

NEW STANDARD ACADEMY

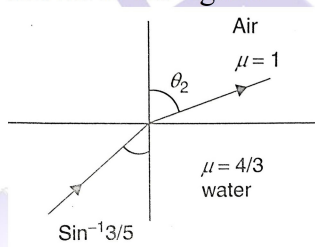
Date : 02-09-24

CLASS : 12TH JEE

Marks: 60
Time: 3 HRS

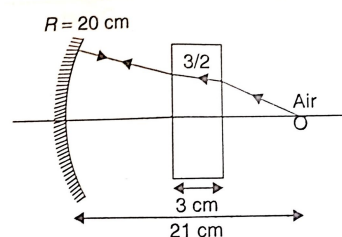
PHYSICS

- A plane mirror makes an angle of 30° with horizontal. If a vertical ray strikes the mirror, the angle between the mirror and the reflected ray is
(a) 30° (b) 45°
(c) 60° (d) 90°
- A small plane mirror is placed at the centre of a spherical screen of radius R . A beam of light is falling on the mirror. If the mirror makes n revolutions per second, The speed of light on the screen after reflection from the mirror will be
(a) $4\pi nR$ (b) $2\pi nR$
(c) $\frac{nR}{2\pi}$ (d) $\frac{nR}{4\pi}$
- A convergent beam of light is incident on a convex mirror so as to converge to a distance 12 cm from the - pole of the mirror. An inverted image of the same size is formed coincident with the virtual object. What is the focal length of the mirror?
(a) 24 cm (b) 12 cm
(c) 6 cm (d) 3 cm
- Find the angle θ_2 made by the light ray when it gets refracted from water to air, shown in the figure.



- In case of image formation by plane mirrors,
(i) object can be real and image virtual
(ii) object can be virtual and image real
(iii) both object and image can be real
(iv) both object and image can be virtual
Choose the correct option.
(1) (i) and (ii)
(2) (ii) and (iii)

- (3) (iii) and (iv)
(4) (i) and (iv)
- The focal length of a concave mirror is f and the distance of the object from the focus is n (away from the mirror). The magnification produced by the mirror is
(1) f/u (2) uf
(3) u/f (4) f^2/u .
- In the figure shown, Find the distance of final image formed by mirror.



- An object is placed at a distance of 20 cm from the pole of a concave mirror whose focal length is 20 cm. Then image is formed at
(1) 20 cm from the pole of the mirror
(2) 40 cm from the pole of the mirror
(3) at the pole of the mirror
(4) at infinity
- Find the maximum angle that can be made in glass medium ($\mu = 1.5$) if a light ray is refracted from glass to vacuum.
- At what distance from a concave mirror of focal length 10 cm must an object be placed in order that an image double to its size may be obtained?
(1) 5 cm only
(2) 15 cm only
(3) either 5 cm or 15 cm
(4) at 10 cm
- Two vertical plane mirrors are inclined at an angle of 60° with each other. A ray of light travelling horizontally is reflected first from one mirror and then from the other. The resultant deviation is
(a) 60° (b) 120°
(c) 180° (d) 240°

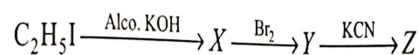
12. A light bulb is placed between two plane mirrors inclined at an angle of 60° . The number of images formed are
- (a) 6
(b) 2
(c) 5
(d) 4
13. A plane mirror produces a magnification of
- (a) -1 (b) +1
(c) Zero (d) Between 0 and $+\infty$
14. A watch shows time as 3:25. When seen through a mirror, time appeared will be
- (a) 8:35
(b) 9:35
(c) 7:35
(d) 8:25
15. An object is at a distance of 0.5 m in front of a plane mirror. Distance between the object and image is
- (a) 0.5 m (b) 1 m
(c) 0.25 m (d) 1.5 m

CHEMISTRY

1. Lucas reagent is
- (a) Concentrated HCl + anhydrous $ZnCl_2$
(b) Dilute HCl + hydrated $ZnCl_2$
(c) Concentrated HNO_3 + anhydrous $ZnCl_2$
(d) Concentrated HCl + anhydrous $MgCl_2$
2. Among the following one with the highest percentage of chlorine is
- (a) Chloral
(b) Pyrene
(c) PVC
(d) Gammexane
3. The odd decomposition of carbon chlorine bond form
- (a) Two free ions
(b) Two-carbanium ion
(c) Two carbanion
(d) A cation and an anion
4. Lindane can be obtained by the reaction of benzene with
- (a) CH_3Cl /anhydrous $AlCl_3$
(b) C_2H_5I /anhydrous $AlCl_3$
(c) CH_3COCl /anhydrous $AlCl_3$
(d) Cl_2 in sunlight
5. When but-3-en-2-ol reacts with aq. HBr, the product formed is

- (a) 3-bromobut-1-ene
(b) 1-bromobut-2-ene
(c) A mixture of both a and b
(d) 2-bromobut-2-ene

6. Identify Z in the following series



- (a) CH_3CH_2CN (b) $\begin{array}{c} CH_2CN \\ | \\ CH_2CN \end{array}$
(c) $BrCH_2-CH_2CN$ (d) $BrCH=CHCN$
7. Gammexane is:
- (a) Benzene hexachloride
(b) Chlorobenzene
(c) Hexachlorobenzene
(d) p-dichlorobenzene
8. In the preparation of chlorobenzene from aniline, the most suitable reagent is
- (a) Chlorine in presence of ultraviolet light
(b) Chlorine in the presence of $AlCl_3$
(c) Nitrous acid followed by heating with Cu_2Cl_2
(d) HCl and Cu_2Cl_2
9. The number of isomers for the compound with molecular formula C_2BrClF_1 is
- (a) 3
(b) 4
(c) 5
(d) 6
10. Which compound among the following gives a positive iodoform test?
1. Ethanol,
2. Ethanal,
3. 1-Butanol,
4. 2-Butanol,
5. Phenylethanal.
- (a) 1,2,3
(b) 1, 3, 4
(c) 1,2,4
(d) 1,2,5
(e) 2,4,5
11. At higher temperature, iodoform reaction is given by
- (a) CH_3COOCH_3
(b) $CH_3COOC_2H_5$
(c) $C_6H_5COOCH_3$
(d) $CH_3COOC_6H_5$

12. What is the product obtained when chlorine reacts with ethyl alcohol in the presence of NaOH

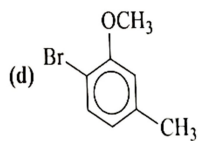
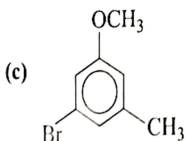
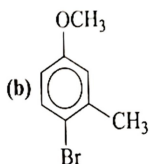
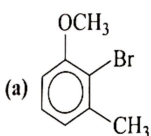
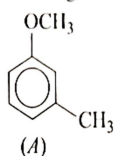
- (a) CH_3Cl
 (b) $\text{C}_2\text{H}_5\text{Cl}$
 (c) CCl_3CHO
 (d) CHCl_3

13. 3-Phenyl propene on reaction with HBr gives (as a major product):

- (a) $\text{C}_6\text{H}_5\text{CH}_2\text{CH}(\text{Br})\text{CH}_3$
 (b) $\text{C}_6\text{H}_5\text{CH}(\text{Br})\text{CH}_2\text{CH}_3$
 (c) $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{CH}_2\text{Br}$
 (d) $\text{C}_6\text{H}_5\text{CH}(\text{Br})\text{CH}=\text{CH}_2$

14.

The major product obtained of the monobromination (with $\text{Br}_2/\text{FeBr}_3$) of the following compound (A) is



15. Which will undergo reaction fastest among the following halogen compounds?

- (a) $\text{CH}_3\text{CH}_2\text{F}$
 (b) $\text{CH}_3\text{CH}_2\text{Cl}$
 (c) $\text{CH}_3\text{CH}_2\text{Br}$
 (d) $\text{CH}_3\text{CH}_2\text{I}$
 (e) $(\text{CH}_3)_2\text{CH} - \text{Cl}$

MATHS

1. Evaluate the definite integral

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \operatorname{cosec} x \, dx.$$

- a) $\log\left(\frac{\sqrt{2}-1}{2-\sqrt{3}}\right)$ b) $\log\left(\frac{\sqrt{2}+1}{2-\sqrt{3}}\right)$
 c) $\log\left(\frac{\sqrt{2}-1}{\sqrt{2}-\sqrt{3}}\right)$ d) 0

2. Evaluate the definite integral

$$\int_2^3 \frac{x \, dx}{x^2+1}.$$

- a) $\frac{1}{2} \log^2$ b) \log^2
 c) $\frac{1}{2} \log^3$ d) $\frac{1}{3} \log^2$

3. Evaluate the integral

$$\int_0^1 \sin^{-1}\left(\frac{2x}{1+x^2}\right) dx \text{ using substitution.}$$

- a) $\frac{\pi}{2} - \log 4$ b) $\frac{\pi}{2} - \log 3$
 c) $\frac{\pi}{4} - \log 2$ d) $\frac{\pi}{2} - \log 2$

4. Evaluate $\int_0^1 \frac{dx}{(x^2+1)^{3/2}}$

- a) $\frac{1}{\sqrt{2}}$ b) $\frac{1}{\sqrt{3}}$

- c) $\frac{1}{\sqrt{5}}$ d) 0

5. If $f(0) = 1$, $f(2) = f'(2) = 5$ then find the value of $\int_0^1 x \cdot f''(2x) \, dx$.

- a) 2 b) 4
 c) 5 d) 6

6. Evaluate $\int_0^{\pi/2} |\sin x - \cos x| \, dx$

- a) $2(\sqrt{2}-1)$ b) $2(\sqrt{2}+2)$
 c) $2(\sqrt{2}+1)$ d) $(\sqrt{2}-1)$

7. Evaluate $\int_1^2 (4x^3 - 5x^2 + 6x + 9) \, dx$

- a) $64/3$ b) 64
 c) $3/64$ d) 0

8. Evaluate $\int_0^{\pi} \tan x \, dx$

- a) $(\log 2)/7$ b) $(\log 2)/3$
 c) $(\log 2)/5$ d) $(\log 2)/2$

9. Evaluate $\int_0^1 (Xe^x + \sin \frac{\pi x}{4}) \, dx$.

- a) $1 + \frac{4}{\pi} - \frac{2\sqrt{2}}{\pi}$ b) $2 + \frac{4}{\pi} - \frac{2\sqrt{2}}{\pi}$
 b) $1 - \frac{4}{\pi} - \frac{2\sqrt{2}}{\pi}$ d) $1 + \frac{4}{\pi} + \frac{2\sqrt{2}}{\pi}$

10. Evaluate $\int_0^{\frac{2}{3}} \frac{dx}{4+9x^2}$

11. Evaluate the definite

$$\text{integral } \int_0^{\frac{\pi}{2}} \cos 2x \, dx.$$

12. Evaluate

$$\int_1^2 \left(\frac{1}{x} - \frac{1}{2x^2}\right) e^{2x} \, dx.$$

13. Evaluate $\int_0^{\pi/2} e^x \sin x \, dx =$

14. By using the properties of definite integrals, evaluate the integral

$$\int_0^{\frac{\pi}{2}} \frac{\sin^2 x \, dx}{\sin^2 x + \cos^2 x}$$

15. Evaluate

$$\int_0^{\frac{\pi}{2}} \log\left(\frac{4+3\sin x}{4+3\cos x}\right) dx$$