SOLVED PAPER
AIIMS - 2002

Time : 3½ Hours Max. Marks : 200

PHYSICS

1. Length cannot be measure by
(a) fermi (b) micron
(c) debye (d) light year.

2. The dimension of torque is
(a) $[MT^{-2}]$ (b) $[ML^{-1}T^{-1}]$
(c) $[ML^{3}T^{-2}]$ (d) $[ML^{3}T^{-3}]$.

3. If vectors $\vec{P} = a\hat{i} + a\hat{j} + 3\hat{k}$ and $Q = a\hat{i} - 2\hat{j} - \hat{k}$ are perpendicular to each other, then the positive value of a is
(a) 3 (b) 1
(c) 2 (d) 0.

4. Three different objects m_1, m_2 and m_3 are allowed to fall from rest and from the same point O along three different frictionless paths. The speeds of the three objects, on reaching the ground, will be in the ratio of
(a) $m_1 : m_2 : m_3$ (b) 1 : 1 : 1
(c) $m_1 : 2m_2 : 3m_3$ (d) $\frac{1}{m_1} : \frac{1}{m_2} : \frac{1}{m_3}$.

5. A particle starts from rest and has an acceleration of 2 m/s² for 10 sec. After that, it travels for 30 sec with constant speed and then undergoes a retardation of 4 m/s² and comes back to rest. The total distance covered by the particle is
(a) 650 m (b) 750 m
(c) 700 m (d) 800 m.

6. Hubble's law is related with
(a) comet (b) speed of galaxy
(c) black hole (d) planetary motion.

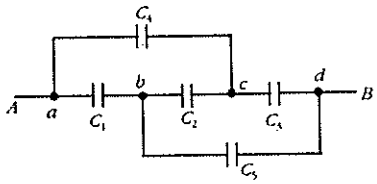
7. At 0 K temperature, a p-type semiconductor
(a) does not have any charge carriers
(b) has few holes but no free electrons
(c) has few holes and few free electrons
(d) has equal number of holes and free electrons.

8. The potential barrier, in the depletion layer, is due to
(a) ions (b) electrons
(c) holes (d) forbidden band.

9. The speed of an electron having a wavelength of 10^{-10} m is
(a) 7.25×10^6 m/s (b) 5.25×10^6 m/s
(c) 6.26×10^6 m/s (d) 4.24×10^6 m/s.

10. An electron having charge e and mass m is moving in a uniform electric field E. Its acceleration will be
(a) $\frac{e^2}{m}$ (b) $\frac{eE}{m}$
(c) $\frac{eE^2}{m}$ (d) $\frac{mE}{e}$.

11. In the given figure, the capacitance C_1, C_3, C_4, C_5 have a capacitance 4 μF each. If the capacitor C_2 has a capacitance 10 μF, then effective capacitance between A and B will be



(a) 2 μF (b) 6 μF
(c) 4 μF (d) 8 μF.

12. An electric bulb marked 40 W and 200 V, is used in a circuit of supply voltage 100 V. Now its power is
(a) 100 W (b) 20 W
(c) 40 W (d) 10 W.

13. The magnetic needle of a tangent galvanometer is deflected at an angle 30° due to a magnet. The horizontal component of earth's magnetic field 0.34×10^{-4} T is along the plane of the coil. The magnetic intensity is
(a) 1.96×10^{-4} T (b) 1.96×10^{4} T
(c) 1.96×10^{-5} T (d) 1.96×10^{5} T.

14. The coefficient of mutual inductance, when magnetic flux changes by 2×10^{-2} Wb and current changes by 0.01 A is
(a) 2 H (b) 4 H
(c) 3 H (d) 8 H.

15. Light propagates rectilinearly because of its
(a) frequency (b) velocity
(c) wavelength (d) wave nature.

16. Brilliance of diamond is due to
(a) shape (b) reflection
(c) cutting
(d) total internal reflection.

17. Velocity of light is equal to
(a) $\sqrt{\varepsilon_0\mu_0}$ (b) $\sqrt{\varepsilon_0/\mu_0}$
(c) ε_0/μ_0 (d) $\sqrt{\frac{1}{\varepsilon_0\mu_0}}$.

18. The Cauchy's dispersion formula is
(a) $n = A + B\lambda^{-2} + C\lambda^{-4}$
(b) $n = A + B\lambda^{-2} + C\lambda^{4}$
(c) $n = A + B\lambda^{2} + C\lambda^{-4}$
(d) $n = A + B\lambda^{2} + C\lambda^{4}$.

19. Golden view of sea shell is due to
(a) diffraction (b) polarisation
(c) dispersion (d) reflection.

20. At the uppermost point of a projectile, its velocity and acceleration are at an angle of
(a) 0° (b) 90°
(c) 45° (d) 180°.

21. The kinetic energy of a body becomes four times its initial value. The new linear momentum will be
(a) same as the initial value
(b) four times of the initial value
(c) twice of the initial value
(d) eight times of the initial value.

22. The angular momentum of a moving body remains constant if
(a) net external force is applied
(b) net external torque is applied
(c) net pressure is applied
(d) net external torque is not applied.

23. The force of gravitation is
(a) repulsive
(b) conservative
(c) electrostatic
(d) non-conservative.

24. Kepler's second law is based on
(a) Newton's first law
(b) special theory of relativity
(c) Newton's second law
(d) conservation of angular momentum.

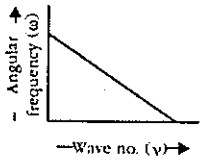
25. A conducting sphere of radius 10 cm is charged with 10 μC. Another uncharged sphere of radius 20 cm is allowed to touch it for some time. After that if the spheres are separated, then surface density of charges on the spheres will be in the ratio of
(a) 1 : 4 (b) 1 : 2
(c) 1 : 3 (d) 1 : 1.

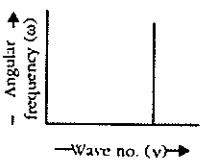
26. What is the path difference for destructive interference?
(a) $n\lambda$ (b) $\frac{(n+1)\lambda}{2}$
(c) $n(\lambda + 1)$ (d) $\frac{(2n+1)\lambda}{2}$.

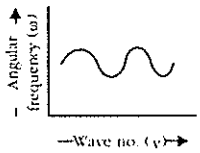
27. A siren emitting sound of frequency 800 Hz is going away from a static listener with a speed of 30 m/s. Frequency of the sound to be heard by the listener is (Take velocity of sound as 300 m/s)
(a) 733.3 Hz (b) 481.2 Hz
(c) 644.8 Hz (d) 286.5 Hz.

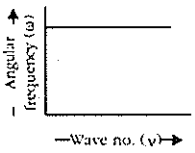
28. A string in a musical instrument is 50 cm long and its fundamental frequency is 800 Hz. If a frequency of 1000 Hz is to be produced, then required length of string is
(a) 62.5 cm (b) 40 cm
(c) 50 cm (d) 37.5 cm.

29. If equation of sound wave is $y = 0.0015\sin(62.4x + 316t)$, then its wavelength will be
(a) 0.2 unit (b) 0.3 unit
(c) 0.1 unit (d) 2 unit.

30. The graph between wave number ($\bar{\nu}$) and angular frequency (ω) is
(a) 

(b) 

(c) 

(d) 

31. If v_0 be the orbital velocity of a satellite in a circular orbit close to the earth's surface and v_e is the escape velocity from the earth, then relation between the two is

(a) $v_o = v_e$ (b) $v_e = \sqrt{3}v_o$

(c) $v_e = \sqrt{2}v_o$ (d) $v_e = 2v_o$.

32. The breaking stress of a wire depends upon

(a) length of the wire

(b) material of the wire

(c) radius of the wire

(d) shape of the cross-section.

33. The density of a substance at 0°C is 10 g/cc and at 100°C, its density is 9.7 g/cc. The coefficient of linear expansion of the substance is

(a) 10^{-4} (b) 10^{-2}

(c) 10^{-3} (d) 10^{2}.

34. Scent sprayer is based on

(a) Charle's law (b) Archimedes principle

(c) Boyle's law (d) Bernoulli's theorem.

35. According to Wein's displacement law

(a) λT = constant (b) λ/T = constant

(c) $\lambda \propto (1/T)$ (d) both (b) and (c).

36. A black body is at a temperature 300 K. It emits energy at a rate, which is proportional to

(a) 300 (b) $(300)^3$

(c) $(300)^2$ (d) $(300)^4$.

37. The latent heat of vapourisation of water is 2240 J. If the work done in the process of vapourisation of 1 g is 168 J, then increase in internal energy is

(a) 2408 J (b) 2072 J

(c) 2240 J (d) 1904 J.

38. The velocities of sound at the same temperature in two monoatomic gases of densities ρ_1 and ρ_2 are v_1 and v_2 respectively. If $\rho_1/\rho_2 = 4$, then the value of v_1/v_2 is

(a) 1/4 (b) 2

(c) 1/2 (d) 4.

39. The property utilized in the manufacture of lead shots is

(a) specific weight of liquid lead

(b) compressibility of liquid lead

(c) specific gravity of liquid lead

(d) surface tension of liquid lead.

40. When a wire is stretched and its radius becomes $r/2$, then its resistance will be

(a) $16R$ (b) $2R$

(c) $4R$ (d) 0.

Directions for Q. 41 to 60 : *These questions consist of two statements each, printed as Assertion and Reason. While answering these questions you are required to choose any one of the following four responses.*

(a) *If both the assertion and reason are true and reason is a correct explanation of the assertion.*

(b) *If both assertion and reason are true but assertion is not a correct explanation of the assertion.*

(c) *If the assertion is true but the reason is false.*

(d) *If both assertion and reason are false.*

41. *Assertion :* Planet is a heavenly body revolving round the sun.
Reason : Star is luminous body made of gaseous material.

42. *Assertion :* Coloured spectrum is seen when we look through a muslin cloth.
Reason : It is due to the diffraction of white light on passing through fine slits.

43. *Assertion :* When tiny circular obstacle is placed in the path of light from some distance, a bright spot is seen at the centre of the shadow of the obstacle.
Reason : Destructive interference occurs at the centre of the shadow.

44. *Assertion :* The quantity L/R possesses dimension of time.
Reason : To reduce the rate of increase of current through a solenoid, we should increase the time constant (L/R).

45. *Assertion :* In a simple battery circuit, the point of the lowest potential is positive terminal of the battery.
Reason : The current flows towards the point of the higher potential, as it does in such a circuit from the negative to the positive terminal.

46. *Assertion :* We use a thick wire in the secondary of a step down transformer to reduce the production heat.
Reason : When the plane of the armature is parallel to the line of force of magnetic field, the magnitude of induced e.m.f. is maximum.

47. *Assertion :* We cannot think of a magnetic field configuration with three poles.
Reason : A bar magnet does exert a torque on itself due to its own field.

48. *Assertion :* Thin films such a soap bubble or a thin layer of oil on water show beautiful colours when illuminated by white light.
Reason : It happens due to the interference of light reflected from the upper surface of the thin film.

49. *Assertion :* Quasar emits radiowaves more than radio galaxy.
Reason : Quasar has very small size.

50. *Assertion :* S.I. units are logical and coherent.
Reason : S.I. system of units is a rationalised system.

51. *Assertion :* It is difficult to move a cycle along the road with its brakes on.
Reason : Sliding friction is greater than rolling friction.

52. *Assertion :* Faraday's laws are consequences of conservation of energy.
Reason : In a purely resistive A.C. circuit, the current lags behind the e.m.f. in phase.

53. *Assertion :* The flash of lightening is seen before the sound of thunder is heard.
Reason : Speed of sound is greater than speed of light.

54. *Assertion :* Blue star is at high temperature than red star.
Reason : Wein's displacement law states that $T \propto (1/\lambda_m)$.

55. *Assertion :* The time-period of pendulum, on a satellite orbiting the earth is infinity.
Reason : Time-period of a pendulum is inversely proportional to $\sqrt{g}$.

56. *Assertion :* Stress is the internal force per unit area of a body.
Reason : Rubber is more elastic than steel.

57. *Assertion :* In an elastic collision of two billiard balls, the total kinetic energy is conserved during the short time of oscillation of the balls (i.e. when they are in contact).
Reason : Energy spent against friction does not follow the law of conservation of energy.

58. *Assertion :* The earth without its atmosphere would be inhospitably cold.
Reason : All heat would escape in the absence of atmosphere.

59. *Assertion :* In simple harmonic motion, the motion is to and fro and periodic.
Reason : Velocity of the particle $(v) = \omega\sqrt{k^2 - x^2}$ (where x is the displacement).

60. *Assertion :* Woolen clothes keep the body warm in winter.
Reason : Air is a bad conductor of heat.

CHEMISTRY

61. Methyl orange is the example of which type of dye?
(a) acid dye (b) mordant dye
(c) azo dye (d) both (a) and (c).

62. Enzymes with two sites are called
(a) apoenzyme (b) allosteric enzyme
(c) holoenzyme (d) conjugate enzyme.

63. Teflon is a polymer of
(a) tetrafluoroethylene
(b) tetrabromoethylene
(c) tetraiodoethylene
(d) tetrachloroethylene.

64. Lucas test is used for the determination of
(a) alcohols (b) alkyl halides
(c) phenols (d) aldehydes.

65. Which of the following is involved in Sandmayer's reaction?
(a) ferrous salt (b) diazonium salt
(c) ammonium salt (d) cupromonium salt.

66. The weight of one molecule of a compound $C_{60}H_{122}$ is

(a) 1.2×10^{-20} g (b) 5.025×10^{23} g
(c) 1.4×10^{-21} g (d) 6.023×10^{23} g.

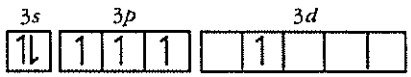
67. Which of the following is not an ore of iron?
(a) limonite (b) caniterite
(c) magnetite (d) none of these.

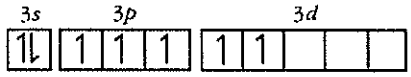
68. If P is pressure and ρ is density of a gas, then P and ρ are related as
(a) $P \propto \rho$ (b) $P \propto (1/\rho)$
(c) $P \propto \rho^2$ (d) $P \propto (1/\rho^2)$.

69. Quantum numbers of an atom can be defined on the basis of
(a) Hund's rule
(b) Pauli's exclusion principle
(c) Aufbau's principle
(d) Heisenberg's uncertainty principle.

70. Which of the following has maximum energy?

(a) 

(b) 

(c) 

(d) 

71. The intermediate formed in aldol condensation is
(a) aldol (b) carbanion
(c) alcohol (d) α-hydrogen ester.

72. The compound most suitable for the preparation of cyanohydrin is
(a) C_2H_5COOH (b) $C_6H_5NH_2$
(c) $C_2H_5COC_2H_5$ (d) $C_2H_5 - C_2H_5$.

73. In the reaction :
$C_6H_5CHO + C_6H_5NH_2 \rightarrow C_6H_5N = HCC_6H_5 + H_2O$,
the compound $C_6H_5N = HCC_6H_5$ is known as
(a) aldol (b) Schiff's base
(c) Schiff's reagent (d) Benedict's reagent.

74. Action of acetylene on dilute H_2SO_4 gives
(a) acetic acid
(b) acetaldehyde
(c) acetone
(d) acetoacetic ester.

75. CH_3COCH_3 can be converted to $CH_3CH_2CH_3$ by the action of
(a) HIO_3 (b) HNO_3
(c) HI (d) H_3PO_3.

76. At 80°C, distilled water has concentration equal to 1×10^{-6} mole/litre. The value of K_w at this temperature will be
(a) 1×10^{-6} (b) 1×10^{-12}
(c) 1×10^{-9} (d) 1×10^{-15}.

77. The pH of solution containing 0.10 M sodium acetate and 0.03 M acetic acid is
(pK_a for $CH_3COOH = 4.57$)
(a) 4.09 (b) 6.09
(c) 5.09 (d) 7.09.

78. Oxidation state of Fe in Fe_3O_4 is
(a) 3/2 (b) 5/4
(c) 4/5 (d) 8/3.

79. For the reaction :

$$H_2 + Cl_2 \xrightarrow{\text{sunlight}} 2HCl$$

the order of reaction is
(a) 0 (b) 2
(c) 1 (d) 3.

80. The correct order of solubility in water for He, Ne, Ar, Kr, Xe is
(a) He > Ne > Ar > Kr > Xe
(b) Xe > Kr > Ar > Ne > He
(c) Ne > Ar > Kr > He > Xe
(d) Ar > Ne > He > Kr > Xe.

81. Spectrum of Li^{2+} is similar to that of
(a) H (b) Be
(c) He (d) Ne.

82. IUPAC name of $CH_3 - \underset{(CH_2CH_3)}{CH} - CH_2 - \underset{CN}{CH} - CH_3$ is
(a) 2-cyano, 3-methylhexane
(b) 2-dimethyl, 4-cyanopentane
(c) 3-methyl, 5-cyanohexane
(d) 2-cyano, 3-methylhexane.

83. Which of the following molecule has highest bond energy?
(a) F – F (b) N – N
(c) C – C (d) O – O.

84. The heat of neutralization of a strong base and a strong acid is 57 kJ. The heat released when 0.5 mole of HNO_3 solution is added to 0.20 moles of NaOH solution, is
(a) 11.4 kJ (b) 34.7 kJ
(c) 23.5 kJ (d) 58.8 kJ.

85. The solubility of CuBr is 2×10^{-4} mol/L at 25°C. The K_{sp} value for CuBr is
(a) 4×10^{-8} mol^2 L^{-2} (b) 4×10^{-4} mol^2 L^{-2}
(c) 4×10^{-11} mol^2 L^{-2} (d) 4×10^{-15} mol^2 L^{-2}.

86. Schottky defect defines imperfection in the lattice structure of a
(a) solid (b) gas
(c) liquid (d) plasma.

87. An AB_2 type structure is found in
(a) NaCl (b) CaF_2
(C) Al_2O_3 (d) N_2O.

88. Azimuthal quantum number defines
(a) *e/m* ratio of electron
(b) angular momentum of electron
(c) spin of electron
(d) magnetic momentum of electron.

89. Which of the following does not have valence electron in 3d-subshell?
(a) Fe (III) (b) Cr (I)
(c) Mn (II) (d) P (0).

90. The reaction:
$C_2H_5OH + SOCl_2 \xrightarrow{\text{Pyridine}} C_2H_5Cl + SO_2 + HCl$
is known as
(a) Kharasch effect
(b) Williamson's synthesis
(c) Darzen's procedure
(d) Hunsdiecker reaction.

91. Which of the following compound is a tribasic acid?
(a) H_3PO_2 (b) H_3PO_4
(c) H_3PO_3 (d) $H_4P_2O_7$.

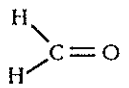
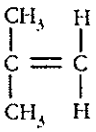
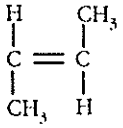
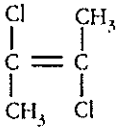
92. Thermite is a mixture of iron oxide and
(a) zinc powder
(b) potassium metal
(c) sodium shavings
(d) aluminium powder.

93. Which of the following reaction produces hydrogen?
(a) $Mg + H_2O$ (b) $H_2S_4O_8 + H_2O$
(c) $BaO_2 + HCl$ (d) $Na_2O_2 + 2HCl$.

94. An element (atomic mass 100 g/mol) having BCC structure has unit cell edge 400 pm. The density of element is (No. of atom in BCC (Z) = 2).
(a) 2.144 g/cm^3 (b) 7.289 g/cm^3
(c) 5.188 g/cm^3 (d) 10.376 g/cm^3.

95. The size of colloidal particle is
(a) 10^{-3} to 10^{-9} m (b) 10^{-9} to 10^{-12} m
(c) 10^{-6} to 10^{-9} m (d) 10^{-12} to 10^{-19} m.

96. Which of the following is a chiral compound?
(a) hexane (b) *n*-butane
(c) methane
(d) 2,3,4-trimethyl hexane.

97. Which of the following has the highest dipole moment?
(a) 
(b) 
(c) 
(d) 

98. The length of C – C bond in benzene is
(a) 1.22 Å (b) 1.54 Å
(c) 1.39 Å (d) 1.56 Å.

99. The number of σ- and π-bonds present in pent-4-ene, 1-yne is
(a) 10, 3 (b) 4, 9
(c) 3, 10 (d) 9, 4.

100. Which of the following is most stable?
(a) 1-butene (b) 1-pentene
(c) 2-butene (d) 2-pentene.

Direction for Q. 101 to 120 : *These questions consist of two statements each, printed as Assertion and Reason. While answering these questions you are required to choose any one of the following four responses.*
(a) *If both assertion and reason are true and reason is a correct explanation of the assertion.*

(b) *If both the assertion and reason are true but the reason is not a correct explanation of the assertion.*
(c) *If the assertion is true but the reason is false.*
(d) *If both the assertion and reason are false.*

101. *Assertion :* During an adiabatic process, heat energy is not exchanged between system and its surroundings.
Reason : The temperature of a gas increases when it undergoes an adiabatic expansion.

102. *Assertion :* Potassium and caesium are used in photo-electric cells.
Reason : Potassium and caesium emit electrons on exposure to light.

103. *Assertion :* Physical absorption of molecules takes place on surface only.
Reason : In this process, the bonds of the absorbed molecules are broken.

104. *Assertion :* Boiling and melting points of amides are higher than corresponding acids.
Reason : It is due to strong intermolecular hydrogen bonding in their molecules.

105. *Assertion :* Stannous chloride gives grey precipitate with mercuric chloride, but stannic chloride does not do so.
Reason : Stannous chloride is a powerful oxidising agent which oxidises mercuric chloride to metallic mercury.

106. *Assertion :* DNA molecules and RNA molecules are found in the nucleus of a cell.
Reason : On heating, the enzymes do not lose their specific activity.

107. *Assertion :* All halogens are coloured.
Reason : The halogens absorb visible light.

108. *Assertion :* F – F bond has low bond dissociation energy.
Reason : The fluorine has lower reactivity.

109. *Assertion :* Phenol is a weak acid than ethanol.
Reason : Groups with +M effect and –I effect decrease acidity at *m*-position.

110. *Assertion :* Ethers behave as bases in the presence of mineral acids.
Reason : It is due to the presence of lone pair of electrons on the oxygen.

111. *Assertion :* For Balmer series of hydrogen spectrum, the value $n_1 = 2$ and $n_2 = 3, 4, 5$.
Reason : The value of *n* for a line in Balmer series of hydrogen spectrum having the highest wave length is 4 and 6.

112. *Assertion :* An increase in surface area increases the rate of evaporation.
Reason : Stronger the inter-molecular attractive forces, fast is the rate of evaporation at a given temperature.

113. *Assertion :* Diamond is a bad conductor.
Reason : Graphite is a good conductor.

114. *Assertion :* Atoms can neither be created nor destroyed.
Reason : Under similar condition of temperature and pressure, equal volume of gases does not contain equal number of atoms.

115. *Assertion :* Mass and volume are extensive properties.
Reason : Mass/volume is also an extensive parameter.

116. *Assertion :* Absolute values of internal energy of substances can not be determined.
Reason : It is impossible to determine exact values of constituent energies of the substances.

117. *Assertion :* Cuprous ion (Cu^+) is colourless whereas cupric ion (Cu^{++}) is blue in the aqueous solution.
Reason : Cuprous ion (Cu^+) has unpaired electrons while cupric ion (Cu^{++}) does not.

118. *Assertion :* Dinegative anion of oxygen (O^{2-}) is quite common but dinegative anion of sulphur (S^{2-}) is less common.
Reason : Covalency of oxygen is two.

119. *Assertion :* Sigma (σ) is a strong bond, while pi (π) is a weak bond.
Reason : Atoms rotate freely about pi (π) bond.

120. *Assertion :* Absorption spectrum consists of some bright lines separated by dark spaces.
Reason : Emission spectrum consists of dark lines.

BIOLOGY

121. Which of the following displays immune tolerance?
(a) B-cells (b) α-cells
(c) T-cells (d) both (a) and (c).

122. Cyclosporine is used as
(a) allergic eczema
(b) immunodepressant
(c) prophylactic for viruses
(d) prophyacetic for marasmus.

123. The cranial capacity was largest among the
(a) Peking man (b) Java ape man
(c) African man (d) Neanderthal man.

124. A point mutation comprising the substitution of a purine by pyrimidine is called
(a) transition (b) translocation
(c) deletion (d) transversion.

125. Which of the following teeth are lophodont?
(a) incisor and canine
(b) canine and premolar
(c) premolar and molar
(d) premolar and incisor.

126. The photorespiratory carbon-oxidation cycle involves the interaction of
(a) chloroplast (b) mitochondria
(c) peroxisomes (d) all of these.

127. Which of the following is related to glycosylation of protein?
(a) lysosome (b) mitochondria
(c) peroxisome
(d) rough endoplasmic reticulum.

128. Frameshift mutation occurs when
(a) base is deleted
(b) base is deleted or added
(c) base is added
(d) anticodons are not present.

129. A chromosome carrying the centromere at one of the ends is called
(a) acentric (b) apocentric
(c) telocentric (d) metacentric.

130. Glycolysis is found in cytoplasm of virtually all types of aerobic/anaerobic cells. In this process, glucose is converted into a compound which is
(a) PEP (b) acetyl CoA
(c) pyruvic acid (d) citric acid.

131. Excretion in cockroach takes place by
(a) nephridium (b) parotid gland
(c) coxal glands (d) malpighian tubules.

132. Ambulacral grooves are absent in the living forms of the class
(a) crinoidea (b) asteroidea
(c) ophiuroidea (d) echinodermata.

133. The ganglia of sympathetic and the central nervous system in frog develops from the
(a) neural cell
(b) neural plate cells
(c) notochordal cells
(d) neural crest cells.

134. Lysis of foreign cell is mediated through
(a) IgM only (b) IgM and IgG
(c) IgA only (d) IgD and IgE.

135. Which of the following digestive juices have the minimum pH?
(a) bile (b) gastric juice
(c) saliva (d) pancreatic juice.

136. Introduction of foreign genes for improving genotype is
(a) biotechnology (b) vernalization
(c) tissue culture
(d) genetic engineering.

137. Pure line breed refers to
(a) heterozygosity only
(b) heterozygosity and linkage
(c) homozygosity only
(d) homozygosity and self assortment.

138. If a homozygous red flowered plant is crossed with a homozygous white flowered plant, the off-spring would be
(a) half red-flowered
(b) all red flowered
(c) half white-flowered
(d) half pink-flowered.

139. Bud dormancy is induced by
(a) ABA (b) ethylene
(c) IAA (d) gibberellic acid.

140. Xenia and metaxenia terms are related with
(a) pollen culture (b) xylem and phloem
(c) only endosperm
(d) pollen and endosperm.

141. Algae are useful because they
(a) are large in number
(b) are used in alcoholic fermentation
(c) purify the atmosphere
(d) are used in study of photosynthesis.

142. The plant body of moss (*Funaria*) is
(a) completely sporophyte
(b) predominantly sporophyte with gametophyte
(c) completely gametophyte
(d) predominantly gametophyte with sporophyte.

143. Elater mechanism for seed dispersal is exhibited by
(a) *Riccia* (b) *Dryopteris*
(c) *Funaria* (d) *Marchantia*.

144. Megasporophyll of *Cycas* has the same nature as
(a) stamen (b) petal
(c) sepal (d) carpel.

145. When the filament runs along the back of anther, it is called
(a) adnate (b) longitudinal
(c) versatile (d) syngenecious.

146. If turgor pressure becomes equal to the wall pressure, then
(a) water leaves the cell
(b) water enters the cell
(c) no exchange of water takes place
(d) solute goes from the cell into water.

147. Passage cells are found in
(a) dicot stem (b) monocot root
(c) ariel root (d) monocot stem.

148. Green mufler is used against which type of pollution ?
(a) air (b) soil
(c) water (d) noise.

149. The abundance of a species population within its habitat is called
(a) niche density (b) relative density
(c) regional density (d) absolute density.

150. Which of the following structure helps in the respiration of lichens?
(a) soredia (b) isidia
(c) cyphella (d) cephalodia.

151. In *Entamoeba histolytica*, the presence of chromatid bodies is characteristic of
(a) precystic stage
(b) mature quadrinucleate stage
(c) trophozoite stages
(d) mature binucleate stage.

152. What is left, when bath-sponges dries up?
(a) spicules (b) tentacles
(c) holdfast (d) spongin fibres.

153. *Hydra* receives impulses and stimuli through
(a) nerve net (b) nematocytes
(c) sensory cells (d) neuron cells.

154. Adults of *Wuchereria bancrofti* attacks
(a) excretory system
(b) nervous system
(c) blood circulation
(d) lymph vessels.

155. The sites of the first, second and third moulting of the *Ascaris* larva are
(a) soil, lung and intestine
(b) liver, stomach and intestine
(c) soil, alveoli and lung
(d) soil, intestine and lungs.

156. Wobble hypothesis was given by
(a) R.W. Holley (b) M. Nirenberg
(c) H.G. Khorana (d) F.H.C. Crick.

157. Which of the following are uricotelic animals?
(a) rohu and frog (b) camel and frog
(c) lizard and crow
(d) earthworm and eagle.

158. Curdling of milk in small intestine occurs due to the action of
(a) rennin (b) erypsine
(c) trypsin (d) chymotrypsin.

159. The vitamin nicotinamide can be synthesized in our body from
(a) tyrosine (b) tryptophan
(c) valine (d) phenyl alanine.

160. Which of the following would not give Fehling's test ?

(a) glucose (b) sucrose
(c) fructose (d) lactose.

Directions for Q. 161 to 180 : *These questions consists of two statements each, printed as assertion and reason. While answering these questions you are required to choose any one of the following four responses.*

(a) *If both the assertion and reason are true and reason is a correct explanation of the assertion.*
(b) *If both the assertion and reason are true but reason is not a correct explanation of the assertion.*
(c) *If the assertion is true but reason is false.*
(d) *If both the assertion and reason are false.*

161. *Assertion :* Study of biology requires basic knowledge of chemistry and physics.
Reason : Living organisms are made up of atoms and molecules which follow chemical and physical laws.

162. *Assertion :* Living organisms are regarded as closed systems.
Reason : Energy of living organisms cannot be lost or gained from the environment.

163. *Assertion :* Death is regarded as the most important regulatory process on earth.
Reason : It avoids over-crowding, caused by continuous reproduction.

164. *Assertion :* WBCs accumulate at the site of wounds by diapedesis.
Reason : It is the squeezing of leucocytes from the endothelium.

165. *Assertion :* Specilization of cells is advantageous for the organism.
Reason : It increases the operational efficiency of an organism.

166. *Assertion :* The imbalance in the concentration of Na^+, K^+ and proteins generates the resting potential.
Reason : To maintain the unequal distribution of Na^+ and K^+, the neurons use electrical energy.

167. *Assertion :* The regulation of RBC production is accompanied by the kidneys.
Reason : Erythropoietin hormone circulates to the red bone marrow, where it increases stem cell mitosis and speeds up the development of RBCs.

168. *Assertion :* Lateral line system is found in fishes and aquatic larval amphibians.
Reason : Lateral line system has receptors which are the clusters of sensory cells derived from ectoderm.

169. *Assertion :* Histamine is involved in allergic and inflammatory reactions.
Reason : Histamine is a vasodilator.

170. *Assertion :* The number of cells in a multicellular organism is inversely proportional to the size of body.
Reason : All the cells in the biological world are of same size.

171. *Assertion :* Systematics is the branch of biology that deals with classification of living organism.
Reason : The aim of classification is to group the organisms in an orderly manner.

172. *Assertion :* The megaspore mother cell undergoes mitosis to produce four megaspores.
Reason : Megaspore mother cells and the megaspores are both haploid.

173. *Assertion :* In bacteria, photosynthesis occurs by utilizing wavelengths longer than 700 nm.
Reason : Here the reaction centre is B-890.

174. *Assertion :* The two cotyledons in the seed are the embryonic leaves.
Reason : The embryo contains radicle and plumule.

175. *Assertion :* The collenchyma is thick walled living tissue.
Reason : The collenchyma is thickened due to the deposition of pectin.

176. *Assertion :* Clones are a group of organism of identical genotype, produced by same kind of sexual reproduction and same sexual processes.
Reason : These are prepared by a group of cells descended from many cells or by inbreeding of a completely heterozygous line.

177. *Assertion :* It is important that the organisms should have cell.
Reason : A cell keeps its chemical composition steady within its boundary.

178. *Assertion :* Plasmids are single stranded extra-chromosomal DNA.
Reason : Plasmids are possessed by eukaryotic cells.

179. *Assertion :* The *m*RNA attaches itself to the ribosome via its 3′ end.
Reason : The *m*RNA has F-capsular nucleotide and bases of lagging sequence.

180. *Assertion :* When six molecules of carbon dioxide participate in photosynthesis, 12 molecules of NADPH + H^+ and 18 ATP are used up, forming one hexose molecule.
Reason : The photosynthetic light reaction results in the formation of ATP and $NADPH_2$.

GENERAL KNOWLEDGE

181. Highest city of the world is in
(a) Tibet (b) China
(c) Japan (d) Mexico

182. Which of the following mountain is found in Tibet ?
(a) Mt. Kailas (b) Mt. Everest
(c) Dholagiri (d) Mt. Abu

183. 1st successful Indian expedition to Annapurna-I was undertaken in which year ?
(a) 1998 (b) 2001
(c) 1999 (d) 2002

184. Copper T is an IUCD used in
(a) preventing fertilization by blocking the sperms from getting to the fallopian tube
(b) prevents ovulation
(c) preventing fertilized eggs from implanting in the endometrium lining
(d) none of the above

185. Who was first to take 350 wickets in test matches ?
(a) Dennis Lillee (b) Courtney Walsh
(c) Kapil Dev (d) Richard Hadley

186. Which of these lines is the closest border lines ?
(a) Durand line & Mc Mohan line
(b) Radcliff line & Mc Mohan line
(c) Durand line & Radcliff line
(d) none of the above

187. M.M.Joshi is ..... speaker of Loksabha
(a) 9th (b) 10th
(c) 11th (d) 12th

188. 1st artificial satellite to go round the earth ?
(a) Sputnik – I (b) Apollo – II
(c) Aryabhatta (d) Rohini

189. "Shades of sword" is written by
(a) M.J.Akbar (b) Sanjay Khan
(c) Khushwant Singh (d) Tariq

190. Only bengali film to be produced by Raj Kapoor
(a) Nala Damayanti (b) Jamai Sasthi
(c) Ramrajya (d) Indrasabha

191. ISO mark related to health services
(a) 9001 (b) 9003
(c) 9002 (d) 9004

192. 'Day for the care of aged'
(a) 1st October (b) 5th October
(c) 16th October (d) 24th October

193. 'Dirty snowballs" refers to
(a) meteorites (b) asteroid
(c) comets (d) old space craft

194. Surrogate motherhood refers to
(a) one who donates ovum
(b) bearing child of some one else after the ovum is fertilized by artificial insemination
(c) step mother (d) none of these

195. "Ad hoc" means
(a) for the time being
(b) for a fixed period of time
(c) for specific purpose
(d) none of these

196. Shakespeare's sonnet has ..... lines
(a) 9 (b) 14
(c) 24 (d) 12

197. Bill for right to pets to be introduced first in
(a) Britain (b) US
(c) Canada (d) India

198. Mount Kamet found in which country
(a) Tibet (b) India
(c) China (d) Mexico

199. Number of females/males in India
(a) 933 (b) 930
(c) 927 (d) 940

200. When was the golden jubilee of Indian Parliament celebrated?
(a) 1st Jan. 1997 (b) 15th Aug. 1997
(c) 26th Jan. 2002 (d) 13th May 2002.

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