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PHYSICS + CHEMISTRY

OFFICIAL PAPER
CODE : 11

Physics

Single Correct Questions +1 | -0

1. An ideal gas has pressure 'P', volume 'V' and absolute temperature 'T'.If 'm' is the mass of each molecule and 'K' is the Boltzmann constant then density of the gas is

(A) $\frac{Pm}{KT}$ (B) $\frac{KT}{Pm}$ (C) $\frac{Km}{PT}$ (D) $\frac{PK}{Tm}$

2. A big water drop is formed by the combination of 'n' small water drops of equal radii. The ratio of the surface energy of 'n' drops to the surface energy ofbig drop is

(A) $n^2 : 1$ (B) $n : 1$ (C) $\sqrt{n} : 1$ (D) $\sqrt[3]{n} : 1$

3. The ratio of binding energy of a satellite at rest on ea1th's surface to the binding energy of a satellite of same mass revolving around the earth at a height 'h' above the earth's surface is (R = radius of the earth)

(A) $\frac{2(R+h)}{R}$ (B) $\frac{R+h}{2R}$ (C) $\frac{R+h}{R}$ (D) $\frac{R}{R+h}$

4. A particle performing S.H.M. starts from equilibrium position and ittime period is 16 seconrl. After 2 seconds its velocity is $n\,m/s$. Amplitude of oscillation is $\left(\cos 45^{\circ} = \frac{1}{\sqrt{2}}\right)$

(A) $2\sqrt{2}\,m$ (B) $4\sqrt{2}\,m$ (C) $6\sqrt{2}\,m$ (D) $8\sqrt{2}\,m$

5. In a sonometer experiment, the string of length 'L·under tension vibrates in second overtone between two bridges. The amplitude of vibration is maximum at

(A) $\frac{L}{3}, \frac{2L}{3}, \frac{5L}{6}$ (B) $\frac{L}{8}, \frac{L}{4}, \frac{L}{2}$ (C) $\frac{L}{2}, \frac{L}{4}, \frac{L}{6}$ (D) $\frac{L}{6}, \frac{L}{2}, \frac{5L}{6}$

Space for rough use

6. A wheel of moment of inertia $2\,Kg\,m^2$ is rotating about an axis passing through centre and perpendicular to its plane at a speed 60 radls. Due to friction, it comes to rest in 5 minutes. The angular momentum of the wheel three minutes before it stops rotating is

(A) $24\,Kgm^2/s$ (B) $48\,Kgm^2/s$ (C) $72\,Kg\,m^2/s$ (D) $96\,Kg\,m^2/s$

7. The equation of the progressive wave is $Y = 3\sin\left[\pi\left(\frac{t}{3} - \frac{x}{5}\right) + \frac{\pi}{4}\right]$ where x andY are in metre and time in second. Which of the fo11owing is correct ?

(A) velocity V = 1.5 m/s (B) amplitude A= 3 em

(C) frequency F = 0.2 Hz (D) wavelength $\lambda = 10\text{m}$

8. Two spherical hlack horlies have raclii r_1 and r_2. Their surface temperatures are T_1 and T_2. If they radiate same power then $\frac{r_2}{r_1}$ is

(A) $\frac{T_1}{T_2}$ (B) $\frac{T_2}{T_1}$ (C) $\left(\frac{T_1}{T_2}\right)^2$ (D) $\left(\frac{T_2}{T_1}\right)^2$

9. The closed and open organ pipt:s have same length. When they are vibrating simultaneously in first overtone, produce three beats. The length of open pipe is made $\frac{1}{3}^{\text{rd}}$ and dust:d pipe is made three times the original, the number of beals produced will be

(A) 8 (B) 14 (C) 17 (D) 20

10. A 1ift of mass 'm• is con nected to a rope which is moving upward with maximum acceleration 'a'. For maximum safe stress, the elastic l imit of the rope is 'T'. The minimum diamett:r of the rope is (g =gravitational acceleration)

(A) $\left[\frac{2m(g+a)}{\pi T}\right]^{\frac{1}{2}}$ (B) $\left[\frac{4m(g+a)}{\pi T}\right]^{\frac{1}{2}}$

(C) $\left[\frac{m(g+a)}{\pi T}\right]^{\frac{1}{2}}$ (D) $\left[\frac{m(g+a)}{2\pi T}\right]^{\frac{1}{2}}$

Space for rough use

11. A ceiling fan rotates about its own axis with some angular velocity. When the fan is switched off, the angular velocity hecomes $\left(\frac{1}{4}\right)^{\text{th}}$ of the original in time 't' and 'n' revolutions are made in that time. The number of revolutions made by the fan during the time interval between switch off and rest are (Angular retardation is uniform)

(A) $\frac{4n}{15}$ (B) $\frac{8n}{15}$ (C) $\frac{16n}{15}$ (D) $\frac{32n}{15}$

12. A disc of moment of inertia $'I_1'$ is rotating in horizontal plane hout an axis passing through a centre ancl perpendicular to its plane with constant angular speed $'\omega_1'$. Another disc of moment of inertia $'I_2'$ having zero angular speed is placed coaxially on a rotating disc. Now both the dises are rotating with constant angular speed $'\omega_2'$. The energy lost by the initial rotating disc is

(A) $\frac{1}{2}\left[\frac{I_1+I_2}{I_1I_2}\right]\omega_1^2$ (B) $\frac{1}{2}\left[\frac{I_1I_2}{I_1-I_2}\right]\omega_1^2$

(C) $\frac{1}{2}\left[\frac{I_1-I_2}{I_1I_2}\right]\omega_1^2$ (D) $\frac{1}{2}\left[\frac{I_1I_2}{I_1+I_2}\right]\omega_1^2$

13. A particle performs linear S.H.M. At a particular instant, velocity of the particle is 'u' and acceleration is α while at another instant velocity is 'v' and acceleration is $'\beta'(0<\alpha\beta)$. The distance hetwcen the two positions is

(A) $\frac{u^2-v^2}{\alpha+\beta}$ (B) $\frac{u^2+v^2}{\alpha+\beta}$ (C) $\frac{u^2-v^2}{\alpha-\beta}$ (D) $\frac{u^2+v^2}{\alpha-\beta}$

14. The ohserver is moving with velocity $'v_0'$ towards the stationary source of sound and then after crossing moves away from the source with velocity $'v_0'$. Assume that the medium through which the sound waves travel is at rest. If 'v' is the velocity of sound and 'n' is the ft quency emitted by the source then the difference between apparent frequencies heard by the observer is

(A) $\frac{2nv_0}{v}$ (B) $\frac{nv_0}{v}$ (C) $\frac{v}{2nv_0}$ (D) $\frac{v}{nv_0}$

Space for rough use

15. A metal rod oflength 'L' and cross-sectional area 'A' is heated through 'T' ${}^0C$. What is the force required to prevent the expansion of the rod lengthwise ?
[Y = Young's modulus of the material of rod, a - coefficient of linear expansion]

(A) $\frac{YA\alpha T}{(1-\alpha T)}$ (B) $\frac{YA\alpha T}{(1+\alpha T)}$ (C) $\frac{(1-\alpha T)}{YA\alpha T}$ (D) $\frac{(1+\alpha T)}{YA\alpha T}$

16. A solid sphere of mass 2 kg is rolling on a frictionless horizontal surface with velocity 6 rnls. It collides on the free end uf an ideal spring whose other end is fixed.The maximum compression produced in the spring will be (Force constant of the spring= 36 N/m).

(A) $\sqrt{14}m$ (B) $\sqrt{2.8}m$ (C) $\sqrt{1.4}m$ (D) $\sqrt{0.7}m$

17. A flywheel at rest is to reach an angular velocity of 24 rad/s in 8 second with constant angular acceleration. The total angle turned through during this interval is

(A) 24 rad (B) 48 rad (C) 72 rad (D) 96 rad

18. Two uniform wires of the same material arc vibrating under the same tension. If the first overtone of the first wire is equal to the second overtone of the second wire and radius of the first wire is twice the radius of the second wire then the ratio of the lengths uf the first wire to second wire is

(A) $\frac{1}{3}$ (B) $\frac{1}{4}$ (C) $\frac{1}{5}$ (D) $\frac{1}{6}$

19. When one end of the capillary is dipped in water, the height of water column is 'h'. The upward force of 105 dyne due to surface tension is balanced by the force due to the weight of water column. The inner circumference of the capillary is $(\text{Surface tension of water} = 7 \times 10 - 2N/m)$

(A) 1.5 cm (B) 2 cm (C) 2.5 cm (D) 3 cm

20. For a rigid diatomic molecule, universal gas constant R = nCp where 'Cp' is the molar specific heat at constant pressure and 'n' is a number. Hence n is equal to

(A) 0.2257 (B) 0.4 (C) 0.2857 (D) 0.3557

Space for rough use

21. The depth 'd' at which the value of acceleration due to gravity becomestimes the value at the earth's surface is (R = radius of earth)

(A) $d = R\left(\frac{n}{n-1}\right)$ (B) $d = R\left(\frac{n-1}{2n}\right)$

(C) $d = R\left(\frac{n-1}{n}\right)$ (D) $d = R^2\left(\frac{n-1}{n}\right)$

22. A particle is performing S.H.M. starting from extreme pusiliun. Graphical representation shows that, between displacement and acceleration, there is a phase difference of

(A) 0 rad (B) $\frac{\pi}{4}$rad (C) $\frac{\pi}{2}$rad (D) π rad

23. The fundamental frequency of an air column in a pipe dosed at one end is 100 Hz. lf the same pipe is open at both the ends, the frequencies proctuced in Hz are

(A) 100, 200, 300, 400, ... (B) 100, 300, 500, 700, ...

(C) 200, 300, 400, 500, ... (D) 200, 400, 600, 800, ...

24. For a particle moving in vertical circle. the total energy at different positions along the path

(A) is conserved (B) increases

(C) decreases (D) may increase or decrease

25. A simple p ::uuulum of length 'L' has mass 'M' and it oscillates freely with amplitude 'A'. At extreme position, its potential energy is (g = acceleration due to gravity)

(A) $\frac{MgA^2}{2L}$ (B) $\frac{MgA}{2L}$ (C) $\frac{MgA^2}{L}$ (D) $\frac{2MgA^2}{L}$

26. The frequency for series limit of Balmer and Paschen series respectively are $'\upsilon_1'$ and $'\upsilon_3'$. If frequency of first line of Balmer series is $'\upsilon_2'$ then the relation between $'\upsilon_1'$, $'\upsilon_2'$ and $'\upsilon_3'$ is

(A) $\upsilon_1 - \upsilon_2 = \upsilon_3$ (B) $\upsilon_1 + \upsilon_3 = \upsilon_2$

(C) $\upsilon_1 + \upsilon_2 = \upsilon_3$ (D) $\upsilon_1 - \upsilon_3 = 2\upsilon_1$

Space for rough use

27. When three capacitors of equal capacities are connectecl in parallel and one of the same capacity is connected in series with its combination. The resultant capacity is $3.75\mu F$. The capacity of each capacitor is

(A) $5\ \mu F$ (B) $6\ \mu F$ (C) $7\ \mu F$ (D) $8\ \mu F$

28. Sensitivity of moving coil galvanometer is 's'. If a shunt of D $\left(\frac{1}{8}\right)^{\text{th}}$ of the resistance of galvanometer is connected to moving coil galvanometer, its sensitivity becomes

(A) $\frac{s}{3}$ (B) $\frac{s}{6}$ (C) $\frac{s}{9}$ (D) $\frac{s}{12}$

29. Two unknown resistances are connected in two gaps of a meter-bridge. The null point is obtained at 40 cm from left end. A 30 Ω resistance is connected in series with the smaller of the two resistances, the null point shifts by 20 cm to the right end. The value of smaller resistance in Ω is

(A) 12 (B) 24 (C) 36 (D) 48

30. In Fraunhofer diffraction pattern, slit width is 0.2 mm and screen is at 2 m away from the lens. If wavelength of light used is 5000 $\mathring{A}$ then the distance between the first minimum on either side of the central maximum is (θ is small and measured in radian)

(A) $10^{-1}m$ (B) $10^{-2}m$ (C) $2 \times 10^{-2}m$ (D) $2 \times 10^{-1}m$

31. A radioactive element has rate of disintegration 10,000 disintegrations per minute at a particular instant. After four minutes it becomes 2500 disintegration per minute. The decay constant per minute is

(A) $0.2\ \log_e 2$ (B) $0.5\ \log_e 2$ (C) $0.6\ \log_e 2$ (D) $0.8\ \log_e 2$

32. When the same monochromatic ray of light travels through glass slab and through water, the number of waves in glass slab of thickness 6 cm is same as in the water column of height 7 cm. If refractive index of glass is 1.5 then refractive index of water is

(A) 1.258 (B) 1.269 (C) 1.286 (D) 1.310

Space for rough use

33. If the electron in hydrogen atom jumps from second Bohr orbit to grounds state and difference between energies of the two states is radiated in the form of photons. If the work function of the material is 4.2 eV then stopping potential is

$\left[\text{Energy of electron in n}^{\text{th}}\text{orbit } = -\frac{13.6}{n^2}eV\right]$

(A) 2 eV (B) 4 eV (C) 6 eV (D) 8 eV

34. The magnetic moment of electron due to orbital motion is proportional to (n = principlal quantum number)

(A) $\frac{1}{n^2}$ (B) $\frac{1}{n}$ (C) n^2 (D) n

35. Photodiode is a device

(A) which is always operated in reverse bias

(B) which is always operated in forward bias

(C) in which photo current is independent of intensity of incident radiation

(D) which may be operated in forward or reverse bias

36. Two coils P and Q are kept near each other. When no current flows through coil P and current increases in coil Q at the rate 10 A/s, the e.m.f. in coil P is 15 mV. When coil Q carries no current and current of 1.8 A flows through coil P. the magnetic flux linked with the coil Q is

(A) 1.4 mWb (B) 2.2 mWb (C) 2.7 mWb (D) 2.9 mWb

37. In Young's double slit experiment, in an interference pattern second minimum is observed exactly in front of one slit. The distance between the two coherent sources is 'd' and the distance between source and screen is 'D'. The wavelength of light source used is

(A) $\frac{d^2}{D}$ (B) $\frac{d^2}{2D}$ (C) $\frac{d^2}{3D}$ (D) $\frac{d^2}{4D}$

Space for rough use

38. In communication system, the process of superimposing a low frequency signal on a high frequency wave is known as

(A) Repeater (B) Attenuation (C) Modulation (D) Demodulation

39. A bar magnet has length 3 cm, cross-sectional area 2 cm^2 and magnetic moment 3 Am^2. The intensity of magnetisation of bar magnet is

(A) 2×10^5 A/m (B) 3×10^5 A/m (C) 4×10^5 A/m (D) 5×10^5 A/m

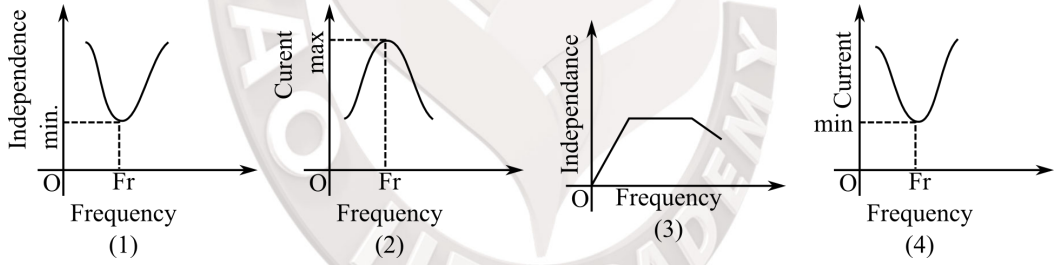
40. The magnetic flux near the axis and inside the air core solenoid of length 60 cm carrying current $1.57 \times 10^{-6}\ Wb$. Its magnetic moment will be (cross-sectional area of a solenoid is very small as compared to its length, $\mu_0 = 4\pi \times 10^{-7}$ SI unit)

(A) 0.25 A (B) 0.50 A (C) 0.75 A (D) 1 A

41. On a photosensitive material, when frequency of incident radiation is increased by 30%, kinetic energy of emitted photoelectrons increases from 0.4 eV to 0.9 eV. The work function of the surface is

(A) 1 eV (B) 1.267 eV (C) 1.4 eV (D) 1.8 eV

42. Out of the following graphs, which graph shows the correct relation (graphical representation) for LC parallel resonant circuit ?



(A) (1) (B) (2)

(C) (3) (D) (4)

Space for rough use

43. According to de-Broglie hypothesis, the wavelength associated with moving electron of mass 'm' is $'\lambda_0'$,; Using mass energy relatino and Planck's quantum theory, the wavelength associated with photon is $'\lambda_p'$. If the energy (E) of electron and photon is same then relation between $'\lambda_e'$ and $'\lambda_p'$ is

(A) $\lambda_p \ \alpha \ \lambda_e$ (B) $\lambda_p \ \alpha \ \lambda_e^2$ (C) $\lambda_p \ \alpha \ \sqrt{\lambda_e}$ (D) $\lambda_p \alpha \frac{1}{\lambda_e}$

44. A parallel plate air capacitor has capacity 'C' farad, potential 'V' volt and energy 'E' joule. When the gap between the plates is completely filled with dielectric

(A) both V and E increase (B) both V and E decrease

(C) V decreases, E increases (D) V increases, E decreases

45. The resistivity of potentiometer wire is $40 \times 10^{-8} \ ohm$ - metre and its area of cross-section is $8 \times 10^{-6} m^2$. If 0.2 ampere current is flowing through the wire, the potential gradient of the wire is

(A) 10^{-1} V/m (B) 10^{-2} V/m

(C) 10^{-3} V/m (D) 10^{-4} V/m

46. In series LCR circuit $R = 18 \ \Omega$ and impedance is $33 \ \Omega$. An r.m.s. voltage 220 V is applied across the circuit. The true power consumed in a.c. circuit is

(A) 220 W (B) 400 W (C) 600 W (D) 800 W

47. Two parallel plate air capacitors of same capacity 'C' are connected in series to a battery of emf 'E'. Then one of the capacitors is completely filled with dielectric material of constant 'K'. The change in the effective capacity of the series combination is

(A) $\frac{C}{2}\left[\frac{K-1}{K+1}\right]$ (B) $\frac{2}{C}\left[\frac{K-1}{K+1}\right]$ (C) $\frac{C}{2}\left[\frac{K+1}{K-1}\right]$ (D) $\frac{C}{2}\left[\frac{K-1}{K+1}\right]^2$

Space for rough use

48. The polarising angle for transparent medium is $'\theta'$, $'\nu'$ is the speed of light in that medium. Then the relation between $'\theta'$, and $'\nu'$ is (c = velocity of light in air)

(A) $\theta = \tan^{-1}\left(\frac{\nu}{c}\right)$ (B) $\theta = \cot^{-1}\left(\frac{\nu}{c}\right)$

(C) $\theta = \sin^{-1}\left(\frac{\nu}{c}\right)$ (D) $\theta = \cos^{-1}\left(\frac{\nu}{c}\right)$

49. Two identical light waves having phase difference $'\phi'$ propagate in same direction. When the y superpose, the inteisity of resultant wave is proportional to

(A) $\cos^2\phi$ (B) $\cos^2\frac{\phi}{2}$

(C) $\cos^2\frac{\phi}{3}$ (D) $\cos^2\frac{\phi}{4}$

50. For a transistor, α_{dc} and β_{dc} are the current ratios, then the value of $\frac{\beta_{dc} - \alpha_{dc}}{\alpha_{dc} \cdot \beta_{dc}}$ is

(A) 1 (B) 1.5 (C) 2 (D) 2.5

Chemistry

51. The rate constant for a first order reaction is $7.0 \times 10^{-4} S^{-1}$. If initial conentration of reactant is $0.080\ M$, what is the half life of reaction?

(A) $990\ S$ (B) $79.2\ S$ (C) $12375\ S$ (D) $10.10 \times 10^{-4}\ S$

52. The polymer used in making handles of cookers and frying pans is

(A) bakelite (B) nylon-2-nylon-6

(C) orlon (D) polyvinyl chloride

53. Which halogen has the highest value of negative electron gain enthalpy?

(A) Fluorine (B) Chlorine (C) Bromine (D) Iodine

Space for rough use

54. What is the actual volume occupied by water molecules present in 20 cm^3 of water?

(A) 20 cm^3 (B) 10 cm^3 (C) 40 cm^3 (D) 24.89 dm^3

55. Which of following coordinate complexes is an exception to EAN rule?
(Given At. No. Pt = 78, Fe = 26, Zn = 30, Cu = 29)

(A) $[Pt(NH_3)_6]^{4+}$ (B) $[Fe(CN)_6]^{4-}$

(C) $[Zn(NH_3)_4]^{2+}$ (D) $[Cu(NH_3)_4]^{2+}$

56. Which of the following statements is **INCORRECT** in case of Hofmann bromamide degradation?

(A) Reaction is useful for decreasing length of carbon chain by one carbon atom

(B) It gives tertiary amine

(C) It gives primary amine

(D) Aqueous or alcoholic KOH is used with bromine

57. Which of the following statements is **INCORRECT** for pair of elements Zr - Hf?

(A) Both possess same number of valence electrons.

(B) Both have identical atomic sizes

(C) Both have almost identical ionic radii

(D) Both of these belong to same period of periodic table

58. Aldehydes or ketones when treated with $C_6H_5 - NH - NH_2$, the product formed is

(A) semicarbazone (B) phenylhydrazone

(C) hydrazone (D) oxime

59. Solubility of which among the following solids in water changes slightly with temperature?

(A) KNO_3 (B) $NaNO_3$ (C) KBr (D) $NaBr$

Space for rough use

60. What is the quantity of hydrogen gas liberated when 46 g sodium reacts with excess ethanol? (Given At. mass of Na = 23)

(A) $2.4 \times 10^{-3}\ kg$ (B) $2.0 \times 10^{-3}\ kg$

(C) $4.0 \times 10^{-3}\ kg$ (D) $2.4 \times 10^{-2}\ kg$

61. Identify the weakest oxidising agent among the following.

(A) Li^{+} (B) Na^{+} (C) Cd^{2+} (D) I_2

62. The monomers used in preparation of dextron are

(A) lactic acid and glycollic acid

(B) 3 - Hydroxy butanoic acid and 3 - Hydroxy pentanoic acid

(C) styrene and 1, 3 - Butadiene

(D) hexamethylenediamine and adipic acid

63. Which among the following compounds does not act as a reducing agent?

(A) H_2O (B) H_2S (C) H_2Se (D) H_2Te

64. Which of the following processes is **NOT** used to preserve the food?

(A) Irradiation (B) Addition of salts

(C) Addition of heat (D) Hydration

65. In case of substituted aniline the group which decreases the basic strength is

(A) $-OCH_3$ (B) $-CH_3$ (C) $-NH_2$ (D) $-C_6H_5$

66. Which among the following equations represents Arrhenius equation?

(A) $k = Ae^{E_a/RT}$ (B) $k = Ae^{RT/E_a}$ (C) $k = \frac{A}{e^{E_a/RT}}$ (D) $k = \frac{A}{e^{RT/E_a}}$

Space for rough use

67. Which of the following compounds will give positive idoform test?

(A) Isopropyl alcohol (B) Propionaldehyde

(C) Ethylphenyl ketone (D) Benzyl alcohol

68. The first law of thermodynamics for isothermal process is

(A) $q = -W$ (B) $\Delta U = W$ (C) $\Delta U = q$ (D) $\Delta U = -q_v$

69. The conversion of ethyl bromide to ethyl iodide using sodium iodide and dry acetone, this reaction is known as

(A) Swarts reaction (B) Finkelstein reaction

(C) Sandmeyer reaction (D) Stephen reaction

70. What is the hybridization of carbon atoms in fullerene?

(A) SP^3 (B) SP (C) SP^2 (D) dSP^3

71. Which of the following is used as antiseptic?

(A) Chloramphenicol (B) Bithional

(C) Cimetidine (D) Chlordiazepoxide

72. In preparation of sulphuric acid from sulphur dioxide in lead chamber process. What substance is used as a catalyst?

(A) Mangenese dioxide (B) Vandadium pentoxide

(C) Nitric oxide (D) Reney Nickel

73. The correct charge on and co-ordination number of $'Fe'$ in $K_3[Fe(CN)_6]$ is

(A) +2, 4 (B) +3, 6 (C) +2, 6 (D) +3, 3

Space for rough use

74. Which among the following reactions is an example of pseudo first order reaction?

(A) Inversion of cane sugar.

(B) Decomposition of H_2O_2

(C) Conversion of cyclopropane to propane

(D) Decomposition of N_2O_5

75. The amine which reacts with p - toluencsulphonyl chloride to give a clear solution which on acidification give insoluble compound is

(A) $C_2H_5NH_2$ (B) $(C_2H_5)_2NH$

(C) $(C_2H_5)_3N$ (D) $CH_3NHC_2H_5$

76. The work done during combustion of 9×10^{-2} kg of ethane, $C_2H_6(g)$ at 300 K is (Given $R = 8.314\ J\ deg^{-1}\ mol^{-1}$, atomic mass $C = 12, H = 1$)

(A) $6.236\ kJ$ (B) $-6.236\ kJ$ (C) $18.71\ kJ$ (D) $-18.71\ kJ$

77. What type of sugar molecule is present in DNA?

(A) D-3-deoxyribose (B) D-ribose

(C) D-2-deoxyribose (D) D-Glucopyranose

78. The molality of solution containing 15.20 g of urea, (molar mass = 60) dissolved in 150 g of water is

(A) $1.689\ mol\ kg^{-1}$ (B) $0.1689\ mol\ kg^{-1}$

(C) $0.5922\ mol\ kg^{-1}$ (D) $0.2533\ mol\ kg^{-1}$

79. The acid which contains both -OH and -COOH groups is

(A) phthalic acid (B) adipic acid (C) glutaric acid (D) salicylic acid

Space for rough use

80. Identify the compound in which phosphorus exists in the oxidation state of +1.

(A) Phosphonic acid (H_3PO_3) (B) Phosphinic acid (H_3PO_2)

(C) Pyrophosphorus acid $(H_4P_2O_5)$ (D) Orthophosphoric acid (H_3PO_4)

81. (+) 2- Methylbutan -1-ol and (-)2-Methylbutan-1-ol have different values for which property?

(A) Boiling point (B) Relative density

(C) Refractive index (D) Specific rotation

82. Which among the following is NOT a mineral of iron?

(A) Haematite (B) Magnesite (C) Magenetite (D) Siderite

83. Nitration of which among the following compounds yields cyclonite?

(A) Formaldehyde (B) benzaldehyde

(C) Urotropine (D) Acetaldehyde ammonia

84. Calculate the work done during compression of 2 mol of ideal gas from a volume of $1m^3$ to $10\ dm^3$ at 300 K against a pressure of 100 Kpa.

(A) - 99 kJ (B) + 99 kJ (C) + 22.98 kJ (D) - 22.98 kJ

85. Which element among the following does from $P\pi - P\pi$ multiple bonds?

(A) Arsenic (B) Nitrogen (C) Phosphorus (D) Antimony

86. tert-butyl methyl ether on treatment with hydrogen iodide in cold gives

(A) tert-butyl iodide and methyl iodide (B) tert-butyl alcohol and methyl alcohol

(C) tert-butyl alcohol and methyl iodide (D) tert-butyl iodide and methyl alcohol

Space for rough use

87. Name the process that is employed to refine aluminium.

(A) Hall's process (B) Mond process

(C) Hoope's process (D) Serperck's process

88. The colour and magnetic nature of manganate ion (MnO_4^{2-}) is

(A) green, paramagnetic (B) purple, diamagnetic

(C) green, diamagnetic (D) purple, paramagnetic

89. The osmotic pressure of solution containing 34.2 g of cane suger (molar mass $= 342\, mol^{-1}$) in 1L of solution at 20^oC is
(Given, R = 0.082 L atm $K^{-1}\ mol^{-1}$)

(A) 2.40 atm (B) 3.6 atm (C) 24 atm (D) 0.0024 atm

90. In assigning R-S configuration which among the following group has highest priority?

(A) $-SO_3H$ (B) $-COOH$ (C) $-CHO$ (D) $-C_6H_5$

91. Which among the following equations represents the reduction taking place in lead accumulator at positive electrode, while it is being used as source of electrical energy?

(A) $Pb \rightarrow Pb^{2+}$ (B) $Pb^{4+} \rightarrow Pb$ (C) $Pb^{2+} \rightarrow Pb$ (D) $Pb^{4+} \rightarrow Pb^{2+}$

92. For which among the following equimolar aqueous solution Van't factor has the lowest value?

(A) Aluminium Chloride (B) Potassium Sulphate

(C) Ammonium Chloride (D) Urea

93. The amino acid which is basic in nature is

(A) Histidine (B) Tyrosine (C) Proline (D) Valine

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94. Which element among the following does NOT form diatomic molecules?

(A) Argon (B) Oxygen (C) Nitrogen (D) Bromine

95. A molecule of Stachyose contains how many carbon atoms?

(A) 6 (B) 12 (C) 18 (D) 24

96. What of the SI unit of conductivity?

(A) Sm (B) Sm^{-1} (C) Sm^{2} (D) Sm^{-2}

97. Which of the following is Baeyer's reagent?

(A) alkaline $KMnO_4$ (B) acidic $K_2Cr_2O_7$

(C) alkaline $Na_2Cr_2O_7$ (D) MnO_2

98. What is the chief constituent of Pyrex glass?

(A) B_2O_3 (B) SiO_2 (C) Al_2O_3 (D) Na_2O

99. Which of the following compounds has lowest boiling point?

(A) n-butyl alcohol (B) isobutyl alcohol

(C) tert-butyl alcohol (D) sec-butyl alcohol

100. Identify the INVALID equation.

(A) $\Delta H = \sum H_{products} - \sum H_{reactants}$

(B) $\Delta H = \Delta U + P\Delta V$

(C) $\Delta H^o_{reaction} = \sum H^o_{(\text{product bonds})} - \sum H^o_{(\text{reactant bonds})}$

(D) $\Delta = \Delta U + \Delta nRT$

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