

1105-01

Printed Pages : 8

Degree (Part-I) Examination, 2020

(Honours)

PHYSICS

[ Paper : First ]

[ PPU-D-I(H)-PHY-1 ]

Time : Three Hours]

[Maximum Marks : 75

**Note** : Candidates are required to give their answers in their own words as far as practicable. Attempt **five** questions in all. Question 1 is **compulsory** and select at least one question from each section. Each question carries equal marks.

1. (i) For Einstein's relation  $E^2 - p^2c^2 =$
- (a)  $m_0c^2$
  - (b)  $m_0^2c^4$
  - (c)  $m_0c^4$
  - (d)  $m_0^2c^6$

1105-01/13760

( 1 )

[P.T.O.]

(ii) As an object approaches the speed of light, its mass becomes :

- (a) Zero
- (b) Double
- (c) Remains constant. ✓
- (d) Infinite

(iii) The orbit of mercury is changing slightly due to the sun's gravity :

- (a) True
- (b) False ✓
- (c) I dont know
- (d) None of the above

(iv) When a rope is pulled on either side, what is the stress acting on it ?

- (a) Compressive Stress
- (b) Tensile Stress ✓

- (c) Normal Stress
- (d) Tangential Stress
- (v) What is the effect of annealing on elasticity of materials ?
- (a) Increases
- (b) Decreases
- (c) No effect
- (d) Distorts the material
- (vi) When a pebble is dropped into a pond of still water, what happens ?
- (a) Particles move
- (b) Waves move
- (c) Pebble moves
- (d) Water moves
- (vii) Which of the following waves can be transmitted through solids, liquids and gases ?

- (a) Transverse Waves ✓
- (b) Electromagnetic Waves
- (c) Mechanical Waves
- (d) Longitudinal Waves

(viii) Sound travels through a gas under which of the following condition ?

- (a) Isothermal Condition ✓
- (b) Non-isothermal Condition
- (c) Adiabatic Condition
- (d) Transverse Condition

(ix) How much shift was expected in Michaelson-Morley experiment ?

- (a) 0.01
- (b) 0.02
- (c) 0.03 ✓
- (d) 0.04

- (x) If the density of the planet is doubled without any change in its radius, how does  $g$  change on the planet ?
- (a) it remains the same
  - (b) it is tripled ✓
  - (c) it reduces ✓
  - (d) it is doubled

**Section - A**

2. (a) Explain why the surface of water in a glass tube is concave while that of mercury is convex.
- (b) What is angle of contact ? How will you find it for mercury and glass ? ✓
3. (a) Derive an expression for the bending moment of a beam. <https://www.ppuonline.com> ✓
- (b) Explain why a cantilever of uniform cross-section is more likely to break near its fixed end. ✓
4. (a) Explain the terms coriolis and centrifugal forces. ✓
- (b) Show that centrifugal force is a fictitious force. ✓

5. Define the terms :
- (i) Gravitational fields
  - (ii) Gravitational potential
  - (iii) Gravitational intensity

**Section - B**

6. State the basic postulates of Einstein's special theory of relativity. Obtain the expression for Lorentz coordinate transformations.
7. (a) Show that in vacuum, nothing can move with a velocity greater than the velocity of light.
- (b) Do you agree with the statement, "Earth cannot be used as inertial frame" ? Explain.
8. With the help of a schematic diagram, describe the Michaelson-Morley experiment.

**Section - C**

9. Solve differential equation of damped harmonic oscillator and discuss in detail for underdamped case.

10. What is meant by forced harmonic oscillator ? Show that amplitude of forced oscillation is given by :

$$A = \frac{f}{\sqrt{(w^2 - p^2)^2 + uK^2 p^2}}$$

Where the symbols have their usual significance. Explain resonance and sharpness of resonance in forced oscillations.

----- x -----

<https://www.ppuonline.com>

Whatsapp @ 9300930012

Send your old paper & get 10/-

अपने पुराने पेपर्स भेजे और 10 रुपये पायें,

Paytm or Google Pay से