1. (d) From figure  and  ⇒ 

*I*

*I* /4

3*I* /4

3*I* /16

3*I* /64

9*I* /64

*A*

*B*

*B* ′

*A* ′

By using 

1. (a) The cylindrical surface touches the glass plate along a line parallel to axis of cylinder. The thickness of wedge shaped film increases on both sides of this line. Locus of equal path difference are the lines running parallel to the axis of the cylinder. Hence straight fringes are obtained.
2. (b) *PR* = *d* ⇒ *PO* = *d* sec*θ* and *CO* = *PO* cos 2*θ*  is

*C*

*R*

*θ*

*P*

*B*

*A*

*θ*

*O*

*θ*

Path difference between the two rays

Δ = *CO* + *PO* = (*d* sec*θ* + *d* sec*θ* cos 2*θ*)

Phase difference between the two rays is

*φ* = *π* (One is reflected, while another is direct)

Therefore condition for constructive interference should be 

or 

or  ⇒ 

1. (a,b) For microwave 

*S*1

*S*2

*d*

*θ*

*θ*

*D*

Δ*x*

*Y*

*P*

As 

Phase difference (Path difference)





Here and 



*IR* will be maximum when 



Hence 

If then 

If  then 

If then 

1. (d) 

Put and 

1. (d) Since *P* is ahead of *Q* by 90o and path difference between *P* and *Q* is Therefore at *A*, phase difference is zero, so intensity is 4*I*. At *C* it is zero and at *B*, the phase difference is 90o, so intensity is 2*I*.
2. (b) By using phase difference 

For path difference *λ*, phase difference and for path difference *λ*/4, phase difference *φ*2 = *π*/2.

Also by using  ⇒ 

⇒  ⇒ 

1. (d) If shift is equivalent to *n* fringes then





1. (a) According to given condition

for minimum *t,* *n* =1

So, 



1. (a) and 





1. (b) 



1. (a) where 



1. (a)  ⇒ *β* ∝ *D*

⇒  ⇒ ⇒ 



1. (a) *P* is the position of 11th bright fringe from *Q*. From central position *O*, *P* will be the position of 10th bright fringe.

Path difference between the waves reaching at *P* = *S*1*B* =10 *λ* = 10 × 6000 × 10–10 = 6 × 10–6*m*.

1. (b) Resultant intensity 

At central position with coherent source (and 

 ... (i)

In case of incoherent at a given point, *φ* varies randomly with time so (cos *φ*)*av* = 0

∴  ... (ii)

Hence .

1. (b) Here path difference at a point  on the circle is given by

*d*

*S*1

*S*2

*θ*

*P*

 ….. (i)

For maxima at 

 ….. (ii)

From equation (i) and (ii)



1. (b) From 



*P*

*S*1

*S*2

*xn*

4*λ*

*xn*

*y*

*x*

*D*



Here  is the path difference  for maximum intensity.



or 

Then 





.

Number of points for maxima becomes 3.

1. (a) 

Number of *HPZ* covered by the disc at  



Hence the intensity at this point is



or 



Hence the correct answer will be (a).

1. (b) 











1. (d) given  ⇒ 









1. (b) Angular width 



1. (a) In a single slit diffraction experiment, position of minima is given by 

So for first minima of red 

and as first maxima is midway between first and second minima, for wavelength ,

its position will be



According to given condition 

 so 

1. (c)  where 

For  secondary maxima 





So 



1. (d) If *I* is the final intensity and *I*0 is the initial intensity then

 or 

1. (a) Using Matus law, 

As here polariser is rotating *i.e.* all the values of *θ* are possible.



On integration we get 

where 

∴ 

and Time period 

∴ Energy of light passing through the polariser per revolution 

1. (d) Let *n*th minima of 400 *nm* coincides with *m*th minima of 560 *nm* then

 ⇒ 

*i.e.* 4th minima of 400 *nm* coincides with 3rd minima of 560 *nm*.

The location of this minima is



Next, 11th minima of 400 *nm* will coincide with 8th minima of 560 *nm*

Location of this minima is



∴ Required distance = 28 *mm*

1. (b) For maxima 

⇒ ⇒ 

since value of sin *θ* cannot be greater 1.

∴ *n* = 0, 1, 2

Therefore only five maximas can be obtained on both side of the screen.

1. (a) ⇒ 

⇒ *v* = 6.48 ×106 *m/s* = 6480 *km/sec*.

1. (c) The interference fringes for two slits are hyperbolic.
2. (d) If you divide the original slit into *N* strips and represents the light from each strip, when it reaches the screen, by a phasor, then at the central maximum in the diffraction pattern you add *N* phasors, all in the same direction and each with the same amplitude. The intensity is therefore *N*2. If you double the slit width, you need 2*N* phasors, if they are each to have the amplitude of the each to have the amplitude of the phasors you used for the narrow slit. The intensity at the central maximum is proportional to (2*N*)2 and is, therefore, four times the intensity for the narrow slit.