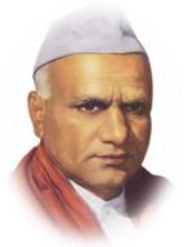

"ज्ञान, विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार"

शिक्षणमहर्षी- डॉ बापूजी साळुंखे .

**Shri Swami Vivekanand Shikshan Sanstha's**

**Dattajirao Kadam Arts, Science & Commerce College, Ichalkaranji**

# DEPARTMENT OF PHYSICS

# QUESTION BANK

B.Sc. Part-I, Semester-I, PHYSICS Paper- I

DSC- 1 A MECHANICS-I

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## ❖Long answer questions

1. State and Explain scalar triple product and discuss the properties of scalar product with special reference to the work done by a force.
2. State and Explain vector triple product and discuss the properties of scalar product with special reference to the torque.
3. Define and Obtain expressions for instantaneous velocity and acceleration of a particle as the time derivatives of position vector of a particle.
4. Define second order homogeneous differential equation with constant coefficients and discuss a method of obtaining its solution. Discuss different cases.
5. State and prove laws of conservation of linear and angular momentum of a particle.
6. State and prove laws of conservation of linear and angular momentum of a system of particles.
7. Define center of mass of a system of particles? How the co-ordinates of center of mass are obtained? Discuss its physical significance.
8. Obtain expressions for moment of inertia of a solid cylinder about its axes of symmetries.

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## ❖Short answer type questions

1. Define torque and obtain an expression for it in terms of angular momentum for a particle rotating about a point.
2. State and explain the law of parallelogram of vector addition.
3. Define scalar or dot product of two vectors. State its characteristics.

4. Define vector or cross product of two vectors. State its characteristics.
5. What is the differential equation? Define order, degree and linearity of a differential equation.
6. Define first order homogeneous differential equation and discuss variable separation method to obtain its solution.
7. What is centre of mass for system of particles? Discuss its physical significance.
8. State and prove work - energy theorem.
9. State and prove the law of conservation of energy of a system of particles.
10. Define moment of Inertia and radius of gyration. Explain physical significance of moment of Inertia.
11. Obtain expressions for moment of inertia of a spherical shell about one of its diameter.
12. State and prove law of conservation of linear momentum of a particle.
13. State and prove law of conservation of angular momentum of a particle.
14. Determine the angle between the vectors A = 2i + 3j - k and B = i - 2j + 3k.
15. Find the value of m, if three vectors A = i + 3j - 2k, B = 4i – mj + 3k and C = i + j - k are coplanar.
16. Solve $\frac{dy}{dx} + x^2y = x^4$
17. Solve $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + 8y = 0$