Dual Degree B.Sc. (Hons.) Chemistry-M.Sc. Chemistry with Biology at 10+2 level Entrance Test, 2022

PHYSICS

1. A baseband signal of 3.5 MHz frequency is modulated with a carrier signal of 3.5 GHz frequency using amplitude modulation method. What should be the minimum size of antenna required to transmit the modulated signal ?

    (A) 21.4 m   (B) 42.8 mm

    (C) 21.4 mm   (D) 42.8 m

2. If surface tension (S), Moment of inertia (I) and Planck's constant (h), were to be taken as the fundamental units, the dimensional formula for linear momentum would be :

    (A) $S^{1/2} I^{1/2} h^0$ (B) $S^{3/2} I^{1/2} h^0$

    (C) $S^{1/2} I^{1/2} h^{-1}$ (D) $S^{1/2} I^{3/2} h^{-1}$

3. The diameter of a cylinder is measured using a vernier calipers with no zero error. It is found that the zero of the vernier scale lies between 5.10 cm and 5.15 cm of the main scale. The vernier scale has 50 divisions equivalent to 2.45 cm. The 24th division of the vernier scale exactly coincides with one of the main scale divisions. The diameter of the cylinder is :

    (A) 5.148 cm   (B) 5.136 cm

    (C) 5.124 cm   (D) 5.112 cm

4. During the padding of a bicycle, the force of friction exerted by the ground on the two wheels is such that it acts :

(A) in the forward direction on the front wheel and in the backward direction on the rear wheel

(B) in the backward direction on both the front and the rear wheels

(C) in the forward direction on both the front and the rear wheels

(D) in the backward direction on the front wheel and in the forward direction on the rear wheel

5. The position of a particle as a function of time t, is given by $x(t) = at + bt^2 - ct^3$ where a, b and c are constants. When the particle attains zero acceleration, then its velocity will be :

(A) $a + \dfrac{b^2}{4c}$

(B) $a + \dfrac{b^2}{2c}$

(C) $a + \dfrac{b^2}{c}$

(D) $a + \dfrac{b^2}{3c}$

6. An ideal spring with spring constant k is hung from the ceiling and a block of mass M is attached to its lower end. The mass is released with the spring initially unstretched. Then the maximum extension in the spring is :

(A) $\dfrac{4Mg}{k}$

(B) $\dfrac{2Mg}{k}$

(C) $\dfrac{Mg}{k}$

(D) $\dfrac{Mg}{2k}$

7. A bob of mass M is suspended by a massless string of length L. The horizontal velocity V at position A is just sufficient to make it reach the point B. The angle θ at which the speed of the bob is half of that at A, satisfies :
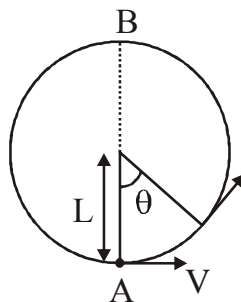
(A) $\theta = \dfrac{\pi}{4}$

(B) $\dfrac{\pi}{4} < \theta < \dfrac{\pi}{2}$

(C) $\dfrac{\pi}{2} < \theta < \dfrac{3\pi}{4}$

(D) $\dfrac{3\pi}{4} < \theta < \pi$

8. A satellite of mass M is in a circular orbit of radius R about the centre of the earth. A meteorite of the same mass falling towards the earth collides, with the satellite completely inelastically. The speeds of the satellite and the meteorite are the same, just before the collision. The subsequent motion of the combined body will be :

(A) in the same circular orbit of radius R

(B) in an elliptical orbit

(C) such that it escape to infinity

(D) in a circular orbit of a different radius

9. If resultant of all the external forces acting on a system of particles is zero, then from an inertial frame of reference, one can say surely that :

(A) angular momentum of the system does not change with time

(B) kinetic energy of the system does not change with time

(C) potential energy of the system does not change with time

(D) linear momentum of the system does not change with time

10. From a solid sphere of mass M and radius R a cube of maximum possible volume is cut. Moment of inertia of cube about an axis passing through its center and perpendicular to one of its faces is :

(A) $\dfrac{MR^2}{32\sqrt{2}\pi}$

(B) $\dfrac{4MR^2}{3\sqrt{3}\pi}$

(C) $\dfrac{4MR^2}{9\sqrt{3}\pi}$

(D) $\dfrac{MR^2}{16\sqrt{2}\pi}$

11. A cylinder rolls up an inclined plane, reaches some height and then rolls down (without slipping through these motions). The direction of the frictional force acting on cylinder are :

(A) up the incline while ascending and down the incline while descending.

(B) up the incline while ascending as well as descending.

(C) down the incline while ascending as well as descending.

(D) down the incline while ascending and up the incline while descending.

12. A satellite is revolving in a circular orbit at a height h from the earth's surface, such that $h \ll R$, where R is the radius of the earth. Assuming that the effect of earth's atmosphere can be neglected, what is the minimum increase in speed required so that the satellite could escape from the gravitational field of earth ?

(A) $\sqrt{gR}\left(\sqrt{2}-1\right)$

(B) $\sqrt{gR}$

(C) $\sqrt{2gR}$

(D) $\sqrt{\dfrac{gR}{2}}$

13. A thin uniform cylindrical shell, closed at both ends, is partially filled with water. It is floating vertically in water in half-submerged state. If ρ_c is the relative density of the material of the shell with respect to water, then the correct statement is that the shell is :

(A) more than half-filled if ρ_c is less than 0.5

(B) more than half-filled if ρ_c is more than 1.0

(C) half-filled if ρ_c is more than 0.5

(D) less than half-filled if ρ_c is less than 0.5

14. A particle of mass m is executing oscillations about the origin on the x-axis. Its potential energy is $V(x) = k|x|^3$, where k is a positive constant. If the amplitude of oscillation is a, then its time period T is :

(A) Proportional to $\dfrac{1}{\sqrt{a}}$

(B) Independent of a

(C) Proportional to $\sqrt{a}$

(D) Proportional to $a^{3/2}$

15. Two rods of different materials having coefficient of thermal expansion α_1, α_2 and Young's modulii Y_1, Y_2 respectively are fixed between two rigid massive walls. The rods are heated such that they undergo the same increase in temperature. There is no bending of rods. If $\alpha_1 : \alpha_2 = 2 : 3$, the thermal stresses developed in the two rods are equal provided $Y_1 : Y_2$ is equal to :

(A) 2 : 3   (B) 3 : 2

(C) 1 : 1   (D) 4 : 9

16. When a capillary is immersed in a liquid, then liquid of mass M rises in the capillary tube. If capillary tube of double the radius is taken, then the mass of same liquid rising in the tube is :

(A) M

(B) 4 M

(C) 2 M

(D) $\dfrac{M}{2}$

17. In a given process on an ideal gas, $dW = 0$ and $dQ < 0$. Then for the gas :

(A) The temperature will increase

(B) The volume will increase

(C) The pressure will remain constant

(D) The temperature will decrease

18. In the experiment to determine the speed of sound using a resonance column :

(A) In one of the two resonances observed, the length of the resonating air column is close to half of the wavelength of sound in air

(B) In one of the two resonances observed, the length of the resonating air column is close to the wavelength of sound in air

(C) Prongs of the tuning fork are kept in a horizontal plane

(D) Prongs of the tuning fork are kept in a vertical plane

19. Two vibrating strings of same material but lengths L and 2L have radii $2r$ and r respectively. They are stretched under the same tension and vibrate in their fundamental modes with frequencies f_1 and f_2 respectively. The ratio of f_1/f_2 is given by (strings are fixed at both ends) :

(A) 1 (B) 2

(C) 4 (D) 8

20. A parallel plate capacitor of capacitance C is connected to a battery and is charged to a potential difference V. Another capacitor of capacitance 2C is similarly charged to a potential difference 2V. The charging battery is now disconnected and the capacitors are connected in parallel to each other in such a way that the positive terminal of one is connected to the negative terminal of the other. The final energy of the configuration is :

(A) Zero (B) $\dfrac{3CV^2}{2}$

(C) $\dfrac{25CV^2}{6}$ (D) $\dfrac{9CV^2}{2}$

21. Which of the following statements is *false* ?

(A) In a balanced Wheatstone bridge, if the cell and the galvanometer are exchanged, the null point is disturbed

(B) A rheostat can be used as a potential divider

(C) Kirchhoff's second law represents energy conservation

(D) Wheatstone bridge is the most sensitive when all the four resistances are of the same order of magnitude.

22. Mobility of electrons in a semiconductor is defined as the ratio of their drift velocity to the applied electric field. If, for an *n*-type semiconductor, the density of electrons is 10^{19} m^{-3} and their mobility is 1.6 m^{2}V^{-1}s^{-1}, then the resistivity of the semiconductor (since it is an *n*-type semiconductor contribution of holes is ignored) is close to :

(A) 2 Ω m (B) 0.2 Ω m

(C) 0.4 Ω m (D) 4 Ω m

23. An ionized gas contains both positive and negative ions. If it is subjected simultaneously to an electric field along the +ve X-axis and a magnetic field along the +*z*-direction, then :

(A) Positive ions deflect towards +*y*-direction and negative ions towards − *y*-direction

(B) All ions deflect towards − *y*-direction

(C) All ions deflect towards + *y*-direction

(D) Positive ions deflect towards − *y*-direction and negative ions towards + *y*-direction.

24. A current I flows along the length of an infinitely long, straight, thin walled pipe. Then :

(A) The magnetic field at all points inside the pipe is the same but not zero

(B) The magnetic field is zero only on the axis of the pipe

(C) The magnetic field is different at different points inside the pipe

(D) The magnetic field at any point inside the pipe is zero

25. The image of an object, formed by a plano-convex lens at a distance of 8 m behind the lens, is real and is one-third the size of the object. The wavelength of light inside the lens is 2/3 times the wavelength in free space. The radius of the curved surface of the lens is :

(A) 3 m   (B) 1 m

(C) 2 m   (D) 4 m

26. In a double-slit experiment, instead of taking slits of equal width, one slit is made twice as wide as the other. Then in the interference pattern :

(A) the intensity of the maxima increases and the minima has zero intensity

(B) the intensities of both the maxima and the minima increases

(C) the intensity of maxima decreases and that of minima increases

(D) the intensity of maxima decreases and the minima has zero intensity

27. Two radioactive materials X_1 and X_2 have decay constants 10λ and λ respectively. If initially they have the same number of nuclei, then the ratio of the number of nuclei of X_1 to that of X_2 will be $1/e$ after a time :

(A) $\dfrac{1}{10\lambda}$

(B) $\dfrac{1}{11\lambda}$

(C) $\dfrac{11}{10\lambda}$

(D) $\dfrac{1}{9\lambda}$

28. During the propagation of electromagnetic waves in a medium :

(A) Both electric and magnetic energy densities are zero

(B) Electric energy density is double of the magnetic energy density

(C) Electric energy density is half of the magnetic energy density

(D) Electric energy density is equal to magnetic energy density

29. A strip of copper and another germanium are cooled from room temperature to 80 K. The resistance of :

(A) each of these decreases

(B) copper strip increases and that of germanium decreases

(C) copper strip decreases and that of germanium increases

(D) each of these increases.

30. The density of a solid ball is to be determined in an experiment. The diameter of the ball is measured with a screw gauge, whose pitch is 0.5 mm and there are 50 divisions on the circular scale. The reading on the main scale is 2.5 mm and that on the circular scale is 20 divisions. If the measured mass of the ball has a relative error of 2%, the relative percentage error in the density is :

(A) 0.9%

(B) 2.4%

(C) 3.1%

(D) 4.2%

31. If an emitter current is changed by 4 mA, the collector current changes by 3.5 m A. The value of β will be :

(A) 0.875

(B) 0.5

(C) 3.5

(D) 7

32. An airplane is moving with a horizontal velocity v at a height h above a level plane. If a projectile is fired from a gun at an instant when the plane is vertically above the gun, what is the minimum initial velocity of the projectile in order to hit the plane ?

(A) $\sqrt{v^2 + 2gh}$

(B) $\sqrt{2gh}$

(C) $\sqrt{v^2 - 2gh}$

(D) None of the above

33. Unpolarized light of intensity I_0 is incident on surface of a block of glass at Brewster's angle. In that case, which one of the following statements is true ?

(A) Reflected light is completely polarized with intensity less than $I_0/2$.

(B) Transmitted light is completely polarized with intensity less than $I_0/2$

(C) Transmitted light is partially polarized with intensity $I_0/2$

(D) Reflected light is partially polarized with intensity $I_0/2$

CHEMISTRY

34. Bond angle of 120° is found in :

(A) PH_3 (B) NCl_3

(C) ClF_3 (D) BCl_3

35. What is the pH of the resulting solution when equal volumes of 0.1 M NaOH and 0.01 M HCl are mixed ?

(A) 7.0   (B) 1.04

(C) 12.65   (D) 2.0

36. In the exothermic reaction, the enthalpy of reaction is always :

(A) Zero   (B) Positive

(C) Negative   (D) None of these

37. When is deviation more in the behaviour of a gas from the ideal gas equation $PV = nRT$?

(A) At high temperature and low pressure

(B) At low temperature and high pressure

(C) At high temperature and high pressure

(D) At low temperature and low pressure

38. Electromagnetic radiation with maximum wavelength is :

(A) Ultraviolet   (B) Radiowave

(C) X-ray   (D) Infrared

39. Which one of the following is the correct electronic configuration of gold (ground state) ?

(A) $[Xe]\ 6s^2\ 4f^{14}\ 5d^9$ (B) $[Xe]\ 6s^1\ 4f^{14}\ 5d^{10}$

(C) $[Xe]\ 6s^2\ 4f^{13}\ 5d^{10}$ (D) $[Xe]\ 6s^2\ 4f^{14}\ 5d^{10}$

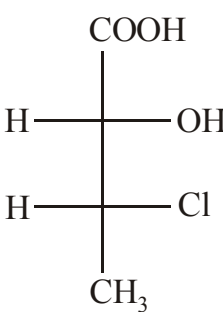**40.** Which one of the following is the correct order of increasing covalent character of halides of Al^{3+} ?

(A) $AlF_3 < AlCl_3 < AlBr_3 < AlI_3$

(B) $AlI_3 < AlBr_3 < AlCl_3 < AlF_3$

(C) $AlF_3 < AlBr_3 < AlCl_3 < AlI_3$

(D) $AlCl_3 < AlF_3 < AlBr_3 < AlI_3$

41. The correct geometry and hybridization for XeF_4 are :

(A) Octahedral, sp^3d^2

(B) Trigonal bipyramidal, sp^3d

(C) Planar triangle, sp^3d^3

(D) Square planar, sp^3d

42. During an adiabatic process, the pressure of a gas is found to be proportional to the cube of its absolute temperature. The ratio C_p/C_v for the gas is :

(A) 2   (B) 3/2

(C) 4/3   (D) 5/3

43. A metal crystallizes in a face centred cubic structure. If the edge length of its unit cell is 'a', the closest approach between two atoms in metallic crystal will be :

(A) $2a$ (B) $2\sqrt{2}\,a$

(C) $\sqrt{2}\,a$ (D) $a/\sqrt{2}$

44. In the electrolytic cell, flow of electrons is from :

(A) Cathode to anode in solution

(B) Cathode to anode through external supply

(C) Cathode to anode through internal supply

(D) Anode to cathode through internal supply

45. If 75% of a sample of pure $^{3}_{1}H$ decays in 24.6 years, what is the half-life of $^{3}_{1}H$?

(A) 24.6 years   (B) 18.4 years

(C) 6.15 years   (D) 12.3 years

46. The right option for the statement "Tyndall effect is exhibited by" is :

(A) Starch solution   (B) Urea solution

(C) NaCl solution   (D) Glucose solution

47. How many bridging oxygen atoms are present in P_4O_{10} ?

(A) 6   (B) 4

(C) 5   (D) 2

48. Hydrogen peroxide in its reaction with KIO_4 and NH_2OH respectively, is acting as a :

(A) reducing agent, oxidizing agent

(B) reducing agent, reducing agent

(C) oxidizing agent, reducing agent

(D) oxidizing agent, oxidizing agent

49. Among the following ions which one has the highest paramagnetism ?

(A) $[Cr(H_2O)_6]^{3+}$ (B) $[Fe(H_2O)_6]^{2+}$

(C) $[Cu(H_2O)_6]^{2+}$ (D) $[Zn(H_2O)_6]^{2+}$

50. In the commercial electrochemical process for aluminium extraction, the electrolyte used is :

(A) $Al(OH)_3$ in NaOH

(B) an aqueous solution of $Al_2(SO_4)_3$

(C) a molten mixture of $AlO(OH)$ and $Al(OH)_3$

(D) a molten mixture of Al_2O_3 and Na_3AlF_6

51. On heating ammonium dichromate, the gas evolved is :

(A) Oxygen   (B) Nitrogen

(C) Ammonia   (D) Nitrous oxide

52. How many isomers are possible for $[Co(en)_2Cl_2]^+$ complex ion ?

(A) 1   (B) 2

(C) 3   (D) 4

53. Arrange the decreasing order of the ionic radii of La^{3+}, Ce^{3+}, Yb^{3+}, Pm^{3+}.

(A) $La^{3+} > Ce^{3+} > Yb^{3+} > Pm^{3+}$

(B) $Ce^{3+} > La^{3+} > Yb^{3+} > Pm^{3+}$

(C) $La^{3+} > Ce^{3+} > Pm^{3+} > Yb^{3+}$

(D) $Yb^{3+} > Pm^{3+} > Ce^{3+} > La^{3+}$

54. The ratio of slopes of log P *vs* log V for reversible adiabatic process and reversible isothermal process of an ideal gas is equal to :

(A) γ (B) $-\gamma$

(C) zero   (D) -1

55. The absolute configuration of

$$
\begin{array}{c}
\text{COOH} \\
|\\
\text{H} \!-\!\!-\!\!-\!\!-\! \text{OH} \\
|\\
\text{H} \!-\!\!-\!\!-\!\!-\! \text{Cl} \\
|\\
\text{CH}_3
\end{array}
$$

is :

(A) (2S, 3R)   (B) (2S, 3S)

(C) (2R, 3R)   (D) (2R, 3S)

56. Among the following compounds the one that is most reactive towards electrophilic nitration is :

(A) Benzoic acid   (B) Nitrobenzene

(C) Toluene   (D) Benzene

57. In a S_N1 reaction on chiral centres, there is :

(A) Inversion more than retention leading to partial racemisation

(B) 100% retention

(C) 100% inversion

(D) 100% racemisation

58. An unknown alcohol is treated with the Lucas reagent to determine the alcohol is primary, secondary or tertiary. Which alcohol reacts faster and by what mechanism ?

(A) Secondary alcohol by S_N1

(B) Tertiary alcohol by S_N1

(C) Secondary alcohol by S_N2

(D) Primary alcohol by S_N1

59. Nitrobenzene on reaction with conc. HNO_3/H_2SO_4 at 80-100ºC forms which one of the following products ?

(A) 1, 4-Dinitrobenzene

(B) 1, 2, 4-Trinitrobenzene

(C) 1, 2-Dinitrobenzene

(D) 1, 3-Dinitrobenzene

60. Which of the following compounds is more basic ?

(A) O_2N—⟨benzene⟩—NH_2

(B) ⟨benzene⟩—CH_2NH_2

(C) ⟨benzene⟩—$NHCOCH_3$

(D) ⟨benzene⟩—NH_2
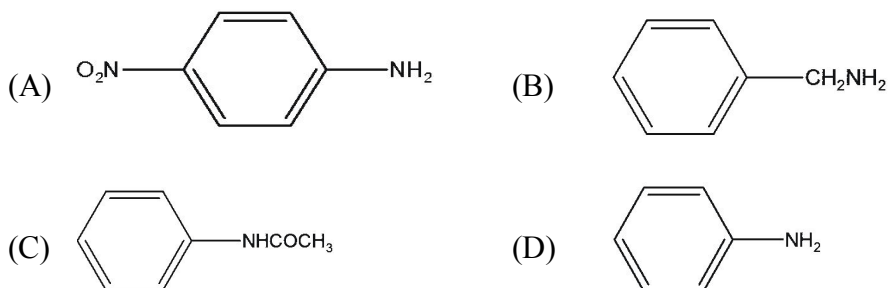
61. An organic compound 'A' has the molecular formula C_3H_6O. It undergoes iodoform test. When saturated with dil. HCl it gives 'B' of molecular formula $C_9H_{14}O$. A and B respectively are :

(A) Propanal and mesitylene

(B) Propanone and mesityl oxide

(C) Propanone and 2, 6-dimethyl –2, 5-heptadien-4-one

(D) Propanone and mesitylene oxide

62. Two forms of D-glucopyranose are called :

(A) Enantiomers   (B) Anomers

(C) Epimers   (D) Diastereomers

63. Among the following, the one that is *not* a Greenhouse gas, is :

(A) Methane

(B) Nitrous oxide

(C) Ozone

(D) Sulphur dioxide

64. Which of the following Vitamins is water-soluble ?

(A) Vitamin A   (B) Vitamin K

(C) Vitamin B   (D) Vitamin E

65. Aspirin is an acetylation product of :

(A) *o*-hydroxybenzoic acid

(B) *o*-dihydroxybenzene

(C) *m*-hydroxybenzoic acid

(D) *p*-dihydroxybenzene

66. The S in buna-S refers to :

(A) Sulphur   (B) Styrene

(C) Sodium   (D) Salicylate

BIOLOGY

67. Which one of the following are *not* polymeric ?

(A) Nucleic acid   (B) Proteins

(C) Polysaccharides   (D) Lipids

68. Metagenesis refers to :

(A) The presence of different morphic forms

(B) Alternation of generation between asexual and sexual phases of an organism

(C) Occurrence of a drastic change in form during post-embryonic development

(D) The presence of a segmented body and parthenogenetic mode of reproduction

69. In living beings, ammonia is converted into urea through :

(A) Ornithine cycle   (B) Citrulline cycle

(C) Fumarine cycle   (D) Arginine cycle

70. Vitamin-K is required for :

(A) Formation of thromboplastin

(B) Conversion of fibrinogen to fibrin

(C) Conversion of prothrombin to thrombin

(D) Synthesis of prothrombin

71. Which cells do not form layer and remain structurally separate :

(A) Epithelial cells   (B) Muscle cells

(C) Nerve cells   (D) Gland cells

72. Select the wrong statement :

(A) Bacterial cell wall is made up of peptidoglycan

(B) Pili and fimbriae are mainly involved in motility of bacterial cells

(C) Cyanobacteria lack flagellated cells

(D) Mycoplasma is a wall-less microorganism

73. In germinating seeds, fatty acids are degraded exclusively in the :

(A) Proplastids   (B) Glyoxisomes

(C) Peroxisomes   (D) Mitochondria

74. Which one of the following kinds of animals are triploblastic ?

(A) Flatworms   (B) Sponges

(C) Ctenophores   (D) Corals

75. The mechanism of ATP formation both in chloroplast and mitochondria is explained by :

(A) Relay Pump Theory of Godlewski

(B) Cholodny-Went's Model

(C) Chemiosmotic Theory

(D) Munch's Mass Flow Hypothesis

76. Magnification of compound microscope is *not* connected with :

(A) Numerical aperture   (B) Focal length of objective

(C) Focal length of eyepiece   (D) Tube length

77. Antibodies in our body are complex :

(A) Steroids   (B) Prostaglandins

(C) Glycoproteins   (D) Lipoproteins

78. Number of chromatids at metaphase is :

(A) Two each in mitosis and meiosis

(B) Two in mitosis and one in meiosis

(C) Two in mitosis and four in meiosis

(D) One in mitosis and two in meiosis

79. Stomata of a plant open due to :

(A) Influx of hydrogen ions

(B) Influx of calcium ions

(C) Efflux of potassium ions

(D) Influx of potassium ions

80. During prolonged fasting, in what sequence are the following organic compounds used up by the body :

(A) First carbohydrates, next proteins and lastly lipids

(B) First proteins, next lipids and lastly carbohydrates

(C) First carbohydrates, next fats and lastly proteins

(D) First fats, next carbohydrates and lastly proteins

81. Which of the following sets of diseases is caused by bacteria ?

(A) Cholera and tetanus

(B) Typhoid and small pox

(C) Tetanus and mumps

(D) Herpes and influenza

82. On hydrolysis, a nucleoside would not yield :

(A) Purine   (B) Pentose sugar

(C) Phosphoric acid   (D) Pyrimidine

83. Which of the following is the least likely to be involved in stabilizing the three-dimensional folding of most proteins ?

(A) Hydrogen bonds

(B) Electrostatic interaction

(C) Hydrophobic interaction

(D) Ester bonds

84. Which one of the following vertebrate organs receives the oxygenated blood only ?

(A) Gill   (B) Lung

(C) Liver   (D) Spleen

85. Angiosperm to which the largest flowers belong is :

(A) Total stem parasite (B) Partial stem parasite

(C) Total root parasite (D) Partial root parasite

86. Which of the following statements regarding enzyme inhibition is *correct* ?

(A) Competitive inhibition is seen when a substrate competes with an enzyme for binding to an inhibitor protein

(B) Competitive inhibition is seen when the substrate and the inhibitor compete for the active site on the enzyme

(C) Non-competitive inhibition of an enzyme can be overcome by adding large amount of substrate

(D) Non-competitive inhibitors often bind to the enzyme irreversibly

87. If kidneys fail to reabsorb water, the effect on tissue would :

(A) Remain unaffected

(B) Shrink and shrivel

(C) Absorb water from blood plasma

(D) Take more O_2 from blood

88. The number of base substitution possible in amino acid codons is :

(A) 261 (B) 264

(C) 576 (D) 549

89. What is common amongst parrot, platypus and kangaroo ?

(A) Homeothermy

(B) Toothless jaws

(C) Functional post-anal tail

(D) Oviparity

90. A common structural feature of vessel elements and sieve tube elements is :

(A) Presence of p-protein

(B) Pores on lateral walls

(C) Enucleate condition

(D) Thick secondary walls

91. Approximately 70% of carbon-dioxide absorbed by the blood will be transported to the lungs :

(A) As bicarbonate ions

(B) In the form of dissolved gas molecules

(C) By binding to RBC

(D) As carbaminohaemoglobin

92. Albinism is known to be due to an autosomal recessive mutation. The first child of a couple with normal skin pigmentation was an albino. What is the probability that their second child will also be an albino ?

(A) 100%

(B) 25%

(C) 50%

(D) 75%

93. The colonies of recombinant bacteria appear white in contrast to blue colonies of non-recombinant bacteria because of :

(A) Non-recombinant bacteria containing β-galactosidase

(B) Insertional inactivation of α-galactosidase in non-recombinant bacteria

(C) Insertional inactivation of α-galactosidase in recombinant bacteria

(D) Inactivation of glycosidase enzyme in recombinant bacteria

94. Stems modified into flat green organs performing the functions of leaves are known as :

(A) Phylloclades

(B) Phyllodes

(C) Scales

(D) Cladodes

95. An analysis of chromosomal DNA using the Southern hybridization technique does not use :

(A) Electrophoresis   (B) Blotting

(C) Autoradiography   (D) PCR

96. If a person shows production of interferons in his body, the chances are that he has got an infection of :

(A) Typhoid   (B) Measles

(C) Tetanus   (D) Malaria

97. Enzymes enhance the rate of reaction by :

(A) Forming a reactant-product complex

(B) Changing the equilibrium point of the reaction

(C) Combining with the product as soon as it is formed

(D) Lowering the activation energy of the reaction

98. Which is *correct* about transport or conduction of substances :

(A) Organic food moves up through phloem

(B) Organic food moves up through xylem

(C) Inorganic food moves upwardly and downwardly through xylem

(D) Organic food moves upwardly and downwardly through phloem

99. Select the correct statement from the ones given below :

(A) Barbiturates when given to criminals make them tell the truth

(B) Chewing tobacco lowers blood pressure and heart rate

(C) Morphine is often given to persons who have undergone surgery as a pain killer

(D) Cocaine is given to the patients after surgery as it stimulates recovery

100. A transgenic food crop which may help in solving the problem of nightblindness in developing countries is :

(A) *Bt.* soyabean   (B)   Golden rice

(C) Flavr savr tomatoes   (D)   Starlink maize

GENERAL APTITUDE

101. Direction : Study the following information carefully and answer the question given below :

Eight points – A, B, C, D, E, F, G and H are marked on different positions in a plane such that the ratio of the distances between points G and B, and points B and E is 2 : 3. C is 10 m to the north of F, which is 5 m to the west of A. D is 10 m to the south of B and 15 m to the east of F. The ratio of distances between points A and D and points G and B is 1 : 1. B is to the west of E. Point H is to the north of A and to the west of G.

What is the position of point G with respect to point B ?

(A) West

(B) East

(C) North

(D) North-West

102. Complete the series :

    432 443 463 500 562 ?

(A) 657

(B) 658

(C) 659

(D) 660

103. Direction : Study the following information carefully and answer the question given below :

If A + B means A is the father of B

If A × B means A is the sister of B

If A $ B means A is the wife of B

If A % B means A is the mother of B

If A ÷ B means A is the son of B

Which among the given expressions indicates that M is the daughter of D ?

(A) L % R $ D + T × M

(B) L + R $ D + M × T

(C) L % R % D + T ÷ M

(D) D + L $ R + M × T

104. Direction : Read the information carefully and answer the question given below :

Four friends – Ram, Laxman, Bharat and Shatrughan were having a conversation. They were expressing their thoughts in a coded language—

Ram says, "le po ki ba" when he wants to convey that "friends make life live". Laxman says, "te ki mo ba" when he wants to convey that "without friends life impossible". Bharat says, "lo mo se te" when he wants to convey that "without trouble gain impossible". Shatrughan says, "st ba po lo" when he wants to convey that "life make trouble joy".

What is the code for "live gain" ?

(A) le se   (B) ki le

(C) ki lo   (D) lo se

105. Hanker : .... :: Ponder : Think.

(A) Junk   (B) Fool

(C) Yearn   (D) Bunker

106. How many triangles are there in the given figure ?

(A) 8   (B) 9

(C) 10   (D) 12

107. Direction : Read the following information carefully and answer the question given below :

8 persons from A to H are sitting around a square table such that 4 persons sit at each of the corners while the rest 4 sit at the middle of the sides. The ones sitting at the corners are facing inside while the rest are facing outside. The persons whose name starts with consecutive letters do not sit adjacent. B sits second to the right of A, who is on the immediate left of C. F sits on the immediate right of D, who sits at one of the corners. At least one person sits between C and G.

Which of the following pairs represents the immediate neighbors of H ?

(A) CD   (B) FD

(C) CA   (D) FC

108. Direction : In this question on the basis of the information given in the statement, you have to assume everything in the statement to be true, then decide which of the suggested courses of action logically follow(s) for pursuing.

Give answer :

(a) If only I follows.

(b) If only II follows.

(c) If either I or II follows.

(d) If neither I nor II follows.

(e) If both I and II follow.

Statement—A speeding truck has seriously injured many persons sleeping on the roadside early in the morning.

Courses of Action—

I.   The local administration should immediately put a complete ban on people sleeping on the roadsides.

II.   The driver of the speeding truck should be nabbed and tried for the crime he committed.

(A) (a)

(B) (c)

(C) (d)

(D) (e)

109. In the figure below there are three intersecting circles each representing certain section of people different region marked. Read the statement in question and choose the letter of the region which correctly represents the statement :
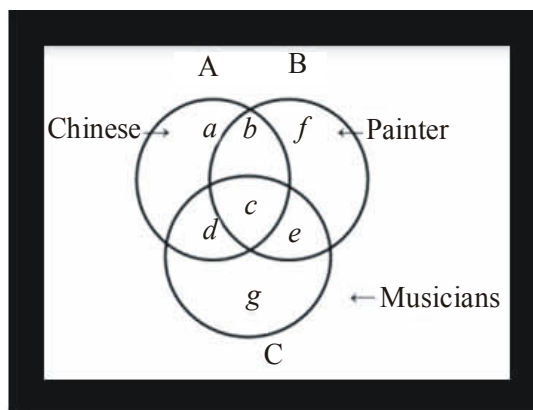
Chinese who are painters as well as musicians.

(A) a

(B) b

(C) c

(D) d

110. Srini is taller than Anlu. Ragu is taller than Chandru but shorter than Brinda. Srini is shorter than Chandru. Who is the tallest ?

(A) Srini

(B) Ragu

(C) Chandru

(D) Brinda

GENERAL ENGLISH

111. **Direction** : Which of the phrases given below should replace the phrase given in bold in the following sentence to make the sentence grammatically correct ?

The party explicitly **denies that they are not** involved in mainstream politics.

(A) denied that they are not

(B) denies that they were

(C) denied that they are

(D) deny that they are not

112. The four sentences (labelled 1, 2, 3, 4) given below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequence of the order of the sentences and key in the sequence of the four numbers as your answer.

1. We'll all live under mob rule until then, which doesn't help anyone.

2. Perhaps we need to learn to condense the feedback we receive online so that 100 replies carry the same weight as just one.

3. As we grow more comfortable with social media conversations being part of the way we interact every day, we are going to have to learn how to deal with legitimate criticism.

4. A new norm will arise where it is considered unacceptable to reply with the same point that dozens of others have already.

(A) 3 2 1 4   (B) 3 2 4 1

(C) 2 4 1 3   (D) 2 4 3 1

113. Fill in the blank :

After the treatment, he was relieved..............the pain.

(A) from

(B) with

(C) for

(D) of

114. Direction : Select the option which contains the part of the sentence which has an error (spelling, grammatical or contextual) :

I am not familiar with (a)/all the important places in this town (b)/although I had been living here for two years. (c)/No error (d).

(A) I am not familiar with

(B) all the important places in this town

(C) although I had been living here for two years.

(D) No error

115. Direction : This question has two blanks, each blank indicating that something has been omitted. Choose the set of words for each blank that best fits in the context of the sentence :

The internal and concurrent audit system of banks is intended to red..............risks in real time, but has failed and must be..............up.

(A) hood, kept

(B) flag, shored

(C) dress, developed

(D) salute, prodded

116. Find the correctly spelt word :

(A) Exhilirate

(B) Exhiliret

(C) Exhilarate

(D) Exhilerate

117. In this following question, out of the four alternatives, select the alternative which best expresses the meaning of the idiom/phrase :

Fuddy-duddy

(A) an ill-mannered person that one accepts willingly because he/she is a very dear friend

(B) a person who is very old-fashioned and pompous

(C) a shoddy work

(D) a very confusing situation

118. Out of the four alternatives choose the one which can be substituted for the given words/sentence in the question :

To stop doing something; cease or abstain

(A) To endure   (B) To dismay

(C) To persevere   (D) To desist

119. Find the Antonym of EFFLUVIUM :

(A) Land

(B) Essential

(C) Fragrance

(D) Solid

120. Find the synonym of ERSATZ :

(A) Chaotic   (B) Artificial

(C) Impromptu   (D) Vague