Higher Secondary Revision Examination 2018-19 – Unit:5

TOTAL MARKS: 40
TIME: 45 Min

PHYSICS

N.B. i) Answer all the following.
ii) Choose and write the correct answer with option.

10 x 1 = 10

1. In an electromagnetic wave
   a) power is equally transferred along the electric and magnetic fields
   b) power is transmitted in a direction perpendicular to both the fields
   c) power is transmitted along electric field
   d) power is transmitted along magnetic field

2. Refractive index of glass is 1.5. Time taken for light to pass through a glass plate of thickness 10 cm is
   a) $2 \times 10^{-8}$ s   b) $2 \times 10^{-10}$ s   c) $5 \times 10^{-8}$ s  d) $5 \times 10^{-10}$ s

3. A beam of monochromatic light enters from vacuum into a medium of refractive index $\mu$. The ratio of the wavelengths of the incident and refracted waves is
   a) $\mu : 1$   b) $1 : \mu$   c) $\mu^2 : 1$   d) $1 : \mu^2$

4. The relation shows the velocity of electromagnetic waves
   a) $C = (\mu_0\varepsilon_0)^{-1/2}$   b) $C = 1/(\mu_0\varepsilon_0)$   c) $\mu_0\varepsilon_0$   d) $\sqrt{\mu_0\varepsilon_0}$

5. The ratio of the radii of Newton’s dark rings
   a) $1 : 2 : 3$   b) $\sqrt{1} : \sqrt{2} : \sqrt{3}$   c) $1 : 3 : 5$  d) $\sqrt{1} : \sqrt{3} : \sqrt{5}$

6. The scientist who suggested light rays as transverse are
   a) Foucault, Huygens   b) Huygens, Fresnel   c) Newton, Einstein   d) Fresnel, Young

7. A diffraction pattern is obtained using a beam of red light. What happens if the red light is replaced by blue light?
   a) bands disappear   b) no change   c) diffraction pattern becomes narrower and crowded together   d) diffraction pattern becomes broader and farther apart

8. Which one of the following are not electromagnetic waves?
   a) Gamma rays   b) X-rays   c) Beta rays   d) Micro waves

9. Refractive indices of glass and water are $3/2$ and $4/3$ respectively. The ratio of the speed of light in water to that in glass is
   a) $1 : 1$   b) $8 : 9$   c) $9 : 8$  d) $4 : 15$

10. The velocities of red light (600 nm) and violet light (400 nm) in free space are in the ratio of
    a) $2 : 3$   b) $1 : 2$   c) $3 : 2$  d) $1 : 1$

II. Answer for any four of the following. Question No.15 is compulsory:  

4 x 2 = 8

11. (i) What is Tyndall scattering? (ii) Give two examples for uniaxial crystals.

12. Define optic axis of a crystal.

13. What are the uses of UV radiation?


15. The refractive index of the medium is $\sqrt{3}$. Calculate the angle of refraction if the unpolarised light is incident on it at the polarizing angle of the medium.

III. Answer for any four of the following. Question No. 20 is compulsory:  

4 x 3 = 12

16. Distinguish between Fresnel and Fraunhofer diffraction.

17. (i) State any two characteristics of electromagnetic waves (ii) Write the applications of Raman spectrum.

18. (i) State Huygen’s principle. (ii) Sun appears reddish at sunrise and sunset. Why?

19. What is fluorescence and phosphorescence?

20. In young’s double slit experiment, the intensity ratio of two coherent sources are $81 : 1$. Calculate the ratio between maximum and minimum intensities.

IV. Answer all the following:  

2 x 5 = 10

21. a) Explain emission and absorption spectra.
    (or)
   
   b) (i) Obtain the expression for the radius of $n^{th}$ dark ring in Newton’s ring experiment.
      (ii) Why the centre of the Newton’s ring is dark?

22. a) Derive an expression for bandwidth of interference fringes in young’s double slit experiment
    (or)
   
   b) (i) On the basis of wave theory, explain total internal reflection.
      (ii) What is meant by interference?