

**Sessional Examination, 2018**  
**1<sup>st</sup> semester, Physics (M)**  
**Paper: 101**

**Time: 45 mins**

**Total Marks: 15**

*Answer any three of the following. Each question carries 5 marks and all the symbols have their usual meaning.*

1. Define Coriolis force. Find the expression for coriolis force in a rotating frame of reference.
2. Calculate the moment of inertia of a spherical shell about its diameter.
3. Write an expression for angular momentum of a system of particles in term of centre of mass.
4. (a) Show that cross product of two vectors represents area of a parallelogram whose two adjacent sides are represented by the vectors.  
(b) Give examples, one for each of dot product and cross product of vectors
5. If  $\vec{A} = \hat{i}A_x + \hat{j}A_y + \hat{k}A_z$   
 $\vec{B} = \hat{i}B_x + \hat{j}B_y + \hat{k}B_z$   
 $\vec{C} = \hat{i}C_x + \hat{j}C_y + \hat{k}C_z$   
Find the value of  $\vec{A} \times (\vec{B} \times \vec{C})$ .

**Sessional Examination, 2018**  
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*Answer any three of the following. Each question carries 5 marks and all the symbols have their usual meaning.*

1. What is aberration? What are the different types of aberration? Explain in brief.
2. The refractive indices of crown glass for red and violet light are 1.517 and 1.523 respectively and the corresponding values for dense flint glass are 1.650 and 1.664. Design a plano-convex achromatic doublet of 50 cm focal length.
3. What are the Lissajous figures? Deduce the equation showing composition of two simple harmonic oscillator having same frequency but at right angle to each other.
4. What is forced oscillation? Find an equation representing the displacement for such oscillation.
5. Using matrix method deduce Gaussian formula for a single refracting surface.
6. Using Fermat's principle deduce Snell's law of refraction in plane surface.