffusion-without derivation) and interrelationship.

4.Thermodynamics I: (10)

Thermodynamic state, thermodynamic equilibrium, zeroth law and first law of thermodynamics, Reversible and irreversible processes, isothermal and adiabatic processes, work done during isothermal and adiabatic processes.

5 .Thermodynamics II: (10)

Carnot's reversible engine, Carnot cycle, Efficiency of Carnot's engine, Carnot's theorem, Second law of Thermodynamics (different statements), Practical cycles used in internal combustion engine (diesel engine only). Entropy, principle of increase of entropy in natural processes (conduction and free expansion of a gas), Third law of Thermodynamics.

Paper IV: Electricity, Magnetism and Electronics:

6. Varying currents: (8)

Growth and decay of current in L-R circuit, Growth and decay of current in C-R and L-C circuits, time constant.

7. A.C. Circuits: (10)

Complex number, j-operator and its applications to A.C. Circuits, LCR Circuit, Complex impedance, Reactance, Admittance, Susceptance and power factor, Series resonance circuit, parallel resonance circuit, Sharpness of resonance and Q- factor, A.C. Bridges, Owen's Bridge.

8. Ballistic Galvanometer: (6)

Moving coil ballistic galvanometer, Theory of ballistic galvanometer, figure of merit, current sensitivity and voltage sensitivity, Damping correction and log decrement.

9 Semiconductor diodes: (10)

Characteristics of PN junction diode**,** Bridge rectifier, Pi- filter, Clipper, Clampers, Zener diode, I-V characteristics, Zener diode as a voltage regulator,

10. Bi Junction Transistors: (8)

CB, CE transistor characteristics, Comparative study of CB, CE and CC configurations, Relation between current amplification factor α and β , Transistor as an amplifier in CE mode (Qualitative treatment only).

Practicals

Group I:-

1) M.I. of disc using annular ring.
2) Bifilar's pendulum – M.I. of rod
3) Kater's pendulum
4) Poission's ratio of rubber (Hollow tube method)
5) S.T. of liquid by Jaeger's method
6) Viscosity of liquid by Poiseuille's method
7) Frequency of A.C. by Sonometer (magnetic & non magnetic wire)
8) Temperature coefficient of resistance

Group II:-

9) Liquid lens.
10) Calibration of spectrometer- Measurement of unknown λ .
11) Newton's rings- Measurement of λ .
12) Photo Cell – Inverse square law verification.
13) Plane diffraction grating.
14) Bridge rectifier with Pie filter.
15) Output Characteristics of a transistor-CE mode.
16) Zener diode as voltage regulator.

Reference Books:-

1) Properties of matter- D.S. Mathur
2) A Text book of properties of matter- N.S. Khare & S.Kumar
3) Physics Vol.I –David & Robert Resnick
4) Treatise on heat – Saha & Shrivastav
5) Kinetic theory of gases – V.N. Kelkar
6) Heat and Thermodynamics – Brijlal & Subrahmanyam
7) Principles of electronics –V.K. Mehta
8) Electronics principles- Malvino
9) Basic electronics & Linear circuits- Bhargav, Kulshrstha &Gupta
10) University Physics-Mechanics of a particle- Anvar Kamal
12) Electricity and Magnetism – Khare & Shrivastav
13) Foundations of electromagnetic theory- Reitz & Milford
14) Electronic devices & circuits-allen Mottershed
15) Advanced Practical physics –Nelkon
16) Practical physics - Rajopadhye and Purohit

Solapur University, Solapur

Nature of Question Paper For Semester Pattern
- ### **Faculty of Science**
(w.e.f. June 2010)

Time :- 2 hrs.   **Total Marks-50**

Q. No.1)   **Multiple choice questions.**   **(10)**
    1)   ---
        a)   b)   c)   d)
    2)
    3)
    4)
    5)
    6)
    7)
    8)
    9)
    10)

Q.No.2)   **Answer any Five of the following**   **(10)**
    i)
    ii)
    iii)
    iv)
    v)
    vi)

Q.No.3)   **A) Answer any Two of the following**   **(06)**
    i)
    ii)
    iii)
    B) Write the Answer/Solve/Problem/Note   **(04)**

Q.No.4)   **Answer any Two of the following**   **(10)**
    i)
    ii)
    iii)

Q.No.5)   **Answer any one of the following**   **(10)**
    i)
    ii)

1. Structure of the courses :-

A) Each paper of every subject for Arts, Social Sciences & Commerce Faculty shall be of 50 marks as3 resolved by the respective faculties and Academic Council.

B) For Science Faculty subjects each paper shall be of 50 marks and practical for every subject shall be of 50 Marks as resolved in the faculty and Academic Council.

C) For B. Pharmacy also the paper shall be of 50 marks for University examination. Internal marks will be given in the form of grades.

D) For courses which were in semester pattern will have their original distribution already of marks for each paper.

E) For the faculties of Education, Law, Engineering the course structure shall be as per the resolutions of the respective faculties and Academic Council.

2. Nature of question paper:

A) Nature of questions.

"20% Marks - objectives question" **(One mark each and multiple choice questions)**

"40% Marks - Short notes / Short answer type questions / Short Mathematical type questions/ Problems. **(2 to 5 Marks each)**

"40% Marks - Descriptive type questions / Long Mathematical type questions / Problems. **(6 to 10 Marks each)**

B) Objective type question will be of multiple choice (MCQ) with four alternatives. This answer book will be collected in first 15 minutes for 10 marks and in first 30 minutes for 20 marks. Each objective question will carry one mark **each.**

C) Questions on any topic may be set in any type of question. All questions should be set in such a way that there should be permutation and combination of questions on all topics from the syllabus. As far as possible it should cover entire syllabus.

D) There will be only five questions in the question paper. All questions will be compulsory. There will be internal option **(30%)** and not overall option. **for questions 2 to 5.**

3. Practical Examination for B. Sc. I. will be conducted at the end of second semester.

4. Examination fees for semester Examination will be decided in the Board of Examinations.

The structures of all courses in all Faculties were approved and placed before the Academic Council. After considered deliberations and discussion it was decided not to convene a meeting of the Academic Council for the same matter as there is no deviation from any decision taken by Faculties and Academic Council. Nature of Question Paper approved by Hon. Vice Chancellor on behalf of the Academic Council.