Sri Chaitanya IIT Academy, India

A.P, TELANGANA, KARNATAKA, TAMILNADU, MAHARASHTRA, DELHI, RANCHI

A right Choice for the Real Aspirant

ICON CENTRAL OFFICE, MADHAPUR-HYD

Sec: Sr. IPLCO **JEE ADVANCED** **DATE : 13-12-15**
TIME : 3:00 **2012_P1 MODEL** **MAX MARKS : 210**

KEY & SOLUTIONS

PHYSICS

1	**C**	2	**B**	3	**A**	4	**D**	5	**A**	6	**C**
7	**D**	8	**B**	9	**B**	10	**D**	11	**BCD**	12	**AC**
13	**ABD**	14	**ACD**	15	**ABD**	16	**6**	17	**1**	18	**1**
19	**5**	20	**4**								

CHEMISTRY

21	**C**	22	**D**	23	**A**	24	**B**	25	**C**	26	**A**
27	**D**	28	**D**	29	**C**	30	**A**	31	**BC**	32	**ABC**
33	**ABD**	34	**AB**	35	**ABC**	36	**3**	37	**3**	38	**2**
39	**2**	40	**4**								

MATHEMATICS

41	**D**	42	**C**	43	**C**	44	**C**	45	**B**	46	**D**
47	**C**	48	**B**	49	**D**	50	**D**	51	**ACD**	52	**ABCD**
53	**ABCD**	54	**BC**	55	**ABD**	56	**1**	57	**1**	58	**2**
59	**1**	60	**4**								

PHYSICS

1. Apply lens maker's formula. To get parallel rays from 2nd curvature the rays after refraction from 1st curvature should become parallel.

2. use $\sin c = \frac{1}{\mu}$ and $\mu \alpha \frac{1}{\lambda}$

3. Conceptual

4. Take projection of mirror along x-axis.

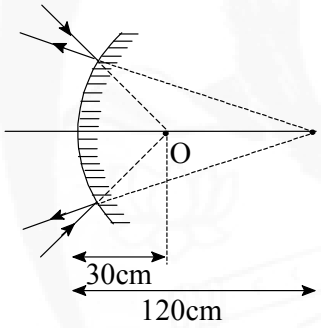
5. Use Snell's law

6. The shift produced by glass plate would be equal to pp'

   i.e., $\left(1-\frac{1}{\mu}\right)t = 2cm \Rightarrow t = 6cm$

7. The situation is shown clearly in figure. Here, object and image both are virtual.

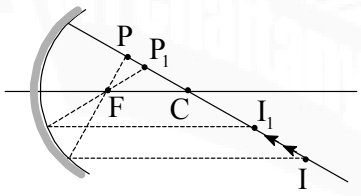
   $u = 30cm, v = 120cm$



   $\Rightarrow \frac{1}{120}+\frac{1}{30}=\frac{1}{f} \Rightarrow f = 24cm$

8. Conceptual

9.



   It is clear from the ray diagram that as object moves from P to P_1, the image moves from I to I_1 and hence velocity of image, when object is at P is along $\overrightarrow{v_2}$

10. Deviation produced by mirror is $\delta_1 = \pi - 2\times 60°$; clockwise

Deviation produced by prism is $\delta_2 = (2-1)\times 6° = 6°$; anticlockwise

So, net deviation $\delta = \delta_1 + \delta_2 = 54°$; clockwise

11. Conceptual

12. $\frac{1}{F} = -\frac{2}{f_g} + \frac{2}{f_w} - \frac{1}{f_m}$

13. Conceptual

14. Conceptual

15. Δx at O = d (path difference is maximum at O)

So, if $d = \frac{7\lambda}{2}$, O will be a minima

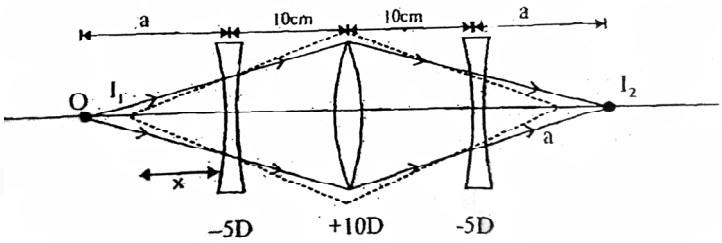
$d = \lambda$, O will be maxima

$d = \frac{5\lambda}{2}$, O will be minima and hence intensity is minimum

$\Delta x = \pm\frac{\lambda}{2}, \pm\frac{3\lambda}{2}, \pm\frac{5\lambda}{2}, \pm\frac{7\lambda}{2}, \pm\frac{9\lambda}{2}$

16 to 18. Conceptual

19. Since the system arrangement of lenses with the object possesses symmetry about the convex lens, therefore the ray diagram must also be symmetric



Object and image $(I_1 \& I_2)$ for convex lens are placed symmetrically therefore,

$x = 10\text{cm}$

$f = -\frac{100}{5}\text{cm} = -20\text{cm}$

$\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \Rightarrow \frac{1}{(-10)} - \frac{1}{(-a)} = \frac{1}{(-20)} \Rightarrow a = +20\text{cm}$

20. From $y = (2n+1)\frac{\lambda D}{2d}$, those wavelength which undergo destructive interference at the pinhole. They will be absent.