DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

B. Sc. (Physics) SEMESTER II

Paper-I (Oscillations, Kinetic theory of gases and Thermodynamics)

Unit I

Free oscillations- Introduction to linear and angular S.H.M.,Differential equation of S.H.M. and its solution
https://www.youtube.com/watch? v=I1TBV421ar4&list=PLSWDszNFa1Q3aQmaSthNcX-mMgjjKIxOZ&index=1

Composition of two perpendicular linear S.H.M.s for 1:1 and 1:2 (analytical method), Lissajous's figure.
https://www.youtube.com/watch?v=3DwTWGT2LcI&list=PLSWDszNFa1Q3aQmaSthNcX-mMgjjKIxOZ&index=2
https://youtu.be/NkywVfQ4j20

Damped oscillations- Differential equation of damped harmonic oscillator and its solution,
https://www.youtube.com/watch?v=Fj3gFT-cQ04&list=PLSWDszNFa1Q3aQmaSthNcX-mMgjjKIxOZ&index=10

Energy equation of damped oscillations, Power dissipation and quality factor.
https://www.youtube.com/watch?v=UaMcE4XAW9k&list=PLSWDszNFa1Q3aQmaSthNcX-mMgjjKIxOZ&index=11

Unit II

Forced oscillations- Forced oscillation with one degree of freedom
https://www.youtube.com/watch?v=ME08eeC8Qns

Differential equation of forced oscillation and its solution, Resonance (Amplitude), Sharpness of resonance, Power dissipation, Quality factor and bandwidth.
https://www.youtubeh.com/watch?v=ME08eeC8Qns&list=RDCMUCtHXRO3puapFK8jrQMqyYJg&index=2

Kinetic theory of gases -Assumptions, Boyle's law, Equipartition of energy
https://www.youtube.com/watch?v=a6pbzc26-jE&list=PLQqqNcLnVUbTTxybh9Ve3zxoKDgDKuOMf&index=1

Molecular collision, Mean free path and collision cross section
https://www.youtube.com/watch?v=H15w-a5Bu4A&list=PLQqqNcLnVUbTTxybh9Ve3zxoKDgDKuOMf&index=2

Estimate of molecular diameter and mean free path
https://www.youtube.com/watch?v=8y8eg5wUSMo&list=PLQqqNcLnVUbTTxybh9Ve3zxoKDgDKuOMf&index=3

Unit III

Transport phenomenon in gases
https://www.youtube.com/watch?v=gLyBqMDSD_c&list=PLQqqNcLnVUbTTxybh9Ve3zxoKDgDKuOMf&index=4

Transport of mass, momentum, energy and their relationship,
https://www.youtube.com/watch?v=0tI9wPLuIVw&list=PLQqqNcLnVUbTTxybh9Ve3zxoKDgDKuOMf&index=5

Dependence on temperature and pressure, Van der wall's gas (Real gas, Equation of state), Critical constants.
https://www.youtube.com/watch?v=6vF8pbDPmfM&list=PLQqqNcLnVUbTTxybh9Ve3zxoKDgDKuOMf&index=6

Thermodynamic -Thermodynamic variables, Thermal equilibrium and temperature, Zeroth law of thermodynamics
https://www.youtube.com/watch?v=qjQ9iWoMouc&list=PLQqqNcLnVUbTqIWe9mcDmxKYwSu69D53O&index=1

Thermodynamic processes (Reversible and Irreversible), Indicator diagram
https://www.youtube.com/watch?v=ANkc4BzrloY&list=PLQqqNcLnVUbTqIWe9mcDmxKYwSu69D53O&index=2

First law of thermodynamics, Carnot's cycle and it's efficiency, Carnot's theorem.
https://www.youtube.com/watch?v=VkSm22-JwgU&list=PLQqqNcLnVUbTqIWe9mcDmxKYwSu69D53O&index=3

Unit IV

Thermodynamic-Entropy, Second law of thermodynamic, Thermodynamic scales of temperature,
https://www.youtube.com/watch?v=J5ekEHuMFCc&list=PLQqqNcLnVUbTqIWe9mcDmxKYwSu69D53O&index=4

Third law of thermodynamics, Maxwell general relationship[$\delta(T,S)/\delta(x, y) = \delta(P,V)/\delta(x, y)$] and it's applications, Joules coefficient,
https://www.youtube.com/watch?v=SRjL0tV5O18&list=PLQqqNcLnVUbTqIWe9mcDmxKYwSu69D53O&index=12

Porous plug experiment, Liquefaction of gases-
https://www.youtube.com/watch?v=fGLs_r7P_DU&list=PLQqqNcLnVUbTqIWe9mcDmxKYwSu69D53O&index=15

Boyle's temperature and inversion temperature, Liquefaction of Helium, Air conditioning
https://www.youtube.com/watch?v=ZM_7FJVH9LQ&list=PLQqqNcLnVUbTqIWe9mcDmxKYwSu69D53O&index=16