KENDRIYA VIDYALAYA SANGATHAN
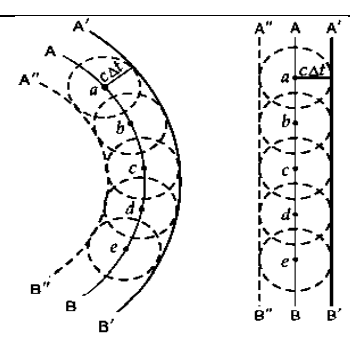## ZIET CHANDIGARH
SUB : - PHYSICS CLASS XII 2022-23
REVISION PAPER UNIT- X–WAVE OPTICS

Note: Q. No. 1-4 is of 01 mark each, Q. 5-6 is of 02 marks each, Q.No.7 is of 03 marks, Q. No. 8 is a case study based and is of 04 marks, Q. No. 11 is of 5 marks.

S N	Question	Marks
1	According to Huygens' principle, each point of the wavefront is the source of (a) secondary disturbance (b) primary disturbance (c) third disturbance (d) fourth disturbance	1
2	**Assertion (A):** No interference pattern is detected, when two coherent sources are infinitely close to each other **Reason (R):** The fringe width is inversely proportional to the distance between the two slits. a- Both assertion and reason are correct and the reason is the correct explanation of assertion. b- Both assertion and reason are correct and reason is not a correct explanation of assertion. c- Assertion is correct but the reason is incorrect d- Assertion is incorrect but the reason is correct.	1
3	In a single diffraction pattern observed on a screen placed at D ,distance from the slit of width d , the ratio of the width of the central maxima to the width of other secondary maxima is (a) 2 : 1 (b) 1 : 2 (c) 1 : 1 (d) 3 : 1	1
4	In the phenomenon of interference, energy is (a) destroyed at destructive interference (b) created at constructive interference (c) conserved but it is redistributed (d) same at all points	1
5	Use Huygens' geometrical construction to show the behaviour of a plane wavefront, (i) passing through a biconvex lens and (ii) reflected by a concave mirror.	2
6	The ratio of maximum and minimum intensities of two sources is 4:1. Find the ratio of their amplitudes.	2
7	(i) What is the effect on the interference fringes to a Young's double slit experiment, when (a) the width of the source slit is increased and (b) the monochromatic source is replaced by a source of white light? Justify your answer in each case. (ii) The intensity at the central maxima in Young's double slit experiment set-up is I_0. Show that the intensity at a point, where the path difference is $l/3$ is $I_0/4$.	3
	Case study-based questions (questions no 8- 11) **HUYGENS' PRINCIPLE** Huygens' principle is a geometrical construction, which is used to determine the new position of a wavefront at a later time from its given position at any instant. In other words, the principle gives a method to know as to how light spreads out in the medium. Huygens' principle is based on the following assumptions: -	4

1. Each point on the given or primary wavefront acts as a source of secondary wavelets, sending out disturbance in all directions in a similar manner as the original source of light does.

2. The new position of the wavefront at any instant (called secondary wavefront) is the envelope of the secondary wavelets at that instant.

The above two assumptions are known as Huygens' principle or Huygens' construction.

8. Differentiate between a ray and a wavefront. 1

9. What type of wavefront will emerge from a (i) point source (ii) distant light source? 1

10. Draw the diagrams to show the behaviour of plane wavefronts as they pass through a thin prism. 2

OR

10. Draw the diagrams to show the behaviour of plane wavefronts as they reflect by a concave mirror. 2

| 11 | (i) Explain two features to distinguish between the interference pattern in Young's double slit experiment with the diffraction pattern obtained due to a single slit. 2
 (ii) A monochromatic light of wavelength 500 nm is incident normally on a single slit of width 0.2 mm to produce a diffraction pattern. Find the angular width of the central maximum obtained on the screen. Estimate the number of fringes obtained in Young's double slit experiment with fringe width 0.5 mm, which can be accommodated within the region of total angular spread of the central maximum due to single slit. 3 | 5 |