PHYSICS & CHEMISTRY

Choose the correct answers :

1. The dimensional formula of slar constant is
   (1) $[ML^0 T^{-3}]$ (2) $[ML^{-1} T^{-1}]$
   (3) $[MLT^{-1}]$ (4) $[M^0LT^{-4}]$
2. A system takes 88.00 second to complete 25 oscillations. The time period of the system is
   (1) 3.52 s (2) 35.2×10 s
   (3) 3.520 s (4) 3.5200 s
3. What is the decimal equivalent of $\frac{1}{40}$ upto four significant figures.
   (1) 0.020 (2) 0.025
   (3) 0.0250 (4) 0.02500
4. A particle is dropped from a height of 26.975 m. In what time the particle would travel the first metre distance ? given : g = 10 ms^{-2}
   (1) $\sqrt{\frac{1}{2}}$ s (2) $\sqrt{\frac{1}{3}}$ s
   (3) $\frac{1}{2}$ s (4) $\sqrt{\frac{1}{5}}$ s
5. Speedometer of an automobile measures
   (1) average speed (2) instantaneous velocity
   (3) acceleration (4) instantaneous speed
6. Given : $\vec{P} : 3\hat{i} + 4\hat{j} - 2\hat{k}$
   and $\vec{Q} : 4\hat{i} - 3\hat{j} + 2\hat{k}$
   Unit vector in the direction of $\vec{P} + \vec{Q}$ is
   (1) $7\hat{i} + 4\hat{j}$
   (2) $\frac{1}{\sqrt{50}}(7\hat{i} + \hat{j})$
   (3) $\frac{1}{29}(2\hat{i} - 14\hat{j} - 25\hat{k})$
   (4) $2\hat{i} - 14\hat{j} - 25\hat{k}$
7. A stone is dropped from a running train. It will hit the ground following a
   (1) parabolic path (2) straight path
   (3) elliptical path (4) circular path
8. When a body is stationary
   (1) there is no force acting on it
   (2) the force acting on it are not in contact with it
   (3) the forces acting on it balance each other
   (4) the body is in vacuum
9. The kinetic energy of a ball of mass 10 g and momentum 1000 g cm s^{-1} is
   (1) 5×10 erg (2) 5×10^2 erg
   (3) 5×10^3 erg (4) 5×10^4 erg
10. A metal ball falls from a height of 32 metre on a steel plate. If the coefficient of restitution is 0.5, to what height will the ball rise after second bounce ?
    (1) 2 m (2) 4 m
    (3) 8 m (4) 16 m
11. Two identical particles are located *x* and *y* with reference to the origin of the three dimensional co-ordinate system. the position vector of the centre of mass of the system is given by
    (1) $\vec{x} + \vec{y}$ (2) $\vec{x} - \vec{y}$
    (3) $\frac{\vec{x} + \vec{y}}{2}$ (4) $\vec{x} \cdot \vec{y}$
12. Three thin uniform rods, each of mass *m* and length *l*, are placed along the three axes of a cartesian coordinate system with one end of each rod at the origin. The M.I. of the system about z-axis is
    (1) ml^2 (2) $Ml^2/3$
    (3) $ml^2/6$ (4) $\frac{2}{3}ml^2$
13. For traffic moving at 60 km h^{-1} along a circular track of radius 100 m, the correct angle of banking is
    (1) $\frac{(60)^2}{0.1}$ km (2) $\tan^{-1}\left[\frac{(50/3)^2}{100 \times 9.8}\right]$
    (3) $\tan^{-1}\left[\frac{100 \times 9.8}{(50/3)^2}\right]$ (4) $\tan^{-1}\sqrt{60 \times 0.1 \times 9.8}$
14. If *g* and *g′* denote respectively the values of acceleration due to gravity on the surface of the earth and another planet whose mass and radius are twice

that of earth, then

(1) $g' = 2g$ (2) $g' = 3g$

(3) $g' = g/2$ (4) $g' = g/4$

15. Work done in transporting mass from one point to another in a gravitational field

(1) depends on the end points only

(2) depends on the length of the path

(3) depends on the end points and the length of the path

(4) is a function of the velocity of the transport

16. Compressibility is the fractional change in volume per unit increase in

(1) temperature (2) mass

(3) density (4) pressure

17. An ice block is floating in a tall and narrow cylinder containing water. Due to the melting of small amount of ice, the temperature of water falls from 4ºC to 1ºC. The level of water

(1) rises

(2) falls

(3) remains unchanged

(4) data is inadequate

18. Two equal drops of water are falling through air with a terminal velocity of 10 cm s^{-1}. If the drops coalesce to form a single drop, then the new terminal velocity will be nearly

(1) 10 cm s^{-1} (2) 12 cm s^{-1}

(3) 14 cm s^{-1} (4) 16 cm s^{-1}

19. If a section of soap bubble (of radius r) through its centre is considered, the force on one half due to surface tension is

(1) $2\ \pi r\sigma$ (2) $4\ \pi r\sigma$

(3) $\pi r^2\sigma$ (4) $2\ s/\rho$

20. If the extremes of temperature for a particular planet differ by 116ºF, then the range in Celsius degree is

(1) 64.4ºC (2) 82ºC

(3) 232ºC (4) 0ºC

21. A tube of copper of outer radius 1 cm and length 50 cm and a solid rod of copper of radius 2 cm and length 50 cm are heated from 0ºC to 50ºC. The increase in length

(1) will be the same for both

(2) for the solid rod will be more

(3) for the solid rod will be less

(4) for the solid rod will be double the increase in length for the tube

22. A gas performs the most work when it expands

(1) isothermally (2) adiabatically

(3) isobarically (4) equal in all of the above

23. Equal temperature difference exists between the ends of two metallic rods 1 and 2 of equal lengths. Their thermal conductivity is K_1 and K_2 and cross-sectional areas are respectively A_1 and A_2. The condition for equal rate of heat transfer will be

(1) $K_1A_1^2 = K_2A_2^2$ (2) $K_1A_2 = K_2A_1$

(3) $K_1A_1 = K_2A_2$ (4) $K_1A_2^2 = K_2^2A_1$

24. The energy emitted per second by a black body at 1227ºC is E. If the temperature of the black body is increased to 2727ºC, the energy emitted per second in terms of E is

(1) E (2) 2E

(3) 4E (4) 16E

25. The speed of sound in a gas at N.T.P. is 300 ms^{-1}. If the pressure increases 4 times without change in temperature the velocity of sound will be

(1) 150 ms^{-1} (2) 300 ms^{-1}

(3) 600 ms^{-1} (4) 120 ms^{-1}

26. A hollow metallic tube of length L and closed at one end produces resonance with a tuning fork of frequency n. The entire tube is then heated carefully. So that at equilibrium temperature its length changes by l. If the change in velocity V of sound is v, the resonance will now be produced by tuning fork whose frequency is

(1) $\frac{V-v}{4(L+l)}$ (2) $\frac{V+v}{4(L-l)}$

(3) $\frac{V-v}{4(L-l)}$ (4) $\frac{V+v}{4(L+l)}$

27. Two slits in Young's double slit experiment have widths in the ratio 1 : 25. The ratio of intensity at maxima and minima in the interference pattern is

(1) 4 : 9 (2) 9 : 4

(3) 3 : 2 (4) 2 : 3

28. A sample contains 10 mg of radioactive material of half-life 270 days. After 540 days, the mass of radioactive material left will be

(1) 5 mg (2) 2.5 mg

(3) 1.25 mg (4) zero

29. The number of NAND gates required to make one OR gate is
(1) 1 (2) 2
(3) 3 (4) 4

30. A spherical shell of radius r is given a charge Q. The work done in moving a unit negative charge once along a complete circle of radius R ($> r$) is
(1) $\frac{1}{4\pi\varepsilon_0}\frac{Q}{r}(2\pi r)$ (2) $\frac{1}{4\pi\varepsilon_0}\frac{Q}{r^2}(2\pi r)$
(3) zero (4) $\frac{1}{4\pi\varepsilon_0}Q(2\pi r)$

31. Midway betweenthe two equal and similar charges, a third equal and similar charge is placed. Then
(1) the third charge will be in stable equilibrium
(2) it will be in unstable equilibrium
(3) it wil not be in equilibrium at all
(4) it will lose its charge

32. A voltmeter of range 0 to 1 V is calibrated by using a 8-wire potentiometer. When this voltmeter is connected to the two ends of the potentiometer wire, it gives full scale deflection. Suppose the voltmeter reads 0.55 V when connected across 4 m length of the wire. The error in reading is
(1) 0.05 V (2) 0.50 V
(3) 0.1 V (4) zero

33. Two electric bulbs whose resistances are in the ratio 1 : 2 are connected in parallel to a constant voltage source. The powers dissipated in them have the ratio
(1) 1 : 2 (2) 1 : 1
(3) 2 : 1 (4) 1 : 4

34. A galvanometer of resistance 18 Ω shows a deflection of 50 divisions. When this galvanometer is shunted with a 12 Ω resistance, the deflection shall fall to
(1) zero (2) 10 divisions
(3) 20 divisions (4) 25 divisions

35. Two identical coils carry equal currents, have a common centre and their planes are at right angles to each other. Find the ratio of the magnitudes of the resultant magnetic field at the centre and the field due to one coil alone
(1) 2 : 1 (2) 1 : 1
(3) $\sqrt{2}$: 1 (4) 1 : $\sqrt{2}$

36. The velocities of two alpha-particles A and B entering a uniform magnetic field are in the ratio 1 : 3. On entering the magnetic field, they begin to move in different circular paths. What is the ratio of the radii of curvature of the paths of the particles ?
(1) 3 : 1 (2) 1 : 3
(3) 2 : 1 (4) 1 : 2

37. If a dip needle is suspneded at an angle 30º to the magnetic meridian, it makes an angle of 45º with the horizontal. The real dip is
(1) $\tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$ (2) $\tan^{-1}\left(\frac{2}{\sqrt{3}}\right)$
(3) $\tan^{-1}\left(\sqrt{\frac{3}{2}}\right)$ (4) $\tan^{-1}(\sqrt{3})$

38. Current in the LCR circuit becomes very high when in the circuit
(1) the inductance is equal to capacitance
(2) the inductive reactance is equal to the capacitive reactance
(3) frequency of AC supply becomes high
(4) frequency of AC supply becomes low

39. A beam of light strikes a piece of glass at an angle of incidence of 60º and the reflected beam is completely plane polarised. The refractive index of glass is
(1) $\sqrt{3}$ (2) $2\sqrt{3}$
(3) $\sqrt{3}/2$ (4) $1\frac{1}{2}$

40. If u is the distance of a real point object from the principal focus of a spherical mirror of focal length f and v is the disance of the real point image from the principal focus, then the product of u and v is equal to
(1) f (2) f^2
(3) f^3 (4) f^4

41. If a lens of power 3 dioptre is combined with a lens of power –4 dioptre, the combination will be
(1) converging lens of focal length 1 m
(2) converging lens of focal length 5 m
(3) diverging lens of focal length 1 m
(4) diverging lens of focal length 5 m

42. The focal lengths of a thin convex lens are 100 cm and 96.8 cm for red and blue rays respectively. the dispersive power of the material of lens is
(1) 0.0325 (2) 9.68
(3) 0.968 (4) 6.3

43. The de Broglie wavelength of helium atoms (mass 6.65×10^{-27} kg) having average velocity 1.635×10^{3} ms^{-1} is
(1) 6.61×10^{-4} m (2) 4×10^{-24} m
(3) 6.1×10^{-9} m (4) 6.1×10^{-11} m

44. A light of wavelength 4000 Å falls on metal having work function 3.0×10^{-19} J. the K.E. of fastest moving electron is
(Given c = 3×10^{8} ms^{-1}, h = 6.6×10^{-34} Js)
(1) 1.95×10^{-19} J (2) 12.5×10^{-34} J
(3) 19.5×10^{-19} eV (4) 19.5×10^{-21} eV

45. The photoelectrons are emitted by a nickel surface under the action of a ultraviolet light of wavelength 200 Å. The work function of nickel is 5.01 eV. The potential difference applied to stop the fastest photoelectrons is
(1) 2.40 V (2) 1.20 V
(3) 3.60 V (4) 4.80 V

46. Who of the following was the first to predict Lyman series ?
(1) Bohr (2) Balmer
(3) Lyman (4) Einstein

47. A nucleus of mas 218 amu in free state decays to emit an alpha particle (mass 4 amu). The kinetic energy of the α -particle is found to be 6.7 MeV. The recoil energy of the daughter nucleus (in MeV) is
(1) $6.7 \times 4/214$ (2) $6.7 \times \left(\frac{4}{124}\right)^2$
(3) $\frac{6.7 \times 4}{218}$ (4) $6.7 \times \left(\frac{4}{218}\right)^2$

48. If *n* be the number of atoms in unit cell, A is atomic weight, N is Avogadro's number and *V* is the volume of the unit cell, then the density *r* of the crystalline solid is given by s
(1) $\frac{nA}{VN}$ (2) $\frac{VN}{nA}$
(3) VA (4) $\frac{nVA}{N}$

49. The ratio of power gain and resistance gain in the case of common base amplifier is
(1) α (2) α^2
(3) α^3 (4) α^4

50. A 100 watt bulb is used for 10 hours. What is the cost of operation if 1 kWh costs Rs. 1 ?
(1) Rs. 0.5 (2) Rs. 1.0
(3) Rs. 1.5 (4) Rs. 1.6

51. Each atom of gold would occpy a volume of (Au = 197.0, d = 19.3 g/cm^3)
(1) $1.7 \times 10^{-23} cm^3$ (2) $1.7 \times 10^{-22} cm^3$
(3) $1.7 \times 10^{-21} cm^3$ (4) $1.7 \times 10^{-19} cm^3$

52. A sample Penicillin V weighing 8.19 mgs gave 5.46 mgs of $BaSO_4$ (M.W. = 233). What is the minimum M.W. of penicillin V?
(1) 354 (2) 708
(3) 1416 (4) 2832

53. In $Na_2S_6O_6$, sodium hexathiosulphate
(1) the oxidation state of S is 1.67
(2) there are 5 S–S bonds
(3) there is no bond of the type S–O–S
(4) all of these

54. A salt (X) is soluble in water. The aqueous solution gives a white ppt. with $BaCl_2$ and a white ppt. with NH_4OH or NaOH (soluble only in excess NaOH). The salt (X) gives a blue mass in Cobalt nitrate test. (X) is likely to be
(1) $MgSO_4$ (2) $ZnSO_4$
(3) $Al_2(SO_4)_3$ (4) $NiSO_4$

55. A colourless solid (A) when placed into water produces a heavy white ppt. which dissolves in dil. HCl to givea clear solution of (A). When solution of (A) is treated with H_2S, a colourless gas is evolved which, when passed through mercurous nitrate solution, gives a white ppt. (A) is likely to be
(1) $AsCl_3$ (2) $SbCl_3$
(3) $BiCl_3$ (4) PCl_3

56. A co-ordination complex of composition $Co(NH_3)_4(H_2O)Cl_3$. One mole of it gives 2 moles of AgCl. It has the structure
(1) $[Co(NH_3)_4(H_2O)Cl]Cl_2$
(2) $[Co(NH_3)_4Cl]Cl_2H_2O$
(3) $[Co(NH_3)_4(H_2O)Cl_2]Cl$
(4) both (a) & (b)

57. The rate law equation for the reaction
$O_3 + 2NO_2 \rightarrow O_2 + N_2O_5$
is rate = $k(NO_2)(O_3)$. Hence the slow steps in the reaction mechanism is
(1) $O_3 + NO_2 \rightarrow NO_3 + O_2$
(2) $NO_3 + NO_2 \rightarrow N_2O_5$
(3) both (1) & (2)
(4) none of these

58. The reactivity of white phophorous P_4 results from
(1) the small P–P–P angle (60°)
(2) low bond energy
(3) its tetrahedral structure
(4) low kindling temperature

59. How many amperes over a period of 1000 seconds are required to plate out all the silver form 2 litres of 1 N $AgNO_3$ solution?
(1) 193 amphere (2) 1930 amphere
(3) 95.5 amphere (4) 3860 amphere

60. What is the reduction potential of a Cu^{2+}–Cu electrode at 25°C when $(Cu^{2+}) = 5 \times 10^{-4}$M?
$Cu^{2+}_{(aq)} + 2e^- \rightarrow Cu_{(s)}$ E° = +0.34 V
(1) +0.24 V (2) 0.34 V
(3) 0.48 V (4) 0.14 V

61. For the reaction
$H_2(g) + Br_2(g) \rightleftharpoons 2HBr(g)$, $K_c = 4.0 \times 10^{-2}$.
For the reaction

$$HBr(g) \rightleftharpoons \frac{1}{2}H_2(g) + \frac{1}{2}Br_2(g),\ K_c \text{ is}$$

(1) 4×10^{-2} (2) 2.0×10^{-1}
(3) 5.0 (4) 2.5

62. A sample of wrapping cloth from an Egyption mummy gives 7.65 disintegrations per minute per gram of carbon. What is the age of the cloth?
(1) equal to $t_{½}$ of C-14
(2) a little more than $t_{½}$
(3) a little less than $t_{½}$
(4) equal to 2 half lives

63. Which of the following is a false statement?
(1) $[CuCl_4]^{2-}$ exists but $(CuI_4)^{2-}$ does not exist
(2) PbI_4 does not exist
(3) The F.P. of 0.01 m $[Co(NH_3)_6]Cl_3$ is expected to be -0.0744°C
(4) $CsAuCl_3$ is paramagnetic

64. The highest oxidation state is exhibited by iron in
(1) Na_2FeCrO_4 (2) $FeCl_3$
(3) Mohr's salt (4) Ferric alum

65. Residual Cl_2 in drinking water may be present at concentration of one part per million. This corresponds to a molal concentration of about
(1) 1×10^{-6} (2) 1×10^{-5}
(3) 1×10^{-3} (4) 1

66. The strongest acid among the following is
(1) *p*-nitrophenol (2) *m*-nitrophenol
(3) *o*-nitrophenol (4) *p*-chlorophenol

67. Which of the following compounds is most readily suphonated at room temperature?
(1) *o*-xylene (2) *p*-xylene
(3) *m*-xylene (4) cumene

68. Ethyl acetoacetate is prepared from ethyl acetate by the
(1) Benzoin cendensation
(2) Acyloin condensation
(3) Claisen condensation
(4) Aldol condensation

69. Which of the following has zero dipole moment?
(1) H_2O (2) $CHCl_3$
(3) CO_2 (4) NH_3

70. Check the incorrect statement
(1) Adenine and guanine are both purine bases and are found both in DNA and RNA
(2) DNA is polymer made from nucleotides
(3) The genetic code consists of triplets of nucleotides, each triplet codes an aminoe acid
(4) Transfer RNA carries the code for the synthesis of proteins

71. Isoprene units prevail in all the following except
(1) natural rubber (2) vitamin A
(3) terpenes (4) vitamin E

72. Which amino acid is not essential in diet?
(1) Lysine (2) Valine
(3) Methionine (4) Glycine

73. Silicones
(1) an organo silicon polymers
(2) are manufactured by hydrolysing alkyl-substituted chlorosilanes, $(CH_3)_2SiCl_2$ followed by dehydration
(3) are used for making silicon rubbers, silicon resines, lubricants
(4) all of these

74. Of the molecules NO_2, SO_2, O_3, CO, CO_2 which are major contribution to photochemical smog?
(1) NO_2, O_3 (2) CO, O_3
(3) SO_2, CO (4) NO_2, CO_2

75. A solution that is 1×10^{-2}M is Cu^{2+} and 1×10^{-2}M is Zn^{2+}. It is saturated with H_2S at pH = 9. Which would precipitate? Given K_{sp} of CuS = 1×10^{-37} and K_{sp} of ZnS = 1×10^{-12}
(1) ZnS (2) CuS
(3) both (1) & (2) (4) none will precipitate

76. A complex containing is SCN^- is used to confirm the presence of
(1) Fe^{3+} (2) Fe^{2+}
(3) Ni^{2+} (4) Co^{3+}

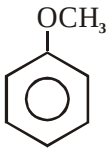
77. The existence of geometric isomers of $Pt(NH_3)_2Cl_2$ is evidence of which geometry?
(1) square planar (2) tetrahedral
(3) both (1) & (2) (4) none of these

78. At 30°C, the V.P. of C_6H_6 is 118 torr and the V.P. of C_7H_8 is 36 torr. What is the vapour pressure of a benzone-toluene solution whose mole fraction of benzene is 0.40 at 30°C?
(1) 68.8 torr (2) 47.2 torr
(3) 21.6 torr (4) none of these

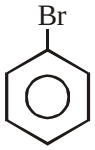
79. What is the voltage of a Zn-Cu cell where (Zn^{2+}) = 0.1 M and (Cu^{2+}) = 0.001 M?
Given $Zn^{2+} + 2e^- \rightarrow Zn - 0.76$ V
$Cu^{2+} + 2e^- \rightarrow Cu + 0.34$ V
(1) 1.0408 V (2) 1.1592 V
(3) 1.0204 V (4) none of these

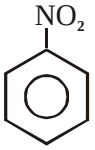
80. $2Sn(s) + O_2(s) \rightarrow 2SnO(s), \Delta G° = -123$ kcals
$2SnO(s) + O_2(g) \rightarrow 2SnO_2, \Delta G° = -125$ kcals
$\Delta G°$ for $SnO_2(s) \rightarrow Sn(s) + O_2$ is computed to be
(1) +124 kcals (2) –124 kcals
(3) +248 kcals (4) –248 kcals

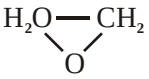
81. In a pyrite of composition $\underset{0.86}{FeS}$, what is the ratio of Fe^{3+} to Fe^{2+} in the sample?
(1) 0.33 (2) 0.48
(3) 0.24 (4) 058

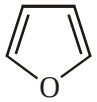
82. Select the most reactive towards Br_2 in the presence of $FeBr_2$
(1) 

(2) 

(3) 

(4) 

83. Select the most easily cleaved by HBr
(1) 

(2) 
(3) 

(4) 

84. The Markownikoff rule is used in connection with
(1) stereo chemistry of elimination reactions
(2) stability of free radicals
(3) activity of enzymes
(4) addition of acids to double bonds

85. Which of the following reaction is not stereo specific?
(1) S_N1
(2) S_N2
(3) addition of Br_2 to ethylene in CCl_4
(4) electrophilic substitution

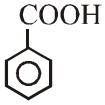
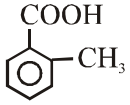
86. Ethanol boils at 78°C whereas dimethyl ether boils at –34°C. This is explained by the fact that
(1) in C_2H_5OH, Hydrogen bonding occurs
(2) C_2H_5OH is more soluble in water than the ether
(3) C_2H_5OH forms an azeotrope
(4) C_2H_5OH has lower molecular mass than CH_2OCH_3

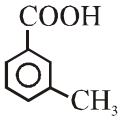
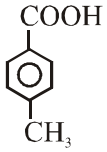
87. Suppose the metabolism of glucose could be represented simply as
$C_6H_{12}O_6(s) + 6O_2(g) \rightarrow 6CO_2(g) + 6H_2O(l)$.
The maximum amount of work that this reaction could do is equal in magnitude to
(1) ΔH (2) ΔG
(3) $\frac{\Delta H - \Delta G}{T}$ (4) $T\Delta S$

88. '10 volume' H_2O_2 means
(1) 3.035% (w/v) (2) 3.035% (w/w)
(3) 6.07%(w/v) (4) 5 N H_2O_2

89. 5 g of protective colloid is added in 1 L gold sol, to stop the coagulation by 1 ml and 10% NaCl. Gold number of protective colloid (X) is
(1) 0.5 (2) 5
(3) 50 (4) 500

90. Which aromatic acid is most acidic ?

(1)  (2) 

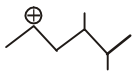
(3)  (4) 

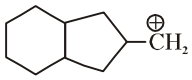
91. CF_3NH_2 does not work as a base. Thepossible answer for this character is
(1) –I effect of CF_3 group
(2) Bond eneergy of C–F
(3) Non availability of electron pair of N atom
(4) Bond energy of C–N

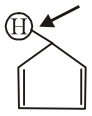
92. Carbon exists in ---- hybridisation state indiamond with ----- geometry
(1) sp^3 and tetrahedral
(2) sp and linear
(3) sp^3d and trigonal bipyramidal
(4) sp^3 and planar

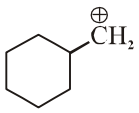
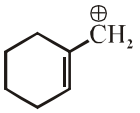
93. $H-C\equiv C\underset{a}{-}C\equiv C\underset{b}{-}CH_3$;
Compare the bond lengths a and b.
(1) a = b (2) a > b
(3) b > a (4) a >>> b

94. Most stable carbocation among the given example is

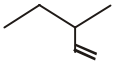
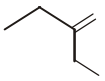
(1)  (2) 

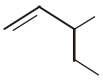
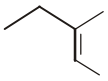
(3)  (4)

95. 
the hydrogen indicated by arrow will be easily removed as
(1) H^+ (2) $H^{\square}$
(3) $H^{\bullet}$ (4) H^{-2}

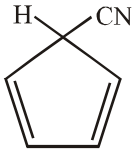
96. Some pairs of ions are given below. In which pair, first ion is more stable than second ?
(1) $CH_3-\overset{\oplus}{C}H-CH_3$ and $CH_3-\overset{\oplus}{C}H-OCH_3$
(2) $CH_3-CH_2-\overset{\oplus}{C}H-CH_3$ and
$CH_2=CH-CH_2-\overset{\oplus}{C}H_2$
(3)  and 
(4) $\begin{matrix}CH_3-CH-CH_3\\ |\\ CH_2-\overset{\oplus}{C}-CH_3\end{matrix}$ and $\begin{matrix}CH_3-N-CH_3\\ |\\ CH_3-\overset{\oplus}{C}-CH_3\end{matrix}$

97. Which of the following alkenes is the most stable ?

(1)  (2) 

(3)  (4) 

98. Decreasing order of acidic strengths of following compounds is :

(x)  (y)  (z) 

(1) x > y > z (2) y > x > z
(3) z > y > x (4) x > x > y

99. Among the given sets, which represents the resonating structures ?
(1) $H-C\equiv\overset{+}{N}-\ddot{\underset{\cdot\cdot}{O}}:^-$ and $H-\ddot{\underset{\cdot\cdot}{O}}-C\equiv N:$
(2) $H-\overset{+}{\underset{\cdot\cdot}{O}}=C=\ddot{N}:^-$ and $H-\ddot{\underset{\cdot\cdot}{O}}-C\equiv N:$
(3) $H-C\equiv\overset{+}{N}-\ddot{\underset{\cdot\cdot}{O}}:^-$ and $H-\overset{\ddot{O}:}{\overset{\|}{C}}-\ddot{N}:$
(4) $H-\ddot{\underset{\cdot\cdot}{O}}-C\equiv N:^-$ and $H-\ddot{N}=C=\ddot{O}:$

100. $C_6H_5C\equiv N$ and $C_6H_5N\equiv C$ exhibit which type of isomerism ?
(1) Position (2) Functional
(3) Dextroisomerism (4) Position isomerism

101. Net primary production is
(1) The total energy accumulated in plants by the process of photosynthesis
(2) The energy stored in plants after a part of the stored food has been utilized in respiration
(3) The total amount of food including carbohydrates, fat and protein of a plant
(4) The amount of food stored in the storage organs

102. How was the sheep "Dolly" obtained ?
(1) By introducing the nucleus of udder cells (mammary cells) of the mother into the unfertilized enucleated egg
(2) By introducing the nucleus of udder cells of the mother into the nucleated egg
(3) By direct fusion of udder cells with fertilized egg
(4) All of these

103. The specific function of light energy in the process of photosynthesis is to
(1) Activation of chlorophyll and ejection of electron
(2) Split water
(3) Reduce carbon dioxide
(4) Synthesize glucose

104. A compound of Krebs cycle is a key compound in nitrogen metabolism. It is
(1) Citric acid
(2) Oxalosuccinic acid
(3) α-Ketoglutaric acid
(4) Fumaric acid

105. Which of the following is not involved in the processing of mRNA precursors in eukaryotic cells?
(1) Capping of the 5´ end
(2) Addition of poly A
(3) Excision of introns
(4) Transport of the pre-mRNA to the cytoplasm

106. Which one of the following terms denotes the southern temperate vegetation of our country and which is represented by extensive growth of grasses and evergreen forests ?
(1) Alpine vegetation
(2) Moist tropical forest
(3) Sholas
(4) Tundra vegetation

107. Haploid plants are preferred over diploids for mutation study because in haploids
(1) Induction of mutation is easier
(2) Culturing is easier
(3) Dominant mutations express immediately
(4) Recessive mutations express immediately

108. Monocotyledones leaf showing reticulate venation is
(1) *Cocos* (2) Maize
(3) *Smilax* (4) *Calophyllum*

109. Which of the following is correct about C_3 plants ?
(1) The efficiency of CO_2 absorption at low concentration is less
(2) In each chloroplast, two pigment systems (PS-I and PS-II) are present
(3) The Calvin cycle enzymes are present in mesophyll chloroplast
(4) All of these

110. Which of the following is true about photophosphorylation ?
(1) Reduced NADPH is not formed in PS-I (Cyclic phosphorylation)
(2) The process of cyclic phosphorylation is not inhibited by DCMU
(3) Photosystem-I is involved in both cyclic & noncyclic phosphorylation
(4) All of these

111. Under given suitable conditions, the DPD will be more than OP
(1) When TP is negative
(2) When OP is equal to TP
(3) When OP is less than TP
(4) When OP is greater than TP

112. Somaclonal variations are the variations
(1) Produced during tissue culture
(2) Produced during sexual embryogeny
(3) Caused by mutagenic chemicals
(4) Caused by γ (gamma) rays

113. In *Eichhornia* vegetative reproduction is carried out through
(1) Rhizome (2) Offset
(3) Corm (4) Bulbils

114. Which two elements are the components of nitrogenase enzyme
(1) Calcium and potassium
(2) Magnesium and Calcium
(3) Iron and Molybednum
(4) Copper and calcium

115. How many amino acids are coded by only one codon?
(1) Three (2) Six
(3) Two (4) One

116. C_4 plants are similar to C_3 plants in
(1) Compensation point
(2) Having photorespiration
(3) Net rate of photosynthesis
(4) None of these

117. The energy wastage occurs during
(1) Dark reaction (2) Photorespiration
(3) Photosynthesis (4) None of these

118. The chief merit of Bentham and Hooker's classification is that
(1) It also considers the phylogenetic aspects
(2) It is a system mostly based on evolutionary concepts
(3) It is a natural system of classification of seeded plants
(4) The description of the taxa are based on actual examination of the specimens

119. Intrafascicular cambium is situated
(1) In between vascular bundles
(2) Inside vascular bundle
(3) Outside the vascular bundle
(4) In pith

120. Ethylene gas
(1) Slows down ripening of apples
(2) Speeds up maturation of fruits
(3) Is saturated hydrocarbon
(4) Retards ripening of tomatoes

121. Exceptional tetramerous flower of Liliaceae is
(1) *Allium* (2) *Gloriosa*
(3) *Smilax* (4) *Aspidiastra*

122. The wall of pollen tube is made of
(1) Cellulose (2) Pectin
(3) Both (1) and (2) (4) None of these

123.

I.	Haploid production	A.	Protoplast culture
II.	Somatic hybridization	B.	Endosperm culture
III.	Triploid production	C.	Pollen culture
IV.	Adventive embryony	D.	Nucellus

(1) I-A, II-B, III-C, IV-D
(2) I-B, II-A, III-D, IV-C
(3) I-C, II-A, III-B, IV-D
(4) I-D, II-C, III-B, IV-A

124. Which of the following is a nitrifying bacteria
(1) *Bacillus ramosus*
(2) *Pseudomonas*
(3) *Nitrosococcous*
(4) *Rhizobium*

125. Which organelles helps in conversion of fats into carbohydrates in germinating seeds ?
(1) Peroxisomes (2) Oxysomes
(3) Glyoxysomes (4) Mitochondria

126. 0.1 M solution of a solute has a water potential of
(1) –2.3 bars (2) 0 bar
(3) 22.4 bars (4) +2.3 bars

127. Volcanic eruption causes the development of a bare area without any form of life is called
(1) Nudation
(2) Autotropic succession
(3) Migration
(4) Ecesis

128. Kadiri-1, Kadiri-2 are the varieties of
(1) Red gram hybrids
(2) Groundnut hybrids
(3) Rice hybrids
(4) *Sorghum* hybrids

129. The total number of biodiversity hot spots in the world is
(1) 25 (2) 34
(3) 3 (4) 14

130. Which of the following is situated in Rajasthan ?
(1) Nameri National Park
(2) Keoladeo Ghana Bird Sanctuary
(3) Chilka Lake Bird Sanctuary
(4) Govind Sagar Bird Sanctuary

131. The enzyme used in polymerase chain reaction (PCR) is
(1) *Taq* polymerase (2) RNA polymerase
(3) Ribonuclease (4) Endonuclease

132. The most common lethal genetic disease in the United States is
(1) Sickle cell disease
(2) Cystic fibrosis
(3) Huntington's disease
(4) Haemophilia

133. Bitterness of cucurbits is due to
(1) The acids present in them
(2) The alkalinity present in their pulp
(3) The occurrence of triterpenes
(4) The presence of bitter seeds in them

134. Many vegetable yielding and pulse yielding plants belong to the families
(1) Solanaceae and Liliaceae
(2) Malvaceae and Compositae
(3) Compositae and Leguminosae
(4) Cucurbitaceae and Leguminosae

135. Which of the following is found without exception in angiosperms ?
(1) Secondary growth
(2) Presence of vessels
(3) Double fertilisation
(4) Autotrophic nutrition

136. The inner layer of exine of the pollen grain is also called
(1) Sexine (2) Intine
(3) Ectine (4) Nexine

137. In a bitegmic ovule the development of the integuments follows definite pattern of development
(1) The outer integument is differentiated first
(2) The inner integument is differentiated first
(3) Both the integuments arise simultaneously
(4) There is no set pattern of differentiation

138. Meiosis is best observed in the cells of
(1) Apical meristem
(2) Lateral meristem
(3) Microspores and anther wall
(4) Microsporocytes

139. The fruit of tomato can be described as
(1) A berry, since the entire ovary wall ripens into fleshy fruit tissue
(2) A capsule, since it is derived from a compound pistil
(3) Aggregate, since it is derived from a pentacarpellary pistil
(4) A pome, as the entire fruit wall is fleshy and the fruit has many seeds

140. Dicliny is found in
(1) *Calotropis* (2) *Cucurbita*
(3) *Crotalaria* (4) *Pisum*

141. In the TS of root
(1) Protoxylem and metaxylem are not present in same radius
(2) Protoxylem is absent
(3) Protoxylem lies on inner side and metaxylem on outer side
(4) Metaxylem lies on inner side and protoxylem on outer side

142. Monothecous anther is found in
(1) Compositae (2) Cruciferae
(3) Malvaceae (4) Solanceae

143. The vascular bundle in which the central phloem is surrounded by xylem is called
(1) Bicollateral (2) Amphivasal
(3) Collateral (4) Amphicribal

144. Bostryx is a
(1) Uniparous scorpoid cyme
(2) Dichasium ending in monochasium
(3) Uniparous helicoid cyme
(4) Polychasium ending in monochasium

145. In a type of apomixis known as adventive embryony, embryos develop directly from the
(1) Synergid or antipodals in an embryo sac
(2) Accessory embryo sacs in the ovule
(3) Zygote
(4) Nucellus or integuments

146. When the phyllotaxy is described as pentastichous the arrangement corresponds to
(1) 1/5 (2) 2/5
(3) 3/5 (4) All of these

147. Vinblastine drug is obtained from
(1) *Catharanthus* (2) *Viola*
(3) *Vicia* (4) None of these

148. Which of the following pair is correctly matched ?
(1) Bulbil : *Lilium*
(2) Corm : *Asparagus*
(3) Sobole : *Agropyron*
(4) Tendril : *Dioscorea*

149. The nature and the type of life cycle shown by λ-phages is
(1) Temperate and lytic
(2) Virulent and lytic
(3) Temperate and lysogenic
(4) Virulent and lysogenic

150. Viruses are no more 'alive' than isolated chromosomes because
(1) They require both RNA and DNA
(2) They both need food molecules
(3) The both require oxygen for respiration
(4) Both require the environment of a cell to replicate

151. ST segment is elevated
(1) During myocardial infraction
(2) Ventricular depolarization
(3) Rheumatic heart disease
(4) Failure of conducting system

152. In recent years a complete female fossil was discovered. This fossil was named "Lucy". It belonged to
(1) *Ramapithecus*
(2) *Australopithecus*
(3) *Proconsul*
(4) *Pithecanthropus*

153. Match List–I and List–II and select the correct answer using the code given below the lists

	List I	List II
1.	Microtubules	Structural components of cilia
2.	Centrioles	Store hydrolytic enzymes
3.	Peroxisomes	Store oil, protein and starch in plants

(1) 1, 2 and 3 are correct
(2) 1 and 2 are correct, 3 is false
(3) 1 is correct, 2 and 3 are false
(4) 1 and 3 are correct, 2 is false

154. Karl von Frisch got Nobel Prize for his work on
(1) Conditioned reflex
(2) Honeybee communication
(3) Learned behaviour
(4) Imprinting Principles

155. Given are two lists. Match List I with List II and select your answer using the given codes.

	List I	List II
A.	Tranquillisers	1. Bhang, Charas
B.	Opiate narcotics	2. Amphetamines
C.	Hallucinogens	3. Benzodiazephines
D.	Stimulants	4. Pethidine
		5. Morphine, heroin

The given codes re
(1) A–3, B–5, C–1, D–2
(2) A–2, B–4, C–1, D–5
(3) A–2, B–4, C–5, D–3
(4) A–3, B–2, C–1, D–5

156. Short-lived immunity acquired from mother to foetus across placenta or through mother's milk to the infant is categorised as
(1) Active immunity
(2) Passive immunity
(3) Cellular immunity
(4) Acquired non-specific immunity

157. A saline drip is given to patients suffering from cholera because
(1) Na^+ ions help in the retention of water in the body tissues
(2) Na^+ ions help in stopping nerve impulses to stop sensation of pain
(3) NaCl is an important component for the supply of energy
(4) NaCl furnishes most of the fuel required for cellular activity

158. Given are some respiratory pigments and name of groups. Match the correct sequence and tick the answer using codes given :

	List I (respiratory pigment)	List II (group)
A.	Haemocyanin	1. Annelida
B.	Haemoglobin in plasma	2. Crustaceans
C.	Haemoglobin in cells	3. Mollusca
D.	Haemoerythrin	4. Chordata

Codes :
(1) A–1, B–4, C–3, D–2
(2) A–2, B–3, C–4, D–1
(3) A–1, B–3, C–4, D–2
(4) A–2, B–1, C–4, D–3

159. Process used for amplication or multiplication of DNA for finger printing is
(1) Polymerase chain reaction
(2) Nesslerisation
(3) Southern blotting
(4) Northern blotting

160. Broca's area is situated in frontal lobe and is associated with
(1) Vision (2) Speech formation
(3) Motor control (4) Smell and taste

161. Cutaneous receptors are
(1) Rods and cones
(2) Erythrolabs
(3) Glands of Zea
(4) End organs of Ruffini

162. If ovaries of a rat are removed, production of which of the following will be stopped
(1) Gonadotropin
(2) Estrogen
(3) progesterone
(4) Both (2) and (3)

163. In mammals scrotal sacs are situated outside the body cavity for
(1) Providing space for other body organs
(2) Normal development of sperms
(3) No apparent reason
(4) Scrotal sacs are situated in abdominal cavity

164. The function of acrosin is
(1) It dissolves acrosome membrane
(2) It dissolves zona pellucida
(3) It dissolves corona radiata
(4) All of these

165. Which of the following is a correct matching set ?

A. Sternum	(1) 14
B. Ribs	(2) 1
C. Pelvis	(3) 24
D. Face	(4) 2

(1) A–2, B–3, C–4, D–1
(2) A–2, B–3, C–1, D–4
(3) A–2, B–1, C–3, D–14
(4) A–2, B–4, C–1, D–3

166. Use of muscular movement for their various activities is made by
(1) Only higher vertebrates whereas fishes swim by fins
(2) Vertebrates only
(3) All vertebrates and some higher non-chordates such as arthropods
(4) All vertebrates and most multicellular animals

167 Biotechnology is
(1) A science of culture bacteria
(2) Application of biological organisms to study genetics
(3) Application of biological organisms, systems to manufacture industrial products
(4) All of the above

168. Which of the following set of organisms is used as biofertilizers ?
(1) *Azospirillum* and *Azobacter*
(2) *Rhizobium* and mycorrhiza
(3) *Anabaena*, *Nostoc* and *Oscillatoria*
(4) All of these

169. The urinary and genital apertures open separately in
(1) Male rat
(2) Female rat
(3) Both male and female rat
(4) Neither in male rat nor in female rat

170. *Trichonympha* lives as a symbiont in the alimentary canal of
(1) Earthworms (2) Termites
(3) Snails (4) Hermit Crabs

171. Which of the following possesses post anal tail
(1) Spider (2) Scorpion
(3) Cockroach (4) Cobra

172. Sleeping sickness is caused by
(1) *Trypanosoma gambiense*
(2) *Trypanosoma rangeli*
(3) *Trypanosoma brucei*
(4) *Trypanosoma cruzi*

173. The spongocoel of the sponge is lined with
(1) Porocytes (2) Amoebocytes
(3) Choanocytes (4) Mesenchyme

174. Which of the following has no intermediate host?
(1) *Taenia* (2) *Fasciola*
(3) *Ascaris* (4) *Plasmodium*

175. Restriction endonuclease enzymes are used in genetic engineering and they
(1) Cut DNA at specific sites
(2) Cut DNA at various sites
(3) Join DNA segments
(4) Cut RNA at specific sites

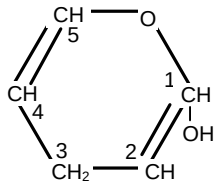
176. Molecular anthropologists are likely to be more accurate then palaeontologists in their scientific pronouncements because
(1) Their approach is molecular
(2) They approach a different line of investigation
(3) They use dependable scientific tools
(4) They use the latest and most modern methods of investigation

177. Two opposite forces operate in the growth and development of every population. One of them relates to the ability to reproduce at a given rate. The force opposing it is called
(1) Morbidity (2) Fecundity
(3) Biotic potential
(4) Environmental resistance

178. Interferon acts in
(1) Already viral affected cells
(2) It makes unaffected cell less susceptible to viral attacks
(3) It makes affected cell less susceptible to viral attacks
(4) Inactivates virus

179. Foot and mouth disease of cattle is caused by
(1) Virus (2) Bacteria
(3) Protozoa (4) Nutritional disease

180. The following figure represents



(1) α-Furan form (2) α-Pyran form
(3) β-Furan form (4) β-Pyran form

181. The myogenic heart is found in
(1) Cockroach (2) Scorpion
(3) Prawn (4) Rat

182. Which among the following set is of uricotelic animals?
(1) Tadpole of frog
(2) Man, monkey, cattle
(3) Teleost fish, earthworm, Aplysia
(4) Lizards, crow, penguin

183. How many molecules of oxygen bound to one molecule of myoglobin ?
(1) 1 (2) 2
(3) 3 (4) 4

184. Believers of spontaneous generation theory believed that
(1) Life originated from air
(2) Life originated only spontaneously
(3) Life originated from similar organisms
(4) Life originated from other similar organisms or spontaneously

185. Study of different structures shows homology. Homology is due to
(1) Homologous organs arise due to parallel evolution
(2) Homologous organs arise due to convergent evolution
(3) Homologous organs originate from a different ancestry
(4) Homologous organs arise due to divergent evolution

186. For evolution most important requirement is
(1) Adaptation to environment
(2) Variations
(3) Continuity of germplasm
(4) Natural selection

187. A disease of domesticated cattle that has been controlled by a National Programme of vaccination is
(1) Bacterial disease of mouth
(2) Bacterial disease of foot
(3) Rinderpest or cattle plague
(4) All of these

188. The chief source of Cod liver oil is
(1) Sharks (2) Carps
(3) *Gambusia* (4) Fresh water fishes

189. What is true for monoclonal antibodies ?
(1) These antibodies obtained from one parent and for one antigen
(2) These antibodies obtained from different parents and for one antigen
(3) These antibodies obtained from one parent and for many antigens
(4) These antibodies obtained from many parents and for many antigens

190. Given are two lists, List I contains name of type of antibody and List II contains function. Match List I with List II and select your answer using the given codes

List I	List II
A. IgM	1. Provide protection from inhaled and ingested pathogens
B. IgG	2. Stimulate lymphocytes for production of other antibodies
C. IgA	3. Provide passive immunity to foetus
D. IgD	4. Sensitizes cells for certain antigens thus play role in allergy
E. IgE	5. Activate B lymphocytes

The given codes are
(1) A–3, B–4, C–1, D–5, E–2
(2) A–2, B–3, C–4, D–5, E–1
(3) A–5, B–3, C–1, D–2, E–4
(4) A–2, B–5, C–1, D–5, E–3

191. The population in which pre reproductive indivduals are more than the reproductive individuals, is
(1) Shrinking population
(2) Stable population
(3) Expanding population
(4) Fluctuating population

192. Enzymes differing in molecule weight, amino acid composition and in their sequence but having the same substrate specificity are known as
(1) Isozymes (2) Zymogens
(3) Coenzymes (4) Lysozymes

193. The blood protein involved in blood clot is
(1) Thrombin (2) Fibrion
(3) Fibrinogen (4) Prothrombin

194. HIV virus causes the disease
(1) By inhibiting plasma B cells
(2) By inhibiting T_H cells
(3) By stimulating N_K cells
(4) By inhibiting T_S cells

195. Arrange the following stages of fertilization and early development into a proper sequence
I. Onset of new DNA synthesis
II. Cortical reaction
III. First cell division
IV. Acrosomal reaction; plasma membrane depolarization
V. Fusion of egg and sperm nuclei completed
(1) I, III, II, IV, V (2) III, V, I, IV, II
(3) IV, II, V, I, III (4) V, I, IV, II, III

196. Which part of retina consists of only cones ?
(1) Fovea centralis
(2) Ora serrata
(3) Blind spot
(4) Iridal retina

197. Insulin receptor is a
(1) Heterotetrameric protein
(2) Heterotetrameric protein consisting of 2α subunits and two b subunits
(3) Heterotetrameric protein consisting of 1α subunit, 1β subunit, 1ϕ subunit and 1δ subunits
(4) Simple polypeptide

198. Entry of sperm restarts cell cycle by
(1) Breaking M phase promoting factor (MPF) and turning on the anaphase promoting complex (APC)
(2) Activating female pronucleus
(3) Activating cytoplasm of egg
(4) Secretion of fertilizin

199. Which of the following are all homologous structures?
(1) Vomer of man and frontoparietal of frog
(2) Teeth of man and teeth of frog
(3) Coccyx of man, pygostyle of birds and urostyle of fish
(4) Both (2) and (3)

200. The causative agent of syphilis
(1) *Trogoderma granarium*
(2) *Triboleum castaneum*
(3) *Treponema pallidium*
(4) *Neisseria spp*

ANSWERS

Physics

1.	(1)	2.	(3)	3.	(4)	4.	(4)	5.	(4)
6.	(2)	7.	(1)	8.	(3)	9.	(4)	10.	(1)
11.	(3)	12.	(4)	13.	(2)	14.	(3)	15.	(1)
16.	(4)	17.	(1)	18.	(4)	19.	(2)	20.	(1)
21.	(1)	22.	(3)	23.	(3)	24.	(4)	25.	(2)
26.	(4)	27.	(2)	28.	(2)	29.	(3)	30.	(3)
31.	(2)	32.	(1)	33.	(3)	34.	(3)	35.	(3)
36.	(2)	37.	(1)	38.	(2)	39.	(1)	40.	(2)
41.	(3)	42.	(1)	43.	(4)	44.	(1)	45.	(2)
46.	(1)	47.	(1)	48.	(1)	49.	(2)	50.	(2)

Chemistry

51.	(1)	52.	(1)	53.	(4)	54.	(3)	55.	(3)
56.	(1)	57.	(3)	58.	(1)	59.	(1)	60.	(1)
61.	(2)	62.	(3)	63.	(4)	64.	(1)	65.	(2)
66.	(1)	67.	(3)	68.	(3)	69.	(3)	70.	(4)
71.	(4)	72.	(4)	73.	(4)	74.	(1)	75.	(1)
76.	(1)	77.	(1)	78.	(1)	79.	(1)	80.	(3)
81.	(2)	82.	(1)	83.	(1)	84.	(4)	85.	(4)
86.	(1)	87.	(2)	88.	(1)	89.	(3)	90.	(2)
91.	(1)	92.	(1)	93.	(3)	94.	(1)	95.	(1)
96.	(2)	97.	(4)	98.	(1)	99.	(2)	100.	(2)

Botany

101.	(2)	102.	(1)	103.	(1)	104.	(3)	105.	(4)
106.	(3)	107.	(4)	108.	(3)	109.	(4)	110.	(4)
111.	(1)	112.	(1)	113.	(2)	114.	(3)	115.	(2)
116.	(4)	117.	(2)	118.	(3)	119.	(2)	120.	(2)
121.	(4)	122.	(3)	123.	(3)	124.	(3)	125.	(3)
126.	(3)	127.	(1)	128.	(2)	129.	(2)	130.	(2)
131.	(1)	132.	(2)	133.	(3)	134.	(4)	135.	(3)
136.	(4)	137.	(2)	138.	(4)	139.	(1)	140.	(2)
141.	(4)	142.	(3)	143.	(2)	144.	(3)	145.	(4)
146.	(2)	147.	(1)	148.	(3)	149.	(3)	150.	(4)

Zoology

151	(1)	152	(2)	153	(3)	154	(2)	155	(1)
156	(2)	157	(1)	158	(4)	159	(1)	160	(2)
161	(4)	162	(4)	163	(2)	164	(2)	165	(1)
166	(4)	167	(3)	168	(4)	169	(2)	170	(2)
171	(4)	172	(1)	173	(3)	174	(3)	175	(1)
176	(4)	177	(4)	178	(2)	179	(1)	180	(2)
181	(4)	182	(4)	183	(1)	184	(2)	185	(4)
186	(3)	187	(3)	188	(1)	189	(2)	190	(3)
191	(3)	192	(1)	193	(3)	194	(2)	195	(3)
196	(1)	197	(2)	198	(1)	199	(3)	200	(3)