



UNIVERSITY OF IBADAN
DEPARTMENT OF PHYSICS

B.Sc. (PHYSICS) DEGREE EXAMINATION – FIRST CONTINUOUS ASSESSMENT TEST – 2017/2018 SESSION
PHY 103: INTRODUCTORY WAVES OPTICS AND MODERN PHYSICS

NAME: _____

MATRIC NO: _____

DEPARTMENT: _____

DATE: Wednesday, 24 October 2018

INSTRUCTION: Attempt all questions. Use **HB Pencil** to shade an option out of the four alternatives in the **GRIDDED BOX** provided below. Submit the question and the work sheet before leaving the hall.

Time Allowed: 25 minutes

Where necessary, $g = 10 \text{ m/s}^2$

1	A	B	C	D	5	A	B	C	D	9	A	B	C	D
2	A	B	C	D	6	A	B	C	D	10	A	B	C	D
3	A	B	C	D	7	A	B	C	D					
4	A	B	C	D	8	A	B	C	D					

1. Which of the following statements about wave propagation is/are correct?

- i) A wave is a transfer of energy in the form of oscillatory disturbance.
- ii) A wave is a transfer of energy and matter in the form of oscillatory disturbance.
- iii) Electromagnetic waves propagate through vacuum but not through matter.
- iv) Electromagnetic waves propagate through both vacuum and matter.

A. i and iii only B. ii and iv only C. i and iv only D. ii and iii only

2. Which of the following statements about a wavefront is correct?

- A. It consists of points that are undergoing periodic vibrations
- B. It is a combination of points that undergo in-phase vibrations.
- C. The distance between two adjacent wavefronts is a multiple of the wavelength.
- D. Wavefront is synonymous with waveform.

3. One end of a uniform rope of length 3 m and mass 500 g is attached to a ceiling while a mass of 2 kg is made to hang at the lower end. If a transverse wave is carefully set up at the lower end of the rope, calculate its velocity when it reaches half way up on the rope.

- A. 11.5 m/s B. 10.8 m/s
- C. 13.2 m/s D. 9.8 m/s

4. A transverse wave has the wave function in S. I. unit as $y(x,t) = 0.015 \cos(8x - 80t)$. What is the wavelength of the wave?

- A. $\pi/4$ m B. 80π m C. $80/\pi$ m D. $120/\pi$ m

5. Two sonometer strings S_1 and S_2 of equal length and thickness are kept under different tensions τ_1 and τ_2 . A vibrating tuning fork causes S_1 to resonate at its fundamental frequency while it causes S_2 to resonate at its second harmonic. Determine the ratio τ_1/τ_2

- A. 1/2 B. 1/8 C. 2 D. 4

6. Which of the following options is odd among others?

- A. Ultrasonic B. Infrared C. Supersonic D. Ultraviolet

7. Which of the following statements about diffraction of waves is correct?

- A. It is associated with change in velocity of waves.
- B. It associated with change in wavelength.
- C. Waves with longer wavelengths diffract more through narrow openings.
- D. Waves with shorter wavelengths diffract more through narrow openings.

8. A police vehicle moving at 22 m/s with its horn blowing is chasing a car that is going at a speed of 18 m/s on a straight road. If the speed of sound in air is 340 m/s, what frequency of the horn is perceived by the driver of the car?

- A. 1000 Hz B. 1126 Hz
- C. 989 Hz D. 1013 Hz

9. The pressure variation associated with a sound wave of frequency 1000 Hz propagating in air is ± 0.03 Pa. Calculate the maximum displacement caused by this pressure variation if the speed of sound in air is 344 m/s and the bulk modulus of air is 1.42×10^5 Pa.

- A. 1.16×10^{-8} m B. 1.51×10^{-6} m
- C. 1.81×10^{-5} m D. It cannot be determined

10. Which of the following statements is true for the modes of vibration associated with a cylindrical pipe that is open at one end and closed at the other end?

- A. The open end always constitutes a node of standing wave
- B. Only even harmonics are present
- C. Both even and odd harmonics are present
- D. Only odd harmonics are present



NAME: _____

MATRIC NO: _____

DATE: Wednesday, 08 November 2017

DEPARTMENT: _____

INSTRUCTION: Attempt all questions. Use HB Pencil to shade an option out of the four alternatives in the GRIDDED BOX provided below. Submit the question and the work sheet before leaving the hall. Time Allowed: 20 minutes

1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D

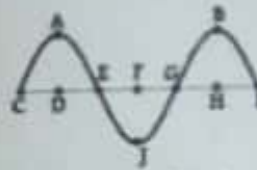
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D

9	A	B	C	D
10	A	B	C	D

1. If the particles of the medium are vibrating to and fro in the same direction of energy transport, then the wave is a _____ wave.

- A. longitudinal B. sound
C. standing D. transverse

2. A transverse wave is traveling through a medium. See diagram below. The particles of the medium are vibrating _____.



- A. parallel to the line joining AD. B. along the line joining CI.
C. perpendicular to the line joining AD. D. at various angles to the line CI.

3. As a pulse travels through a uniform medium, the speed of the pulse _____.

- A. decreases B. increases
C. remains the same D. double

4. The main factor which affects the speed of a sound wave is the _____.

- A. amplitude of the sound wave B. intensity of the sound
C. loudness of the sound D. properties of the medium

5. As a wave passes across a boundary into a new medium, which characteristic of the wave would NOT change?

- A. speed B. frequency
C. wavelength D. Amplitude

6. A periodic and repeating disturbance in a lake creates waves which emanate outward from its source to produce circular wave patterns. If the frequency of the source is 2.00 Hz and the wave speed is 5.00m/s then the distance between adjacent wave crests is _____ meter.

- A. 0.200 B. 0.400 C. 1.25 D. 2.50

7. An object is placed 12 cm from a convex lens of focal length 10 cm. The image must be

- A. virtual and enlarged
B. virtual and reduced in size
C. real and reduced in size
D. real and enlarged

8. An object is placed 25 cm from a convex lens of focal length 10 cm. The image distance is

- A. 50 cm
B. 16.66 cm
C. 6.66 cm
D. 10 cm

9. The law of reflection says

- A. all reflected rays are perpendicular to the incident ray.
B. all reflected rays are parallel to the incident ray.
C. all reflected rays are parallel to each other.
D. the angle of reflection equals the angle of incidence.

10. A wave whose speed in a snakey is 4.4 m/s enters a second snakey. The wavelength changes from 2.0 m to 3.0 m. The wave in the second snakey travels at approximately _____.

- A. 2.2 m/s. B. 2.9 m/s. C. 4.4 m/s. D. 6.6 m/s.