101 PC07

Series **C**

ROLL No. | | | | | | TEST BOOKLET No. 13842

TEST FOR FIRST DEGREE PROGRAMMES IN ENGINEERING AND TECHNOLOGY

PHYSICS AND CHEMISTRY

Time: 1½ Hours Maximum Marks: 375

INSTRUCTIONS TO CANDIDATES

1. You are provided with a Test Booklet and an Optical Mark Reader (OMR) Answer Sheet to mark your responses. Do not soil your OMR Sheet. Read carefully all the instructions given on the OMR Sheet.

2. Write your Roll Number in the space provided for on the top of this page.

3. Also write your Roll Number, the date and time of the examination, Test Centre Code, Test Centre Name and the Test Subject in the columns provided for the same on the OMR Sheet and mark Roll Number and Test Booklet Series (**A**, **B** or **C**) in the boxes provided for the same.

4. The paper consists of 125 objective type questions, out of which the first 75 questions are from Physics and the remaining 50 questions are from Chemistry. All questions carry equal marks.

5. Each question has four alternative responses marked **A, B, C** and **D** and you have to **darken** the bubble fully corresponding to the correct response as indicated in the example shown on the Answer Sheet. Use **HB Pencil** to mark your choices on the Answer Sheet

6. Each correct answer carries **3** marks and each wrong answer carries minus **1** mark.

7. Please do your rough work only on the space provided for the same at the end of this Test Booklet.

8. You can retain the Test Booklet but should return the OMR Sheet to the Invigilator before leaving the examination hall.

9. Every precaution has been taken to avoid errors in the Test Booklet. In the event of any such unforeseen happenings, suitable remedial measures will be taken at the time of evaluation.

10. Please feel comfortable and relaxed. You can do better in this test in a tension-free disposition.

WISH YOU A SUCCESSFUL PERFORMANCE

PHYSICS

1. Working of Solar cell is based on the principle of -

(A) Photoelectric effect.
(B) Photo voltaic effect.
(C) Thermionic effect.
(D) Photo thermal effect.

2. The magnetic field B at a distance r from a conductor carrying a current is computed using -

(A) Raleigh's law.
(B) Lenz's law.
(C) Biot-savart law.
(D) Gauss's law.

3. The maximum magnification achievable with a magnifying glass of focal length f and exact distance of distinct vision D is given by -

(A) $1+\frac{D}{f}$.
(B) $1+\frac{f}{D}$.
(C) $\frac{f}{D}$.
(D) $1+Df$.

4. A body of mass m_1, moving with a velocity v is to collide with another stationary body of mass m_2. The velocity of the two body system at the centre of mass is given by -

(A) $\frac{(m_1+m_2)v}{m_2}$.
(B) $\frac{m_1 v}{m_1+m_2}$.
(C) $\frac{m_2 v}{m_1+m_2}$.
(D) $\frac{(m_1+m_2)v}{m_1}$

5. The value of the integral $\int_0^\infty x^n e^{-x} dx$ is equal to -

(A) $n(n-1)$.
(B) $n!$.
(C) zero.
(D) infinity.

6. Ohm's law can also be written as -

(A) $E = -\frac{\partial V}{\partial x}$.
(B) $J = \sigma E$.
(C) $J = nqv$.
(D) $J = I/S$.

7. The work done by the force $\vec{F} = 4\hat{x} - 3\hat{y} + 2\hat{z}$ N on 1 nC charge resulting a displacement of $10\hat{x} + 2\hat{y} - 7\hat{z}$ m is -

(A) 20 *nJ*.
(B) 60 *nJ*.
(C) 103 *nJ*.
(D) 64 *nJ*.

8. A unit vector perpendicular to each of the vectors $\vec{A}$ and $\vec{B}$ is given by -

(A) $\vec{A} \times \vec{B}$.
(B) $\frac{\vec{B} \times \vec{A}}{|\vec{A}||\vec{B}|}$.
(C) $\frac{\vec{A} \times \vec{B}}{|\vec{A} \times \vec{B}|}$.
(D) $\frac{\vec{A} \times \vec{B}}{\vec{A} \bullet \vec{B}}$.

9. If N counts are registered in a radiation counter according to the statistics of random processes, the statistical error would be -

(A) $\sqrt{N}$.
(B) $\frac{N^2}{100}$.
(C) $\frac{1}{N}$.
(D) $\frac{N}{100}$.

10. Protons moving with a constant velocity enter a uniform magnetic field B in a direction perpendicular to B. The path of the proton in the field is -

(A) a helix.
(B) straight line parallel to B.
(C) a parabola.
(D) a circle.

11. Which of the following represents a travelling wave (a, b and c are constants)?

(A) y = a cos (bx) sin (ct)
(B) y = a sin (bx + ct)
(C) y = a sin (bx + ct) + a sin (bx – ct)
(D) y = a sin (bx – ct) – b sin (ax + ct)

12. We plot a graph having temperature in °C along the *x*-axis and in °F along *y*-axis. If the graph is a straight line, then the correct statement is -

(A) the line intercepts the positive *x*-axis.
(B) the line intercepts the positive *y*-axis.
(C) the line passes through the origin.
(D) the line intercepts the negative axis of both *x* and *y* axes.

13. An object entering the earth's atmosphere at a high velocity catches fire due to -

(A) viscosity of air.
(B) high heat content in atmosphere.
(C) pressure of certain gases.
(D) high gravitational force.

14. Which of the following statements is correct?

(A) Ferromagnetic materials have high susceptibility and high permeability.
(B) Ferromagnetic materials have low susceptibility and high permeability.
(C) Ferromagnetic materials have high susceptibility and low permeability.
(D) Ferromagnetic materials have low susceptibility and low permeability.

15. In uniform circular motion of radius of curvature R, the tangential force vanishes. The normal force is then called -

(A) Coriolis force.
(B) Centripetal force.
(C) Reaction force.
(D) Guiding force.

16. In a.c. circuits, Ohm's law holds for -

(A) peak values of voltage and current.
(B) effective values of voltage and current.
(C) instantaneous values of voltage and current.
(D) All of the above.

17. X-rays do not show -

(A) polarisation.
(B) diffraction.
(C) transverse wave characteristics.
(D) longitudinal wave characteristics.

18. A sample of n type silicon -

(A) contains an excess of free electrons and, therefore, is negatively charged.
(B) contains an excess of free electrons and is electrically neutral.
(C) predominantly contains trivalent impurities.
(D) contains only tetravalent impurities.

19. The following table is truth table for

A	B	X
0	0	1
1	0	1
0	1	1
1	1	0

(A) NAND gate.
(B) NOR gate.
(C) XOR gate.
(D) AND gate.

20. For the Light Emitting Diode (LED), which of the following does not hold good?

(A) It is made of a semi conducting Gallium Arsenide Phosphide.
(B) It emits light when forward biased.
(C) It emits monochromatic radiation.
(D) It emits light when reverse biased.

21. For standing waves at points between successive nodes, the vibrations are said to be -

(A) out of phase by 120°.
(B) in phase.
(C) out of phase by 90°.
(D) out of phase by 180°.

22. In the a.c. mains supply of 240 *V* (r.m.s), the peak value of the voltage is equal to -

(A) 240 *V*.
(B) 170 *V*.
(C) 338 *V*.
(D) 480 *V*.

23. When a d.c. supply is connected to a coil of inductance L and resistance R, the current rises at a rate which depends on the time constant -

(A) $\frac{L}{R}$.
(B) $\frac{R}{L}$.
(C) LR.
(D) $\frac{1}{2}RL$.

24. An induced *emf* is obtained between the ends of a horizontal steel axle X of a train moving due east. This is because -

(A) X-points due east.
(B) Earth's magnetic field has a horizontal component.
(C) X-moves parallel to the earth's field.
(D) Earth has a vertical magnetic component.

25. A 0-10 *mA* moving coil meter of 5 Ω resistance can be converted into a 0-2 *A* Ammeter by connecting a resistance R with the meter in a way -

(A) $R = 0.025$ Ω in parallel.
(B) $R = 0.025$ Ω in series.
(C) $R = 0.1$ Ω in parallel.
(D) $R = 190$ Ω in series.

26. A thermo couple has an emf of 3 *mV*. It cannot be balanced on a potentiometer wire of length 100 *cm* connected to a supply of 2.0 *V* because -

(A) the current in the wire is too low.
(B) the wire p.d. is too high.
(C) the thermo couple emf needs to be lower.
(D) the balancing length would be too high.

27. The wire on a metre bridge is 100 *cm* long. For the most accurate measurement of an unknown resistance, the balance point on the wire in *cm* should best be in the range -

(A) 0 – 20.
(B) 20 – 40.
(C) 40 – 60.
(D) 80 – 100.

28. The mechanism which transfers heat energy into electrical energy is known as -

(A) Joule-Thomson effect.
(B) Ohmic effect.
(C) Seebeck effect.
(D) Johnson heat effect.

29. The efficiency of a power generator tends to 100% as the load resistance R tends to -

(A) infinity.
(B) zero.
(C) its internal resistance.
(D) twice its internal resistance.

30. The capacitance of a parallel plate capacitor of cross section A, permittivity ε and separation of parallel plates d is given by -

(A) $C = \frac{d\varepsilon}{A}$.
(B) $C = \frac{dA}{\varepsilon}$.
(C) $C = \frac{\varepsilon}{Ad}$.
(D) $C = \frac{\varepsilon A}{d}$.

31. For an intrinsic semiconductor, which of the following statements is not valid?

(A) Intrinsic semiconductor is perfect insulator at 0 K.
(B) The number of charge carriers varies exponentially with temperature.
(C) The number density of electrons is always higher than that of holes.
(D) The mobility of electrons is more than that of holes.

32. The three lattice parameters of a crystal are equal but mutually perpendicular to one another. The nature of such crystal system is -

(A) hexagonal.
(B) orthorhombic.
(C) tetragonal.
(D) cubic.

33. Fusion reaction takes place at a high temperature because -

(A) atoms are ionised at high temperature.
(B) molecules break up at high temperature.
(C) nuclei break up at high temperature.
(D) the kinetic energy is high enough to overcome repulsion between nuclei.

34. If we consider electrons and photons of same wavelength, then they will have same -

(A) energy.
(B) velocity.
(C) angular momentum.
(D) linear momentum.

35. The different lines in the Lyman series have their wavelengths lying between -

(A) 100 nm to 150 nm.
(B) 90 nm to 120 nm.
(C) 50 nm to 100 nm.
(D) 1000 nm to 2000 nm.

36. In a hydrogen atom, the radius of electron orbit is governed by Bohr's quantum rule which states that -

(A) the linear momentum of the electron is quantised.
(B) the angular momentum of the electron is quantised.
(C) the linear velocity of the electron is quantised.
(D) the angular velocity of the electron is quantised.

37. X-rays of frequency v are used to irradiate sodium and copper surface in two separate experiments and the stopping potential is determined. Then the stopping potential -

(A) is more for copper than sodium.
(B) is more for sodium than copper.
(C) is same for sodium and copper.
(D) for both will vary as $1/v$.

38. Photoelectric effect was discovered by -

(A) Einstein. (B) Max Planck.
(C) Lenz. (D) de Broglie.

39. A lens behaves as converging lens in air and a diverging lens in water. The refractive index of the material of the lens is -

(A) equal to unity. (B) equal to 1.33.
(C) between unity and 1.33. (D) greater than 1.33.

40. Huygens's principle states that every point on a wavefront is to be considered as a source of secondary -

(A) plane wavelets. (B) spherical wavelets.
(C) cylindrical wavelets. (D) wavelets of different shapes.

41. The water level in a tank is kept at constant height while water flows out of tank through a narrow tube at a depth h below the water head. The velocity v of the water flowing out of the tube is -

(A) gh. (B) $\sqrt{2gh}$.

(C) $2\,gh$. (D) $\frac{hg}{2}$.

42. A vertical spring fixed at one end has a mass of 2.0 *kg* attached at the other end. If the spring constant $k = 4N\ cm^{-1}$, then the extension of the spring is equal to -

(A) 0. 5 *m*. (B) 0.05 *m*.
(C) 0.005 *m*. (D) 4.0 *m*.

43. If a motorcycle moves round a circular road of radius *r* at a constant speed *v*, then -

(A) its velocity changes with the acceleration as $\frac{v}{r^2}$.
(B) there is no net force on the car as its speed is constant.
(C) the force on the car is outward from the centre and is $\frac{v^2}{r}$.
(D) the force on the car is towards the centre and is $\frac{mv^2}{r}$.

44. An aeroplane lands on the run way with a velocity of $100ms^{-1}$ and decelerates $10ms^{-2}$ to a velocity of $10ms^{-1}$. What is the distance it travelled on the runway?

(A) 100 *m*. (B) 495 *m*.
(C) 90 *m*. (D) 990 *m*.

45. Dark lines in the solar spectrum is known as -

(A) Fresnel's Lines. (B) Emission Lines.
(C) Balmer Lines. (D) Fraunhofer Lines.

46. The integral $\int \frac{\text{Cos}\, x}{\text{Sin}\, x} dx$ is equal to -

(A) Cosec *x*. (B) Sec *x* tan *x*.
(C) Sin (Cos *x*). (D) Log (Sin *x*).

47. Kinetic energy of the gram molecule of a gas is given by -

(A) $\frac{1}{2}$kT. (B) $\frac{1}{2}$RT.

(C) $\frac{3}{2}$RT. (D) kT.

48. Force of attraction between molecules of different substances are called -

(A) Cohésion. (B) Adhésion.
(C) Friction. (D) Effusion.

49. Solutions exerting the same osmotic pressure are called -

(A) ideal solutions. (B) isotoric solutions.
(C) isotopic solutions. (D) electrolytic solutions.

50. The law of diffusion is known as -

(A) Fick's Law. (B) Pascal's Law.
(C) Reynolds's Law. (D) Coulomb's Law.

51. Select the wrong statement in the following:-

(A) Lines of force start from the north pole and end at the south pole of a magnet.
(B) No two lines of force intersect.
(C) The strength of the magnetic field is the largest where the lines of force crowd together.
(D) The lines of force are real curves which are invisible to human eye.

52. When a ferro magnetic substance is heated to a temperature higher than its curie temperature, it -

(A) behaves like a paramagnetic substance.
(B) behaves like a diamagnetic substance.
(C) remains ferromagnetic.
(D) is permanently magnetised.

53. A carbon resistor is marked in coloured bands of red, black, orange and silver. Its resistance is -

(A) 20 kΩ. (B) 200 Ω.
(C) 2 kΩ. (D) 200 kΩ.

54. A charge q is placed at the centre of the line joining two equal charges Q. The system of the three charges will be in equilibrium if q is equal to -

(A) – Q/2. (B) – Q/4.
(C) Q/2. (D) Q/4.

55. In a sinusoidal wave, the time required for a particular point to move from maximum displacement to zero displacement is 0.17s. The frequency of the wave is -

(A) 1.47 Hz. (B) 0.36 Hz.
(C) 0.73 Hz. (D) 2.94 Hz.

56. The potential energy of a particle executing simple harmonic motion at a distance x from the equilibrium position is proportional to -

(A) $(x)^{1/2}$. (B) x.
(C) x^2. (D) x^3.

57. Which of the following is not transverse waves?

(A) Waves produced in air by a vibrating tuning fork.
(B) Thermal radiation received from the Sun.
(C) Waves produced on the surface of water by dropping a stone.
(D) X-rays.

58. Two vessels of different materials are similar in size in every respect. The same quantity of ice filled in them gets melted in 20 minutes and 40 minutes respectively. The ratio of their thermal conductivities is -

(A) 5 : 6. (B) 1 : 2.
(C) 3 : 1. (D) 2 : 1.

59. At zero Kelvin which of the following properties of a gas will be zero?

(A) Kinetic energy. (B) Potential energy.
(C) Vibrational energy. (D) Density.

60. In isothermal expansion, the pressure is determined by -

(A) temperature only.
(B) compressibility only.
(C) both compressibility and temperature.
(D) neither compressibility nor temperature.

61. Theoretically, the value of Poisson's ratio of any substance must be less than -

(A) 0.2. (B) 0.5.
(C) 1.0. (D) 2.0.

62. If the two impinging bodies are perfectly plastic, then its coefficient of restitution e satisfies -

(A) $e = 0$.
(B) $e = 1$.
(C) $e > 0$
(D) $e < 0$

63. Within the elastic limit, ratio of lateral strain to the tangential strain for any material acted up on a force is called -

(A) Poisson's ratio.
(B) Reynolds's ratio.
(C) Searle's ratio.
(D) Young's ratio.

64. Positron is the -

(A) antiproton.
(B) anti-neutron.
(C) antihydrogen.
(D) antielectron.

65. The relation that establishes the contact between the wave picture and the particle picture is given by -

(A) $\lambda \bullet p = h$.
(B) $E = \left(n + \frac{1}{2}\right)\hbar\omega$.
(C) $\Delta x \bullet \Delta p \geq \hbar$.
(D) $\hat{H}\psi = E\psi$.

66. A cube of ice is floating in a liquid of relative density 1.25 contained in a beaker. When the ice melts, the level of the liquid in the beaker -

(A) rises.
(B) falls.
(C) remains unchanged.
(D) first falls and then rises.

67. Modulus of elasticity is explained by -

(A) Bernoulli's theorem.
(B) Newton's Law.
(C) Hooke's Law.
(D) Young's Law.

68. In planetary motion -

(A) the speed along the orbit remains constant.
(B) the angular speed remains constant.
(C) the total angular momentum remains constant.
(D) the radius of the orbit remains constant.

69. A mass m is moving with a constant velocity along a line parallel to the x-axis away from the origin. Its angular momentum with respect to origin -

(A) is zero.
(B) remains constant.
(C) goes on increasing.
(D) goes on decreasing.

70. Which one of the following has the dimensions of $ML^{-1}T^{-2}$?

(A) Torque.
(B) Surface tension.
(C) Viscosity.
(D) Stress.

71. Which of the following represents increasing order of wavelength?

(A) Ultraviolet, near infra red, visible, microwaves.
(B) Near infra red, ultraviolet, microwaves, radio waves.
(C) Cosmic rays, ultraviolet, visible, infra red.
(D) X-rays, visible, ultraviolet, infra red.

72. Ohm is the SI unit of -

(A) resistance.
(B) reactance.
(C) impedance.
(D) All of the above.

73. How many electrons pass through a conductor in one minute if the current through it is 1 mA?

(A) 37.5×10^{17}.
(B) 3.75×10^{17}.
(C) 3.75×10^{19}.
(D) 37.5×10^{19}.

74. Isotopes of a given element must have same -

(A) atomic weight.
(B) molecular weight.
(C) number of protons.
(D) number of neutrons.

75. The period of oscillation of a thin bar magnet is 2s. If it is cut into two equal parts along the axis, the period of oscillation of each part will be -

(A) 2s.
(B) 4s.
(C) 1s.
(D) 0.5s.

CHEMISTRY

76. For a first order reaction, the half life $t_{1/2}$ -

(A) increases with decreasing concentration.
(B) remains constant.
(C) decreases with decreasing concentration.
(D) reduces exponentially with concentration.

77. Sodium hydroxide solution can be used to separate a mixture of -

(A) Al^{3+} and Sn^{2+}.
(B) Al^{3+} and Zn^{2+}.
(C) Zn^{2+} and Sn^{2+}.
(D) Al^{3+} and Fe^{3+}.

78. A mixture of benzaldehyde and formaldehyde on heating with aqueous NaOH solution gives -

(A) benzyl alcohol and sodium formate
(B) sodium benzoate and methyl alcohol.
(C) sodium benzoate and sodium formate.
(D) benzyl alcohol and methyl alcohol.

79. Which among the following is a polar molecule?

(A) CCl_4
(B) CH_3Cl
(C) CH_4
(D) CO_2

80. The ratio between root mean square velocity : average velocity : most probable velocity of molecules is -

(A) $\sqrt{3} : \sqrt{\frac{8}{\Pi}} : \sqrt{2}$.
(B) $\sqrt{\frac{8}{\Pi}} : \sqrt{3} : \sqrt{2}$.
(C) $\sqrt{2} : \sqrt{3} : \sqrt{\frac{8}{\Pi}}$.
(D) $\sqrt{3} : \sqrt{2} : \sqrt{\frac{8}{\Pi}}$

81. Which of the following solutions will freeze at lowest temperature?

(A) 0.1 M NaCl
(B) 0.1 M $MgCl_2$
(C) 0.1 M $Al_2(SO_4)_3$
(D) 0.1 M $KMnO_4$

82. The relationship between entropy change and heat change at a given temperature is -

(A) $ds = Tdq$. (B) $dq = Tds$.
(C) $ds = -dq/T$. (D) $-ds = Tdq$.

83. The molecular weight of benzoic acid in benzene as determined by depression in freezing point method corresponds to -

(A) Ionization of benzoic acid. (B) Salvation of benzoic acid.
(C) Dimerization of benzoic acid. (D) Dissociation of benzoic acid.

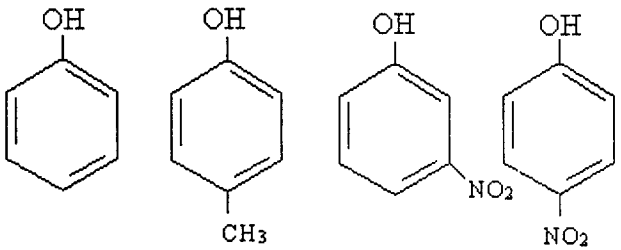
84. Avogadro number of helium atoms weigh -

(A) 1.00 gram. (B) 4.00 gram.
(C) 2.00 gram. (D) $4.00 \times 6.023 \times 10^{-23}$ g.

85. Sodium thiosulphate is prepared by -

(A) reducing Na_2SO_3 solution with H_2S.
(B) boiling Na_2SO_3 solution with S in alkaline solution.
(C) neutralizing H_2SO_3 solution with NaOH.
(D) boiling Na_2SO_3 solution with S in acidic medium.

86. In the following molecule the order of acidity is -



I II III IV

(A) III > IV > I > II (B) I > IV > III > II
(C) IV > III > I > II (D) II > I > III > IV

87. Which one of the molecules is planar?

(A) NF_3. (B) NCl_3.
(C) PH_3. (D) BF_3.

88. Gold colloidal nano particles exhibit different colours because of -

(A) variable valency of gold.
(B) different concentrations.
(C) presence of impurities.
(D) different diameters of colloidal particles.

89. Among the four statements, one of them is not true. This statement is -

(A) The catalyst remains unchanged in a chemical reaction.
(B) The catalyst does not alter the position of equilibrium for a given reversible reaction.
(C) Catalysts are some times specific in favouring the reaction.
(D) The catalyst inhibits a chemical reaction.

90. The solubility product of magnesium phosphate is equal to -

(A) $[Mg^{2+}]\,[PO_4^{3-}]$.
(B) $[Mg^{2+}]\,[PO_4^{3-}]^3$.
(C) $[Mg^{2+}]^3\,[PO_4^{3-}]^2$.
(D) $[Mg^{2+}]^3\,[PO_4^{3-}]$.

91. An aqueous solution of $FeSO_4$, $Al_2(SO_4)_3$, and chrome alum is heated with excess of Na_2O_2 and filtered. The materials obtained are -

(A) a colourless filtrate and a green residue.
(B) a yellow filtrate and a green residue.
(C) a yellow filtrate and a brown residue.
(D) a green filtrate and a brown residue.

92. In which of the following compound both ionic and covalent bonds are represented?

(A) NaCl.
(B) $MgCl_2$.
(C) NH_4Cl.
(D) PCl_5.

93. Toluene on reaction with chlorine in the presence of ferric chloride gives predominantly -

(A) Benzyl chloride.
(B) Para chlorotoluene.
(C) Ortho and para chlorotoluene.
(D) Meta chlorotoluene.

94. Which of the following does not contain a carboxylic group?

(A) Tartaric acid. (B) Picric acid.
(C) Malonic acid. (D) Lactic acid.

95. Acetanilide with NaOH gives -

(A) Acetic acid and aniline. (B) Sodium acetate and aniline.
(C) Ammonia and acetic acid. (D) Benzene and actamide.

96. Which of the following form a Diels Alder adduct easily?

(A) Pyrrole. (B) Benzene.
(C) Pyridine. (D) Furan.

97. Nitrobenzene heated with Zn dust and aqueous ammonium chloride gives predominantly -

(A) Phenyl hydroxylamine. (B) Nitrobenzene.
(C) Aniline. (D) Azobenzene.

98. In the "nitrating mixture" concentrated sulphuric acid is used -

(A) as sulphonating agent.
(B) as dehydrating agent.
(C) for the formation of nitrate ions.
(D) for the formation of nitronium ions.

99. The carbohydrate which has extremely high molecular weight is -

(A) Cellulose. (B) Maltose.
(C) Lactose. (D) Sucrose.

100. The metal alkyl which was used to increase octane number is -

(A) $(C_2H_5)_4Pb$. (B) $(CH_3)_2H_8$.
(C) $(C_2H_5)_4Sn$. (D) C_4H_9Li.

101. The effect of adding cryolite to alumina during electrolysis is -

(A) lowering the melting point and lowering the electrical conductivity.
(B) lowering the melting point and increasing the electrical conductivity.
(C) increasing the electrical conductivity and increasing the melting point.
(D) removing impurities from alumina.

102. Ammonia can be dried using -

(A) Conc. H_2SO_4. (B) P_4O_{10}.
(C) Quicklime. (D) $CaCl_2$.

103. Which of the following compounds is not aromatic?

(A) Cyclobutadiene. (B) Cyclopentadienyl anion.
(C) Cyclopropenium cation. (D) Tropylium cation.

104. The digestion of proteins involves their -

(A) denaturation. (B) oxidation.
(C) reduction. (D) hydrolysis.

105. Ascorbic acid is -

(A) vitamin A. (B) vitamin C.
(C) vitamin D. (D) vitamin E.

106. The least stable cycloalkane is -

(A) Cyclopropane. (B) Cyclohexane.
(C) Cyclobutane. (D) Cyclopentane.

107. The major product of the addition of HCl to pentene-1 is -

(A) 3-chloropentane. (B) 2-chloropentane.
(C) 1-chloropentane. (D) 1, 2-dichloropentane.

108. Geometrical isomerization is possible in the case of -

(A) Pentane. (B) Propane.
(C) Propyne. (D) Butene-2

109. Urea is decomposed into N_2 and CO_2 by _____ acid.

(A) HCl (B) H_2SO_4
(C) HNO_3 (D) HNO_2

110. Aldehydes and ketones can be distinguished by testing with -

(A) Phenylhydrazine. (B) Semicarbazide.
(C) Sodium bisulphate. (D) Ammonical silver nitrate.

111. Heating a carboxylic acid with sodalime leads to -

(A) Dehydroxylation. (B) Dehydration.
(C) Carboxylation. (D) Decarboxylation.

112. Sodium bismuthate is used for testing -

(A) Co. (B) No.
(C) Mn. (D) Al.

113. The IUPAC name of the compound $CH_3.CHOH.CH_2CH_3$ is -

(A) 1-methyl propanol-2. (B) Butanol-2.
(C) 2 hydroxybutane. (D) 1 methyl propanol-1.

114. Household gaseous fuel (liquefied petroleum gas) contains -

(A) CH_4. (B) C_2H_6.
(C) C_3H_8. (D) C_4H_{10}.

115. A Frenkel defect in a solid is caused by -

(A) vacancy of cation.
(B) vacancy of anion.
(C) vacancy of both cation and anion.
(D) ion occupying interstitial position.

116. The oxidation state of sulphur in Na_2SO_4 is -

(A) +2. (B) +4.
(C) +6. (D) –2.

117. Benzyl alcohol is obtained from benzaldehyde by -

(A) Wurtz reaction. (B) Cannizaro reaction.
(C) Claisen reaction. (D) Perkin reaction.

118. Which of the following statements is not correct regarding aniline?

(A) It is less basic than ethylamine.
(B) It can be steam distilled.
(C) It reacts with sodium to give hydrogen.
(D) It is soluble in water.

119. Which of the statements is true for $CsBr_3$?

(A) It contains Cs^{3+} and 3 Br^- ions.
(B) It contains Cs^+, Br^- ions and Br_2 molecule.
(C) It contains Cs^+ and Br_3^- ions.
(D) It is not an ionic compound.

120. Pairing of electrons in degenerate orbitals occurs only after each of these degenerate orbitals are singly occupied. This is a statement of -

(A) Pauli's principle.
(B) Heisenberg principle.
(C) Hund's rule.
(D) de Broglie relationship.

121. The decreasing ionic size order among the ions Na^+, Al^{3+}, Mg^{2+} is -

(A) $Na^+ > Mg^{2+} > Al^{3+}$.
(B) $Mg^{2+} > Al^{3+} > Na^+$.
(C) $Al^{3+} > Na^+ > Mg^{2+}$.
(D) $Na^+ > Al^{3+} > Mg^{2+}$.

122. Which of the following equations is correct?

(A) $K_p = K_c(\Delta v)_e$
(B) $K_p = K_c(RT)^{\Delta n}$.
(C) $K_p = K_c \Delta n$.
(D) $K_p = K_c(\Delta v)^T$.

123. The electronic configuration of chromium atom is different from what is expected according to Aufbau principle. This is because -

(A) chromium is a transition metal.
(B) chromium exhibits variable valency.
(C) the given statement is wrong.
(D) half filled 'd' orbitals give rise to extra stability to the atom.

124. The density of a crystal ρ is given by (a = unit cell length, M = atomic weight, N_A = Avogadro number, Z = effective number of atoms in a unit cell) -

(A) $a^3M/Z\,N_A$.
(B) $N_AM/Z\,a^3$.
(C) ZM / a^3N_A.
(D) a^3N_A/ZM.

125. Atoms that contain the same number of neutrons in their nuclei are called -

(A) Isotopes.
(B) Isobars.
(C) Isotones.
(D) None of the above.

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