SOLVED PAPER
AIIMS - 1995

Time : 3½ Hours Max. Marks : 200

PHYSICS

1. The velocity of photons is proportional to (where υ = frequency)
   (a) $1/\sqrt{\upsilon}$ (b) υ
   (c) υ^2 (d) $\sqrt{\upsilon}$.

2. Susceptibility is positive for
   (a) non-magnetic substances
   (b) paramagnetic substances
   (c) diamagnetic substances
   (d) ferromagnetic substances.

3. Two particles are seen to collide and move jointly together after the collision. During such a collision, for the total system,
   (a) both the mechanical energy and the linear momentum are conserved
   (b) linear momentum is conserved but not the mechanical energy
   (c) neither the mechanical energy nor the linear momentum is conserved
   (d) mechanical energy is conserved but not the linear momentum.

4. The power factor varies between
   (a) 0 to 1 (b) 2 and 2·5
   (c) 1 to 2 (d) 3·5 to 5.

5. A metal rod at a temperature of 150°C, radiates energy at a rate of 20 W. If its temperature is increased to 300°C, then it will radiate at the rate of
   (a) 40·8 W (b) 17·5 W
   (c) 68·3 W (d) 37·2 W.

6. The radius vector, drawn from the Sun to a planet sweeps out equal areas in equal lines. This is the statement of
   (a) Kepler's third law
   (b) Kepler's first law
   (c) Newton's third law
   (d) Kepler's second law.

7. A tin nucleus has charge +50e. If the proton is at 10^{-12} m from the nucleus, then the potential at this position, is (charge on proton is $1·6 \times 10^{-19}$ C)
   (a) $7·2 \times 10^8$ V (b) $14·4 \times 10^4$ V
   (c) $14·4 \times 10^8$ V (d) $7·2 \times 10^4$ V.

8. According to Bohr's principle, the relation between principal quantum number (n) and radius of orbit, is
   (a) $r \propto \frac{1}{n}$ (b) $r \propto n$
   (c) $r \propto \frac{1}{n^2}$ (d) $r \propto n^2$.

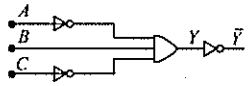
9. The α-rays are
   (a) electromagnetic radiation
   (b) stream of electrons
   (c) stream of uncharged particles
   (d) stream of positively charged particles.

10. The internal resistance of a cell of e.m.f. 2 volts is 0·1 Ω. It is connected to a resistance of 3·9 Ω. The voltage across the cell will be (in volts)
   (a) 1·95 V (b) 0·5 V
   (c) 2 V (d) 1·9 V.

11. If a p-n diode is reverse biased, then the resistance measured by an ohm-meter, will be
   (a) high (b) zero
   (c) infinite (d) low.

12. A nucleus of $_4Be^9$ absorbs an alpha particle and emits a neutron. The resulting nucleus will be
   (a) $_5C^{13}$ (b) $_6C^{12}$
   (c) $_6C^{13}$ (d) $_4BE^8$.

13. The logic circuit given in the figure performs the logic operation



   (a) ABC (b) $AB\bar{C}$

(c) $A\bar{B}C$ (d) $\bar{A}B\bar{C}$.

14. Ten identical wires each having a resistance of one ohm are connected in parallel. The combination will have a resistance of
(a) 0·1 Ω (b) 10 Ω
(c) 0·01 Ω (d) 1 Ω.

15. Radius of gyration of a body depends upon
(a) shape of the body (b) axis of rotation
(c) area of the body (d) translation motion.

16. A body weighed 250 N on the surface assuming the earth to be a sphere of uniform mass density, how much would it weigh half way down to the centre of the earth?
(a) 195 N (b) 240 N
(c) 125 N (d) 210 N.

17. Which of the following relation is called as current density ?
(a) $\frac{I^2}{A}$ (b) $\frac{A}{I}$
(c) $\frac{I^3}{A^2}$ (d) $\frac{I}{A}$.

18. The motion of a rocket is based on the principle of conservation of
(a) linear momentum
(b) mass
(c) angular momentum
(d) kinetic energy.

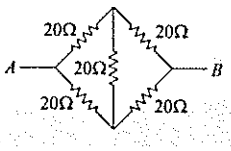
19. Crystalline solids are
(a) amporphus (b) anistropic
(c) isotropic (d) none of these.

20. The moment of inertia of a disc of mass M and radius R about an axis which is tangential to the circumference of the disc and parallel to its diameter, is
(a) $\frac{5}{4}MR^2$ (b) $\frac{3}{2}MR^2$
(c) $\frac{4}{5}MR^2$ (d) $\frac{2}{3}MR^2$.

21. In a phase-shift oscillator, the positive feedback is taken from the
(a) load resistance (b) anode directly
(c) RC networks (d) grid and anode.

22. A certain mass of gas at 273 K is expanded to 81 times its volume under adiabatic conditions. If γ = 1·25 for the gas then its final temperature is
(a) – 182°C (b) 0°C
(c) – 235°C (d) – 91°C.

23. What is the equivalent resistance between A and B in the given figure



(a) 40 Ω
(b) 10 Ω
(c) 50 Ω
(d) 20 Ω.

24. An X-ray beam of wavelength 10^{-10} m falls on a crystal of atomic spacing 2×10^{-10} m. The Bragg angle for the second order reflection will be
(a) 45° (b) 15°
(c) 60° (d) 30°.

25. Curie temperature of iron is the temperature below which, it is
(a) ferromagnetic (b) radioactive
(c) dimagnetic (d) superconducting.

26. The heat produced by a 100 W heater in 2 min. is equal to
(a) 10·5 kcal (b) 16·3 kcal
(c) 2·8 kcal (d) 14·2 kcal.

27. Simple capacitor filters are good for
(a) high current supply
(b) low voltage supply
(c) low voltage and high current supply
(d) low current supply.

28. If two lenses of power + 1·5 D and + 1·0 D are placed in contact, then the effective power of combination will be
(a) 4·5 D (b) 2·5 D
(c) 5·4 D (d) 4·2 D.

29. It is possible to have a positively charged body at
(a) positive potential (b) zero potential
(c) negative potential (d) all of these.

30. For an enclosure maintained at 1000 K, the maximum radiation occurs at wavelength λ_m. If the temperature is raised to 2000 K, the peak will shift to
(a) $\frac{5}{2}\lambda_m$ (b) $\frac{1}{2}\lambda_m$
(c) $\frac{7}{2}\lambda_m$ (d) $\frac{3}{2}\lambda_m$.

31. Time period of pendulum, on a satellite orbiting the earth, is
(a) $1/\pi$ (b) zero
(c) π (d) infinity.

32. The periodic time of a body executing SHM is 4 sec. After how much interval from time $t = 0$, its displacement will be half of its amplitude ?
(a) $\frac{1}{4}$ sec (b) $\frac{1}{2}$ sec
(c) $\frac{1}{6}$ sec (d) $\frac{1}{3}$ sec.

33. An intrinsic semiconductor, at the absolute zero temperature, behaves like a/an
(a) n-type semiconductor
(b) insulator
(c) p-type semiconductor
(d) superconductor.

34. A body of mass 5 kg is raised vertically to a height of 10 m by a force of 170 N. The velocity of the body at this height will be
(a) 15 m/s (b) 37 m/s
(c) 9·8 m/s (d) 22 m/s.

35. Greater accuracy in the determination of the position of a particle with an optical microscope can be had, if the beam of light used
(a) has higher wavelength
(b) is polarised
(c) has higher frequency
(d) has greater intensity.

36. The angular velocity of rotation of a star (of mass M and radius R) at which the matter starts to escape from its equator, is
(a) $\sqrt{\frac{2GM}{R}}$ (b) $\sqrt{\frac{2GR}{M}}$
(c) $\sqrt{\frac{2GM^2}{R}}$ (d) $\sqrt{\frac{2GM}{R^3}}$.

37. The photoelectrons emitted from a given cathode on the incidence of a given monochromatic beam of light, have a/an
(a) energy spread with no sharp limits
(b) energy spread with a lower limit
(c) definite energy only
(d) energy spread with an upper limit.

38. If an electron is brought toward another electron, the electric potential energy of the system
(a) becomes zero (b) increases
(c) remains the same (d) decreases.

39. Which of the following is an essential requirement for initiating the fusion reaction ?
(a) high temperature
(b) critical mass
(c) critical temperature
(d) thermal neutrons.

40. A tube closed at one end containing air produces fundamental note of frequency 512 Hz. If the tube is open at both the ends, the fundamental frequency will be
(a) 1024 Hz (b) 256 Hz
(c) 1280 Hz (d) 768 Hz.

41. Which of the following, when added as impurity into the silicon, produces n-type semi-conductor ?
(a) B (b) P
(c) Mg (d) Al

42. Ten identical cells each of potential E and internal resistance r are connected in series to form a closed circuit. An ideal voltmeter connected across three cells, will read
(a) $10E$ (b) $3E$
(c) $13E$ (d) $7E$.

43. The reactance of an inductance of 0·01 H to a 50 Hz A.C. is
(a) 1·04 Ω (b) 6·28 Ω
(c) 0·59 Ω (d) 3·14 Ω.

44. A ray of light having wavelength 720 nm enters in a glass of refractive index 1·5. The wavelength of the ray within the glass will be
(a) 720 nm (b) 360 nm
(c) 1080 nm (d) 480 nm.

45. A certain radioactive element has a half-life of 20 years. If we have a block with 10 g of the element in it, after how many years will there be just 2·5 g of the element in the block ?
(a) 80 years (b) 40 years
(c) 100 years (d) 60 years.

46. When we heat a gas-sample from 27°C to 327°C, then the initial average kinetic energy, of the molecules was E. What will be the average kinetic energy after heating ?
(a) $2E$ (b) $327E$
(c) $\sqrt{2}\,E$ (d) $300E$.

47. Which of the following is a dimensionless quantity?
(a) specific heat (b) strain
(c) quantity of heat (d) stress.

48. The tension in piano wire is 10 N. What should be the tension in the wire to produce a note of double the frequency ?
(a) 40 N (b) 5 N
(c) 80 N (d) 20 N.

49. An ideal gas is heated from 27°C to 627°C at constant pressure. If initial volume was 4 m^3, then the final volume of the gas will be
(a) 6 m^3 (b) 2 m^3
(c) 12 m^3 (d) 4 m^3.

50. What is the dimensional formula for the gravitational constant ?
(a) $[M^{-1}L^3T^{-2}]$ (b) $[M^{-1}L^3T^{-1}]$
(c) $[M^{-2}L^3T^{-2}]$ (d) $[M^{-2}L^{-1}T^3]$.

Directions: *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 the Reason is a correct explanation of the Assertion.
(b) If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion.
(c) If Assertion is true but the Reason is false.
(d) If both Assertion and Reason are false.

51. *Assertion*: The rainbow is seen sometimes in the sky when it is raining. When one sees a rainbow, one's back is towards the Sun.
Reason: Internal reflection from water droplet causes dispersion. The final ray is in the backward direction.

52. *Assertion*: The sun looks bigger in size at sunrise and sunset than during day.
Reason: The phenomenon of diffraction bends light rays.

53. *Assertion*: On a rainy day, it is difficult to drive a car or bus at high speed.
Reason: The value of coefficient of friction is lowered on wetting the surface.

54. *Assertion*: A normal human eye can clearly see all the objects beyond a certain minimum distance.
Reason: The human eye has the capacity to suitably adjust the focal length of its lens to a certain extent.

55. *Assertion*: Machine parts are jammed in winter.
Reason: The viscosity of lubricant used in machine parts increase at low temperatures.

56. *Assertion*: Electric appliances with metallic body, *e.g.*, heaters have three-pin connection, whereas an electric bulb has a two pin connection.
Reason: Three pin connection reduces heating of connecting cables.

57. *Assertion*: A needle placed carefully on the surface of water may float, whereas a ball of the same material will always sink.
Reason: The buoyancy of an object depends both on the material and shape of the object.

58. *Assertion*: A domestic electrical appliance, working on a three pin, will continue working even if the top pin is removed.
Reason: The third pin is used only as a safety device.

59. *Assertion*: Water kept in an open vessel will quickly evaporate on the surface of the moon.
Reason: The temperature at the surface of the moon is much higher than the boiling point of water.

60. *Assertion*: The comets do not obey Kepler's laws of planetary motion.
Reason: The comets do not have elliptical orbits.

CHEMISTRY

61. How many electrons are delivered at the cathode during electrolysis by a current of 1 A in 60 seconds
(a) 3.74×10^{20} (b) 6.0×10^{23}
(c) 7.48×10^{21} (d) 6.0×10^{20}.

62. Which of the following compound turns black on the addition of ammonium hydroxide ?
(a) $CuCl_2$ (b) $PbCl_2$
(c) AgCl (d) Hg_2Cl_2.

63. A buffer solution contains 0.1 M of acetic acid and 0.1 M of sodium acetate. What will be its pH ? (p^{k_a} of acetic acid is 4.75)
(a) 5.00 (b) 4.00
(c) 5.25 (d) 4.75.

64. By the electrolysis of aqueous solution of $CuSO_4$, the products obtained at both the electrodes are
(a) O_2 at anode and H_2 at cathode
(b) H_2 at anode and Cu at cathode
(c) O_2 at anode and Cu at cathode
(d) $H_2S_2O_8$ at anode and O_2 at cathode.

65. In order to protect, iron from corrosion, the iron is coated with
(a) zinc (b) nickel
(c) tin (d) copper.

66. In $N_2 + 3\,H_2 \rightarrow 2\,NH_3$ reversible reaction, increase in pressure will favour
(a) reversible reaction (b) forward direction
(c) irreversible reaction
(d) backward direction.

67. Which of the following complex has square planar structure ?
(a) $[Ni(CN)_4]^{2-}$ (b) $Ni(CO)_4$
(c) $[Zn(NH_3)_4]^{2+}$ (d) $[NiCl_4]^{2-}$.

68. Which of the following is the least stable and its existence is doubtful ?
(a) SnI_4 (b) Cl_4
(c) PbI_4 (d) GeI_4.

69. Two different gases enclosed in different flasks A and B at same temperature and pressure were found to contain same number of molecules. The ratio of volumes of the flasks A and B must be
(a) 1 : 3 (b) 1 : 1
(c) 1 : 4 (d) 1 : 2.

70. The oxidation number of phosphorus and basicity of acid in pyrophosphoric acid respectively are
(a) + four and three (b) + one and four
(c) + five and four (d) + three and one.

71. In which of the following reaction $K_p > K_c$?
(a) $PCl_3 + Cl_2 \rightarrow PCl_5$ (b) $H_2 + I_2 \rightarrow 2HI$
(c) $2SO_3 \rightarrow O_2 + 2\,SO_2$
(d) $N_2 + 3H_2 \rightarrow 2NH_3$.

72. Atom bomb is based on the principle of
(a) nuclear fission (b) radioactivity
(c) fusion and fission
(d) nuclear fusion.

73. Which of the following is the electronic configuration of Cu^{2+} (Z=29)
(a) $[Ar]3d^9$ (b) $[Ar]4s^13d^8$
(c) $[Ar]4s^23d^{10}4p^1$ (d) $[Ar]4s^13d^{10}$.

74. Which of the following is a condensation polymer?
(a) teflon (b) dacron
(c) polystyrene (d) neoprene.

75. Euchlorine is produced by heating a mixture of
(a) KCl + conc. H_2SO_4 (b) KCl + conc. HCl
(c) K_2ClO_3 + conc.H_2SO_4
(d) $KClO_3$ + conc. HCl

76. Chloroform by reacting with conc. HNO_3 produces
(a) tear gas (b) water gas
(c) producer gas (d) laughing gas.

77. In the presence of an acid, hydrolysis of methyl cyanide produces
(a) methyl alcohol (b) acetic acid
(c) formic acid (d) methylamine.

78. The IUPAC name of the compound having the formula CCl_3CH_2CHO is
(a) 2, 2, 2-trichloropropanal
(b) 1, 1, 1-trichloropropanal
(c) 3, 3, 3-trichloropropanal
(d) 1, 2, 1-dichloromethanal.

79. How many gm of silver will be displaced from a solution of $AgNO_3$ by 4 gm of magnesium ?
(a) 18 gm (b) 4 gm
(c) 36 gm (d) 16 gm.

80. Nessler's reagent is used in the test of
(a) NH_4Cl (b) NH_3
(c) NH_4^+ (d) all of these.

81. The molality of a solution having 18 gm of glucose (mol. wt = 180) dissolved in 500 gm of water is
(a) 0·2 M (b) 0·1 M
(c) 2·2 M (d) 0·5 M.

82. What is the correct bond angle in dimethyl ether ?
(a) 120° (b) 109°
(c) 180° (d) 110°.

83. Which of the following molecule or ions is a bidentate ligand ?
(a) $C_2O_4^{2-}$ (b) Br_2^+
(c) CH_3NH_2 (d) $CH_3\text{-}C \equiv N$.

84. Which of the following compounds is not soluble in HNO_3 ?
(a) PbS (b) CuS
(c) AgCl (d) CdS.

85. Rutherford's scattering experiment is related to the size of
(a) electron (b) nucleus
(c) neutron (d) proton.

86. Which of the following alkaline earth metal has highest ionic mobility in aqueous solution ?
(a) Be^{2+} (b) Ca^{2+}
(c) Ba^{2+} (d) Mg^{2+}.

87. The complete combustion of CH_4 gives
(a) $CO + H_2O$ (b) $CO + H_2$
(c) $CO + N_2O$ (d) $CO + N_2$.

88. Which of the following molecule has regular geometry ?
(a) H_2O (b) PF_3
(c) XeF_4 (d) SF_6.

89. The element, with atomic number 118, will be
(a) transition element (b) alkali
(c) alkaline earth metal
(d) noble gas.

90. Which of the following kinds of catalysis can be explained by the adsorption theory ?
(a) heterogeneous catalysis
(b) enzyme catalysis
(c) homogeneous catalysis
(d) acid base catalysis.

91. If pH value of a solution is 3 and by adding water, it becomes 6, then the dilution is increased by
(a) 500 times (b) 10 times
(c) 1000 times (d) 100 times.

92. The fractional distillation is used in
(a) petroleum (b) crude oil
(c) coal tar (d) all of these.

93. Which of the following oxyacids does not exist ?
(a) H_3SbO_3 (b) $HBiO_3$
(c) H_3AsO_4 (d) H_3BiO_4.

94. The important ore of aluminium is
(a) kaolin (b) corundum
(c) bauxite (d) ruby.

95. The temperature, at which the density of O_2 at 1 atm, is the same as that of CH_4 at S.T.P., is
(a) 273°C (b) 100°C
(c) 546°C (d) 150°C.

96. The property, which can be classified as an intensitive property, is
(a) volume (b) mass
(c) heat capacity (d) temperature.

97. Which of the following has the maximum electronegativity ?
(a) C (b) F
(c) N (d) O.

98. If an atom is reduced, its oxidation number
(a) does not change (b) increases
(c) sharply decreases (d) slightly decreases.

99. In the presence of mercuric ion and conc. sulphuric acid, the reaction of acetylene with water produces
(a) CH_3-CO-CH_3 (b) CH_3-CHO
(c) CH_3-CH_2-OH (d) CH_3-COOH.

100. Which of the following is used in photography?
(a) Ag_2S (b) AgCl
(c) $Ag_2C_2O_4$ (d) AgBr.

101. The equivalent weight of oxygen, when it is converted to oxide is equal to
(a) $\frac{\text{molecular weight}}{3}$ (b) molecular weight
(c) $\frac{\text{molecular weight}}{4}$ (d) $\frac{\text{molecular weight}}{2}$.

102. A certain gas diffuses four times as quickly as oxygen. The molecular weight of the gas is
(a) 2 (b) 1
(c) 16 (d) 1·5.

103. The molarity of pure water is
(a) 18·36 M (b) 1·16 M
(c) 55·56 M (d) 5·56 M.

104. The volume of carbon dioxide gas evolved at S.T.P. by heating 7·3 gm of $Mg(HCO_3)_2$ will be
(a) 2240 ml (b) 1120 ml
(c) 2340 ml (d) 2000 ml.

105. The amount of zinc (at. wt. = 65) necessary to produce 224 ml of H_2 by the reaction with an acid will be
(a) 6·5 gm (b) 0·065 gm
(c) 7·5 gm (d) 0·65 gm.

106. The number of electrons required to deposit 1 gm equivalent aluminium (at. wt. = 27) from a solution of aluminium chloride will be
(a) 3 (b) 1
(c) 4 (d) 2.

107. Lithopone, a white pigment, consists of
(a) ZnS and $BaSO_4$ (b) PbS and MgO
(c) Al_2O_3 and $CaCO_3$ (d) $BaSO_4$ and $PbSO_4$.

108. Maximum covalency of an element of atomic number 7 is
(a) 4 (b) 2
(c) 5 (d) 3.

109. The oxidation number of oxygen atom in O_2^{2-} ion is

(a) - 3 (b) - 1
(c) - 5 (d) - 2.

110. The number of unpaired electrons in $1s^2 2s^2 2p^3$ is
(a) 3 (b) 1
(c) 5 (d) 2.

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111. *Assertion*: The duma's method is more applicable to nitrogen containing organic compounds than the kjeldahl's method.
Reason: The kjeldahl's method does not give satisfactory results for compounds in which nitrogen is directly linked to oxygen.

112. *Assertion*: Cyclobutane is less stable than cyclopentane.
Reason: Presence of 'bent bonds' causes "loss of orbital overlap".

113. *Assertion*: The molecularity of the reaction $H_2 + Br_2 = 2HBr$ is two.
Reason: The order of this reaction is 3/2.

114. *Assertion*: Bond order in a molecule can assume any value positive or negative; integral or fractional, including zero.
Reason: It depends on the number of electrons in the bonding and antibonding orbitals.

115. *Assertion*: Alkali metals impart colour to the flame.
Reason: Their ionisation energies are low.

116. *Assertion*: Phenol undergoes Kolbe reaction whereas ethanol does not.
Reason: Phenoxide ion is more basic than ethoxide ion.

117. *Assertion*: Copper liberates hydrogen from a solution of dilute hydrochloric acid.
Reason: Hydrogen is below copper in the electrochemical series.

118. *Assertion*: Enthalpy of graphite is lower than that of diamond.
Reason: Entropy of graphite is greater than that of diamond.

119. *Assertion*: Sulphur dioxide and chlorine are both bleaching agents.
Reason: Both are reducing agents.

120. *Assertion*: Formic acid reduces mercuric chloride to mercurous chloride on heating, while acetic acid does not.
Reason: Formic acid is a stronger acid than acetic acid.

BIOLOGY

121. Stomach in vertebrates is the chief site for digestion of
(a) carbohydrates (b) fats
(c) proteins (d) all of these.

122. Diapedesis is
(a) formation of WBC (b) formation of pus
(c) passage of WBC (d) bursting of WBC.

123. In *Leucosolenia*, food is stored in
(a) archaeocytes (b) choanocytes
(c) amoebocytes (d) porocytes.

124. Inheritance of ABO blood groups illustrates
(a) euploidy (b) polyploidy
(c) incomplete dominance
(d) multiple allelism.

125. Which of the following animals has a tetramorphic colony ?
(a) *Porpita* (b) *Obelia*
(c) *Velella* (d) *Physalia*.

126. Glycosidic bond is broken during the digestion of
(a) lipid (b) protein
(c) starch (d) all of these.

127. Intervertebral disc is made up of
(a) calcified cartilage (b) elastic cartilage
(c) hyaline cartilage (d) fibrous cartilage.

128. During muscle contraction actin and myosin form
(a) actomyosin (b) actoplasm
(c) plastosine (d) myoplasm.

129. Stenson's duct is associated with
(a) cardiac gland (b) parotid gland
(c) thyroid gland (d) paratoid gland.

130. The protoplasmic segment of a striated muscle

fibre is termed as
(a) sacroplasm (b) metamere
(c) sarcomere (d) neuromere.

131. Meroblastic cleavage refers to which type of division of eggs ?
(a) incomplete (b) total
(c) horizontal (d) spiral.

132. Which of the following monkey has prehensile tail?
(a) spider monkey (b) loris
(c) rhesus monkey (b) tarsiers

133. Cis-trans test is related with
(a) crossing over (b) mutation
(c) genetic map (d) heredity.

134. Schneiderian membrane is found in
(a) loop of henle (b) trachea
(c) Bowman's capsule (d) nasal mucosa.

135. Lining of intestine of man is
(a) brush border (b) ciliated
(c) non-keratinized (d) keratinized.

136. Homonids were originated during
(a) miocene (b) pliocene
(c) oligocene (d) palaeocene.

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

138. Camouflage of *Chameleon* is associated with
(a) chromoplast (b) chromosome
(c) chromatophore (d) chromomere.

139. A vertebrate bone, which directly develops from mesenchyme, is called
(a) endochondrial bone
(b) dermal bone
(c) replacing bone (d) all of these.

140. Earliest fossil form in phylogeny of horse is
(a) *Merychippus* (b) *Equus*
(c) *Mesohippus* (d) *Eohippus.*

141. Preganglionic sympathetic fibres are
(a) synergic (b) adrenergic
(c) hypergonic (d) cholinergic.

142. Bohr effect is related with
(a) reduced carbon level in lymph
(b) reduced oxygen level in haemoglobin
(c) oxidised phosphorus level in blood
(d) reduced carbon dioxide level in blood.

143. In gout patients, high level of which of the following is found in blood ?
(a) cholesterol (b) urea
(c) amino acid (d) uric acid.

144. During muscle contraction, energy is provided by
(a) acetyl-CoA (b) phosphagen
(c) AMP (d) Glucose.

145. Desmosomes are found in
(a) epithelial tissue (b) muscular tissue
(c) nervous tissue (d) all of these.

146. The shade of a tree is cooler than the shade of a roof due to
(a) transpiration (b) guttation
(c) photosynthesis (d) green leaves.

147. Raphides are the crystals of
(a) calcium oxalate (b) calcium
(c) calcium phosphate (d) calcium carbonate.

148. When micropyle, chalaza and funicle are in a straight line, the ovule is called
(a) orthotropous (b) anatropous
(c) amphitropous (d) campylotropous.

149. In phylogenetic classification, the groups are arranged
(a) following the evolutionary trends
(b) according to floral similarities
(c) according to their morphological characters
(d) according to their complexities.

150. Triphasic life cycle is found in
(a) *Chondrus* (b) *Laminaria*
(c) *Polysiphonia* (d) *Macrocystis.*

151. Velamen is found in
(a) *Viscum* (b) *Vanda*
(c) *Santalum* (d) *Rosa.*

152. Which of the following is a cyanophage ?
(a) S-13 (b) $\phi \times 174$
(c) SV-40 (d) LPP-1.

153. In which of the following, reticulate chloroplast is found ?
(a) *Oedogonium* (b) *Spirogyra*
(c) *Ectocarpus* (d) *Ulothrix.*

154. Hornworts are represented by
(a) hepaticopsida (b) bryopsida
(c) anthoceratopsida (d) psilopsida.

155. Bulliform cells are present in
(a) bundle sheath (b) mesophyll
(c) vascular bundles (d) epidermis.

156. Black wood is obtained from
(a) *Dalbergia* (b) *Albizzia*
(c) *Manihot* (d) *Acacia.*

157. The growth hormones, responsible for 'bolting', are
(a) coumarins (b) auxins
(c) gibberellins (d) kinetins.

158. Aerobic respiration produces more usable chemical energy than fermentation, because fermentation involves
(a) formation of lactic acid
(b) complete oxidation of food
(c) partial oxidation of food
(d) evolution of CO_2 and alcohol.

159. Photosynthetic pigments in chloroplast are embedded in the membrane of
(a) thylakoids
(b) matrix
(c) chloroplast envelope
(d) photoglobin.

160. Which of the following are famous for chromosome heredity ?
(a) Morgan & Sutton
(b) Beadle & Tatum
(c) Bridges & Morgan
(d) Sutton & Boveri.

161. Which of the following plant yields powerful analgesic ?
(a) *Rauwolfia serpentina*
(b) *Carcuma longa*
(c) *Papaver somniferum*
(d) *Ferula asafoetida.*

162. Decapitation of plant leads to the activation of axillary buds due to
(a) increase in cytokinins
(b) more light availability
(c) auxin translocation
(d) all of these.

163. How many quanta of light are required to evolve one oxygen molecule in photosynthesis ?
(a) three (b) eight
(c) four (d) two.

164. During interphase, RNAs and proteins are synthesized in
(a) G_2-phase (b) G_1-phase
(c) S-phase (d) all of these.

165. Antherozoids of *Dryopteris* are
(a) sickle-shaped and multiflagellate
(b) coiled and multiflagellate
(c) sickle shaped and biflagellate
(d) coiled and biflagellate.

166. The 3 sub-families of leguminosae are distinguished mainly on the basis of
(a) nature and habit of the plants
(b) nature of gynoecium
(c) nature of fruit and its germination
(d) inflorescence and flower characters.

167. Pollinium is found in family
(a) asclepidaceae (b) rubiaceae
(c) solanaceae (d) myrtaceae.

168. Polyploidy leads to rapid formation of new species, because of
(a) isolation behaviour
(b) genetic recombination
(c) development of multiple sets of chromosomes
(d) mutation therapy.

169. Teminism is same as
(a) transcription
(b) translation
(c) reverse transcription
(d) DNA synthesis.

170. The cell organelle associated with photorespiration is
(a) mesosome (b) ribosome
(c) peroxisome (d) lysosome.

Directions: *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 the Reason is a correct explanation of the Assertion.
(b) If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion.
(c) If Assertion is true but the Reason is false.
(d) If both Assertion and Reason are false.

171. *Assertion*: The third cleavage in frog is latitudinal.
Reason: The mitotic spindle orients parallel to the polar axis.

172. *Assertion*: The aerobic respiration is bioenergetically more efficient than the anaerobic glycolysis.
Reason: The aerobic respiration occurs in the mitochondria, while glycolysis is purely cytosolic.

173. *Assertion*: In mammals, a secondary plate is developed.
Reason: The development of secondary plate is mainly in response to the shifting of internal areas.

174. *Assertion*: The development in cockroach is heterometabolous metamorphosis.
Reason: The young ones resemble the adults in all.

175. *Assertion*: In cells engaged in active secretion, as in pancreas, the rough endoplasmic reticulum is well developed.
Reason: Ribosomes attached to endoplasmic reticulum are actively engaged in protein synthesis.

176. *Assertion*: 'Lac Operon Model' is applicable only to *E.coli.*
Reason: *E.coli.* lacks a definite nucleus.

177. *Assertion*: Ionizing radiations are harmful for the living organism.
Reason: They form toxic photoproducts in the cells.

178. *Assertion*: In woody stems, the amount of heart wood continues to increase year after year.
Reason: The activity of the cambial ring continues uninterrupted.

179. *Assertion*: The 'absorption spectrum' of chlorophyll '*a*' shows close correlation with its 'action spectrum'.
Reason: Chlorophyll '*a*' is present in both the pigment systems I and II.

180. *Assertion*: C_4-plants photosynthesize more efficiently than C_3-plants.
Reason: C_4-plants have a shorter carbon dioxide fixation cycle.

GENERAL KNOWLEDGE

181. 'Vande Matram' was first published in
(a) Gitanjali (b) Anand math
(c) Nandini (d) Vinay patrika.

182. The first chief justice of India, was
(a) Patanjali Shastri (b) J.C. Shah
(c) Harilal J. Kania (d) S.R. Das.

183. First speaker of Lok Sabha, was
(a) Bali Ram Bhagat (b) G.V. Mavalankar
(c) Neelam Sanjiva Reddy
(d) Sardar Hukum Singh.

184. The attorney general of India is the legal adviser to
(a) president of India
(b) prime minister of foreign policies
(c) government of finance policies
(d) government of India.

185. 'GATT' stands for
(a) general agreement on trade and tourism
(b) general agreement on toures and travels
(c) general agreement on telephone and telegraph
(d) general agreement on to traffics and track

186. Latitude is the distance in degrees on the earth's surface measured
(a) upper and lower position of the earth
(b) north and south poles of the equator
(c) temperature difference between different areas on earth
(d) east and west poles of the equator.

187. The natural growth rate of population during any year is the difference between the
(a) birth rate and average population
(b) birth rate and death rate per 1000
(c) average population and birth rate per 1000
(d) death rate and birth rate per 1000.

188. Intergrated Rural Development Progress (IRDP) was initiated during
(a) 1976-77 (b) 1975-1976
(c) 1980-1981 (d) 1969-1970.

189. Astrology deals with the study of
(a) plants life
(b) space
(c) stars and future forecasting
(d) bacteria.

190. 'Diesel Engine' was invented by
(a) Edison (b) Carnot
(c) Rudolf Dieself (d) H.W. Seeley.

191. 'Prince of Wales cup' is related with
(a) Football (b) Golf
(c) Cricket (d) Hockey.

192. Aravali range is situated in the
(a) north-east region (b) north-west region
(c) south-east region (d) south-west region.

193. 'Bharat Bharti' was written by
(a) Suryakant Tripathi
(b) Amrita Preetam
(c) Maithili Saran Gupta
(d) Mulkraj Anand.

194. Sri Aurbindo was a great
(a) philosopher (b) writer
(c) sport person (d) actor.

195. First Woman Congress President, was
(a) Indira Gandhi
(b) Annie Besant
(c) Vijayalakshmi Pandit
(d) Sarojini Naidu.

196. Mother Teresa won the Nobel Prize for peace in
(a) 1984 (b) 1992
(c) 1979 (d) 1989.

197. The capital of 'Barbados' is
(a) Belarus (b) Capetown
(c) Berlin (d) Bridgetown.

198. The chief metabolic function of vitamin 'D' is to
(a) prevent blood coagultaion
(b) afford antiachitic activity
(c) prevent the loss of muscle
(d) prevent night blindness.

199. Who said these words 'Play the game in the spirit of the game'
(a) Chandrasekhar (b) Rajiv Gandhi
(c) Jawahar Lal Nehru (d) Indira Gandhi.

200. The human skeleton is divided into
(a) four parts (b) two parts
(c) six parts (d) three parts.

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