Activities conducted for Students for Future Employment, *Competitive Examinations Higher Education*.

- Department provided study material for PG Physics entrance.
- Important bits and previous years question pap
- PGECET PAPER'S:- https://drive.google.com/file/d/0B5O4w962AMHEa205R0MwcDZ4QVk/view?usp=drivesdk&resourcekey=0-8RPWJtLccuQDr_hiGK5XbA

Important Bits
I Semester

1. The system which is used to define the position of the particle or an incident is known as reference frame.
2. The relation between linear velocity and angular velocity $V = r\omega$ or $\bar{V} = \bar{\omega} \times \bar{r}$.
3. Torque ($\bar{\tau}$) on the particle is defined as vector cross product of position vector ($\bar{r}$) and the force ($\bar{F}$). $\bar{\tau} = \bar{r} \times \bar{F}$, Magnitude of torque $\tau = rF\sin\theta$.
4. Angular momentum ($\bar{J}$) is defined as vector cross product of position vector ($\bar{r}$) and linear momentum ($\bar{p}$). $\bar{J} = \bar{r} \times \bar{p}$. Magnitude of J is $J = rp\sin\theta$.
5. The relation between the Torque($\bar{\tau}$) and Angular momentum ($\bar{J}$) is $\bar{\tau} = \frac{d\bar{J}}{dt}$.
6. Moment of Inertia $I = \sum m_i r_i^2$.
7. Rotational kinetic energy $k = \frac{1}{2} I\omega^2$.
8. General equation of Motion of a Rigid body $\frac{d\bar{J}}{dt} = \sum \bar{r}_k \times \bar{F}_k$.
9. The equation of motion of rigid body rotating about symmetric axis $\frac{dJ}{dt} = I\omega$
10. Radius of Gyration $k = \sqrt{I/M}$, units of k — $kg\,m^2$.
11. Inertia Tensor matrix $\bar{I} = \begin{bmatrix} I_{xx} & I_{xy} & I_{xz} \\ I_{yx} & I_{yy} & I_{yz} \\ I_{zx} & I_{zy} & I_{zz} \end{bmatrix}$
12. The elements I_{xx}, I_{yy}, I_{zz} are called principal inertial elements or diagnol elements.
13. Inertia elements depends on mass distribution of the body.
14. $I_{xx} + I_{yy} + I_{zz} = 2 \sum_k m_k r_k^2$.
15. The rigid body which follows the relation $I_x = I_y \neq I_z$ is called as Symmetric top.
16. The rigid body which follows the relation $I_x = I_y$, $I_z = 0$ is called as rotor
17. Euler Equations i) $\tau_x = I_x \frac{d\omega_x}{dt} + (I_z - I_y)\omega_y\omega_z$.
    ii) $\tau_y = I_y \frac{d\omega_y}{dt} + (I_x - I_z)\omega_x\omega_z$
    iii) $\tau_z = I_z \frac{d\omega_z}{dt} + (I_y - I_x)\omega_x\omega_y$.
18. precessional velocity of a Symmetric top $\omega_p = \frac{rmg}{J}$ or $\omega_p = \frac{gr}{k^2\omega}$.
19. If the pivot of a Symmetric top coincides with its centre of gravity then such tops are called gyroscopes.
20. The direction of rotational axis of the gyroscope is stable in space. It is the characteristic of a gyroscope.

Important Bits V Semester. (USE)

Solid state physics explains different physical properties of solids.

crystals having different physical properties in different directions are called as anisotropic, and which physical properties same in all directions are called as isotropic.

3. when motif is repeated symmetrically the pattern formed is called lattice.
4. The crystal structure is formed by associating with every lattice point a unit assembly of atoms or molecules. This unit assembly is called basis.
5. Lattice + basis → crystal structure.
6. Unit cell is the smallest geometric figure, the repetition of which in three dimensions will give the actual crystal structure.
7. Arranging one or more atoms at lattice points in a crystal so that environment is same at each lattice point. That lattice is called Bravais lattice.
8. There are seven crystal systems and 14 Bravais lattices.
9. In simple cubic lattice, There is one lattice point at each of eight corners of the unit cell. In this the no. of lattice points in the unit cell is one 1. The distance between two lattice planes is a.
10. In Body centered cubic There is one lattice point at each of the eight corners and one lattice point at the centre of each cell. The distance between two lattice planes is $a/2$. The no. of lattice
11. points in the unit cell is Two (2).
11. In Face centered cubic There is one lattice point at each of the eight corners and one lattice point at the centres of each of the six faces of the cubic cell. The no. of lattice points in the unit cell is Four (4). The distance between two plattice planes is $a/2$.
12. The Miller indices are the three smallest possible integers which have the same ratios as the reciprocals of the intercepts of the plane concerned on the three axes.
13. when a face is parallel to an axis, its intercept on the axis is infinite. Then the index is zero.
14. The perpendicular distance between two succeeive lattice plane is called as inter planar spacing (d). $d = \frac{1}{\left(\frac{h^2}{a^2}+\frac{k^2}{b^2}+\frac{l^2}{c^2}\right)^{1/2}}$

Important Bits

Paper V DSC compulsory

1. The torque acting on a current loop placed in a magnetic field $\tau = BiAN\sin\theta$
2. The magnetic field B at the center of the circular loop carrying current is $B = \frac{\mu_0 iN}{2a}$.
3. Magnetic field induction due to a current carrying solenoid at a point on its axis is $B = \frac{\mu_0 ni}{2}(\cos\theta_1 - \cos\theta_2)$.
4. Ampere's law $\oint B.dl = \mu_0 i$.
   The work done in moving a unit north pole around a closed circuit or loop is equal to μ_0 times the current flowing in the closed loop.
5. Equation of continuity $\nabla.j + \frac{d\rho}{dt} = 0$.
6. Faraday's laws i) when the magnetic flux linked with a circuit is changed an induced emf is set up in the circuit.
   ii) The magnitude of the induced emf is directly proportional to the negative rate of variation of magnetic flux linked with the circuit.
   $$e = -\frac{d\phi_B}{dt} = -\frac{d(N\phi_B)}{dt}.$$
7. Vector form or differential form of Faraday's law $\nabla \times \bar{E} = -\frac{\partial \bar{B}}{\partial t}$
8. $K = \frac{C}{BAN}$ is called as reduction factor.
9. Current Sensitivity of the galvanometer is defined as the amount of current required for unit deflection.
10. coefficient of Self induction $L = \phi_B / i$
11. unit of coefficient of Self induction - henry.
12. [The phenomenon of production of an induced emf in a circuit itself due to variation of current through the same circuit is called Self induction.]
    The coefficient of Self induction is numerically equal to the magnetic flux linked with the coil when unit current flows through it.
13. Self induction is also called as self induction electrical inertia.
14. Self inductance $L = \mu_0 n^2 Al = \frac{\mu_0 N^2 A}{l}$.
15. Mutual inductance (M) is defined as the flux linked with a circuit due to a unit current flowing through the other.
16. Mutual inductance $M = \frac{\mu_0 N_1 N_2 A}{l}$

    coefficient of Coupling. $K = \sqrt{k_1 k_2}$