



PHOTON CLASSES

LIGHTING UP THE FUTURE

IIT-JEE & NEET COACHING

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GRAND TEST-3

JEE-MAIN

IMPORTANT INSTRUCTIONS:

- There are three parts in the question paper A, B, C consisting of Maths, Physics and Chemistry having 30 questions in each part of equal weightage. Each question is allotted 4 (four) marks for each correct response.
- Candidates will be awarded marks as stated above in instruction for correct response of each question. 1/4 (one fourth) marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
- There is only one correct response for each question. Filling up more than one response in each question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instruction

Mathematics : **Total Syllabus**
Physics : **Total Syllabus**
Chemistry : **Total Syllabus**

MATHEMATICS

01. If $b_1, b_2, b_3 (b_1 > 0)$ are three successive terms of a G.P with common ratio 'r', the value of 'r' for which the inequality $b_3 > 4b_2 - 3b_1$ holds is given by

- 1) $r > 3$ 2) $0 < r < 2$ 3) $r < 0$ 4) $r < 3$

02. Let p be the statement, "Mr. A passed the examination.", q be the statement, "Mr. A is sad." and r be the statement, "It is not true that Mr. A passed therefore he is sad."

Statement-1 : $r \equiv p \Rightarrow q$

Statement-2 : The logical equivalent of $p \vee q$ is : $q \Rightarrow p$

- 1) Statement-1 is false, Statement-2 is true
 2) Statement-1 is true, Statement-2 is true, Statement-2 correct explanation for Statement-1
 3) Statement-1 is true, Statement-2 is true, Statement-2 not correct explanation for Statement-1
 4) Statement-1 is true, Statement-2 is false
03. Rolle's theorem holds for the function $x^3 + bx^2 + cx$, $1 \leq x \leq 2$ at the point $\frac{4}{3}$, then the value of $b+c$ is
 1) 1 2) 2 3) 3 4) 4
04. The value of $\sqrt{3} \cot 20^\circ - 4 \cos 20^\circ$ is
 1) 1 2) -1 3) 0 4) 2
05. Equation of the normal to the curve $y = (1+x)^y + \sin^{-1}(\sin^2 x)$ at $x = 0$ is $x + y = k$ then $k =$
 1) 1 2) 2 3) 3 4) 4
06. $\lim_{n \rightarrow \infty} \left[\tan q + \frac{1}{2} \tan \frac{q}{2} + \dots + \frac{1}{2^n} \tan \frac{q}{2^n} \right] =$
 1) $\frac{1}{q}$ 2) $\frac{1}{q} - 2 \cot 2q$ 3) $2 \cot 2q$ 4) 3
07. A class contains three girls and four boys. Every Saturday five students go on a picnic, a different group being sent each week. During the picnic, each girl in the group is given a doll by the accompanying teacher. After all possible groups of the five have gone once. The total number of dolls the girls have got is
 1) 45 2) 11 3) 21 4) 27
08. The solution of differential equation $(x+y)(dx - dy) = dx + dy$ is

$$1) x + y = ce^{x+y} \quad 2) x - y = ce^{x-y} \quad 3) x + y = ce^{x-y} \quad 4) x - y = ce^{x+y}$$

09. For $y = f(x) = \int_0^x 2|t| dt$, the tangent lines parallel to the bisector of the first quadrant angle are

$$1) y = x \pm \frac{1}{4} \quad 2) y = x \pm \frac{3}{2} \quad 3) y = x \pm \frac{1}{2} \quad 4) y = x \pm \frac{5}{4}$$

10. If determinant $\begin{vmatrix} a & b & aa - b \\ b & c & ba - c \\ 2 & 1 & 0 \end{vmatrix} = 0$ and $a \neq \frac{1}{2}$, then

$$1) a, b, c \text{ are in A.P.} \quad 2) a, b, c \text{ are in G.P.} \\ 3) a, b, c \text{ are in H.P.} \quad 4) a, b, c \text{ are in A.G.P.}$$

11. A variable chord is drawn through the origin to the circle $x^2 + y^2 - 2ax = 0$. Locus of the centre of the circle drawn on this chord as diameter is

$$1) x^2 + y^2 + ay = 0 \quad 2) x^2 + y^2 - ay = 0 \quad 3) x^2 + y^2 - ax = 0 \quad 4) x^2 + y^2 + ax = 0$$

12. If $f(x) = 3x^3 + 2(a - 50)x^2 + 4(54 - a)x + 9$ be injective function and $a \in (a, b)$ then $a + b =$

$$1) 91 \quad 2) 2014 \quad 3) 15 \quad 4) 92$$

13. If two tangents from the point (a, b) to the parabola $y^2 = 4x$ be such that the slope of one tangent is double of the other then

$$1) b = \frac{2}{9}a^2 \quad 2) a = \frac{2}{9}b^2 \quad 3) 2a = 9b^2 \quad 4) a = 2b^2$$

14. A line passing through point A(-5, -4) meet other three lines

$x + 3y + 2 = 0$, $2x + y + 4 = 0$ and $x - y - 5 = 0$ at B, C and D respectively

If $\frac{AB}{AC} + \frac{AC}{AD} = \frac{6}{AD}$, then the equation of line is

- 1) $2x + 3y + 22 = 0$ 2) $5x - 4y + 7 = 0$
 3) $3x - 2y + 3 = 0$ 4) $3x + 2y + 3 = 0$

15. The variance of the first n natural numbers is

- 1) $\frac{1}{12}(n^2 - 1)$ 2) $\frac{1}{6}(n^2 - 1)$ 3) $\frac{1}{6}(n^2 + 1)$ 4) $\frac{1}{12}(n^2 + 1)$

16. The sum of the infinite series $\cot^{-1} 2 + \cot^{-1} 8 + \cot^{-1} 18 + \cot^{-1} 32 + \dots$ is equal to

- 1) p 2) $\frac{p}{2}$ 3) $\frac{p}{4}$ 4) $\frac{p}{3}$

17. $\int \frac{x^2 + 1}{x^4 - x^2 + 1} dx =$

- 1) $\tan^{-1} \frac{1 + x^2}{x} + c$ 2) $\cot^{-1} \frac{1 + x^2}{x} + c$ 3) $\tan^{-1} \frac{x^2 - 1}{x} + c$ 4) $\cot^{-1} \frac{x^2 - 1}{x} + c$

18. If the tangent at the point $(4 \cos f, \frac{16}{\sqrt{11}} \sin f)$ to the ellipse $16x^2 + 11y^2 = 256$ is also a tangent to the circle $x^2 + y^2 - 2x = 15$, then the value of f is

- 1) $\pm \frac{p}{2}$ 2) $\pm \frac{p}{4}$ 3) $\pm \frac{p}{3}$ 4) $\pm \frac{p}{6}$

19. Two vertices of a triangle are (33, 26) and (-2, 5). If the orthocentre is (1, 2) then the circum centre of the triangle is _____

- 1) (4, -3) 2) $(\frac{35}{3}, \frac{28}{3})$ 3) (17, 13) 4) (1, 2)

20. Number of points of non differentiability of $f(x) = \min \{2, x^2, x^3\}$ is

- 1) 1 2) 0 3) 2 4) 3

21. Following equations $3x - 2y + z = 0$, $lx - 14y + 15z = 0$, $x + 2y - 3z = 0$ have solutions other than $x = y = z = 0$, then $l =$
- 1) 1 2) 2 3) 3 4) 5
22. Let $f(x) = x + \cos x + 2$ and $g(x)$ be the inverse function of $f(x)$ then $g'(3) =$
- 1) 1 2) 2 3) 3 4) 0
23. The shortest distance (S.D.) between lines $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$ and $\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$ is
- 1) $3\sqrt{30}$ 2) $\sqrt{30}$ 3) $2\sqrt{30}$ 4) $4\sqrt{30}$
24. The relation "congruence modulo m " is
- 1) reflexive only 2) transitive only
- 3) symmetric only 4) an equivalence
25. Let \bar{a} and \bar{b} be two unit vectors and a be the angle between them, then $\frac{1}{a} + \frac{1}{b}$ is a unit vector if
- 1) $a = \frac{p}{4}$ 2) $a = \frac{p}{3}$ 3) $a = \frac{2p}{3}$ 4) $a = \frac{p}{2}$
26. A is one of the six race horses which is to be ridden by one of the two jockeys B or C. It is 2:1 that B rides A in this case all the horses are equally likely to win but if C rides then A's chances of winning are trebled. The odds against his winning are
- 1) 13:5 2) 5:13 3) 8:5 4) 5:8

27. Let z be a complex number satisfying $|z - 5i| \leq 1$ such that $\text{amp}(z)$ is minimum. Then z is equal to

- 1) $\frac{2\sqrt{6}}{5} + \frac{24i}{5}$ 2) $\frac{24}{5} + \frac{2\sqrt{6}i}{5}$ 3) $\frac{6\sqrt{2}}{5} + \frac{24i}{5}$ 4) i

28. The set of values of 'a' for which '1' lies between the roots of equation

$$x^2 - ax - a + 3 = 0 \text{ is}$$

- 1) $(-\infty, -6)$ 2) $(-\infty, -6]$ 3) $(-\infty, -6) \cup (2, \infty)$ 4) $(2, \infty)$

29. At constant distance p from the origin a variable plane cuts axes at A, B, C, respectively. Through A, B, C the planes are drawn parallel to co-ordinate planes. The locus of intersection of these planes is

- 1) $x^2 + y^2 + z^2 = p$ 2) $x^2 + y^2 + z^2 = p^2$
 3) $x^2 + y^2 + z^2 = p^{-1}$ 4) $x^2 + y^2 + z^2 = p^{-2}$

30. If p is a constant and $n > 1$, an integer then $\sum_{r=0}^n (-1)^r (p-r)^n C_r = \underline{\hspace{2cm}}$

- 1) 0 2) n 3) $-p$ 4) $n-p$

PHYSICS

31. A heavy weight is suspended from a spring. A person raises the weight till the spring becomes slack. The work done by him is W . The energy stored in the stretched spring was E . The gain in gravitational potential energy is
- 1) W 2) E 3) $W + E$ 4) $W - E$
32. A motor car is fitted with a convex driving mirror of focal length 20 cm. A second motor car 2.01 m broad and 1.005m high is 40 m behind the first car. The size of the image of the second car seen in the mirror of the first, is.
- 1) Breadth = 8cm, height = 4 cm 2) Breadth = 1cm, height = 0.5 cm
3) Breadth = 12cm, height = 6 cm 4) Breadth = 14cm, height = 7 cm
33. A uniform thin bar of mass $6m$ and length $12L$ is bent to make a regular hexagon. Its moment of inertia about an axis passing through the centre of mass and perpendicular to the plane of the hexagon is
- 1) $20mL^2$ 2) $6mL^2$ 3) $\frac{12}{5}mL^2$ 4) $30mL^2$
34. A beam of natural light falls on a system of 5 polaroids, which are arranged in succession such that the pass axis of each polaroid is turned through 60° with respect to the preceding one. The fraction of the incident light intensity that passes through the system is
- 1) $\frac{1}{64}$ 2) $\frac{1}{512}$ 3) $\frac{1}{256}$ 4) $\frac{1}{128}$
35. A cubical block of mass M and edge ' a ' slides down a rough inclined plane of inclination θ with a uniform velocity. The torque of the normal force on the block about its centre has a magnitude.
- 1) zero 2) Mga 3) $Mga \sin \theta$ 4) $\frac{Mga \sin \theta}{2}$

36. A prism of refractive index n and angle A is placed in minimum deviation position. If the angle of minimum deviation is equal to the angle A , then the value of A is
- 1) $\sin^{-1}\left(\frac{n}{2}\right)$ 2) $\sin^{-1}\left(\sqrt{\frac{n}{2}}\right)$ 3) $2\sin^{-1}\left[\sqrt{\frac{1-n^2}{2}}\right]$ 4) $2\sin^{-1}\left[\sqrt{\frac{4-n^2}{4}}\right]$
37. The largest and the shortest distances of the earth from the sun are r_1 and r_2 . Its distance from the sun when it is at the perpendicular to the major axis of the orbit drawn from the sun, is
- 1) $\frac{r_1+r_2}{4}$ 2) $\frac{r_1r_2}{r_1+r_2}$ 3) $\frac{2r_1r_2}{r_1+r_2}$ 4) $\frac{r_1+r_2}{3}$
38. A variable frequency a.c source is connected to a capacitor. How will the displacement current change with decrease in frequency?
- 1) Increase 2) decrease 3) remains same 4) becomes zero
39. A light rod of length 200 cm is suspended from the ceiling horizontally by means of two vertical wires of equal length tied to its ends. One of the wires is made of steel and is of cross-section 0.1 cm^2 and the other of brass of cross-section 0.2 cm^2 . Along the rod at which distance a weight may be hung to produce equal stresses in both the wires ?
- 1) $\frac{4}{3}m$ from steel wire 2) $\frac{4}{3}m$ from brass wire
- 3) 1 m from steel wire 4) $\frac{1}{4}m$ from brass wire
40. An observer moves towards a stationary source of sound with a speed $(1/5)$ th of the speed of sound. The wavelength and frequency of the source emitted are λ and f

respectively. The apparent frequency and wavelength recorded by the observer are respectively

- 1) $1.2f$ and l 2) f and $1.2l$ 3) $0.8f$ and $0.8l$ 4) $1.2f$ and $1.2l$

41. Rain water is falling vertically downwards with a velocity v . When the velocity of the wind is zero, water is collected in a cylindrical vessel at a rate R . When the wind starts blowing horizontally at a speed u , the rate of collection of water in the same vessel is

- 1) $\sqrt{u^2 + v^2}R$ 2) $\frac{v}{u}R$ 3) $\frac{uR}{v}$ 4) R

42. A solid sphere of radius R_1 and volume charge density $\rho = \frac{\rho_o}{r}$ is enclosed by a hollow sphere of radius R_2 with negative surface charge density σ , such that the total charge in the system is zero. ρ_o is a positive constant and r is the distance from the centre of the sphere. The ratio $\frac{R_2}{R_1}$ is

- 1) $\frac{\sigma}{\rho_o}$ 2) $\sqrt{\sigma / \rho_o}$ 3) $\sqrt{\rho_o / (2\sigma)}$ 4) $\frac{\rho_o}{\sigma}$

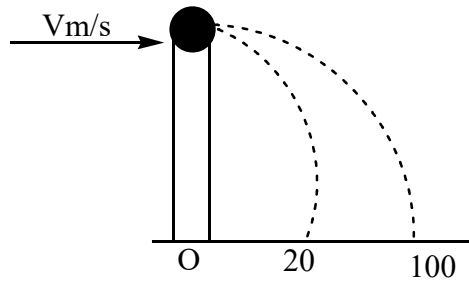
43. A projectile is fired from level ground at an angle θ above the horizontal. The elevation angle ϕ of the highest point as seen from the launch point is related to θ by the relation.

- 1) $\tan \phi = \frac{1}{4} \tan \theta$ 2) $\tan \phi = \tan \theta$ 3) $\tan \phi = \frac{1}{2} \tan \theta$ 4) $\tan \phi = 2 \tan \theta$

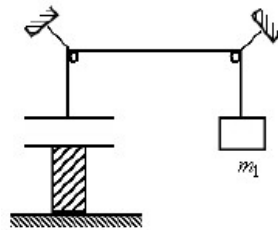
44. Two thin wires rings each having a radius R are placed at a distance d apart with their axes coinciding. The charges on the two rings are $+q$ and $-q$. The potential difference between the centres of the rings is

- 1) $QR / 4\pi\epsilon_0 d^2$ 2) $\frac{Q}{2\pi\epsilon_0} \left[\frac{1}{R} - \frac{1}{\sqrt{R^2 + d^2}} \right]$
- 3) zero 4) $\frac{Q}{4\pi\epsilon_0} \left[\frac{1}{R} - \frac{1}{\sqrt{R^2 + d^2}} \right]$

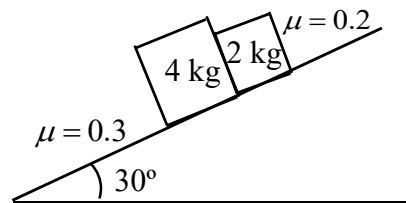
45. A ball of mass 0.2 kg rests on a vertical post of height 5 m. A bullet of mass 0.01 kg, travelling with a velocity v m/s in a horizontal direction, hits the centre of the ball. After the collision, the ball and bullet travel independently. The ball hits the ground at a distance of 20 m and the bullet at a distance of 100 m from the foot of the post. The initial velocity v of the bullet is



- 1) 250 m/s 2) $250\sqrt{2}$ m/s 3) 400 m/s 4) 500 m/s
46. In the given figure a capacitor of plate area A is charged upto charge q . The mass of each plate is m_2 . The lower plate is rigidly fixed. The value of m_1 if the system remains in equilibrium is



- 1) $m_2 + \frac{q^2}{\epsilon_0 Ag}$ 2) m_2 3) $\frac{q^2}{2\epsilon_0 Ag} + m_2$ 4) $2m_2$
47. Two blocks, 4 kg and 2 kg are sliding down an incline plane as shown in the figure. The acceleration of 2 kg block is

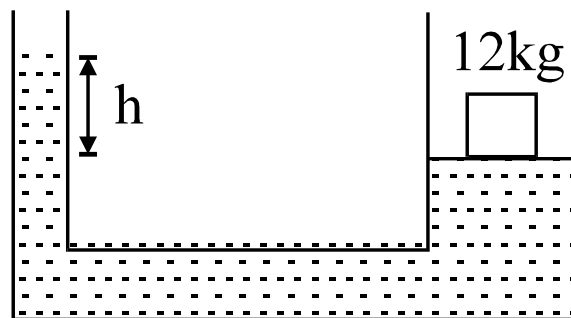


- 1) 1.66 m/s^2 2) 2.66 m/s^2 3) 3.66 m/s^2 4) 4.66 m/s^2

48. If ϕ_1 and ϕ_2 be the angles of dip observed in two vertical planes at right angles to each other and ϕ be true angle of dip, then

- 1) $\cos^2 \phi = \cos^2 \phi_1 + \cos^2 \phi_2$ 2) $\sec^2 \phi = \sec^2 \phi_1 + \sec^2 \phi_2$
 3) $\tan^2 \phi = \tan^2 \phi_1 + \tan^2 \phi_2$ 4) $\cot^2 \phi = \cot^2 \phi_1 + \cot^2 \phi_2$

49. The area of cross-section of the wider tube shown in figure is 800 cm^2 . If a mass of 12 kg is placed on the massless piston, the difference in heights h in the level of water in the two tubes is:



- 1) 10 cm 2) 6 cm 3) 15 cm 4) 2 cm

50. If resistivity of the material of a conductor uniform area of cross-section varies along its length as $\rho = \rho_0 [1 + \alpha x]$. Then the resistance of the conductor if its length is 'L' and area of cross-section is 'A'

1) $\frac{\rho_0}{A} \left[L + \frac{1}{2} \alpha L^2 \right]$

2) $\frac{\rho_0}{A} \left[L - \frac{1}{2} \alpha L^2 \right]$

3) $\frac{\rho_0}{A} \left[L + \frac{1}{2} \alpha L \right]$

4) $\frac{\rho_0}{A} \left[L + \alpha L^2 \right]$

51. Water flows steadily through a horizontal pipe of variable cross-section. If the pressure of water is P at a point where flow speed is v , the pressure at another point where the flow speed is $2v$, is (Take density of water as ρ)

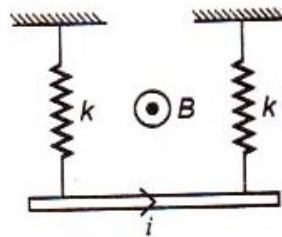
1) $P - \frac{3\rho v^2}{2}$

2) $P - \frac{\rho v^2}{2}$

3) $P - \frac{3\rho v^2}{4}$

4) $P - \rho v^2$

52. A current carrying conductor of mass 50g, length 0.5m carrying a current 1 amp, hangs by two identical springs each of stiffness constant $k = 50\text{N/m}$. For an outward magnetic field $B = 1\text{ T}$, find extension in the springs. ($g = 10\text{m/sec}^2$)



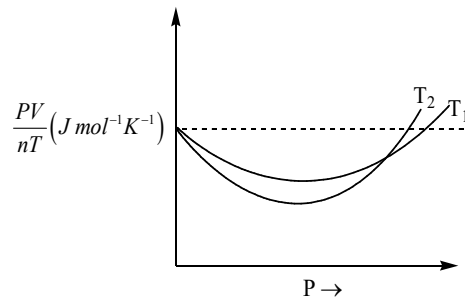
1) 1 cm

2) 0.5 cm

3) 2 cm

4) 5 cm

53. The figure given below shows the plot of $\frac{PV}{nT}$ versus P for oxygen gas at two different temperatures. Read the following statements concerning the curves given below



i) The dotted line corresponds to the 'ideal' gas behaviour

ii) $T_1 > T_2$

iii) The value of $\frac{PV}{nT}$ at the point, where the curves meet on the y-axis is the same for all gases.

Which of the above statement is true ?

1) i only 2) i and ii 3) all of these 4) none of these

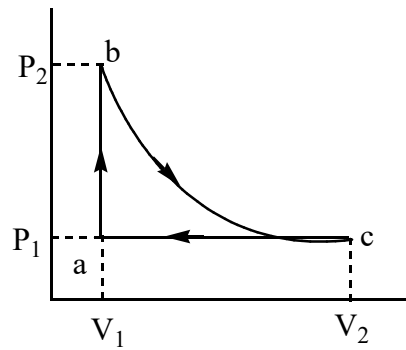
54. When a circular coil of radius 1 m and 100 turns is rotated in a horizontal uniform magnetic field, the peak value of emf induced is 100 V. The coil is unwound and then rewound into a circular coil of radius 2 m. If it is rotated, now, with the same speed under similar conditions, the new peak value of emf developed is

1) 50 V 2) 25 V 3) 200 V 4) 150 V

55. In solar radiation, the intensity of radiation is maximum around the wavelength λ . If R is the radius of the sun and c is the velocity of light, the mass lost by the sun per second is proportional to

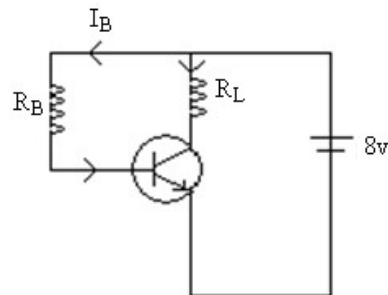
1) $\frac{R^2}{\lambda^4 c^2}$ 2) $\frac{R^2}{\lambda^2 c^2}$ 3) $\frac{R^3}{\lambda^4 c^3}$ 4) $\frac{R^3}{\lambda^4 c^2}$

56. The electron in a hydrogen atom makes a transition from an excited state to the ground state. Which of the following statements is true ?
- 1) Its kinetic energy increases and its potential and total energies decrease.
 - 2) Its kinetic energy decreases, potential energy increases and its total energy remains the same.
 - 3) Its kinetic and total energies decrease and its potential energy increases.
 - 4) Its kinetic, potential and total energies decrease.
57. A refrigerator with coefficient of performance $1/3$ releases 200 J of heat to a hot reservoir, then the work done on the working substance is
- 1) $\frac{100}{3}$ Joule 2) 100 Joule 3) $\frac{200}{3}$ Joule 4) 150 Joule
58. A freshly prepared radioactive source of half life 2 hours emits radiation of intensity which is 64 times the permissible safe level. The minimum time after which it would be possible to work safely with the source is
- 1) 6 hours 2) 12 hours 3) 24 hours 4) 128 hours
59. Carbon monoxide is carried around a closed cycle abc, in which bc is an isothermal process, as shown in the figure. The gas absorbs 7000 J of heat, as its temperature increased from 300K to 1000K in going from a to b. The quantity of heat ejected by the gas during the process ca is



- 1) 4200 J 2) 5000 J 3) 9000 J 4) 9800 J

60. A n-p-n transistor operates in a common emitter mode as shown below. Given that $I_C = 4 \text{ mA}$, $V_{CE} = 4 \text{ V}$, $V_{BE} = 0.6 \text{ V}$. Then R_L is



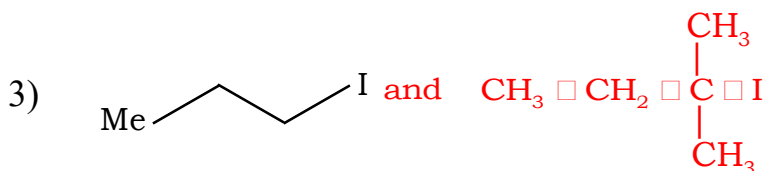
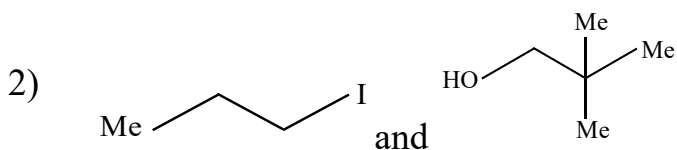
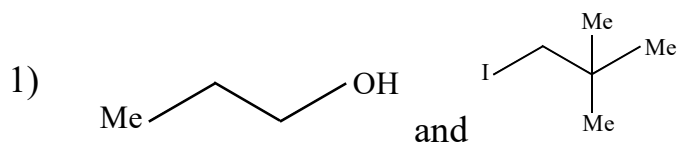
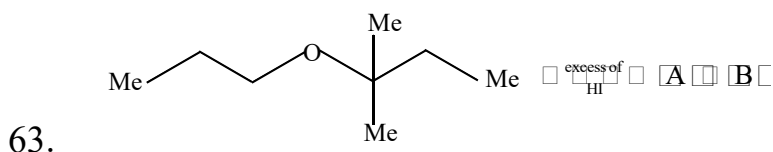
- 1) $1 \text{ K}\Omega$ 2) $18.5 \text{ K}\Omega$ 3) $185 \text{ K}\Omega$ 4) $1.85 \text{ K}\Omega$

CHEMISTRY

61. N_2 and O_2 are converted to mono cations N_2^+ and O_2^+ respectively, which is wrong statement ?

- 1) In , N_2^+ the N – N bond weakens
 2) In , O_2^+ the O – O bond order increases
 3) In , O_2^+ the paramagnetism decreases
 4) N_2^+ becomes diamagnetic
62. The freezing point of a solution containing 0.2 gr of acetic acid in 20 grams of benzene is lowered by 0.45°C . Calculate the degree of dimerisation of acetic acid in benzene. K_f for benzene is $5.12 \text{ K mol}^{-1} \text{ Kg}$.

- 1) 0.527 2) 0.80 3) 0.945 4) None



- 4) All

64. The magnetic moments (spin only) of complexes given below are in the correct order.



- 1) $\text{I} > \text{II} > \text{III} > \text{IV}$ 2) $\text{I} < \text{II} < \text{III} < \text{IV}$

3) $IV = II > I = III$

4) $IV < II < I < III$

65. Equivalent conductivity of $BaCl_2$, H_2SO_4 and HCl are x_1 , x_2 and x_3 $S\ cm^2\ equ^{-1}$ at infinite dilution. If conductivity of saturated $BaSO_4$ solution is x $S\ cm^{-1}$, then K_{sp} of $BaSO_4$ is

$$1) \frac{500x}{(x_1 + x_2 - 2x_3)} \quad 2) \frac{10^6 x^2}{(x_1 + x_2 - 2x_3)^3} \quad 3) \frac{2.5 \times 10^5 x^2}{(x_1 + x_2 - x_3)^2} \quad 4) \frac{0.25x^2}{(x_1 + x_2 - x_3)^2}$$

66. On treatment of acetone with dilute $Ba(OH)_2$, the product formed is

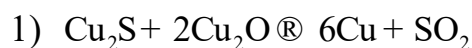
1) 4-hydroxy 2-pentanone

2) Phorone

3) Propionaldehyde

4) 4-hydroxy-4-methyl-2-pentanone

67. In the extraction of copper, metal is formed in the Bessemer converter due to the reaction



68. To avoid the precipitation of hydroxides of Ni^{2+} , Co^{2+} , Zn^{2+} and Mn^{2+} along with those of Fe^{3+} , Al^{3+} , Cr^{3+} the third group solution (in qualitative analysis) should be

1) Heated with few drops of concentrated HNO_3

2) Treated with excess of NH_4Cl

3) Concentrated

4) Made alkaline

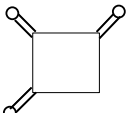
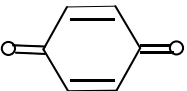

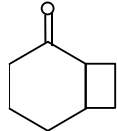
69. K_p has the value of $10^{-6}\ atm^3$ and $10^{-4}\ atm^3$ at 298 K and 323 K respectively for the reaction, $CuSO_4 \cdot 3H_2O_{(s)} \rightleftharpoons CuSO_4_{(s)} + 3H_2O_{(g)}$. $\Delta_r H^\circ$ for the reaction is

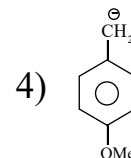
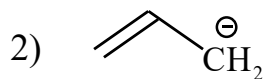
1) 7.7 KJ/mol

2) -147.41 KJ/mol

3) 147.41 KJ/mol

4) -32.5 KJ/mole

70. $\text{PhMe} \xrightarrow[\text{D, H}_3\text{O}^+]{\text{KMnO}_4/\text{OH}^-}$ (A) $\xrightarrow[\text{PCl}_5]{\text{SOCl}_2(\text{or})}$ (B) $\xrightarrow[\text{H}_2\text{O}]{\text{BhCOONa}}$ (C) (D) Compound (D) is
 1) PhCOCl 2) PhCONH_2 3) PhCOOH 4) $(\text{PhCO})_2\text{O}$
71. A mixture of NaOH and Na_2CO_3 required 25 ml of 0.1M HCl using phenolphthalein as the indicator. However the same amount of the mixture required 30 ml of 0.1 M HCl when methyl orange was used as indicator. The molar ratio of NaOH and Na_2CO_3 in the mixture was
 1) 2 : 1 2) 1 : 2 3) 4 : 1 4) 1 : 4
72. An electron in a hydrogen atom in its ground state absorbs 1.5 times as much energy as the minimum required for it to escape from the atom. What is the velocity of emitted electron ?
 1) $1.54 \times 10^6 \text{ m/s}$ 2) $1.54 \times 10^8 \text{ m/s}$ 3) $1.54 \times 10^3 \text{ m/s}$ 4) $1.54 \times 10^4 \text{ m/s}$
73. Tautomerism is not exhibited by
 1)  2)  3)  4) 
74. Under identical conditions of pressure and temperature, 4 litres of gaseous mixture (H_2 and CH_4) effuses through a hole in 5 minutes whereas 4 litres of a gas 'X' of molecular mass 36 takes to 10 minutes to effuse through the same hole. The mole ratio of $\text{H}_2:\text{CH}_4$ in the mixture is
 1) 1 : 2 2) 2 : 1 3) 2 : 3 4) 1 : 1
75. CsBr has bcc type structure with edge length 4.3 pm. The shortest inter ionic distance in between Cs^+ and Br^- is
 1) 3.72 pm 2) 1.86 pm 3) 7.44 pm 4) 4.3 pm
76. Which of the following is least stable

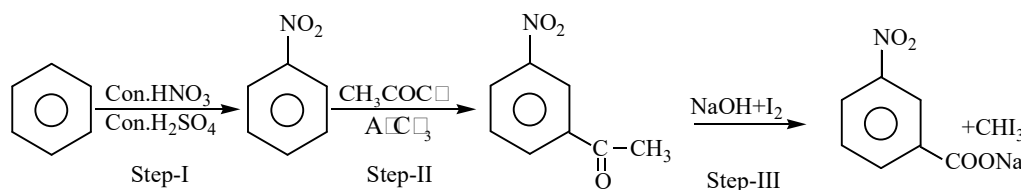


77. On adding AgNO_3 solution into KI solution a negatively charged colloidal sol is obtained where they are in



4) None

78. In the following reactions, which of the following step is wrong?



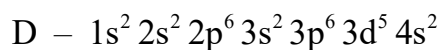
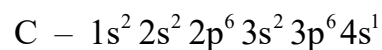
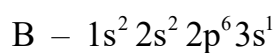
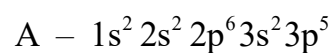
1) Step I

2) Step II

3) Step III

4) Step I and II

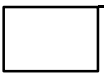
79. The ground state electronic configuration of the elements A, B, C, D and E (symbols have no chemical significance) are as follows.

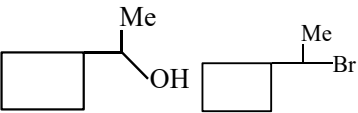
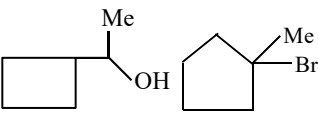
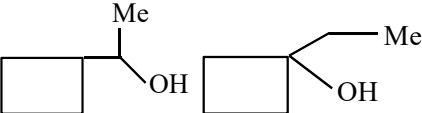
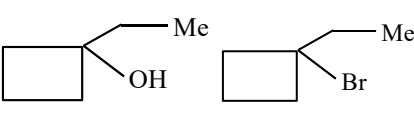


Determine which sequence of elements satisfy the following statements ?

- Element forms a carbonate which is not decomposed by heating.
- Element is most likely to form coloured ionic compounds.
- Element has largest atomic radius.
- Element forms acidic oxide.

- 1) B, C, E, A 2) B, D, E, C 3) B, C, E, D 4) B, D, C, A

80.  MgBr $\xrightarrow[\text{H}_3\text{O}^+]{\text{H}_2\text{C}_3\text{O}_2}$ (A) $\xrightarrow{\text{HBr}}$ (B). The compounds (A) and (B) are

- 1)  2) 
- 3)  4) 

81. Metal M + air $\xrightarrow{\text{D}}$ A $\xrightarrow[\text{H}_2\text{O}]{\text{H}_2\text{O}_2}$ B $\xrightarrow[\text{HCl}_3]{\text{HCl}_3}$ white fumes. Metal 'M' can be

- 1) Li, Mg (or) Al 2) Li, Al (or) K
3) Na, K (or) Mg 4) Li, Na (or) K

82. The units of rate of reaction and rate constant are same for a

- 1) Zero order reaction 2) First order reaction
3) Second order reaction 4) Third order reaction

83. A compound (X) has the molecular formula $\text{C}_7\text{H}_7\text{NO}$ on treatment with Br_2 and KOH , (X) gives an amine (Y), (Y) gives carbylamine test. (Y) upon diazotization and coupling with phenol gives azodye (Z). then 'X' is

- 1) PhCONH_2 2) PhCONHCOCH_3
3) PhNH_2 4) PhCOONH_4

84. $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O} \xrightarrow[\text{H}_2\text{O}]{\text{Heat}}$ X + NaBO_2 + H_2O

X + $\text{Cr}_2\text{O}_3 \xrightarrow{\text{B}}$ Y (green coloured)

X and Y are

- 1) Na_3BO_3 and $\text{Cr}(\text{BO}_2)_3$ 2) $\text{Na}_2\text{B}_4\text{O}_4$ and $\text{Cr}(\text{BO}_2)_3$
3) B_2O_3 and $\text{Cr}(\text{BO}_2)_3$ 4) B_2O_3 and CrBO_3

85. What is the molar solubility of $\text{Fe}(\text{OH})_2$ ($K_{\text{sp}} = 8 \times 10^{-16}$) at $\text{pH} = 13.0$

- 1) 8×10^{-18} 2) 8×10^{-15} 3) 8×10^{-17} 4) 8×10^{-14}

86. The monomers of melamine polymer are

- 1) 2, 4, 6 - triamino -1, 3, 5, -triazine and HCHO
2) 2, 4, 6 - diamino 1, 3, 5 - triazine and $\text{CH}_3 - \text{CHO}$
3) 2, 4 - diamino 1, 3, 5 - triazine and HCHO
4) 2, 4 - diamino 1, 3, 5 - triazine and $\text{CH}_3 - \text{CHO}$

87. Which of the following species is / are formed when concentrated HNO_3 is added to concentrated sulphuric acid.

- I) NO_3^- II) NO_2^+ III) NO_2^- IV) HSO_4^-

- 1) I, II 2) II, IV 3) III, IV 4) II, III

88. Suppose that a reaction has $\Delta H = -40 \text{ kJ}$ and $\Delta S = -50 \text{ J/K}$. At what temperature range will it change from spontaneous to non spontaneous?

- 1) 0.8 K to 1 K 2) 799 K to 800 K
3) 800 K to 801 K 4) 799 K to 801 K

89. Which statements are correct about lactose

- 1) $(\text{C}_1 - \text{O})$ of glucose is linked with $(\text{C}_4 - \text{OH})$ of galactose

- 2) $(C_1 - b)(OH)$ of galactose linked with $(C_4 - OH)$ of glucose
- 3) It is hydrolysed by both by amylase and lactase
- 4) It is a non reducing sugar.
90. The transition metals exhibit higher enthalpies of atomisation due to
- 1) Their ability to show variable oxidation states
 - 2) The presence of incompletely filled d – sub shell
 - 3) Their ability to exist in the solid state with electron pairs
 - 4) Strong interatomic interactions arise because of having large number of unpaired electrons in their atoms

JEE-Main_GT-3
KEY SHEET**MATHS:**

1) 1	2) 1	3) 3	4) 1	5) 1	6) 2	7) 1	8) 3	9) 1	10)2
11)3	12)1	13)2	14)1	15)1	16)3	17)3	18)3	19)3	20)3
21)4	22)1	23)1	24)4	25)3	26)1	27)1	28)4	29)4	30)1

PHYSICS:

31) 3	32)2	33)1	34)2	35)4	36)4	37)3	38)2	39)1	40)1
41) 4	42)3	43)3	44)2	45)4	46)3	47)2	48)4	49)3	50)1
51) 1	52)1	53)3	54)3	55)1	56)1	57)4	58)2	59)4	60)1

CHEMISTRY:

61)4	62) 3	63) 3	64) 3	65) 3	66) 4	67) 1	68) 2	69) 3	70) 4
71)3	72) 1	73) 2	74) 4	75) 1	76) 1	77) 2	78) 2	79) 4	80) 2
81)1	82) 1	83) 1	84) 3	85) 4	86) 1	87) 2	88) 4	89) 2	90) 4