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Roll No. 0601

FIRST SEMESTER **B.Tech. (GROUP A&B)**

MID SEMESTER EXAMINATION ***September-2012***

AP-103 APPLIED PHYSICS-I

Time: 1Hour 30 Minutes ***Max. Marks : 20***

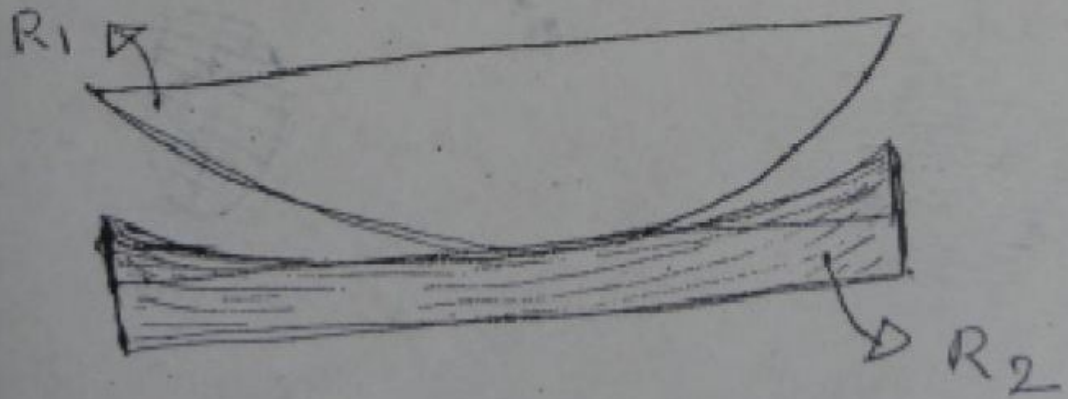
Note : Answer *ALL* questions.
Assume suitable missing data, if any.

1 A soap film of 5×10^{-5} cm thick is viewed at an angle of 35° to the normal. Find the wavelengths of light in the visible spectrum which will be absent from the reflected light. (μ=1.33) 2

2 Two beams of light having intensities I and 4I are made to interfere to produce a fringe pattern on a screen. The phase difference between beams is $\frac{\pi}{2}$ at a point A and π at a point B. Find the difference between the resultant intensities at A and B. 2

3 Show that the diameters of Newton rings when two curved surfaces as shown in the following figure with radii R_1 and R_2 are placed in contact are related by the equation.

$$\left(\frac{1}{R_1}-\frac{1}{R_2}\right)=\frac{4n\lambda}{d_n^2}$$



2

4 A glass microscope lens (μ=1.50) is coated with magnesium fluoride (μ=1.38) film to increase the transmission of normally incident yellow light (λ=5800Å°). With what minimum thickness, the film should be deposited on the lens. 2

5 In Michelson interferometer 200 fringes cross the field of view of the telescope, when the movable mirror is moved through 0.0589 mm. Calculate wavelength of light used.

2

6 A space craft is moving relative to the earth. An observer on the earth finds that, between 1 PM and 2 PM according to her clock, 3601 seconds elapse on the spacecraft's clock. What is the spacecrafts speed relative to the earth?

2

7 A stationary body explodes into two fragments each of mass 1.0 kg that moves apart at speeds 0.6C relative to the original body. Find mass of the original body.

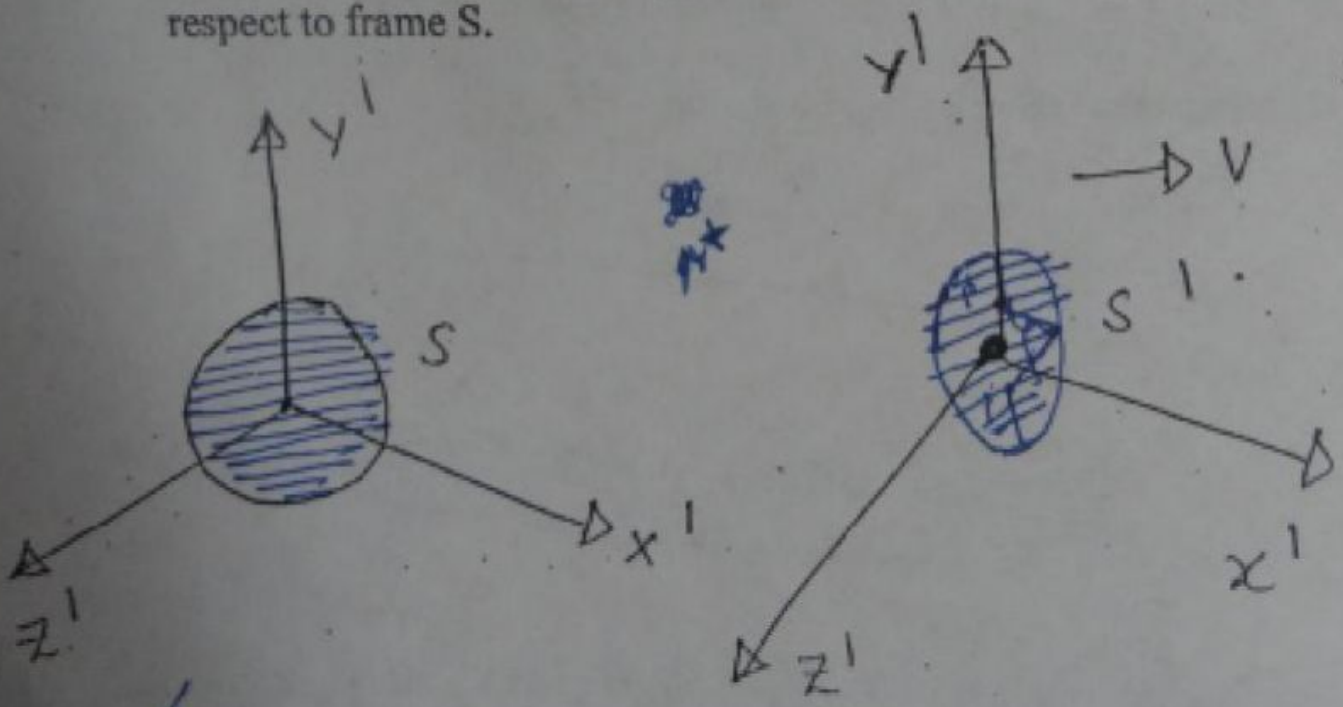
2

8 Spacecraft Alpha is moving at 0.90 C with respect to the earth. If space craft Beta is to pass Alpha at a relative speed of 0.50C in the same direction, what speed must Beta have with respect to the earth.

2

9 Find the shape of a circle at rest in a frame 'S' when viewed from a frame S', when S' is moving with a velocity v along x-direction with respect to frame S.

2



10 Calculate the percentage contraction of a rod moving with a velocity 0.8C in a direction inclined at 60° to its own length.

2