

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

CBCS - Semester - Grading Pattern

B. Sc. :: PHYSICS :: SEMESTER-I

CC PHY-101

(In force from June 2020)

Unit -1

Vector Algebra & Vector Analysis

- Dyadic (1.10) Scalar-Triple product (1.11) Reciprocal vectors (1.12) vector. Triple product (1.13) Pseudo vectors and Pseudo Scalars.(1.16)
- Differentiation of a vector with respect to time (2.2) Integration of vector , Line Integral (2.3 a) , Surface Integral (2.3 b) Partial differentiation (2.4) , Gradient of a scalar point function (2.5), Divergence of vector (2.6), The equation of continuity (2.7) Curl of a vector (2.8) , More about the vector differential operator  $\nabla$  (2.9) , Multiple Del operations (2.11) Irrotational AND Solenoidal vectors (2.12) Some useful identities (2.13), Gauss' Theorem (2.14) , Green's theorem (2.15) , Stokes Theorem (2.17) Physical Significance of the Curl of a vector.
- Related Examples & Problem.
- **Basic Reference**
- Introduction to Classical Mechanics by R.G. Takwale & P.S. Puranik Tata McGraw-Hill Publishing Company Ltd.
- **Other Reference**
- Electricity and Magnetism By K.K.Tewari
- Mathematical method in physical sciences by M.L. Boas (john Willey & Sons)

Unit - 2

Simple Harmonic Oscillations,

- Composition of two simple Harmonic Motions along the same direction of the same frequency (2.8) , Two simple Harmonic Motions act upon a particle simultaneously having no phase difference but they differ in frequency by very small amount (2.9) Composition of two simple Harmonic Motions acting upon a particle simultaneously at right angles to each other, same time period but different in phase (2.10) lissajous figure (2.11) , Experimental determination of lissajous figures : (2.12 a and 2.12 b ) Related Examples & Problem
- Motion Due to a constant force (3.2), The Force acts for short time and to find its effect (3.3 A particle executing S.H.M. is acted upon by a harmonic force  $F \sin pT$  of frequency  $\frac{p}{2\pi}$  (3.4), Motion in a resisting medium (3.5), Forced Vibration(3.6 a), Amplitude Resonance: Maximum Displacement of the system (3.7) , Maximum energy of the system : Velocity Resonance (3.8), Phase of the forced vibration(3.9), Power supply at steady state of forced vibration (3.10)
- Related Examples & Problem
- Compound Pendulum & Oscillations Bar pendulum - ( Element of Properties of matter by D.S Mathur )

Basic Reference :-

A Text Book On Oscillations , Wave and Acoustics by M. Ghosh & D. Bhattacharya (S. Chand & Company LTD.) (for Simple Harmonic Oscillations )

Other Reference :-

1. Waves and oscillations By N. Subhramanyam & Brij lal ( Vikas Publishing House Pvt. Ltd, New Delhi)

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2. Introduction to Classical Mechanics by R.G. Takwale & P.S. Puranik (for Damped & Forced Oscillations)

### Unit -3

#### D.C Circuit , Network Theorem & AC Bridges

##### D.C Circuit

- Simple R-L Circuit – Growth and decay of current Helmholtz equation (11.24), R-c Circuit (11.25), Measurement of high resistance by method of leakage (11.26), Comparison of capacities by De Sauty's Method (11.27), Ideal L-C. Circuit (11.28), Series LCR Circuit ( Change case only) (11.29).
- Related Examples & Problem

##### Network Theorem

- Superposition Theorem (18.5), Thevenin's Theorem (18.6), Norton's Theorem (18.7), Maximum Power Theorem (18.8)
- Related Examples & Problem

##### AC Bridges.

- AC Bridges (17.5) AC Bridges for the measurement of inductances (17.6)  
(1) Maxwell Bridge (2) Anderson Bridge ,
- A.C Bridge for the measurement of capacitance (17.7)  
(1) De Sauty's A.C Bridge (2) Schering Bridge,  
Related Examples & Problem

##### Basic Reference :-

Electricity and magnetism by K.K. Tewari ( S. Chand & Company Ltd)

##### Other Reference :-

1. Electrical Circuit Analysis by Sony and Gupta
2. Network Analysis by G.K. Mittal. ( Khanna Publications)
3. Electricity and Magnetism by D. C. Tayal

### Unit- 4

#### Rectifier and Filter Circuits

- The Half Wave Rectifier (2.2), Voltage Regulation (2.3), Ripple Factor (2.4), Ratio of Rectification (2.5), Transformer utilization factor (2.6), Disadvantage of Half Wave Rectifier (2.7), The Full Wave rectifier (2.8), The Bridge Rectifier (2.9), Comparison of Rectifiers Circuit (2.11),
- The Inductor Filter (3.1), Experimental Determination of Ripple Factor (3.2), The Capacitor Filter (3.3), Ripple Factor (Approximate method) (3.4), Ripple Factor ( Accurate method), (3.5), Effect of capacitor Series Resistance (3.7), The Choke input Filter (3.9), Ripple factor in LC filter (3.10), Value Of critical inductance (3.11), the CLC filter (3.13), Comparison of filter circuits (3.14),
- Zener diode and its characteristics (6.1), The Voltage regulator circuit (6.3), Effect of Temperature on Zener diode (6.7)
- Related Examples & Problem

##### Basic Reference

Electronic Device & Circuits by Allen Mottershead , (PHI Pvt. LTD)

##### Other Reference

1. Electronics and Radio Engineering by M.L.Gupta.
2. Basic Electronics and Linear circuits by Bhargva Kulshreshth & Gupta TMH Edition
3. Elements of Electronics by Bagde & Singh.
4. Hand book of Electronics by Gupta and Kumar