



BJNP

Learning with the Speed of Mumbai and the Tradition of Kota



Max. Marks: 200

Date: 25.09.2022

ABHIMANYU BATCH
PHYSICS : PART TEST
Topics: Ray Optics and Wave Optics

1. The rectilinear propagation of light in a medium is due to its
 - (a) High velocity
 - (b) Large wavelength
 - (c) High frequency
 - (d) Source
2. Two beams of light will not give rise to an interference pattern, if
 - (a) They are coherent
 - (b) They have the same wavelength
 - (c) They are linearly polarized perpendicular to each other
 - (d) They are not monochromatic
3. Two coherent sources of light can be obtained by
 - (a) Two different lamps
 - (b) Two different lamps but of the same power
 - (c) Two different lamps of same power and having the same colour
 - (d) None of the above
4. Two sources of waves are called coherent if
 - (a) Both have the same amplitude of vibrations
 - (b) Both produce waves of the same wavelength
 - (c) Both produce waves of the same wavelength having constant phase difference
 - (d) Both produce waves having the same velocity

Space for Rough Work



5. Two light sources are said to be coherent if they are obtained from
 - (a) Two independent point sources emitting light of the same wavelength
 - (b) A single point source
 - (c) A wide source
 - (d) Two ordinary bulbs emitting light of different wavelengths
6. For constructive interference to take place between two monochromatic light waves of wavelength λ , the path difference should be
 - (a) $(2n - 1) \frac{\lambda}{4}$
 - (b) $(2n - 1) \frac{\lambda}{2}$
 - (c) $n\lambda$
 - (d) $(2n + 1) \frac{\lambda}{2}$
7. Two waves of intensity I undergo Interference. The maximum intensity obtained is
 - (a) $I / 2$
 - (b) I
 - (c) $2 I$
 - (d) $4 I$
8. If the amplitude ratio of two sources producing interference is 3 : 5, the ratio of intensities at maxima and minima is
 - (a) 25 : 16
 - (b) 5 : 3
 - (c) 16 : 1
 - (d) 25 : 9
9. A thin film of soap solution ($\mu_s = 1.4$) lies on the top of a glass plate ($\mu_g = 1.5$). When visible light is incident almost normal to the plate, two adjacent reflection maxima are observed at two wavelength 420 and 630 nm. The minimum thickness of the soap solution are
 - (a) 420 nm
 - (b) 450 nm
 - (c) 630 nm
 - (d) 1260 nm
10. A light of wavelength 5890 Å falls normally on a thin air film. The minimum thickness of the film such that the film appears dark in reflected light is
 - (a) $2.945 \times 10^{-7} \text{ m}$
 - (b) $3.945 \times 10^{-7} \text{ m}$
 - (c) $4.96 \times 10^{-7} \text{ m}$
 - (d) $1.945 \times 10^{-7} \text{ m}$

Space for Rough Work



11. In a Young's double slit experiment (slit distance d) monochromatic light of wavelength λ is used and the figure pattern observed at a distance D from the slits. The angular position of the bright fringes are
- (a) $\sin^{-1}\left(\frac{N\lambda}{d}\right)$ (b) $\sin^{-1}\left(\frac{\left(N + \frac{1}{2}\right)\lambda}{d}\right)$
- (c) $\sin^{-1}\left(\frac{N\lambda}{D}\right)$ (d) $\sin^{-1}\left(\frac{\left(N + \frac{1}{2}\right)\lambda}{D}\right)$
12. In double slit experiment, the angular width of the fringes is 0.20° for the sodium light ($\lambda = 5890 \text{ \AA}$). In order to increase the angular width of the fringes by 10%, the necessary change in the wavelength is
- (a) Increase of 589 \AA (b) Decrease of 589 \AA (c) Increase of 6479 \AA (d) Zero
13. In Young's double slit experiment, angular width of fringes is 0.20° for sodium light of wavelength 5890 \AA . If complete system is dipped in water, then angular width of fringes becomes
- (a) 0.11° (b) 0.15° (c) 0.22° (d) 0.30°
14. In Young's double slit experiment, distance between two sources is 0.1 mm . The distance of screen from the sources is 20 cm . Wavelength of light used is 5460 \AA . Then angular position of the first dark fringe is
- (a) 0.08° (b) 0.16° (c) 0.20° (d) 0.313°
15. The maximum intensity of fringes in Young's experiment is I . If one of the slit is closed, then the intensity at that place becomes I_0 . Which of the following relation is true
- (a) $I = I_0$ (b) $I = 2I_0$
- (c) $I = 4I_0$ (d) There is no relation between I and I_0
16. In Young's double slit experiment, if the widths of the slits are in the ratio $4 : 9$, the ratio of the intensity at maxima to the intensity at minima will be
- (a) $169 : 25$ (b) $81 : 16$ (c) $25 : 1$ (d) $9 : 4$

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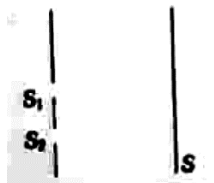


17. In Young's double slit experiment, the intensity of light coming from the first slit is double the intensity from the second slit. The ratio of the maximum intensity to the minimum intensity on the interference fringe pattern observed is
- (a) 34 (b) 40 (c) 25 (d) 38
18. If the two slits in Young's double slit experiment are of unequal width, then
- (a) The bright fringes will have unequal spacing
(b) The bright fringes will have unequal brightness
(c) The fringes do not appear
(d) The dark fringes are not perfectly dark
19. In Young's double slit experiment, the ratio of intensities of bright and dark bands is 16 which means
- (a) The ratio of their amplitudes is 5
(b) Intensities of individual sources are 25 and 9 units respectively
(c) The ratio of their amplitudes is 4
(d) Intensities of individual sources are 4 and 3 units respectively
20. The maximum intensity in Young's double slit experiment is I_0 . Distance between the slits is $d = 5\lambda$, where λ is the wavelength of monochromatic light used in the experiment. What will be the intensity of light in front of one of the slits on a screen at a distance $D = 10d$
- (a) $\frac{I_0}{2}$ (b) $\frac{3}{4}I_0$ (c) I_0 (d) $\frac{I_0}{4}$

Space for Rough Work



21. In a Young's double slit experiment the intensity of light at each slit is I_0 . Interference pattern is observed along a direction parallel to the line S_1S_2 on screen, S. The minimum, maximum, and the intensity average over the entire screen are respectively



- (a) $0, 4I_0, 2I_0$ (b) $I_0, 2I_0, 3I_0/2$ (c) $I_0, 4I_0, I_0$ (d) $I_0, 2I_0, I_0$
22. In Young's double slit experiment, a mica slit of thickness t and refractive index μ is introduced in the ray from the first source S_1 . By how much distance the fringes pattern will be displaced
- (a) $\frac{d}{D}(\mu - 1)t$ (b) $\frac{D}{d}(\mu - 1)t$ (c) $\frac{d}{(\mu - 1)D}$ (d) $\frac{D}{d}(\mu - 1)$
23. A thin plastic sheet of refractive index 1.6 is used to cover one of slits of a double slit arrangement. The central point on the screen is now occupied by what would have been the 7th bright fringe before the plastic was used. If the wavelength of light is 600 nm, what is the thickness (in μm) of the plastic
- (a) 7 (b) 4 (c) 8 (d) 6
24. A flake of glass (refractive index 1.5) is placed over one of the openings of a double slit apparatus. The interference pattern displaces itself through seven successive maxima towards the side where the flake is placed. If wavelength of the diffracted light is $\lambda = 600$ nm, then the thickness of the flake is
- (a) 2100 nm (b) 4200 nm (c) 8400 nm (d) None of these
25. In Young's double slit experiment, the aperture screen distance is 2 m. The fringe width is 1 mm. Light of 600 nm is used. If a thin plate of glass ($\mu = 1.5$) of thickness 0.06 mm is placed over one of the slits, then there will be a lateral displacement of the fringes by
- (a) 0 cm (b) 5 cm (c) 10 cm (d) 15 cm

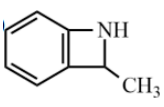
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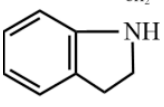
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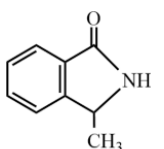
ABHIMANYU BATCH
CHEMISTRY: PART TEST
Topic: Nitrogen Compound

26. Benzamide upon reduction with LiAlH_4 gives
(a) Benzylamine (b) Aniline (c) Benzylalcohol (d) Benzoic acid
27. An isocyanide on reduction with hydrogen in the presence of Pt gives
(a) amide (b) primary amine (c) secondary amine (d) alcohol
28. Reduction of nitroalkanes yields
(a) Acid (b) Alcohol (c) Amine (d) Diazo compounds
29. The major product of the following reaction is
- 

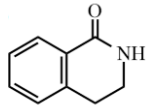
(a)



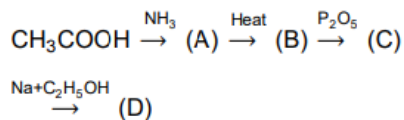
(b)



(c)



(d)
30. Which of the following reagents would not be a good choice for reducing an aryl nitro compound to an amine?
(a) H_2 (excess) / Pt (b) LiAlH_4 in ether (c) Fe and HCl (d) Sn and HCl
31. Primary amines may be obtained by :
(a) the reduction of nitroalkanes (b) the decarboxylation of amino acids
(c) the hydrolysis of alkyl isocyanate (d) All the above
32. The product (D) in the following sequence of reactions is,



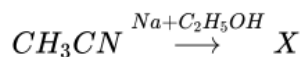
- (a) ester (b) amine (c) acid (d) alcohol

Space for Rough Work



33. Reaction of acetamide with bromine water and KOH gives

- (a) CH_3COOH (b) $\text{CH}_3\text{CH}_2\text{NH}_2$ (c) $\text{CH}_3\text{CH}_2\text{NH}_2$ (d) CH_3NH_2



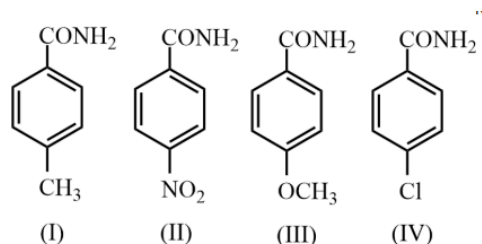
34. The compound X is

- (a) CH_3CONH_2 (b) $\text{CH}_3\text{CH}_2\text{NH}_2$ (c) C_2H_6 (d) CH_3NHCH_3

35. Nitrobenzene on reduction with zinc and NH_4Cl gives

- (a) azobenzene (b) aniline
(c) hydrazobenzene (d) N-phenyl hydroxylamine

36. The rate of Hoffmann's bromamide degradation with following amide will follow the order:



- (a) $\text{III} > \text{I} > \text{IV} > \text{II}$ (b) $\text{II} > \text{IV} > \text{I} > \text{III}$ (c) $\text{I} > \text{II} > \text{III} > \text{IV}$ (d) $\text{I} > \text{III} > \text{IV} > \text{II}$

37. Gabriel phthalimide reaction is used for the preparation of

- (a) primary aromatic amines (b) secondary amines
(c) primary aliphatic amines (d) tertiary amines

38. The following compound can be classified as N, N-dimethyl propanamine, N-methyl Ethanamine and aniline

- (a) Primary, secondary, tertiary (b) Primary, tertiary, secondary
(c) Tertiary, secondary, primary (d) Tertiary, primary, secondary

Space for Rough Work



39. Electrolytic reduction of nitrobenzene in weakly acidic medium gives
- (a) Aniline (b) Nitrosobenzene
(c) N - phenylhydroxylamine (d) P - hydroxyaniline
40. Which of the following is the weakest base?
- (a) NH_3 (b) $\text{C}_6\text{H}_5\text{NH}_2$ (c) $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$ (d) CH_3NH_2
41. The electrolytic reduction of nitrobenzene in strongly acidic medium produces:
- (a) azoxybenzene (b) azobenzene (c) aniline (d) p-aminophenol
42. $\text{CH}_3\text{CONH}_2 + x. \text{Br}_2 + y. \text{KOH} \rightarrow \text{CH}_3\text{NH}_2 + 2\text{KBr} + \text{K}_2\text{CO}_3 + 2\text{H}_2\text{O}$. The sum of (x + y) is
- (a) 1 (b) 4 (c) 6 (d) 5
43. Higher amines are not soluble in
- (a) CCl_4 (b) Diethyl ether (c) Benzene (d) Water.
44. In the Hoffmann Bromamide rearrangement, intermediate species are
- (a) $\text{R} - \text{CO} - \text{NHBr}$ (b) $\left[\text{R} - \text{CO} \text{N}^- - \text{Br} \right] \text{Na}^+$ (c) $\text{R} - \text{N} = \text{C} = \text{O}$ (d) All
45. Which of the following reactions can produce aniline as main product?
- (a) $\text{C}_6\text{H}_5\text{NO}_2 \xrightarrow{\text{Zn/KOH}}$ (b) $\text{C}_6\text{H}_5\text{NO}_2 + \text{Zn/NH}_4\text{Cl}$
(c) $\text{C}_6\text{H}_5\text{NO}_2 + \text{LiAlH}_4$ (d) $\text{C}_6\text{H}_5\text{NO}_2 + \text{Zn/HCl}$
46. Ethyl cyanide(A) can be converted to ethyl amine(B) by :
- (a) $\text{A} \xrightarrow{\text{Sn/HCl}} \text{B}$ (b) $\text{A} \xrightarrow[\Delta]{\text{H}_3\text{O}^+ \text{NH}_3 \text{KOH}} \text{B}$ (c) $\text{A} \xrightarrow{\text{LiAlH}_4} \text{B}$ (d) $\text{A} \xrightarrow{\text{NaBH}_4} \text{B}$
47. "MIC" (methyl isocyanate) is formed as an intermediate in which one of the following reaction
- (a) Carbylamine reaction (b) Hinsberg reaction
(c) Hoffmann bromamide reaction (d) Diazotization reaction

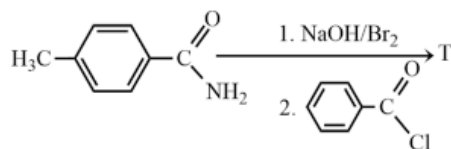
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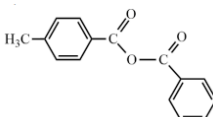
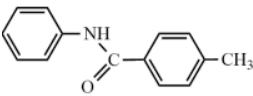
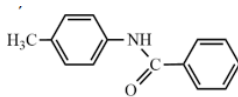
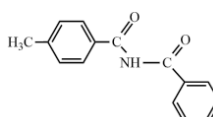


48. Identify 'B' in the reaction, Acetamide $\xrightarrow[\Delta]{P_2O_5}$ A $\xrightarrow{4(H)}$ B

- (a) CH_3NH_2 (b) $CH_3CH_2NH_2$ (c) CH_3CN (d) CH_3COONH_4

49. In the reaction the structure of the product T is



- (a) 
 (b) 
 (c) 
 (d) 

50. The IUPAC name of $\begin{array}{c} |CH_3CH_2-N-CH_2CH_3 \\ | \\ CH_3 \end{array}$ is

- (a) N-methyl-N-ethylethanamine (b) diethyl methyl amine
 (c) N-ethyl-N-methyl ethanamine (d) methyl diethyl amine

Space for Rough Work

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ABHIMANYU BATCH
PHYSICS : PART TEST ANSWER KEY
Topics: Ray Optics and Wave Optics

1.	(c)	2.	(c)	3.	(d)	4.	(c)	5.	(b)
6.	(c)	7.	(d)	8.	(c)	9.	(b)	10.	(a)
11.	(a)	12.	(a)	13.	(b)	14.	(d)	15.	(c)
16.	(c)	17.	(a)	18.	(d)	19.	(b)	20.	(a)
21.	(a)	22.	(b)	23.	(a)	24.	(c)	25.	(b)

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ABHIMANYU BATCH
CHEMISTRY: PART TEST ANSWER KEY
Topic: Nitrogen Compound

26.	(a)	27.	(c)	28.	(c)	29.	(c)	30.	(b)
31.	(d)	32.	(b)	33.	(d)	34.	(b)	35.	(d)
36.	(a)	37.	(c)	38.	(c)	39.	(c)	40.	(b)
41.	(d)	42.	(d)	43.	(d)	44.	(d)	45.	(d)
46.	(b)	47.	(c)	48.	(b)	49.	(c)	50.	(c)