WAVE OPTICS

1. Which among the following isn't a suitable phenomenon to establish that light is wave motion?
a) Interference
b) Diffraction
c) Reflection
d) Polarization

2. The optical path of monochromatic light is the same if it travels 2 cm thickness of glass or 2.25 cm thickness of water. If the refractive index of water is 1.33, what is the refractive index of glass?
a) 2.5
b) 1.5
c) 3.5
d) 4.5

3. Identify the condition which is not necessary for two light waves to be coherent.
a) The two waves must be continuous
b) The two waves should be of the same frequency or wavelength
c) They should have a constant or zero phases difference
d) They two light sources should be narrow

4. The absolute refractive indices of glass and water are 32 and 43. Determine the ratio of the speeds of light in glass and water.
a) 5:7
b) 9:8
c) 7:5
d) 8:9

5. The refractive index of glass is 1.5 and that of water is 1.3, the speed of light in water is 2.25×10^8 m/s. What is the speed of light in glass?
a) 7.95×10^8 m/s
b) 9.95×10^8 m/s
c) 1.95×10^8 m/s
d) 3.95×10^8 m/s

6. In Huygens' theory, light waves are longitudinal and do not require a material medium for their propagation.
a) True

b) False

7. The speed of light in air is 3×10^8 m/s. If the refractive index of glass is 1.5, find the time taken by light to travel a distance of 10 cm in the glass.
a) 0.5×10^{-10} s
b) 5×10^{-10} s
c) 50×10^{-10} s
d) 500×10^{-10} s

8. The speed of yellow light in a certain liquid is 2.4×10^8 m/s. Find the refractive index of the liquid.
a) 1.25
b) 5.55
c) 6.25
d) 12.25

9. The speed of the yellow light in a certain liquid is 2.4×10^8 m/s. Find the refractive index of the liquid.
a) 6.25
b) 5.73
c) 1.25
d) 9.73

10. The wavelength of light coming from a sodium source is 589 nm. What will be its wavelength in the water?
a) 625 nm
b) 443 nm
c) 789 nm
d) 125 nm

11. A light wave enters from air into glass. How will the energy of the wave be affected?
a) Decreases
b) Increases
c) Remains the same
d) Independent

12. If a wave undergoes refraction, what will be the phase change?
a) 180^o
b) 270^o
c) 90^o
d) 0^o

13. When a wave undergoes reflection at a denser medium, what will be the phase change?
a) 2π radian
b) 0
c) π radian
d) 3π radian

14. Two wave-fronts intersect each other.
a) True
b) False

15. A light wave enters from air into glass. How will the frequency of the wave be affected?
a) Increases
b) Remains unchanged
c) Decreases
d) Insignificant

16. What happens to the interference pattern if the phase difference between the two sources varies continuously?
a) Brightens
b) No change
c) Disappears
d) Monochromatic pattern

17. What would be the resultant intensity at a point of destructive interference, if there are two identical coherent waves of intensity I_0 producing an interference pattern?
a) 5 I_0
b) 2 I_0
c) I_0
d) zero

18. What happens to the interference pattern if the phase difference between the two sources varies continuously?
a) Brightens
b) No change
c) Disappears
d) Monochromatic pattern

19. Two independent light sources act as coherent sources'.
a) True
b) False

20. What will be the effect on the fringes formed in Young's double-slit experiment if the apparatus is immersed in water?
a) Increases
b) Decreases
c) Remains the same
d) Independent

ANSWERS-1.(C) 2.(B) 3.(D) 4.(D) 5.(C) 6.(B) 7.(B) 8.(A) 9.(C) 10.(B)
11.(C) 12.(D) 13.(C) 14.(B) 15.(B) 16.(C) 17.(D) 18.(C) 19.(B) 20.(B)