

**B.Tech. (AEROSPACE ENGINEERING)  
(BTAE )**

**Term-End Examination**

**December, 2017**

**BAS-001 : APPLIED PHYSICS**

*Time : 3 hours*

*Maximum Marks : 70*

- Note :**
- (i) *Answer any seven questions.*
  - (ii) *All questions carry equal marks.*
  - (iii) *Use of scientific calculator is permitted.*
  - (iv) *All symbols and notations carry usual meaning.*

1. (a) A body of mass 'm' is suspended by two strings making angles ' $\alpha$ ' and ' $\beta$ ' with the horizontal. Find the tensions in the strings. 6
- (b) The force on a particle of mass 10 g is 4
- $$\left( \vec{i} 10 + \vec{j} 5 \right) \text{N.}$$
- If it starts from rest, what would be its position at time  $t=5$  sec.
2. (a) A particle executes uniform circular motion. Show that the foot of the perpendicular drawn from its position to a diameter of the circle executes Simple Harmonic Motion. 5

- (b) What are matter waves ? Show that the wavelength ' $\lambda$ ' associated with a particle of mass ' $m$ ' and kinetic energy ' $E$ ' is given by, 5

$$\lambda = \frac{h}{\sqrt{2mE}} \text{ where, } h \text{ is the Planck's constant.}$$

3. A particle of mass  $m$  is suspended from a ceiling through a string of length  $L$ . The particle moves in a horizontal circle of radius  $r$ . Find 10
- (a) the speed of the particle and
  - (b) the tension in the string
4. (a) What is meant by plane polarized, circularly polarized and elliptically polarized light ? 5
- (b) Deduce an expression for the intensity at a point in the region of superposition of two waves of same periods and wavelength. On the basis of this result, establish the necessity of two coherent sources for the production of observable interference pattern. 5
5. A particle executing simple harmonic motion has angular frequency  $6.28 \text{ s}^{-1}$  and amplitude 10 cm. Find (a) the time period, (b) the maximum speed, (c) the maximum acceleration, (d) the speed when the displacement is 6 cm from the mean position, (e) the speed at  $t = 1/6$  sec. Assuming that the motion starts from rest at  $t = 0$  sec. 10

6. Explain microscopic reason of elasticity. Also state Hooke's law and define modulus of elasticity. 10
  7. Describe the Young's double slit experiment in detail. 10
  8. (a) Describe, in brief the applications of LASER. 5  
(b) Define (i) Free electrons (ii) Work function in photoelectric effect phenomenon. 5
  9. Explain the phenomenon of 5+5  
(a) Scattering of light  
(b) Polarization of light
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