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Knowledge is Discipline
BJNP
Learning with the Speed of Mumbai and the Tradition of Kota

Max. Marks: 60 **Date: 17.09.2022**

ABHIMANYU BATCH

PHYSICS: DAILY CLASS TEST ANSWER KEY

Topics: Ray Optics and Wave Optics

1.	(a)	2.	(d)	3.	(a)	4.	(a)	5.	(a)
6.	(b)	7.	(a)	8.	(b)	9.	(a)	10.	(b)
11.	(b)	12.	(a)	13.	(d)	14.	(b)	15.	(d)

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CHEMISTRY: DCT ANSWER KEY

Topic: Aldehydes, Ketones and Carboxylic Acid

16.	(a)	17.	(b)	18.	(d)	19.	(d)	20.	(b)
21.	(b)	22.	(a)	23.	(a)	24.	(d)	25.	(a)
26.	(a)	27.	(b)	28.	(b)	29.	(d)	30.	(d)

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MATHEMATICS: DCT ANSWER KEY

Topics: Definite and Indefinite Integration

31.	(b)	32.	(b)	33.	(d)	34.	(d)	35.	(a)
36.	(c)	37.	(b)	38.	(b)	39.	(c)	40.	(b)
41.	(a)	42.	(c)	43.	(c)	44.	(a)	45.	(b)

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PHYSICS : DAILY CLASS TEST

Topics: Ray Optics and Wave Optics

1. An object is placed 40 cm from a concave mirror of focal length 20 cm. The image formed is

   (a) real, inverted and same in size (b) real, inverted and smaller in size

   (c) virtual, erect and larger in size (d) virtual, erect and smaller in size

2. A point object is placed at a distance of 30 cm from a convex mirror of focal length 30 cm. The image will form at

   (a) infinity (b) pole

   (c) focus (d) 15 cm behind the mirror

3. An object is placed at a distance of 30 cm from a concave mirror and its real image is formed at a distance of 30 cm from the mirror. The focal length of the mirror is

   (a) 15 cm (b) 45 cm (c) 30 cm (d) 20 cm

4. A convex mirror of focal length f forms an image which is 1/n times the object. The distance of the object from the mirror is

   (a) $(n-1)f$ (b) $\left[\frac{n-1}{n}\right]f$ (c) $\left[\frac{n+1}{n}\right]f$ (d) $(n+1)f$

5. The focal length of a concave mirror is 50 cm. Where an object be placed, so that its image is two times and inverted

   (a) 75 cm (b) 60 cm (c) 125 cm (d) 50 cm

Space for Rough Work

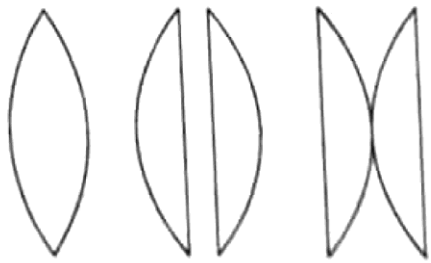
6. An object of size 7.5 cm is placed in front of a convex mirror of radius of curvature 25 cm at a distance of 40 cm. The size of the image should be

(a) 2.3 cm (b) 1.78 cm (c) 1 cm (d) 0.8 cm

7. A convex lens of focal length 40 cm is in contact with a concave lens of focal length 25 cm. The power of combination is

(a) – 1.5 D (b) – 6.5 D (c) + 6.5 D (d) + 1.5 D

8. Two similar plano-convex lenses are combined together in three different ways as shown in the adjoining figure. The ratio of the focal lengths in three cases will be



(a) 2 : 2 : 1 (b) 1 : 1 : 1 (c) 1 : 2 : 2 (d) 2 : 1 : 1

9. Two thin lenses of focal lengths 20 cm and 25 cm are placed in contact. The effective power of the combination is

(a) 9 D (b) 2 D (c) 3 D (d) 7 D

10. In the case of light waves from two coherent sources S_1 and S_2, there will be constructive interference at an arbitrary point P, the path difference $S_1P - S_2P$ is

(a) $\left(n + \frac{1}{2}\right)\lambda$ (b) $n\lambda$ (c) $\left(n - \frac{1}{2}\right)\lambda$ (d) $\frac{\lambda}{2}$

Space for Rough Work

11. Which of the following is the path difference for destructive interference?

(a) $n(\lambda + 1)$ (b) $(2n + 1)\frac{\lambda}{2}$ (c) $n\lambda$ (d) $(n + 1)\frac{\lambda}{2}$

12. When a low flying aircraft passes overhead, we sometimes notice a slight shaking of the picture on out TV screen. This is because of between the direct signal and reflected signal

(a) interference (b) diffraction

(c) polarization of direct signal (d) Both (b) and (c)

13. Two light waves superimposing at the mid-point of the screen are coming from coherent sources of light with phase difference 3p rad. Their amplitudes are 1 cm each. The resultant amplitude at the given point will be

(a) 5 cm (b) 3 cm (c) 2 cm (d) zero

14. Two beams of light having intensities *l* and 4*l* interference to produce a fringe pattern on a screen. The phase difference between the beams is $\pi / 2$ at point A and π at point B. Then the difference between the resultant intensities at A and B is

(a) 2I (b) 4I (c) 5I (d) 7I

15. Light from two coherent sources of the same amplitude A and wavelength λ illuminates the screen. The intensity of the central maximum is I_0. If the sources were incoherent, the intensity at the same point will be

(a) $4I_0$ (b) $2I_0$ (c) I_0 (d) $\frac{I_0}{2}$

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ABHIMANYU BATCH
CHEMISTRY: DCT
Topic: Aldehydes, Ketones and Carboxylic Acid

16. Which of the following gives an aldehyde on dry distillation?
    (a) Calcium formate + calcium acetate (b) Calcium acetate + calcium benzoate
    (c) Calcium acetate (d) Calcium benzoate

17. Stephen's reduction is used to prepare aldehyde from
    (a) alcohol (b) alkyl cyanides (c) alkanones (d) acid chlorides

18. Calcium formate on distillation gives
    (a) HCOOH (b) CH_3COOH (c) CH_3CHO (d) HCHO

19. Which of the following, compounds is the reactant in Rosenmund's reduction?
    (a) CH_3CO_2H (b) CH_3CHO (c) CH_3CH_2Cl (d) CH_3COCl

20. Acetophenone cannot be prepared easily starting from
    (a) $C_6H_5CH(OH)CH_3$ (b) $C_6H_5CH_3$ (c) $C_6H_5C \equiv CH$ (d) C_6H_6

21. Which of the following process is used for the preparation of acetone?
    (a) Haber process (b) Wacker process
    (c) Wolff-Kishner reaction (d) Gattermann-Koch synthesis

22. Silver mirror test is given by which one of the following compounds?
    (a) Acetaldehyde (b) Acetone (c) Formaldehyde (d) Benzophenone

23. Reaction of formaldehyde and ammonia gives
    (a) hexamethylene tetramine (b) bakelite
    (c) urea (d) triethylene tetramine

Space for Rough Work

24. Cannizzaro reaction is preformed by
    (a) formaldehyde
    (b) formaldehyde and acetaldehyde
    (c) benzaldehyde
    (d) formaldehyde and benzaldehyde

25. Which product is obtained on reduction of methanol in the presence of concentrated NaOH?
    (a) Formic acid and methyl alcohol
    (b) $CO + H_2$
    (c) Methyl alcohol
    (d) Formic acid

26. Aldehydes on reaction with $NH_2 \cdot NH_2$ forms
    (a) hydrazones (b) aniline (c) nitrobenzene (d) None of these

27. The reagent used in Clemmensen's reduction is
    (a) conc. H_2SO_4 (b) Zn – Hg/ conc. HCl (c) aq. KOH (d) alc. KOH

28. Aldol condensation is given by
    (a) trimethylacetaldehyde
    (b) acealdehyde
    (c) benzaldehyde
    (d) formaldehyde

29. On reaction with hydroxylamine, aldehydes produce
    (a) ketoxime (b) hydrzone (c) semicarbazone (d) aldoxime

30. Benedict's solution is not reduced by
    (a) formaldehyde (b) acetaldehyde (c) glucose (d) acetic anhydride

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ABHIMANYU BATCH

MATHEMATICS : DAILY CLASS TEST

Topics: Definite and Indefinite Integration

31. If $\int\left[\frac{1}{\sqrt[3]{x}}+\frac{1}{\sqrt[4]{x}}\right]dx = Ax^{2/3} + Bx^{3/4} + c$, than A + B = …..

(a) $\frac{17}{12}$ (b) $\frac{17}{6}$ (c) $\frac{1}{2}$ (d) $\frac{8}{9}$

32. $\int \log\ (\sin^2 x + \cos^2 x)\, dx = \ldots.$

(a) Does not exist (b) (log 1) x (c) –1 (d) 1

33. $\int \frac{1}{\cos 2x + 2\sin^2 x}\, dx = \ldots.$

(a) 0 (b) log |cos 2x| + c (c) 1 (d) x + c

34. If $f(x) = \sin x - \sin^2 x + \sin^3 x - \sin^4 x + \ldots.$ and $x \neq (2n+1)\frac{\pi}{2}$ for any $n \in Z$, then, $\int f(x)\, dx = \ldots.$

(a) $x - \tan\frac{x}{2} + c$ (b) $x + \tan\frac{x}{2} + c$

(c) $\frac{x - \tan(x/2)}{2} + c$ (d) $\sec x - \tan x + x + c$

35. If $\int f(x)\, dx = -\frac{1}{14}\cos 7x + \frac{1}{2}\cos x + c$, then f(x) = ….

(a) sin 3x cos 4x (b) sin 4x cos 3x (c) sin 7x cos x (d) sin x cos 7x

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Space for Rough Work

36. If $\int \frac{\sin 4x}{\cos 3x \,.\, \cos 7x}\, dx = \frac{1}{7}\log|f(x)| - \frac{1}{3}\log|g(x)| + c$, then f(x) + g(x) = ….

(a) cos 7x + cos 3x (b) sec 7x – sec 3x (c) sec 7x + sec 3x (d) cos 7x – cos 3x

37. If $\int \tan(x°)\, dx = p \log\left|\frac{1}{\cos(\pi x / 180)}\right| + c$, then p = ….

(a) $-\frac{180}{\pi}$ (b) $\frac{180}{\pi}$ (c) $\frac{\pi}{180}$ (d) $-\frac{\pi}{180}$

38. If g(x) sin x and f(x) = $\begin{vmatrix} g(x) & g'(x) \\ -g'(x) & g(x) \end{vmatrix}$, then $\int_0^2 f(x)\, dx$ = ….

(a) 1 (b) 2 (c) 3 (d) 4

39. The value of $\int_{-3}^{3} (ax^3 + bx + c)\, dx$ depends on the ….

(a) value of a only (b) value of a, b and c (c) value of c only (d) value of b only

40. $\int_{-2}^{1} \frac{x^4 + x^2 + 1}{x^2 - x + 1}\, dx$ = …..

(a) 4 (b) $\frac{9}{2}$ (c) $\frac{7}{2}$ (d) $\frac{5}{2}$

41. $\int_0^2 \left(\sum_{r=1}^{x} r^3\right) dx$ = ….

(a) $\frac{64}{15}$ (b) $\frac{63}{15}$ (c) $\frac{65}{15}$ (d) $\frac{64}{5}$

Space for Rough Work

42. $\int_{-1}^{1} \cos^{-1} x \, dx = \ldots.$

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{3}$ (c) π (d) $\frac{\pi}{4}$

43. $\int_{1}^{2} \frac{1}{x(x + x^2)} \, dx = \ldots.$

(a) $\frac{1}{2}\log\left(\frac{5}{8}\right)$ (b) $\log\left(\frac{8}{5}\right)$ (c) $\frac{1}{2}\log\left(\frac{8}{5}\right)$ (d) 0

44. $\int_{1}^{\pi/2} [\sin(\log x) + \cos(\log x)] \, dx = \ldots.$

(a) $\frac{\pi}{2}\sin\left(\log\frac{\pi}{2}\right)$ (b) $\pi \sin(\log \pi)$ (c) π (d) 1

45. If $a > 0$ and $\int_{0}^{a} \frac{1}{2 + 8x^2} \, dx = \frac{\pi}{16}$, then value of $a = \ldots.$

(a) 1 (b) $\frac{1}{2}$ (c) 2 (d) 3

Space for Rough Work