

"Education for Knowledge, Science and Culture"

-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR.

B. Sc. Part – I CBCS Syllabus with effect from June, 2021

PHYSICS-DSC -1001 A

Semester: I Part I

MECHANICS-I

Theory: 30 Hours Credits -2

Unit-I

Vectors : (4)

-Vector algebra : Definition of vector, polar vectors and axial vectors, addition of vectors, rectangular resolution of vectors, unit vector (def), position vector of a point, product of two vector, scalar and vector products- scalar or dot products and its geometrical interpretation, work done as a scalar product, Vector or cross product and their useful results, area of parallelogram, moment of force, angular velocity, Scalar triple product, Vector triple product and its geometrical interpretation, problems, Derivative of a vector with respect to a parameter:

Unit -II

Ordinary Differential Equations (6)

Differential Equation: Ordinary and Partial differential Equations, 1st order homogeneous differential equations, 2nd order homogeneous differential equations with constants coefficients, examples

Unit-III

Laws of motion (7)

Introduction, Definition of translational and rotational motion, force and torque, Frames of reference - Inertial and Non-inertial frame with examples, Coordinate system-concept of Cartesian, Polar, Cylindrical and Spherical (Introduction). Newton laws of motion and their proof.

Rotational motion (7)

Rotational variables- Angular position, Angular displacement, Angular velocity, Angular acceleration, System of particle- Centre of mass, Moment of inertia (In short), Torque

Unit-IV

Momentum and Energy (6)

Introduction to mechanics, Mechanics of particle - Conservation of linear and Angular momentum (Single particle), Work - Energy theorem, Mechanics of system of particles- Conservation of linear and angular momentum for a system of particle, Energy conservation, Motion of rockets

PHYSICS-DSC -1001 A

Semester: I Part II

MECHANICS-II

Theory: 30 Hours Credits -2

Unit-I

1. Gravitation: (9 Hours)

Newton's Law of Gravitation, Motion of a particle in a central force field (motion in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statement and deduction), Derivation of Kepler's Laws from Newton's of gravitation, Derivation of Newton's Law of gravitation from Kepler's Laws. Introduction of Satellites, Basic idea of global positioning system (GPS).

2. Oscillations: (6 Hours)

Simple harmonic motion, Differential equation of SHM and its solutions, Kinetic and Potential Energy, Total Energy and their time averages, Damped oscillations, Forced oscillations.

Unit-II

1. Elasticity: (8 Hours)

Bending of beam, Bending moment, Cantilever (without considering weight of cantilever), Beam supported at both the ends (without considering weight of beam). Torsional oscillation, Torsional pendulum-Determination of η by couple per unit twist and moment of inertia, Determination of Y , η and σ by Searles method.

Special theory of relativity (7 Hours)

Introduction - Michelson Morley Experiment, Postulates of theory of relativity - Galilean, Lorentz Transformation, Application of Lorentz transformation- Loss of simultansity, Length contraction, Time dilation, Relativistic addition of velocities, Mass-energy relation.

Reference Books:

1. University Physics. FW Sears, MW Zemansky and HD Young 13/e, 1986. Addison-Wesley
2. Mechanics Berkeley Physics course, v.1: Charles Kittel, et. Al. 2007, Tata McGraw-Hill.
3. Physics – Resnick, Halliday & Walker 9/e, 2010, Wiley eastern Ltd, New Delhi.
4. Engineering Mechanics, Basudeb Bhattacharya, 2nd edn., 2015, Oxford University Press
5. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
6. Physics – S.G. Starling and Woodal Longmams and Green Co. Ltd.
7. Elements of properties of matter – D.S. Mathur, Shamlal Charitable trust New Delhi.
8. A text Book of properties of matter–N.S. Khare and S. Kumar. Atmaram and sons New Delhi.
9. Concepts of Physics –Vol.1 H.C. Verma -Bharati Bhavan Publishers.

PHYSICS-DSC -1001 B

Semester: II Part I

ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC THEORY - I

Theory: 30 Hours -
Credits -2

Unit-I (5 Hours)

Electricity

Direct current-Theory of B.G. and constants of B.G., Varying currents,(LR.RC.LC circuit)Growth and decay of currents, Importance of time constants τ

Unit -II (6 Hours)

1. Network Theorems

Source representation, Ohm's law, KVL, KCL, Superposition theorem, Thevenin's theorem, and Norton's theorem, Introduction to T network and Π network.

2. A.C. Circuits:

Complex numbers and their application in solving a. c. series LCR circuit, complex impedance, Reactance, Admittance, and Susceptance, Resonance in LCR series circuit, Sharpness of resonance (qualitative treatment only), Q-factor (definition only) A.C. Bridge - Owen's Bridge

Unit -III

Magnetism: (6 Hours)

Magnetostatics: Biot-Savart's law & its applications- straight conductor, circular coil, solenoid carrying current, Divergence and curl of magnetic field, Magnetic vector potential, Ampere's circuital law, Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility, Brief introduction of dia-, para- and ferro-magnetic materials.

Unit -(IV)

Electrostatics: (13 Hours)

Electrostatic Field, electric flux, Gauss's theorem of electrostatics, Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere, Calculation of electric field from potential, Capacitance of an isolated spherical conductor, parallel plate, spherical and cylindrical condenser, Energy per unit volume in electrostatic field, Dielectric medium, Polarization, Displacement vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric.

PHYSICS-DSC -1001 B

Semester: II Part II

ELECTRICITY ,MAGNETISM AND ELECTROMAGNETIC THEORY- II

Theory: 30 Hours

Credits -2

Unit-I

Vector Analysis:

(15Hours)

Scalar and Vector product, gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors (statement only).

Unit-II

1. Electromagnetic Induction:

(5Hours)

Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils, Energy stored in magnetic field.

2. Maxwell's equations and Electromagnetic wave propagation:

(10 Hours)

Equation of continuity of current, Displacement current, differential form Gauss and Ampere's theorem, Maxwell's equations, energy density in electromagnetic field, electromagnetic wave propagation through vacuum and isotropic dielectric medium, transverse nature of EM waves, polarization.

Reference Books:

1. Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education.
2. Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I, 1991, Oxford Univ. Press.
3. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
4. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
5. D.J. Griffiths, Introduction to Electrodynamics, 3rd Edn, 1998, Benjamin Cummings.
6. Electricity and Magnetism – Khare and Shrivastav.
7. Foundations of Electromagnetic Theory – Rritz and Milford.
8. University Physics 9th edition – Young and Freedman.
9. Concepts of Physics Vol-2 H. C. Verma

PHYSICS LAB(I) : DSC -1001A(pr)

Semester: I

Mechanics

60 Hours - Credits -2

1. To determine the Moment of Inertia of a Flywheel.
2. To determine the Moment of inertia of a disc using auxiliary annular ring.
3. Young's modulus of material of Bar by vibration.
4. Modulus of rigidity of material of wire by torsional oscillations
5. Y/η of Wire by Searle's method.
6. To determine g by Bar Pendulum.
7. To determine g by Kater's Pendulum.
8. Poission ratio for rubber using rubber tube.
9. To study the Motion of a spring and calculate (a) Spring Constant (b) Value of g .
10. Amplitude Decay

PHYSICS LAB(II) : DSC -1001B (pr)

Semester: II

ELECTRICITY ,MAGNETISM AND ELECTROMAGNETIC THEORY

60 Hours- Credits -2

1. Determination of time period of B.G. and unknown resistance by half deflection method by using B.G.
2. Measurement of constants of B. G.
3. Determine a high resistance by Leakage Method.
4. Transistor characteristics (CE mode)
5. Measurement of field strength B and its variation in a Solenoid (Determine dB/dx).
6. Impedance of series LCR circuit.
7. To study the a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor.
8. 7. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q .
9. Frequency of A. C. mains by sonometer.
10. To verify the Thevenin / Norton theorem.

Reference Books

1. Advanced Practical Physics for students, B.L.Flint &H.T.Worsnop, 1971, Asia Publishing House.

2. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
3. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
4. College Practical Physics – Khanna and Gulati (S. Chand and Co. Ltd, Delhi).
5. Practical Physics – Gupta and Kumar (Pragati Prakashan Meerat)
6. Advanced Level Practical Physics – J.M. Nelcon, J.M. Ogloom (EIBS).
7. A Text Book of Practical Physics - Shrinivasan and Balasubramanyam.
8. Engineering Practical Physics- S.Panigrahi & B.Mallick,2015, Cengage Learning India Pvt. Ltd.

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New course structure to be implemented after sanction(Draft)

For B.Sc./BCA/B.Sc.Computer science (Entire)

| Sr · No. | Internal Examination DSC Course | | | | Total (a+b+c+d) | Conve rsi on of 80 marks in Total(D) (e) | SEE (Semester End Examination) DSC Course | | Tota l (II) (f+g) = h | Tota l (I and II) (e+h) = i |
|----------------|---|---|---|--|------------------------|--|--|--------------------|--|--|
| | Part -I (Two o tests each of 10 mark s) (a) | Part - II (Two tests each of 10 mar ks) (b) | Home assig nm ent Part- I(c) | Home assig nm ent Part- II(d) | | | Part -I (f) | Part -II (g) | | |
| 1 | 20 | 20 | 20 | 20 | 80 | 20 | 40 | 40 | 80 | 100 |

Nature of Internal and SEE(Semester End Examination)Examination

1. For internal examination, there shall be two tests (online/offline) of ten marks and one home assignment of 20 marks for each part per semester.
2. For internal examination there shall be conversion of 80 marks in 20 marks and for passing **7** marks is required out of **20**.
3. For SEE (Semester End Examination), there shall be two parts (Part I and Part II) of each DSC course per semester, each of 40 marks.
4. There shall be combined passing for SEE (Semester End Examination) of Part I and Part II i.e. **28** marks is required out of **80**.
5. There shall be separate passing is mandatory for both internal and SEE (Semester End Examination).

Practical Examination B.Sc.I (as per BoS guidelines)

| Sr.No. | Lab work | Journal (Punctuality, Neatness) | Attendance, and participation in the practical's, motivation | Total |
|--------|----------|------------------------------------|--|-------|
| 1 | 40 | 5 | 5 | 50 |

Nature of Question Paper (Except English)

**Semester: I
Paper- I**

Time : 2 hours

Total Marks: (40)

Instructions:

- (1) **All** questions are **compulsory**.
- (2) Figures to the **right** indicate **full** marks.
- (3) Draw **neat** labeled diagrams **wherever** necessary.
(Paper setter may add or delete any instruction if required)

Q. 1. Select correct alternative.

(8)

- (i) _____
a) b) c) d)
- (ii) _____
a) b) c) d)
- (iii) _____
a) b) c) d)
- (iv) _____
a) b) c) d)
- (v) _____
a) b) c) d)
- (vi) _____
a) b) c) d)
- (vii) _____
a) b) c) d)
- (viii) _____
a) b) c) d)

Q. 2. Attempt any two

(16)

- (i)
- (ii)
- (iii)

Q. 3. Attempt any four

(16)

- (i)
 - (ii)
 - (iii)
 - (iv)
 - (v)
 - (vi)
-

Nature of Question Paper (Except English)
Semester: I
Paper- II

Time : 2 hours

Total Marks: (40)

Instructions:

- (1) **All** questions are **compulsory**.
- (2) Figures to the **right** indicate **full** marks.
- (3) Draw **neat** labeled diagrams **wherever** necessary.
(Paper setter may add or delete any instruction if required)

Select correct alternative.

(8)

- (i) _____
a) b) c) d)
- (ii) _____
a) b) c) d)
- (iii) _____
a) b) c) d)
- (iv) _____
a) b) c) d)
- (v) _____
a) b) c) d)
- (vi) _____
a) b) c) d)

(vii) _____

a) b) c) d)

(viii) _____

a) b) c) d)

Q. 2. Attempt any two

(16)

(i)

(ii)

(iii)

Q.3. Attempt any four

(16)

(i)

(ii)

(iii)

(iv)

(v)

(vi)