



# 11 Physics

Name : \_\_\_\_\_

Roll # : \_\_\_\_\_

Time : 2h40m; Marks : 85

T<sub>3</sub> chp7,8,9. 25/04/2020

Wasim Tahir physics center

**Q1) Choose the most appropriate option. Cutting / overwriting is not allowed:**

17 Marks

- i) The light emitted from light emitting diode (LED) has a wavelength  
 A)  $1.3\mu m$                       B)  $1.2\mu m$                       C)  $1.4\mu m$                       D)  $1.5\mu m$
- ii) The equation of Michelson's Interferometer is \_\_\_\_\_  
 A)  $L = \frac{m\lambda}{2}$                       B)  $L = \frac{m\lambda}{4}$                       C)  $L = m\lambda$                       D)  $L = 2m\lambda$
- iii) The wavelength of the fundamental mode of vibration of a closed pipe of length "l" is \_\_\_\_\_  
 A)  $l/2$                       B)  $l$                       C)  $2l$                       D)  $4l$
- iv) Which expression is correct for the time period of a simple pendulum?  
 A)  $T \propto l$                       B)  $T \propto m$                       C)  $T \propto \sqrt{l}$                       D)  $T \propto lm$
- v) In order to produce beats, the two sound waves should have \_\_\_\_\_  
 A) the same amplitude                      B) slightly different amplitudes                      C) the same frequency                      D) slight different frequencies
- vi) On increasing the tension, frequency of vibration of a string \_\_\_\_\_  
 A) increases                      B) decreases                      C) remains constant                      D) First increases then decreases
- vii) The angle between ray of light and wave front is \_\_\_\_\_ degrees  
 A) 0                      B) 60                      C) 90                      D) 120
- viii) When two identical waves superimposed, which can change:  
 A) Wavelength                      B) Frequency                      C) Velocity                      D) Amplitude
- ix) The product of time period and frequency is \_\_\_\_\_  
 A) zero                      B) 1                      C)  $\pi$                       D) 2
- x) The wavelength of waves produced by microwave oven is:  
 A) 0.12cm                      B) 1 cm                      C) 6cm                      D) 12 cm
- xi) The frequency of second's pendulum is \_\_\_\_\_  
 A) 1Hz                      B) 2Hz                      C) 0.5Hz                      D) 5Hz
- xii) The relation between time period and frequency is:  
 A)  $f = 2\pi T$                       B)  $f = \frac{1}{2\pi T}$                       C)  $f = \frac{T}{2\pi}$                       D)  $fT = 1$
- xiii) 10 waves pass through the medium in one second with speed of 10m/s. The wavelength of waves is \_\_\_\_\_  
 A) 1m                      B) 10m                      C) 20m                      D) 100m
- xiv) If amplitude of a simple pendulum is increased by 4 times, the time period will be \_\_\_\_\_  
 A) four times                      B) half                      C) same                      D) two times
- xv) Beats are used to find \_\_\_\_\_  
 A) Frequency                      B) Wavelength                      C) Intensity                      D) Speed
- xvi) The frequency of waves produced in microwave oven is \_\_\_\_\_  
 A) 1435Hz                      B) 2450MHz                      C) 1860 MHz                      D) 2850Hz
- xvii) The effective path difference between two reflected beams, in x-rays diffraction by crystals is \_\_\_\_\_  
 A)  $d \sin \theta$                       B)  $2d \sin \theta$                       C)  $d \sin(\frac{\theta}{2})$                       D)  $d \sin(2\theta)$

44 Marks

**Q2) Write short answers of the following:**

- i) Define resonance and Describe two common phenomena in which resonance plays an important role.
- ii) Can we realize an ideal simple pendulum?
- iii) What is the total distance traveled by an object moving with SHM in a time equal to its period, if its amplitude is A.

4/19/2020, 6:05 PM



- vi) What is simple pendulum?
- v) State the principle of superposition.
- vi) Does the acceleration of a simple harmonic oscillator remain constant during the motion? Is the acceleration ever zero? Explain briefly.
- vii) How should a sound source move with respect to an observer so that the frequency of its sound does not change?
- viii) Is it possible for two identical waves travelling in the same direction along the string to give rise to a stationary wave?
- ix) As a result of a distant explosion, an observer senses a ground tremor and then hears the explosion. Explain the time difference.
- x) Describe briefly about nodes and antinodes.
- xi) Explain the terms crest, trough, node and antinode.
- xii) A wave is produced along a stretched string but some of its particles permanently show zero displacement. What type of wave is it?
- xiii) What is the effect of density on speed of sound? Explain briefly.
- xiv) What features do longitudinal waves have in common with transverse waves?
- xv) What is the velocity of sound in air, if temperature of air is  $20^{\circ}\text{C}$ ?
- xvi) What is apparent change in frequency when source is moving away from stationary observer?
- xvii) Why the polarized sunglasses are better than ordinary sunglasses?
- xviii) How would you distinguish between unpolarized and plane polarized lights?
- xix) Why polaroid sunglasses are better than ordinary sunglasses?
- xx) Under what conditions two or more sources of light behave as coherent sources?
- xxi) What is polarization of light?
- xxii) Can you obtain Newton's rings with transmitted light? If yes, would the pattern be different from that obtained with reflected light?

**Give explanatory answer of the following:**

24

- 3A) A block of mass 4kg is dropped from a height of 0.88m onto a spring of spring constant  $k = 1960\text{Nm}^{-1}$ . Find maximum distance through which the spring will be compressed.
- 3B) Define simple harmonic motion. Prove that energy is conserved for a body executing simple harmonic motion.
- 4A) A train is approaching a station at  $90\text{ kmh}^{-1}$ , sounding a whistle of frequency 1000 Hz. What will be the apparent frequency of the whistle as heard by a listener sitting on the platform?
- 4B) A pipe has a length of 1 meter. Determine the frequencies of the fundamental and the first two harmonics if the pipe is open at both ends (speed of sound in air =  $340\text{ms}^{-1}$ ). 5A) Explain Young's experiment. 5B) In double slit exp 2nd order maxima occurs at  $.25$  degree. wavelength is 650nm. determine slit separation.

11 T3