

AIPMT

PREVIOUS YEAR

Solved Question Papers 1

2005



Physics, Chemistry
& Biology

AIPMT

PAPER 1

2005

CBSE AIPMT - 2005

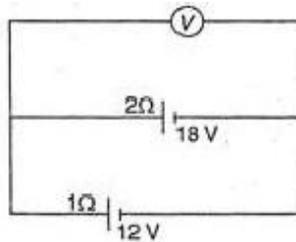
Prelims Question Paper

Physics

1. A coil in the shape of an equilateral triangle of side l is suspended between the pole pieces of a permanent magnet such that it is in plane of the coil. If due to a current i in the triangle a torque τ acts on it, the side l of the triangle is :

- 1) $(2/\sqrt{3}) (\tau/Bi)^{1/2}$
- 2) $(2/\sqrt{3}) (\tau/Bi)$
- 3) $2(\tau / \sqrt{3} Bi)^{1/2}$
- 4) $(1/\sqrt{3}) (\tau/Bi)$

2. Two batteries, one of emf 18 V and internal resistance 2Ω and the other of emf 12 V and internal resistance 1Ω , are connected as shown. The voltmeter V will record a reading of :



- 1) 7 V
 - 2) 21 V
 - 3) 14 V
 - 4) 28 V
3. A point source emits sound equally in all directions in a non-absorbing medium. Two points P and Q are at distance of 2m and 3m respectively from the source. The ratio of the intensities of the waves at P and Q is :
- 1) 9 : 4
 - 2) 2 : 9
 - 3) 9 : 2
 - 4) 4 : 9
4. A bomb of mass 30 kg at rest explodes into two pieces of masses 18 kg and 12 kg. The velocity of 18 kg mass is 6 ms^{-1} . The kinetic energy of the other mass is :
- 1) 243 J
 - 2) 486 J
 - 3) 564 J
 - 4) 388 J

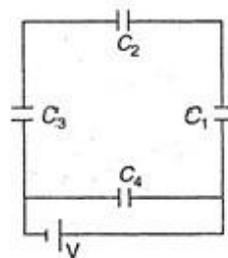
5. A drum of radius R and mass M , rolls down without slipping along an inclined plane of angle θ . The frictional force :

- 1) converts translational energy to rotational energy
- 2) dissipates energy as heat
- 3) decreases the rotational motion
- 4) decreases the rotational and translational motion

6. Imagine a new planet having the same density as that of earth but it is 3 times bigger than the earth in size. If the acceleration due to gravity on the surface of earth is g and that on the surface of the new planet is g' , then :

- 1) $g' = 3g$
- 2) $g' = g/9$
- 3) $g' = 9g$
- 4) $g' = g/3$

7. A network of four capacitors of capacity equal to $C_1 = C$, $C_2 = 2C$, $C_3 = 3C$ and $C_4 = 4C$ are connected to a battery as shown in the figure. The ratio of the charges on C_2 and C_4 is :



- 1) $22/3$
- 2) $3/22$
- 3) $7/22$
- 4) $22/7$

8. Which of the following circular rods, (given radius r and length l) each made of the same material and whose ends are maintained at the same temperature will conduct most heat ?

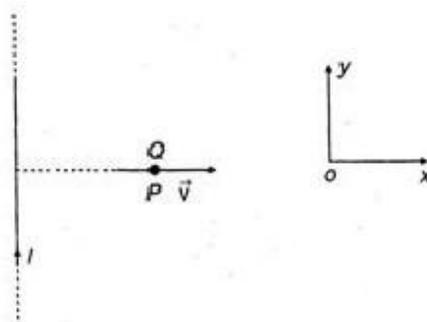
- 1) $r = 2r_0$; $l = 2l_0$
- 2) $r = 2r_0$; $l = l_0$
- 3) $r = r_0$; $l = l_0$
- 4) $r = r_0$; $l = 2l_0$

9. In the reaction ${}^2_1\text{H} + {}^3_1\text{H} \rightarrow {}^4_2\text{He} + {}^1_0\text{n}$, if the binding energies of ${}^2_1\text{H}$, ${}^3_1\text{H}$ and ${}^4_2\text{He}$ are respectively a , b and c (in MeV), then the energy (in MeV) released in this reaction is :

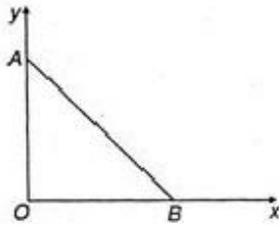
- 1) $c + a - b$
- 2) $c - a - b$
- 3) $a + b + c$

4) $a + b - c$

10. A very long straight wire carries a current I . At the instant when a charge $+Q$ at point P has velocity \vec{v} as shown, the force on the charge is :

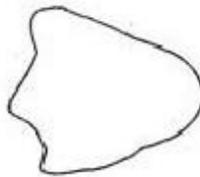


- 1) opposite to ox
 2) along ox
 3) opposite to oy
 4) along oy
11. Energy levels A, B and C of a certain atom correspond to increasing values of energy i.e., $E_A < E_B < E_C$. If λ_1 , λ_2 and λ_3 are wavelengths of radiations corresponding to transitions C to B, B to A and C to A respectively, which of the following relations is correct ?
- 1) $\lambda_3 = \lambda_1 + \lambda_2$
 2) $\lambda_3 = (\lambda_1 \lambda_2) / (\lambda_1 + \lambda_2)$
 3) $\lambda_1 + \lambda_2 + \lambda_3 = 0$
 4) $\lambda_{23} = \lambda_{21} + \lambda_{12}$
12. The work functions for metals A, B and C are respectively 1.92 eV, 2.0 eV and 5 eV. According to Einstein's equation, the metals which will emit photoelectrons for a radiation of wavelength 4100 Å is/are :
- 1) none
 2) A only
 3) A and B only
 4) all the three metals
13. The nuclei of which one of the following pairs of nuclei are isotones ?
- 1) $^{34}\text{Se}^{74}$, $^{31}\text{Ga}^{71}$
 2) $^{42}\text{Mo}^{92}$, $^{40}\text{Zr}^{92}$
 3) $^{38}\text{Sr}^{84}$, $^{38}\text{Sr}^{86}$
 4) $^{20}\text{Ca}^{40}$, $^{16}\text{S}^{32}$
14. As per this diagram a point charge $+q$ is placed at the origin O. Work done in taking another point charge $-Q$ from the point A [co-ordinates (0, a)] to another point B [co-ordinates (a, 0)] along the straight path AB is :



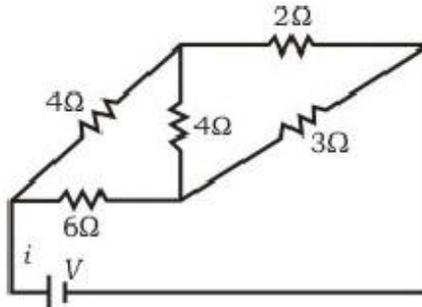
- 1) zero
- 2) $((-qQ/4\pi\epsilon_0)(1/a^2)) \sqrt{2}a$
- 3) $((qQ/4\pi\epsilon_0)(1/a^2)) \cdot a\sqrt{2}$
- 4) $((qQ/4\pi\epsilon_0)(1/a^2)) \sqrt{2}a$

15. As a result of change in the magnetic flux linked to the closed loop shown in the figure, an emf V volt is induced in the loop. The work done (joules) in taking a charge Q coulomb once along the loop is :



- 1) QV
- 2) zero
- 3) $2QV$
- 4) $QV/2$

16. For the network shown in the figure, the value of the current i is :



- 1) $9V/7$
- 2) $5V/18$
- 3) $9V/7$
- 4) $18V/5$

17. The circular motion of a particle with constant speed is :

- 1) simple harmonic but not periodic
- 2) periodic and simple harmonic
- 3) neither periodic nor simple harmonic
- 4) periodic but not simple harmonic

18. A particle executing simple harmonic motion of amplitude 5 cm has maximum speed of 31.4 cm/s. The frequency of its oscillation is :

- 1) 2 Hz
- 2) 1.5 Hz

3) 0.5 Hz

4) 1 Hz

19. The ratio of the dimensions of Planck's constant and that of the moment of inertia is the dimension of :

1) frequency

2) velocity

3) angular momentum

4) time

20. Which of the following processes is reversible ?

1) Transfer of heat by radiation

2) Electrical heating of a nichrome wire

3) Transfer of heat by conduction

4) Isothermal compression

21. The temperature of inversion of a thermocouple is 620°C and the neutral temperature is 300°C . what is the temperature of cold junction ?

1) 20°C

2) 120°C

3) -20°C

4) -120°C

22. A photosensitive metallic surface has work function, $h\nu_0$. If photons of energy $2h\nu_0$ fall on this surface, the electrons come out with a maximum velocity of $4 \times 10^6 \text{ m/s}$. When the photon energy is increased to $5h\nu_0$, then maximum velocity of photoelectrons will be :

1) $16 \times 10^6 \text{ m/s}$

2) $8 \times 10^7 \text{ m/s}$

3) $4 \times 10^5 \text{ m/s}$

4) $8 \times 10^6 \text{ m/s}$

23. Fission of nuclei is possible because the binding energy per nucleon in them :

1) increases with mass number at high mass numbers

2) decreases with mass number at high mass numbers

3) increases with mass number at low mass numbers

4) decreases with mass number at low mass numbers

24. Application of a forward bias to a p-n junction :

1) increases the number of donors on the n-side

2) increases the electric field in the depletion zone

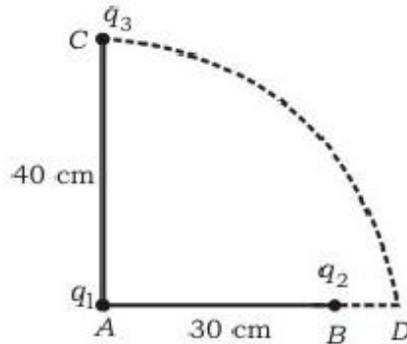
3) increases the potential difference across the depletion zone

4) widens the depletion zone

25. The displacement x of a particle varies with time t as $x = ae^{-\alpha t} + be^{\beta t}$, where a , b , α and β are positive constants. The velocity of the particle will :

- 1) go on decreasing with time
- 2) be independent of α and β
- 3) drop to zero when $\alpha = \beta$
- 4) go on increasing with time

26. Two charges q_1 and q_2 are placed 30 cm apart, as shown in the figure. A third charge q_3 is moved along the arc of a circle of radius 40 cm from C to D. The change in the potential energy of the system is $(q_3/4\pi\epsilon_0)k$, where k is :



- 1) $8q_2$
- 2) $8q_1$
- 3) $4q_2$
- 4) $4q_1$

27. In any fission process the ratio (mass of fission products/mass of parent nucleus) is :

- 1) less than 1
- 2) greater than 1
- 3) equal to 1
- 4) depends on the mass of parent nucleus

28. An ideal gas heat engine operates in Carnot cycle between 227°C and 127°C . It absorbs 6×10^4 cal of heat at higher temperature. Amount of heat converted to work is :

- 1) 2.4×10^4 cal
- 2) 3.6×10^4 cal
- 3) 1.2×10^4 cal
- 4) 6.4×10^4 cal

29. If a vector $2\hat{i} + 3\hat{j} + 8\hat{k}$ is perpendicular to the vector $4\hat{j} - 4\hat{i} + \alpha\hat{k}$, then the value of α is :

- 1) -2
- 2) 1/2

3) $-(1/2)$

4) 2

30. Zener diode is used for :

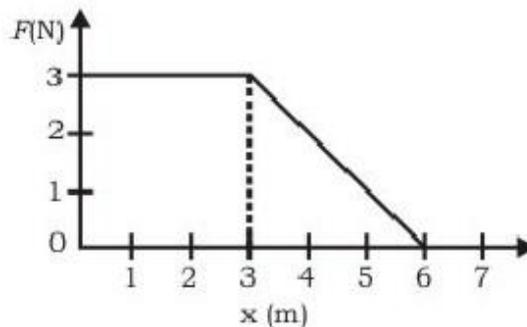
1) producing oscillations in an oscillator

2) amplification

3) stabilisation

4) rectification

31. A force F acting on an object varies with distance x as shown here. The force is in N and x is in m. The work done by the force in moving the object from $x = 0$ to $x = 6$ m is :



1) 10.5 J

2) 13.5 J

3) 8.5 J

4) 6.5 J

32. A stone tied to the end of a string of 1 m long is whirled in a horizontal circle with a constant speed. If the stone makes 22 revolutions in 44 s, what is the magnitude and direction of acceleration of the stone ?

1) $(\pi^2/4)$ ms⁻² and direction along the radius towards the centre

2) $2\pi^2$ ms⁻² and direction along the radius away from centre

3) π^2 ms⁻² and direction along the radius towards the centre

4) $4\pi^2$ ms⁻² and direction along the tangent to the circle

33. If the magnetic dipole moment of an atom of diamagnetic material, paramagnetic material and ferromagnetic material are denoted by μ_d , μ_p and μ_f respectively, then :

1) $\mu_d \neq 0$ and $\mu_f \neq 0$

2) $\mu_p = 0$ and $\mu_f \neq 0$

3) $\mu_d = 0$ and $\mu_p \neq 0$

4) $\mu_d \neq 0$ and $\mu_p = 0$

34. In a circuit, L, C and R are connected in series with an alternating voltage source of frequency f . The current leads the voltage by 45° . The value of C is :

1) $(1)/(2\pi f(2\pi fL + R))$

- 2) $(1)/(\pi f(2\pi fL + R))$
- 3) $(1)/(2\pi f(2\pi fL - R))$
- 4) $(1)/(\pi f(2\pi fL - R))$

35. The angular resolution of a 10 cm diameter telescope at a wavelength of 5000 Å is of the order of :

- 1) 10^6 rad
- 2) 10^{-4} rad
- 3) 10^4 rad
- 4) 10^{-6} rad

36. Two vibrating tuning forks produce progressive waves given by $y_1 = 4 \sin 500 \pi t$ and $y_2 = 2 \sin 506 \pi t$. Number of beats produced per minute is :

- 1) 360
- 2) 180
- 3) 120
- 4) 30

37. When a wire of uniform cross-section a , length l and resistance R is bent into a complete circle, resistance between two of diametrically opposite points will be :

- 1) $R/4$
- 2) $2R$
- 3) $4R$
- 4) $R/2$

38. Carbon, silicon and germanium atoms have four valence electrons each. Their valence and conduction bands are separated by energy band gaps represented by $(E_g)_C$, $(E_g)_{Si}$ and $(E_g)_{Ge}$ respectively. Which one of the following relationships is true in their case ?

- 1) $(E_g)_C > (E_g)_{Si}$
- 2) $(E_g)_C = (E_g)_{Si}$
- 3) $(E_g)_C < (E_g)_{Ge}$
- 4) $(E_g)_C < (E_g)_{Si}$

39. If λ_v , λ_x and λ_m represent the wavelengths of visible light, X-rays and microwaves respectively, then :

- 1) $\lambda_m > \lambda_x > \lambda_v$
- 2) $\lambda_v > \lambda_m > \lambda_x$
- 3) $\lambda_m > \lambda_v > \lambda_x$
- 4) $\lambda_v > \lambda_x > \lambda_m$

40. Two boys are standing at the ends A and B of a ground, where $AB = a$. The boy at B starts running in a direction perpendicular to AB with velocity v_1 . The boy at A starts running simultaneously with velocity v and catches the other boy in a time t , where t is :

- 1) $a/\sqrt{(v^2 + v_1^2)}$
- 2) $\sqrt{(a/v^2 - v_1^2)}$
- 3) $a/(v - v_1)$

4) $a/(v + v_1)$

41. A 5-A fuse wire can withstand a maximum power of 1 W in circuit. The resistance of the fuse wire is :

- 1) 0.02Ω
- 2) 0.2Ω
- 3) 0.4Ω
- 4) 0.04Ω

42. Two bodies have their moments of inertia I and $2I$ respectively about their axis of rotation. If their kinetic energies of rotation are equal, their angular momenta will be in the ratio :

- 1) $1 : 4$
- 2) $\sqrt{2} : 1$
- 3) $4 : 1$
- 4) $1 : \sqrt{2}$

43. An electron moves in a circular orbit with a uniform speed v . It produces a magnetic field B at the centre of the circle. The radius of the circle is proportional to :

- 1) B/v
- 2) v/B
- 3) $\sqrt{(v/B)}$
- 4) $\sqrt{(B/v)}$

44. Choose the only false statement from the following :

- 1) Substances with energy gap of the order of 10 eV are insulators
- 2) The conductivity of a semiconductor increases with increases in temperature
- 3) In conductors the valence and conduction bands may overlap
- 4) The resistivity of a semiconductor increases with increase in temperature

45. If the angle between the vectors \vec{A} and \vec{B} is θ , the value of the product $(\vec{B} \times \vec{A}) \cdot \vec{A}$ is equal to :

- 1) $BA^2 \cos^2 \theta$
- 2) $BA^2 \sin^2 \theta$
- 3) $BA^2 \sin \theta \cos \theta$
- 4) zero

46. The moment of inertia of a uniform circular disc of radius R and mass M about an axis passing from the edge of the disc and normal to the disc is :

- 1) $(5/2)MR^2$
- 2) MR^2
- 3) $(7/2)MR^2$

4) $(3/2)MR^2$

47. Copper has face-centered cubic (fcc) lattice with interatomic spacing equal to 2.54 Å. The value of lattice constant for this lattice is :

- 1) 2.29 Å
- 2) 3.29 Å
- 3) 2.59 Å
- 4) 3.59 Å

48. The total energy of an electron in the first excited state of hydrogen is about - 3.4 eV. Its kinetic energy in this state is :

- 1) - 3.4 eV
- 2) - 1.7 eV
- 3) 1.7 eV
- 4) 3.4 eV

49. For a satellite moving in an orbit around the earth, the ratio of kinetic energy to potential energy is :

- 1) 4
- 2) 1/2
- 3) $1/\sqrt{2}$
- 4) 1/4

50. A ball is thrown vertically upward. It has a speed of 10 m/s when it has reached one half of its maximum height. How high does the ball rise ? (Taking $g = 10 \text{ m/s}^2$)

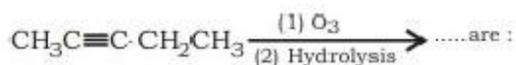
- 1) 6 m
- 2) 10 m
- 3) 14 m
- 4) 18 m

Chemistry

51. Which amongst the following is the most stable carbocation ?

- 1) $\text{CH}_3-\overset{+}{\text{C}}-\text{H}$
 |
 CH_3
- 2) $\text{CH}_3-\overset{+}{\text{C}}$
 |
 CH_3
- 3) $\overset{+}{\text{C}}\text{H}_3$
- 4) $\text{CH}_3\overset{+}{\text{C}}\text{H}_2$

52. Products of the following reaction :



- 1) $\text{CH}_3\text{CHO} + \text{CH}_3\text{CH}_2\text{CHO}$
- 2) $\text{CH}_3\text{COOH} + \text{CH}_3\text{COCH}_3$
- 3) $\text{CH}_3\text{COOH} + \text{HOOC}\cdot\text{CH}_2\text{CH}_3$
- 4) $\text{CH}_3\text{COOH} + \text{CO}_2$

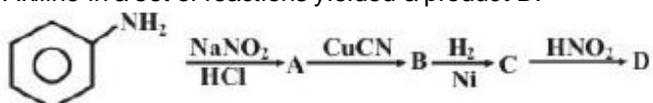
53. At 25°C , the dissociation constant of a base, BOH , is 1.0×10^{-12} . The concentration of hydroxyl ions in 0.01 M aqueous solution of the base would be :

- 1) $1.0 \times 10^{-6} \text{ mol L}^{-1}$
- 2) $1.0 \times 10^{-5} \text{ mol L}^{-1}$
- 3) $1.0 \times 10^{-8} \text{ mol L}^{-1}$
- 4) $1.0 \times 10^{-7} \text{ mol L}^{-1}$

54. Which one of the following pairs represents stereoisomerism ?

- 1) Chain isomerism and rotational isomerism
- 2) Structural isomerism and geometric isomerism
- 3) Linkage isomerism and geometric isomerism
- 4) Optical isomerism and geometric isomerism

55. Aniline in a set of reactions yielded a product D.



The structure of the product D would be :

- 1) $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$
- 2) $\text{C}_6\text{H}_5\text{NHCH}_2\text{CH}_3$
- 3) $\text{C}_6\text{H}_5\text{NHOH}$
- 4) $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$

56. The correct order in which the $\text{O} - \text{O}$ bond length increases in the following is :

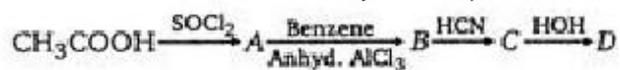
- 1) $\text{H}_2\text{O}_2 < \text{O}_2 < \text{O}_3$
- 2) $\text{O}_3 < \text{H}_2\text{O}_2 < \text{O}_2$
- 3) $\text{O}_2 < \text{O}_3 < \text{H}_2\text{O}_2$
- 4) $\text{O}_2 < \text{H}_2\text{O}_2 < \text{O}_3$

57. The mass of carbon anode consumed (giving only carbon dioxide) in the production of 270 kg of aluminium metal from bauxite by the Hall process is : (Atomic mass $\text{Al} = 27$)

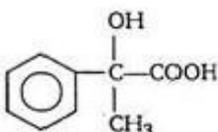
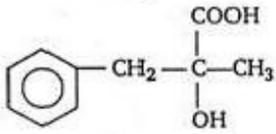
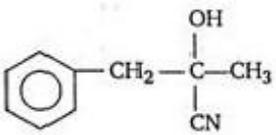
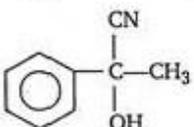
- 1) 180 kg
- 2) 120 kg
- 3) 360 kg

4) 90 kg

58. In a set of reactions, acetic acid yielded a product D.



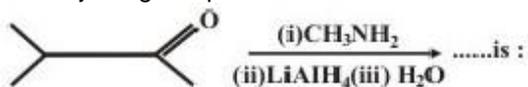
The structure of D would be :

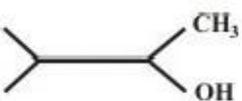
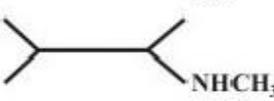
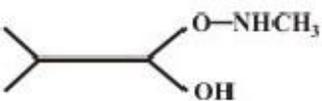
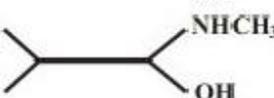
- 1) 
- 2) 
- 3) 
- 4) 

59. The cell membranes are mainly composed of :

- 1) carbohydrates
- 2) proteins
- 3) phospholipids
- 4) fats

60. The major organic product formed from the following reaction :



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

61. The number of moles of KMnO_4 reduced by one mole of KI in alkaline medium is :

- 1) one fifth
- 2) five
- 3) one

4) two

62. Which of the following molecules has trigonal planar geometry ?

- 1) IF₃
- 2) PCl₃
- 3) NH₃
- 4) BF₃

63. The aqueous solution containing which one of the following ions will be colourless ?
(Atomic no. : Sc = 21, Fe = 26, Ti = 22, Mn = 25)

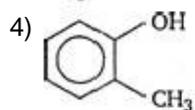
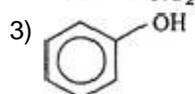
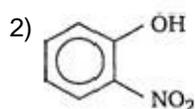
- 1) Sc³⁺
- 2) Fe²⁺
- 3) Ti³⁺
- 4) Mn²⁺

64. Four successive members of the first row transition elements are listed below with their atomic numbers. Which one of them is expected to have the highest third ionization enthalpy ?

- 1) Vanadium (Z = 23)
- 2) Chromium (Z = 24)
- 3) Iron (Z = 26)
- 4) Manganese (Z = 25)

65. Which one of the following compounds is most acidic ?

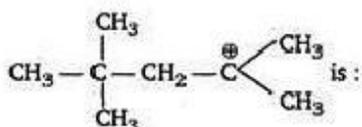
1) Cl—CH₂—CH₂—OH



66. A reaction occurs spontaneously if :

- 1) $T\Delta S < \Delta H$ and both ΔH and ΔS are +ve
- 2) $T\Delta S > \Delta H$ and both ΔH and ΔS are +ve
- 3) $T\Delta S = \Delta H$ and both ΔH and ΔS are +ve
- 4) $T\Delta S > \Delta H$ and ΔH is +ve and ΔS is -ve

67. The monomer of the polymer :



- 1) $\text{H}_2\text{C}=\text{C} \begin{matrix} \text{CH}_3 \\ \text{CH}_3 \end{matrix}$
- 2) $(\text{CH}_3)_2\text{C}=\text{C}(\text{CH}_3)_2$
- 3) $\text{CH}_3\text{CH}=\text{CH} \cdot \text{CH}_3$
- 4) $\text{CH}_3\text{CH}=\text{CH}_2$

68. The correct sequence of increasing covalent character is represented by :

- 1) $\text{LiCl} < \text{NaCl} < \text{BeCl}_2$
- 2) $\text{BeCl}_2 < \text{NaCl} < \text{LiCl}$
- 3) $\text{NaCl} < \text{LiCl} < \text{BeCl}_2$
- 4) $\text{BeCl}_2 < \text{LiCl} < \text{NaCl}$

69. What is the correct relationship between the pHs of isomolar solutions of sodium oxide (pH1), sodium sulphide (pH2), sodium selenide (pH3) and sodium telluride (pH4) ?

- 1) $\text{pH}_1 > \text{pH}_2 \approx \text{pH}_3 > \text{pH}_4$
- 2) $\text{pH}_1 < \text{pH}_2 < \text{pH}_3 < \text{pH}_4$
- 3) $\text{pH}_1 < \text{pH}_2 < \text{pH}_3 \approx \text{pH}_4$
- 4) $\text{pH}_1 > \text{pH}_2 > \text{pH}_3 > \text{pH}_4$

70. Which of the following pairs of a chemical reaction is certain to result in a spontaneous reaction ?

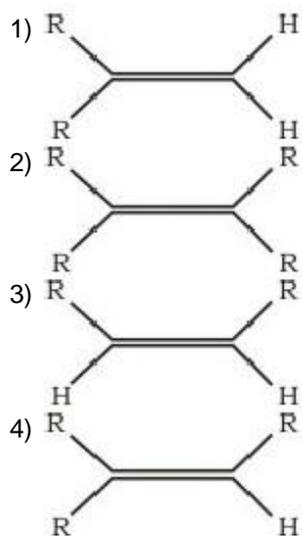
- 1) Exothermic and decreasing disorder
- 2) Endothermic and increasing disorder
- 3) Exothermic and increasing disorder
- 4) Endothermic and decreasing disorder

71. The vapour pressure of two liquids P and Q are 80 and 60 torr, respectively. The total vapour pressure of solution obtained by mixing 3 moles of P and 2 moles of Q would be :

- 1) 144 torr
- 2) 288 torr
- 3) 14 torr
- 4) 72 torr

72. Which one of the following alkenes will react faster with H_2 under catalytic hydrogenation conditions ?

(R = Alkyl substituent)



73. For a first order reaction $A \rightarrow B$, the reaction rate at reactant concentration of 0.01 M is found to be $2.0 \times 10^{-5} \text{ mol L}^{-1} \text{ s}^{-1}$. The half life period of the reaction is :

- 1) 227 s
- 2) 327 s
- 3) 527 s
- 4) 347 s

74. Which of the following is the electron deficient molecule ?

- 1) B_2H_6
- 2) C_2H_6
- 3) PH_3
- 4) SiH_4

75. A nuclide of an alkaline earth metal undergoes radioactive decay by emission of three particles in succession. The group of the periodic table to which the resulting daughter element would belong is :

α -

- 1) Group 14
- 2) Group 16
- 3) Group 4
- 4) Group 6

76. The surface tension of which of the following liquid is maximum ?

- 1) H_2O
- 2) C_6H_6
- 3) CH_3OH
- 4) C_2H_5OH

77. The absolute enthalpy of neutralisation of the reaction :

$\text{MgO(s)} + 2\text{HCl(aq)} \rightarrow \text{MgCl}_2\text{(aq)} + \text{H}_2\text{O(l)}$ will be :

- 1) less than - 57.33 kJ mol⁻¹
- 2) - 57.33 kJ mol⁻¹
- 3) greater than -57.33 kJ mol⁻¹
- 4) 57.33 kJ mol⁻¹

78. Which one of the following forms micelles in aqueous solution above certain concentration ?

- 1) Urea
- 2) Dodecyl trimethyl ammonium chloride
- 3) Pyridinium chloride
- 4) Glucose

79. Electrolytic reduction of nitrobenzene weakly acidic medium gives :

- 1) aniline
- 2) nitrosobenzene
- 3) N-phenylhydroxylamine
- 4) p-hydroxyaniline

80. Equilibrium constants K_1 and K_2 for the following equilibria :

$\text{NO(g)} + (1/2)\text{O}_2 \xrightleftharpoons{K_1} \text{NO}_2\text{(g)}$ and $2\text{NO}_2\text{(g)} \xrightleftharpoons{K_2} 2\text{NO(g)} + \text{O}_2\text{(g)}$ are related as :

- 1) $K_2 = 1/K_1$
- 2) $K_2 = K_1$
- 3) $K_2 = K_1/2$
- 4) $K_2 = 1/K_1^2$

81. Which of the following would have a permanent dipole moment ?

- 1) BF_3
- 2) SiF_4
- 3) SF_4
- 4) XeF_4

82. Which of the following undergoes nucleophilic substitution exclusively by $\text{S}_{\text{N}}1$ mechanism?

- 1) Benzyl chloride
- 2) Ethyl chloride
- 3) Chlorobenzene
- 4) Isopropyl chloride

83. The rate of reaction between two reactants A and B decreases by a factor of 4, if the

concentration of reactant B is doubled. The order of this reaction with respect to reactant B is :

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

84. In a face-centered cubic lattice, a unit cell is shared equally by how many unit cells ?

- 1) 8 2) 4 3) 2 4) 6

85. A solution of urea (mol. mass 56g mol^{-1}) boils at 100.18°C at the atmospheric pressure. If k_f and k_b for water are 1.86 and $0.512\text{K kg mol}^{-1}$ respectively, the above solution will freeze at :

- 1) -6.54°C
2) -65.4°C
3) 65.4°C
4) -0.654°C

86. Which functional group participates in disulphide bond formation in proteins ?

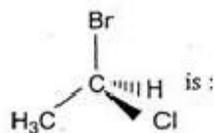
- 1) Thiolactone
2) Thiol
3) Thioether
4) Thioester

87. Which one of the following is an inner orbital complex as well as diamagnetic in behaviour ?

(Atomic no. : Zn = 30, Cr = 24, Co = 27, Ni = 28)

- 1) $[\text{Zn}(\text{NH}_3)_6]^{2+}$
2) $[\text{Cr}(\text{NH}_3)_6]^{3+}$
3) $[\text{Co}(\text{NH}_3)_6]^{3+}$
4) $[\text{Ni}(\text{NH}_3)_6]^{2+}$

88. The chirality of the compound



- 1) R 2) S 3) Z 4) E

89. H_2S gas when passed through a solution of cations containing HCl precipitates the cations of second group of qualitative analysis but not those belonging to the fourth group. It is because :

- 1) presence of HCl decreases the sulphide ion concentration
2) presence of HCl increases the sulphide ion concentration
3) solubility product of group II sulphides is more than that of group IV sulphides

4) sulphides of group IV cations are unstable in HCl

90. Which one of the following oxides is expected to exhibit paramagnetic behaviour ?

- 1) CO₂
- 2) SO₂
- 3) ClO₂
- 4) SiO₂

91. Which one of the following is expected to exhibit optical isomerism ?

(en = ethylenediamine)

- 1) cis-[Pt (NH₃)₂ Cl₂]
- 2) trans-[Co (en)₂ Cl₂]
- 3) trans-[Pt (NH₃)₂ Cl₂]
- 4) cis-[Co (en)₂ Cl₂]

92. The energy of second Bohr orbit of the hydrogen atom is -328 kJ mol⁻¹ ; hence the energy of fourth Bohr orbit would be :

- 1) - 41 kJ mol⁻¹
- 2) -1224 kJ mol⁻¹
- 3) -284 kJ mol⁻¹
- 4) -82 kJ mol⁻¹

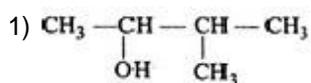
93. The correct order of acid strength is :

- 1) HClO < HClO₂ < HClO₃ < HClO₄
- 2) HClO₄ < HClO < HClO₂ < HClO₃
- 3) HClO₂ < HClO₃ < HClO₄ < HClO
- 4) HClO₄ < HClO₃ < HClO₂ < HClO

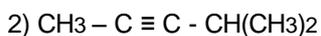
94. The main reason for larger number of oxidation states exhibited by the actinides than the corresponding lanthanides, is :

- 1) lesser energy difference between 5f and 6d orbitals than between 4f and 5d orbitals
- 2) larger atomic size of actinides than the lanthanides
- 3) more energy difference between 5f and 6d orbitals than between 4f and 5d orbitals
- 4) greater reactive nature of the actinides than the lanthanides

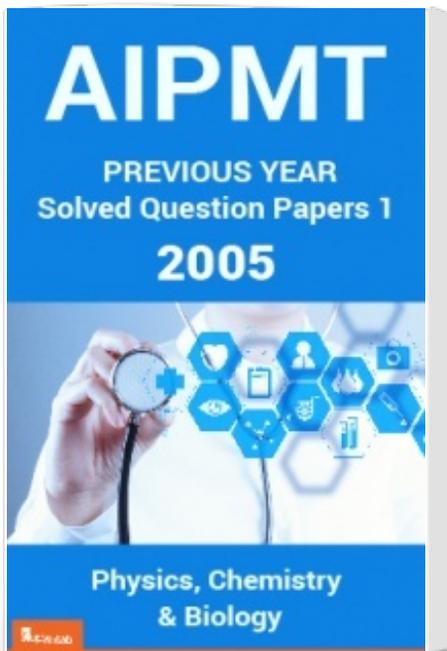
95. Names of some compounds are given. Which one is not correct in IUPAC system ?



3-methyl-2 butanol



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