

**ANNA UNIVERSITY - 2007**  
**B.E/B.TECH II SEMESTER DEGREE EXAMINATION**  
**APPLIED PHYSICS-II**  
**(MARINE ENGINEERING)**

TIME-3HOUR  
MARK-100

**ANSWER ALL QUESTIONS**

**PART A (10 \* 2 = 20)**

1. Find the Moment of Inertia of a equilateral triangular plate whose mass is 3 kg and circumference 90 cm.
2. State the theorem of perpendicular axes.
3. State Routh's rule for Moment of Inertia.
4. Mention any two difference between rectilinear and curvilinear motions.
5. What are the differences between elastic and inelastic collisions?
6. What is a gyroscope?
7. What are the uses of SONAR?
8. What is the principle behind the optical fibre communication?
9. What are the methods used for the production of ultrasonics?
10. State the law of conservation of momentum.

**PART B (5 \* 16 = 80)**

11. (i) Derive the relationship for the Moment of Inertia of a rectangular plate about an axis through (1) its center and parallel to one of its sides (2) its center and perpendicular to its plane and (3) the mid-point of one side and perpendicular to its plane.  
  
(ii) Derive the relationship for the Moment of Inertia of a solid cylinder about an axis passing through its center and perpendicular to its own axis.
12. (a) (i) Define trajectory and range of a projectile.  
  
(ii) Derive expressions for horizontal range, maximum height attained by a projectile and velocity of a projectile at any instant.  
  
(iii) Prove that the path of the projectile is a parabola.  
Or  
(b) (i) Prove that the energy is conserved for the falling body.  
  
(ii) Show that the momentum is conserved during the collision between two elastic bodies.
13. (a) (i) Explain graded index and step index fibres.  
  
(ii) Explain attenuation, distortion and dispersion of light waves in optical fibres.  
Or  
(b) (i) Explain the importance of connectors, detectors, couplers, receptors and multiplexers in optical fibre communication.

(ii) What are the applications of optical fibres in engineering and medicine?

14. (a) (i) Describe the principle, construction and working of SONAR.

(ii) Explain the repeaters.

Or

(b) (i) What is gyroscopic effect?

(ii) Explain gyro compass and give its uses.

(iii) Explain how the depth of the sea can be determined using ultrasonic waves.

15. (a) (i) What is the principle of RADAR? Explain the image recording and analysis using RADAR.

(ii) Write a note on submarine cables.

Or

(b) (i) Write a note on satellite communication.

(ii) Explain the generation of X-rays. Explain how the defect in a material is identified using X-rays.

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