NBTS

Corporate Office : Aakash Tower, 8, Pusa Road, New Delhi-110005, Phone : 011-47623456

MM : 720 **Time : 3.00 Hrs**

NCERT Booster Test Series

(*for* NEET-2022)

Test – 3

Topics covered :

Physics : Units and Measurements, Motion in a Straight line, Motion in a Plane.

Chemistry : Some Basic Concepts of Chemistry, Structure of Atom, Classification of Elements and Periodicity in Properties.

Botany : Cell: The Unit of Life, Cell Cycle and Cell Division, The Living World.

Zoology : Structural Organisation in Animals: Animal Tissues only, Biomolecules, Digestion and Absorption.

Instructions :

(i) There are two sections in each subject, i.e. Section-A & Section-B. You have to attempt all 35 questions from Section-A & only 10 questions from Section-B out of 15.

(ii) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score. Unanswered / unattempted questions will be given no marks.

(iii) Use blue/black ballpoint pen only to darken the appropriate circle.

(iv) Mark should be dark and completely fill the circle.

(v) Dark only one circle for each entry.

(vi) Dark the circle in the space provided only.

(vii) Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet.

PHYSICS

Choose the correct answer :

SECTION-A

1. The unit vector along $\vec{A} = 3\hat{i} + 4\hat{j}$ is

(1) $3\hat{i} + 4\hat{j}$ (2) $\frac{3\hat{i} + 4\hat{j}}{3}$

(3) $\frac{3\hat{i} + 4\hat{j}}{4}$ (4) $\frac{3\hat{i} + 4\hat{j}}{5}$

2. The *x*-component of a vector is 5 unit and *y*-component is 12 unit. The magnitude of this vector is

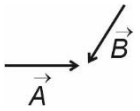
(1) 5 unit

(2) 7 unit

(3) 13 unit

(4) 17 unit

3. Two vectors $\vec{A}$ and $\vec{B}$ of finite magnitude are shown below. Then the $(\vec{A}-\vec{B})$ can be represented by



(1) 
(2) 
(3) 
(4) 

4. Parallelogram law of vectors is applicable to the addition of
   (1) Any two vectors
   (2) A vector and a scalar
   (3) Two vectors representing same physical quantity
   (4) All of these

5. The resistive force acting on a body moving with velocity v through a fluid at rest is given by $F = \frac{kv^2A}{\rho}$, where k = constant of drag, A = area of cross-section and ρ = density of material. Then the dimension of k is
   (1) $[ML^{-3}T^{-2}]$ (2) $[M^2L^{-6}T^0]$
   (3) $[M^2L^{-3}T^{-4}]$ (4) $[ML^{-3}T^{-4}]$

6. Match column I with column II.

	Column I		**Column II**
(A)	Size of nucleus	(P)	Astronomical unit (AU)
(B)	Distance between earth and sun	(Q)	Angstrom
(C)	Wavelength of ultraviolet rays	(R)	Fermi

   (1) A → Q; B → P; C → R
   (2) A → R; B → P; C → Q
   (3) A → R; B → Q; C → P
   (4) A → P; B → Q; C → R

7. A wire has a mass (0.5 ± 0.0025) kg, radius (0.4 ± 0.004) cm and length (3 ± 0.06) m. The maximum percentage error in the measurement of its density is
   (1) 3% (2) 3.7%
   (3) 4.5% (4) 5.0%

8. Select the correct statement.
   (1) A body moving with varying speed may have constant velocity if its direction of motion remains constant.
   (2) A body moving with varying velocity may have constant speed.
   (3) A body moving with varying velocity, must have varying speed.
   (4) A body moving with varying speed, must have zero acceleration.

9. An aircraft is flying horizontally at a height of 2000 m vertically above the ground. If the angle subtended at a ground observation point by the aircraft positions, 8 s apart is 45°. What is the speed of aircraft?
   (1) 100 m/s (2) 200 m/s
   (3) 250 m/s (4) 400 m/s

10. The ceiling of a long hall is 80 m high. What is the maximum horizontal distance that a ball thrown with a speed of 50 m/s can go without hitting the ceiling of the hall?
   (1) 240 m (2) 160 m
   (3) 180 m (4) 250 m

11. Identify the pair whose dimensions are equal.
   (1) Stress and energy (2) Force and pressure
   (3) Work and pressure (4) Torque and energy

12. Which of the following method is preferred to measure large distances such as distance of planet?
   (1) Tunnelling microscopy
   (2) Parallax method
   (3) Radioactive dating
   (4) Optical interferometer

13. The length and breadth of a rectangular sheet of metal are 3.248 m and 2.35 m respectively. What is the area of the sheet upto correct significant figures?

(1) 7.63 (2) 7.64

(3) 7.61 (4) 7.6328

14. A physical quantity X is related to three observable quantities a, b and c as follows.

$$X = \frac{a^{3/2}b^2}{c^{1/3}}$$

The percentage error in measurement of a, b and c are 2%, 1% and 6% respectively. What is the maximum percentage error in calculation of the quantity X?

(1) 3% (2) 5%

(3) 7% (4) 9%

15. State the number of significant figures in the following respectively

a. 2.60×10^8 m

b. 0.00264 m

c. 3.14700 m

(1) 2, 3, 4 (2) 3, 3, 6

(3) 2, 5, 4 (4) 3, 3, 4

16. Which of the following relation is dimensionally incorrect? (Symbols have their usual meaning)

(1) $v = u + at$ (2) $y = x\tan\theta$

(3) $F = \frac{2(\text{Energy})}{\text{Volume}}$ (4) $\frac{1}{2}mv^2 = mgh$

17. A car moving along a straight road with speed 60 m/s is brought to rest within 15 seconds with uniform retardation. What is the distance covered before stopping?

(1) 300 m (2) 320 m

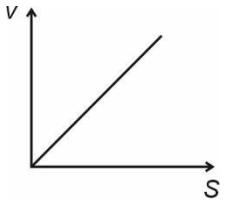
(3) 430 m (4) 450 m

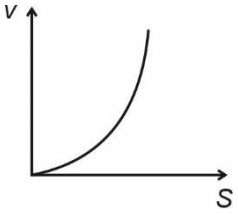
18. Two particles held at different heights h_1 and h_2 above the ground are allowed to fall from rest. The ratio of their velocities on reaching the ground is

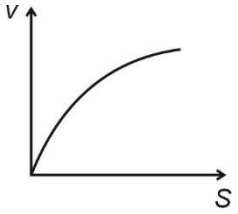
(1) 1 : 1 (2) h_1/h_2

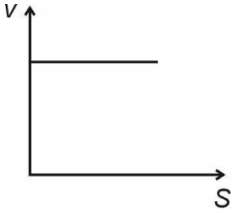
(3) h_2/h_1 (4) $\sqrt{h_1/h_2}$

19. A particle starts from rest and moves along a straight line with constant acceleration. The variation of velocity v with displacement S is correctly shown by the graph

(1) 

(2) 

(3) 

(4) 

20. A person is swimming towards south at 10 km/h and the river current is flowing at 6 km/h in the direction of 60° east of north. Then the velocity of person with respect to ground and the angle made with south direction, in which person going is

(1) $\sqrt{50}$ km/h and $\theta = \tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$

(2) $\sqrt{76}$ km/h and $\theta = \tan^{-1}\left(\frac{3\sqrt{3}}{7}\right)$

(3) $\sqrt{76}$ km/h and $\theta = \tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$

(4) $\sqrt{50}$ km/h and $\theta = \tan^{-1}\left(\frac{3\sqrt{3}}{7}\right)$

21. During circular motion of a body with uniform speed

(1) Both velocity and acceleration change

(2) Both velocity and acceleration are constant

(3) Velocity is constant but acceleration changes

(4) Acceleration is constant but velocity changes

22. Let a_r and a_t represent radial and tangential acceleration. The motion of particle may be circular, if

a. $a_r \neq 0; a_t = 0$

b. $a_r \neq 0; a_t \neq 0$

c. $a_r = 0; a_t \neq 0$

d. $a_r = 0; a_t = 0$

(1) a, b and c (2) a, c and d

(3) a and b (4) c and d

23. In a projectile motion, projected from ground at some angle θ ($\theta < 90°$) the velocity is

(1) Always perpendicular to acceleration

(2) Never perpendicular to acceleration

(3) Perpendicular to acceleration at one instant

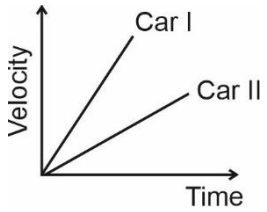
(4) Perpendicular to acceleration at three instants

24. If the radius of circular paths of two particles of same masses are in the ratio of 1 : 4, then in order to have same centripetal acceleration, their speeds should be in the ratio of

(1) $1:\sqrt{2}$ (2) 1:2

(3) 1:4 (4) $2\sqrt{2}:1$

25. Two cars start moving from a fixed position. Their velocity-time graph are shown in the figure. Which of the following statement about their magnitude of relative velocity is correct?



(1) Is constant and non-zero

(2) Is zero

(3) Continuously increases

(4) Continuously decreases

26. Two particles are moving with velocities v_1 and v_2. Their relative velocity has maximum magnitude, when the angle between their velocities is

(1) 0° (2) 45°

(3) 90° (4) 180º

27. Accuracy of measurement is determined by

(1) Absolute error only (2) Percentage error

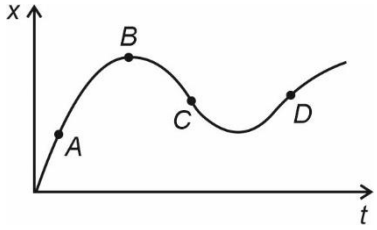
(3) Both (1) and (2) (4) Neither (1) nor (2)

28. When the planet Jupiter is at a distance of 8×10^{11} m from the earth, its angular diameter is measured to be 36" of arc. Calculate the diameter of Jupiter.

(1) 2.42×10^9 m (2) 1.4×10^8 m

(3) 3.2×10^6 m (4) 4.8×10^9 m

29. In the position-time graph of a moving particle shown, the instantaneous velocity of the particle is negative at the point

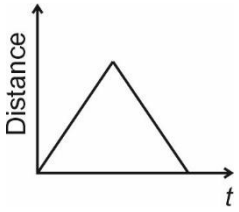


(1) *A* (2) *B*

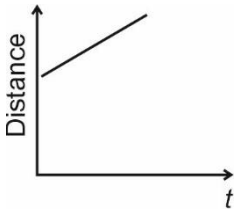
(3) *C* (4) *D*

30. Which of the following graph(s) is/are not possible?

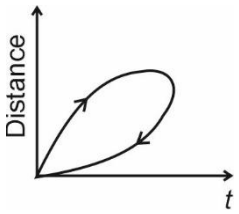
(a)



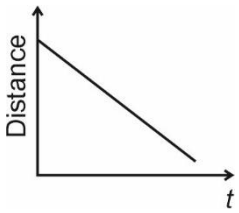
(b)



(c)



(d)



(1) a, b and c (2) a, c and d

(3) a and c (4) c only

31. The position of a particle is given by $\vec{r} = (4t^2\hat{i} - 3t\hat{j} + 4t^3\hat{k})$ m, where t is in seconds. Then the magnitude of acceleration at t = 1 second will be close to

(1) 20 m/s^2 (2) 22 m/s^2

(3) 25 m/s^2 (4) 28 m/s^2

32. A ball tied to the end of a string of length 1 m is whirled in horizontal circle with a constant speed. If the ball completes 20 revolutions in 40 seconds. Then the magnitude of acceleration of the ball is (neglect gravity)

(1) 6.2 m s^{-2} (2) 7.4 m s^{-2}

(3) 8.6 m s^{-2} (4) 9.8 m s^{-2}

33. A car starts its journey from the origin with a velocity of $20\hat{i}$ m/s and moves in x-y plane with acceleration of $(2\hat{i} + 4t\hat{j})$ m/s^2. Then the speed of car at t = 2 s will be

(1) 20 m/s (2) 22.5 m/s

(3) 25.3 m/s (4) 28.2 m/s

34. The component of $(2\hat{i} + 3\hat{j})$ vector in the direction of $(\hat{i} + \hat{j})$ is

(1) $\sqrt{2}$ (2) $4/\sqrt{3}$

(3) $3\sqrt{3}$ (4) $5/\sqrt{2}$

35. Equation of trajectory of a projectile is given by $y = 4x - 5x^2$. Horizontal range of projectile motion is ($x \rightarrow$ horizontal axis; $y \rightarrow$ vertical axis)

(1) 0.8 m (2) 1.20 m

(3) 1.25 m (4) 1.50 m

SECTION-B

36. Two balls A and B are moving with velocity $(\hat{i} + \hat{j})$ m/s and $(4\hat{i} - 3\hat{j})$ m/s respectively. Then the magnitude of relative velocity of ball B w.r.t. ball A is

(1) 3 m/s

(2) 4 m/s

(3) $\sqrt{41}$ m/s

(4) 5 m/s

37. A plane flying horizontally at a height of 1500 m with a velocity of 200 m/s passes directly overhead an anticraft gun. Then the angle with the horizontal at which the gun should be aimed for the shell with a muzzle velocity of 400 m/s at the same instant, to hit the plane, is

(1) 30° (2) 60°

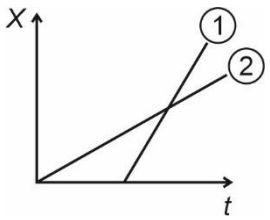
(3) 45° (4) 90°

38. Two perpendicular rail tracks have two trains A and B respectively. Train A moves towards north with a speed of 36 km/h and train B moves towards east with speed of 72 km/h. Then the magnitude of relative velocity of train B w.r.t. train A is

(1) 10 m/s (2) $10\sqrt{5}$ m/s

(3) $10\sqrt{3}$ m/s (4) $20\sqrt{2}$ m/s

39. The figure shows position-time graph for two women going home from the market. Which of the following statement regarding their relative velocity is true?



(1) Relative velocity is zero

(2) Relative velocity is constant

(3) Relative velocity first increases then decreases

(4) Relative velocity first decreases then increases

40. Raindrops are falling vertically with respect to ground with a velocity of 10 m/s. A person who is running on straight road, the raindrops appear him to be coming with a velocity of 20 m/s. The running speed of man is

(1) 10 m/s (2) $10\sqrt{2}$ m/s

(3) $10\sqrt{3}$ m/s (4) 20 m/s

41. Match column I with column II.

	Column I		Column II
(A)	Work	(P)	$[ML T^{-2}]$
(B)	Potential energy	(Q)	$[ML^{-1}T^{-2}]$
(C)	Pressure	(R)	$[ML^{2}T^{-3}]$
(D)	Force	(S)	$[ML^{2}T^{-2}]$

(1) A → Q; B → S; C → P; D → R

(2) A → S; B → S; C → R; D → P

(3) A → S; B → S; C → Q; D → P

(4) A → S; B → R; C → Q; D → P

42. Which of the following statement(s) is/are incorrect regarding a projectile projected from ground?

a. The maximum possible horizontal range attained by a projectile is $\frac{u^2}{2g}$, where u is the projection speed.

b. To attain maximum possible horizontal range, body is thrown at an angle 45°.

c. Linear momentum is conserved throughout projectile motion journey.

(1) Only a (2) a and b

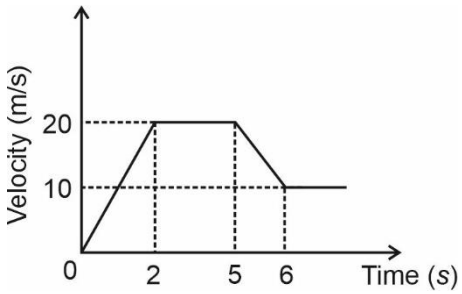
(3) b and c (4) a and c

43. A cricket ball is thrown at a speed of 90 km/h in a direction 60° with the vertical. The time taken by the ball to return to same level is (g = 10 m s^{-2})

(1) $2\sqrt{5}$ s (2) 2.5 s

(3) 4 s (4) $\frac{5}{\sqrt{2}}$ s

44. The variation of velocity of a particle moving in a fixed direction is shown in the figure. Distance travelled by the particle between time instant t = 0 to t = 6 s is



(1) 35 m (2) 65 m

(3) 75 m (4) 95 m

45. Consider the motion of the tip of the second hand of a clock. In one minute

a. Displacement is zero

b. Average speed is zero

c. Average velocity is zero

(1) a and b (2) a and c

(3) b and c (4) Only a

46. Two balls are projected from ground at angles 30° and 60° with same initial speeds. If R_1 and R_2 are the ranges of first and second ball, similarly H_1 and H_2 are their maximum heights and T_1 and T_2 are time of flights. Then match the information given in column I with column II.

	Column I		Column II
(A)	$\frac{R_1}{R_2}$	(P)	$\frac{1}{3}$
(B)	$\frac{H_1}{H_2}$	(Q)	$\frac{1}{\sqrt{3}}$
(C)	$\frac{T_1}{T_2}$	(R)	1

(1) A → Q; B → P; C → R

(2) A → R; B → Q; C → P

(3) A → R; B → P; C → Q

(4) A → P; B → R; C → Q

47. Read the following statements and choose the **correct** option.

Statement I : Instantaneous speed is always equal to magnitude of instantaneous velocity.

Statement II : Distance is always equal to magnitude of displacement.

(1) Statement (I) is true and statement (II) is false

(2) Statement (I) is false and statement (II) is true

(3) Both statement I and statement II are true

(4) Both statement I and statement II are false

48. A person stands on the roof of a tall building of height 320 m and throws a ball horizontally with an initial speed of 20 m/s. Then the speed with which the ball hits the ground is

(1) 60 m/s (2) 82.5 m/s

(3) 75.5 m/s (4) 80 m/s

49. A coin is released inside a lift at a height of 2 m from the floor of the lift. The height of lift compartment is 4 m. The lift is moving downward with an acceleration 5 m/s^2. The time after which the coin will strike with the lift floor is

(1) 2 s (2) $2\sqrt{2}$ s

(3) $\frac{4}{\sqrt{3}}$ s (4) $\frac{2}{\sqrt{5}}$ s

50. A swimmer crosses the river stroking along the line making an angle of 90° with the direction of flow. Velocity of the river water is 5 m/s. Swimmer takes 20 s to cross the river of width 300 m. Then the velocity of the swimmer with respect to water is

(1) 10 m/s (2) 20 m/s

(3) 15 m/s (4) $\frac{20}{\sqrt{2}}$ m/s

CHEMISTRY

SECTION-A

51. The correct scientific notation of 123.456 is

(1) 1.23456×10^2 (2) 12.3456×10

(3) 1.234×10^2 (4) 0.12×10^3

52. If true value of a result is 3.00 g and a student takes two measurements and reports the result 2.95 and 2.92 g then these values are

(1) Precise as well as accurate

(2) Precise but not accurate

(3) Neither precise nor accurate

(4) Accurate but not precise

53. 1.001 has _____ significant figures.

Fill in the blank with appropriate option.

(1) One (2) Two

(3) Three (4) Four

54. **Statement-I:** Gay Lussac's Law of Gaseous Volumes : When gases combine or are produced in a chemical reaction they do so in a simple ratio by volume provided that all gases are at same temperature and pressure.

Statement-II: The volumes of $H_2(g)$ and $O_2(g)$ which combine together to form water bear a simple ratio of 2 : 1

In the light of above statements, choose the correct answer from the options given below.

(1) Statement I is false but statement II is true

(2) Both statements I and II are true

(3) Both statements I and II are false

(4) Statement I is true but statement II is false

55. Match List-I with List-II.

	List I		List II
a.	Molarity	(i)	mole
b.	Mole fraction	(ii)	Unitless
c.	Molality	(iii)	mol L^{-1}
d.	Amount of substance	(iv)	mol kg^{-1}

Choose the correct answer from the options given below.

(1) a(iv), b(iii), c(ii), d(i) (2) a(ii), b(iv), c(i), d(iii)

(3) a(iii), b(ii), c(iv), d(i) (4) a(iv), b(ii), c(i), d(iii)

56. Mass % of carbon in glucose ($C_6H_{12}O_6$) is

(1) 40%

(2) 50%

(3) 45%

(4) 35%

57. Given below are two statements:

Statement I: The formula such as NaCl is used to calculate the formula mass instead of molecular mass.

Statement II: In the solid state, sodium chloride exist as a single entity.

In the light of above statements, choose the correct answer from the options given below.

(1) Statement I is incorrect but statement II is true

(2) Both statement I and statement II are true

(3) Both statement I and statement II are false

(4) Statement I is correct but statement II is false

58. Which one of the following will have largest number of atoms?

(1) 16 g O_3 (2) 2 g H_2

(3) 4 g He (4) 20 g Ca

59. Volume of 0.5 M NaOH required to prepare 0.2 M, 1 L NaOH solution is

(1) 300 ml (2) 400 ml

(3) 200 ml (4) 500 ml

60. Empirical formula and molecular formula is same for

(1) $C_2H_4Cl_2$ (2) Fe_2O_3

(3) C_2H_6 (4) H_2O_2

61. Match column I with column II.

	Column I		**Column II**
a.	One mole of CO	(i)	4 mole of O atoms
b.	Two mole of CO_2	(ii)	$2N_A$ atoms
c.	One mole of H_2O_2	(iii)	4 mole atoms
d.	One mole of C_3O_2	(iv)	5 mole atoms

Choose the correct answer from the options given below.

(1) a(iv), b(i), c(ii), d(iii) (2) a(iii), b(iv), c(i), d(ii)

(3) a(i), b(iii), c(ii), d(iv) (4) a(ii), b(i), c(iii), d(iv)

62. Select the incorrect statement among the following.

(1) In the periodic table of elements, the atomic masses mentioned for different elements actually represent their average atomic masses

(2) One amu is defined as a mass exactly equal to one-twelfth the mass of one carbon-12 atom

(3) One mole is the amount of a substance that contains as many particles or entities as there are atoms in exactly 12 kg of the ^{12}C isotope

(4) The atomic mass of an element is expressed relative to ^{12}C isotope of carbon which has an exact value of 12 u

63. The incorrect order for atomic/ionic radii is

(1) $F^- > F$ (2) $Na^+ < Na$

(3) $Mg^{2+} > Al^{3+}$ (4) $O^{2-} < Na^+$

64. The incorrect match for general outer electronic configuration is

(1) *p*-block elements : ns^2np^{1-6}

(2) *d*-block elements : $(n-1)d^{1-10}\ ns^{1-2}$

(3) *f*-block elements : $(n-2)f^{1-14}\ (n-1)d^{0-1}\ ns^2$

(4) *s*-block elements : ns^{1-2}

65. Among group-16 and group-17 elements, the elements having minimum and maximum negative electron gain enthalpy respectively are

(1) O and Cl (2) Po and F

(3) O and F (4) S and Cl

66. Among the following, which pair of elements have diagonal relationship?

(1) N and S (2) Cl and O

(3) Be and Al (4) P and C

67. Select the **correct** statement among the following.

(1) Germanium is known as Eka-aluminium

(2) Noble gases exhibit very high chemical reactivity

(3) *p*-block elements together with *s*-block elements are called representative elements

(4) Actinoids elements are also known as transuranic elements

68. The atomic number of the element present in fourth period and sixth group of the modern periodic table is

(1) 41 (2) 33

(3) 19 (4) 24

69. Select the incorrect option among the following.

(1) Dobereiner's law of triads: The middle element of each of the triads has an atomic weight about halfway between the atomic weights of the other two.

(2) Newlands' law of octave: On arranging the elements in increasing order of their atomic weights, every eighth element have properties similar to the first element

(3) Dmitri Mendeleev periodic law: The properties of the elements are a periodic function of their atomic numbers

(4) Lothar Meyer: On arranging elements in the increasing order of their atomic weights, similarities appear in physical and chemical properties at regular intervals.

70. The IUPAC symbol for the element having atomic number 106 is

(1) Unq (2) Unh

(3) Unb (4) Une

71. Consider the reasons for variation in chemical behaviour of the first member of a group of elements in the *s*-and *p*-blocks compared to that of the subsequent members in the same group.

(a) Small size

(b) Large charge/radius ratio

(c) High electronegativity

(d) Only four valence orbitals

The correct reasons are

(1) (a), (b) and (c) only (2) (a), (c) and (d) only

(3) (a) and (b) only (4) (a), (b), (c) and (d)

72. A 66.2 watt bulb emits monochromatic light of wavelength 300 nm. The number of photons emitted by the bulb per second is

($h = 6.62 \times 10^{-34}$ Js)

(1) 10^{20} (2) 10^{22}

(3) 10^{24} (4) 10^{18}

73. Given below are two statements.

Statement I: In photoelectric effect, the number of electrons ejected depend upon the brightness of light.

Statement II: In photoelectric effect, the kinetic energy of the ejected electrons does not depend upon the brightness of light.

In the light of above statements, choose the correct answer from the options given below.

(1) Statement I is false but statement II is true

(2) Statement I is true but statement II is false

(3) Both statement I and statement II are true

(4) Both statement I and statement II are false

74. Incorrect statement among the following is

(1) Each element has a unique line emission spectrum

(2) Line spectrum becomes more and more complex for heavier atoms

(3) The three quantum numbers n, l and m_s are enough to explain the line spectra observed in the case of multi-electron atoms

(4) Bohr model could not explain the spectra of multi-electron atoms

75. The number of nodes for 3*s* orbital is

(1) 1 (2) 2

(3) 3 (4) Zero

76. The correct order of increasing energy of orbitals for H-atom is

(1) 4s < 3*d* < 4*p* < 5*s* < 4*d*

(2) 3*d* < 4*s* = 4*p* = 4*d* < 5*s*

(3) 3*d* < 4*s* < 4*p* < 4*d* < 5*s*

(4) 3*d* < 4*s* = 5*s* < 4*p* < 4*d*

77. Which of the following sets of quantum numbers is not possible?

(1) n = 3, l = 2, $m_l = -2$, $m_s = +\frac{1}{2}$

(2) n = 2, l = 0, $m_l = 0$, $m_s = -\frac{1}{2}$

(3) n = 4, l = 2, $m_l = +1$, $m_s = +\frac{1}{2}$

(4) n = 3, l = 3, $m_l = 2$, $m_s = -\frac{1}{2}$

78. Consider the following statements/expression regarding Heisenberg's uncertainty principle.

(a) $\Delta x \times \Delta p_x \geq \frac{h}{4\pi}$

(b) It rules out existence of definite paths of electrons

(c) It is negligible for the motion of macroscopic objects

The **correct** statement(s) is/are

(1) (a) only (2) (a) and (b) only

(3) (a) and (c) only (4) (a), (b) and (c)

79. The wavelength of an electron moving with velocity 10^7 ms^{-1} is (Given: $m_e = 9.1 \times 10^{-31}$ kg, $h = 6.62 \times 10^{-34}$ Js)

(1) 5.4×10^{-10} m (2) 6.2×10^{-12} m

(3) 8.2×10^{-13} m (4) 7.3×10^{-11} m

80. The visible region of electromagnetic radiations lies in between

(1) UV rays and IR rays

(2) γ-rays and X-rays

(3) Microwaves and radiowaves

(4) IR rays and long radiowaves

81. The (e/m) ratio for an electron is

(1) 1.758×10^{11} C kg^{-1} (2) 1.254×10^{11} C kg^{-1}

(3) 1.942×10^{12} C kg^{-1} (4) 1.121×10^{10} C kg^{-1}

82. The number of protons, neutrons and electrons in $^{13}_{6}C$ respectively are

(1) 6, 7 and 6 (2) 7, 6 and 6

(3) 6, 6 and 7 (4) 7, 6 and 7

83. Match column I with column II.

	Column I		**Column II**
a.	Lyman series	(i)	Visible spectral region
b.	Balmer series	(ii)	$n_2 = 4, 5\ldots$
c.	Paschen series	(iii)	$n_1 = 5$
d.	Pfund series	(iv)	Ultraviolet spectral region

Choose the correct answer from the options given below.

(1) a(iv), b(i), c(iii), d(ii)

(2) a(ii), b(i), c(iii), d(iv)

(3) a(iv), b(i), c(ii), d(iii)

(4) a(iv), b(ii), c(iii), d(i)

84. The maximum number of emission lines obtained when an excited electron of H-atom in n = 6 drops to ground state is

(1) 5 (2) 10

(3) 15 (4) 18

85. How many electrons in an atom may have the quantum numbers n = 4 and $m_s = +\frac{1}{2}$?

(1) 32 (2) 16

(3) 8 (4) 12

SECTION-B

86. The average atomic mass of chlorine assuming it exists in two isotopic forms ^{35}Cl and ^{37}Cl with % natural abundance 75% and 25% respectively is

(1) 35.5 (2) 35.1

(3) 36.8 (4) 36.1

87. The density of 2 M solution of HCl is 1 g ml^{-1}. The molality of the solution is [Given that molecular mass of HCl = 36.5 g mol^{-1}]

(1) 2.16 m (2) 1.15 m

(3) 2.95 m (4) 1.81 m

88. The number of moles of oxygen molecules required to produce 10 moles of CO_2 through combustion of 1 mole of ethane (C_2H_6) is

(1) 17.5 mol (2) 14.5 mol

(3) 21.5 mol (4) 19.5 mol

89. How many maximum moles of water will be formed from a reaction between 6 g of H_2 and 64 g of O_2?

(1) 3 mol (2) 2.5 mol

(3) 2 mol (4) 3.5 mol

90. The mole fraction of urea in its 0.1 molal aqueous solution is

(1) $\frac{1}{655.5}$ (2) $\frac{1}{596.5}$

(3) $\frac{1}{556.5}$ (4) $\frac{1}{535.5}$

91. A mixture of gases contains O_2 and N_2 in the ratio of 1:1 (w/w). The molar ratio of the two gases in the mixture is

(1) $\frac{5}{6}$ (2) $\frac{7}{8}$

(3) $\frac{9}{7}$ (4) $\frac{2}{3}$

92. In which of the following arrangements, the given sequence is not strictly according to the properties indicated against it?

(1) $Na_2O < Al_2O_3 < Cl_2O_7$: Increasing acidic character

(2) Be < B < C : Increasing electronegativity

(3) He < Ne < Ar : Increasing electron gain enthalpies

(4) B < C < N : Increasing first ionization enthalpies

93. The IUPAC official name of element having atomic number Z = 104 is

(1) Bohrium (2) Rutherfordium

(3) Meitnerium (4) Nobelium

94. Which of the following element do not show most of the properties of transition elements?

(1) Cd (2) Fe

(3) Ag (4) Os

95. The radii of second orbit of He^+ is

(1) 52.9 pm

(2) 105.8 pm

(3) 158.7 pm

(4) 211.6 pm

96. The wavenumber for the longest wavelength transition in the Balmer series of atomic hydrogen is

(1) $\frac{R_H}{4}$

(2) $\frac{5}{36}R_H$

(3) $\frac{5R_H}{108}$

(4) $\frac{3R_H}{37}$

97. The correct sequence of energies of 2*s* orbitals for the H, Li, Na and K is

(1) $E_{2s}(K) > E_{2s}(Na) > E_{2s}(Li) > E_{2s}(H)$

(2) $E_{2s}(Li) > E_{2s}(Na) > E_{2s}(K) > E_{2s}(H)$

(3) $E_{2s}(H) > E_{2s}(K) > E_{2s}(Na) > E_{2s}(Li)$

(4) $E_{2s}(H) > E_{2s}(Li) > E_{2s}(Na) > E_{2s}(K)$

98. The **incorrect** statement among the following is

(1) For an atom (whose energy does not change with time), the Schrodinger equation is written as $H\psi = E\psi$

(2) $|\psi|^2$ is known as probability density and is always positive

(3) An atomic orbital is the wave function ψ for an electron in an atom

(4) The Schrodinger equation can be solved exactly for a multi-electron atom

99. The pair of *d*-orbitals having electron density along the axis is

(1) d_{z^2} and $d_{x^2-y^2}$ (2) d_{xy} and d_{yz}

(3) $d_{x^2-y^2}$ and d_{xy} (4) d_{z^2} and d_{yz}

100. Boundary surface diagram for a *s*-orbital encloses a region in which probability of finding the electron is about

(1) 100% (2) 90%

(3) 80% (4) 70%

BOTANY

SECTION-A

101. At which phase of cell cycle morphology of chromosome is easily studied?

(1) Telophase (2) Anaphase

(3) Prophase (4) Metaphase

102. At which phase of cell cycle, nucleolus, Golgi complex and ER reform?

(1) Prophase (2) Anaphase

(3) Metaphase (4) Telophase

103. During which stage of meiosis I, the four chromatids of each bivalent chromosome become distinct and clearly appear as tetrad?

(1) Leptotene (2) Diplotene

(3) Zygotene (4) Pachytene

104. Diakinesis is marked by

(1) Pairing of chromosome called synapsis of chromosomes

(2) Dissolution of synaptonemal complex

(3) Terminalisation of chiasmata

(4) Formation of bivalents

105. Select the **correct** sequence of phases involved in cell cycle.

(1) $G_1 \rightarrow G_2 \rightarrow S \rightarrow M$

(2) $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$

(3) $G_2 \rightarrow G_1 \rightarrow S \rightarrow M$

(4) $G_2 \rightarrow M \rightarrow S \rightarrow G_1$

106. When we move from species to kingdom, the number of common characteristics
(1) Goes on increasing
(2) Remains same
(3) Goes on decreasing
(4) Increases but gradually decreases after class

107. Select the **correct** statement w.r.t. museum.
(1) Serves as quick referral system in taxonomical studies
(2) It has collection of preserved plants and animals specimens
(3) Collections of living plants for reference
(4) Dried, pressed and preserved insects are pasted on sheets

108. National Botanical Research Institute is located at
(1) Kew (2) Howrah
(3) Lucknow (4) Delhi

109. Keys are
(1) Based on the contrasting characters in a pair called couplet
(2) Not analytical in nature
(3) Used for identification of plants and animals based on similarities only
(4) Used to provide information about English name, local name, botanical names and collector's name of specimen

110. Which of the following contains information on any one taxon?
(1) Catalogue (2) Manual
(3) Monograph (4) Flora

111. Who modified cell theory by explaining how new cells are formed?
(1) M. Schleiden (2) T. Schwann
(3) A.V. Leeuwenhoek (4) R. Virchow

112. Identify the **incorrect** one for plasmids.
(1) These are extrachromosomal DNA
(2) They are dsDNA
(3) Unlike genomic DNA they are linear type
(4) They have genes that confer certain unique phenotypic characters to bacteria

113. Bacterial cells have chemically complex envelope choose the **odd** one for cell envelope.
(1) The outermost layer is called glycocalyx
(2) They all together act as single protective unit
(3) Capsule is a thin glycocalyx layer that is loosely bound to cell envelope
(4) On the basis of difference in cell envelope bacteria are classified into two groups

114. Select the **correct** sequence of wall layer of prokaryotic cell from outside to inside.
(1) Cell wall $\rightarrow$ Glycocalyx $\rightarrow$ Plasma membrane
(2) Glycocalyx $\rightarrow$ Plasma membrane $\rightarrow$ Cell wall
(3) Plasma membrane $\rightarrow$ Cell wall $\rightarrow$ Glycocalyx
(4) Glycocalyx $\rightarrow$ Cell wall $\rightarrow$ Plasma membrane

115. Small bristle-like structures that sprout out of bacterial cell
a. Are flagella
b. Are made of special protein
c. Help bacteria to attach to the rocks in streams
Mark the **correct** one.
(1) a and b (2) b and c
(3) a and c (4) All a, b and c

116. Identify the **wrong** match w.r.t. plasma membrane.

(1)	Lipid component is mainly	- Phosphoglycerides
(2)	Peripheral proteins	- Lie on the surface of membrane
(3)	Integral protein	- Partially or totally buried in membrane
(4)	Non-polar tail of lipid	- Projected towards outer side aqueous environment

117. The component of endomembrane system which have ribosomes
(1) Consist of cis and trans faces
(2) Is frequently observed in cells that are actively involved in protein synthesis
(3) Is smooth endoplasmic reticulum
(4) Is involved in lipid and steroid synthesis

118. Select the **correct** statement for interkinesis.
(1) No replication of DNA takes place
(2) It is a long-lived phase
(3) It is followed by prophase I
(4) It is a phase between two mitotic phases

119. If a diploid cell had 48 chromosomes and 2C content of DNA initially. Then what will be the number of chromosomes after S phase?
(1) 24 (2) 12
(3) 48 (4) 96

120. The given diagram of cell represents which stage of mitosis?

(1) Transition to metaphase
(2) Metaphase
(3) Late prophase
(4) Early prophase

121. In oocytes of some vertebrates, which stage of meiosis I can last for months or years?
(1) Zygotene (2) Diplotene
(3) Diakinesis (4) Pachytene

122. At which phase of meiosis homologous chromosomes separate, while sister chromatids remain associated at their centromere?
(1) Metaphase I (2) Anaphase II
(3) Prophase II (4) Anaphase I

123. Read the given statements and select the **correct** option.
Statement-A : Mitochondria divide by fission.
Statement-B : Aleuroplast stores protein.
(1) Only statement A is correct
(2) Only statement B is correct
(3) Both statements are incorrect
(4) Both statements are correct

124. Select the true statement for centrioles.
(1) Nine radial spokes are found
(2) There are eighteen peripheral doublets
(3) Central hub contains a pair of microtubules
(4) Central sheath surrounds the central doublet

125. In telocentric chromosome
(1) Telomeres are absent
(2) There is one short arm and one long arm
(3) Centromere is not seen
(4) Centromere is situated at its tip

126. Sometimes a few chromosomes have non-staining _____ at a constant location.
Fill in the blank with **correct** option.
(1) Secondary constriction
(2) Chromatid
(3) Primary constriction
(4) Centromere

127. Total number of microtubules found in a cilium is
(1) 20 (2) 27
(3) 18 (4) 9

128. Na^+/K^+ pump involves
(1) Osmosis
(2) Passive transport
(3) Energy independent transport
(4) Active transport

129. Choose the **odd** one w.r.t. surface structure of prokaryotes.
(1) Pili (2) Fimbriae
(3) Cilia (4) Flagella

130. Which one is **not** a double membrane bound structure of cell?
(1) Plastid
(2) Mitochondria
(3) Nucleus
(4) Endoplasmic reticulum

131. In which stage of cell cycle, cells remain metabolically active but no longer proliferate?
(1) G_1 phase (2) S phase
(3) G_0 phase (4) M phase

132. The cells during the G_1 phase

(1) Divide their cytoplasm

(2) Are metabolically active and continuously grow but does not replicate its DNA

(3) Double the amount of DNA

(4) Divide in a random manner

133. Which structure of chromosome serves as a site of attachment of spindle fibres?

(1) Centromere (2) Chromatids

(3) Metaphasic plate (4) Kinetochore

134. Which phase of cell cycle will last more than 95% of total duration of cell cycle?

(1) Interphase (2) Prophase

(3) Anaphase (4) Telophase

135. Mitotic apparatus consists of

(1) Two chromatids together with spindle fibre

(2) Microtubules radiating out from each centrosome

(3) Two asters together with spindle fibres

(4) Two chromosomes together with centromere

SECTION-B

136. Growth and reproduction are mutually exclusive events for all, **except**

(1) Higher animals

(2) Unicellular algae

(3) Filamentous algae

(4) *Hydra*

137. Select the characteristic key events of Anaphase

a. Spindle fibre attach to the kinetochore of chromosome.

b. Centromere splits and chromatids are separated.

c. Chromosomal material condenses to form compact mitotic chromosomes.

d. Separated chromatids moves to opposite poles.

(1) a and c only (2) a and b only

(3) b and d only (4) c and d only

138. Which among the following is not a defining feature of living organisms?

(1) Reproduction

(2) Consciousness

(3) Cellular organisation

(4) Metabolism

139. In a cell when karyokinesis is not followed by cytokinesis as a result multinucleate condition arises leading to the formation of

(1) Syncytium (2) Polyploid

(3) Bivalent (4) Tetrad

140. Which among the following is not true for mitosis?

(1) Helps in repairing of cells

(2) Helps in continuous growth of plant throughout their life

(3) Does not restore nucleo-cytoplasmic ratio in cell

(4) Produces diploid daughter cells with identical genetic complement

141. Read the following statements given below and select the **correct** option

Statement-A : Meiosis II is referred to as equational division.

Statement-B : At the end of meiosis II four haploid daughter cells are formed.

(1) Only statement A is correct

(2) Only statement B is correct

(3) Both statements are correct

(4) Both statements are incorrect

142. Select the **incorrect** statement w.r.t. universal rules of nomenclature.

(1) The first letter of both genus and specific epithet starts with capital letter

(2) Biological names are Latinised or derived from Latin irrespective of their origin

(3) First word in a biological name represents genus

(4) Both words in a biological name are separately underlined when handwritten

143. The most obvious and technically complicated feature of all living organisms is
(1) Production of progeny
(2) Self-consciousness
(3) Increase in body mass
(4) Ability to sense their surroundings and response towards external stimuli

144. The number of species currently known and described range between
(1) 17-18 million (2) 1.7-1.8 billion
(3) 17-18 billion (4) 1.7-1.8 million

145. Contractile vacuole of *Amoeba*
(1) Stores food material
(2) Is important for excretion
(3) Provides buoyancy
(4) Is covered by double membrane

146. All of the below given features are common between mitochondria and chloroplast, **except**
(1) Presence of circular dsDNA
(2) Machinery for ATP synthesis
(3) Contains 70S ribosomes
(4) Synthesis as well as oxidation of starch

147. During prophase
(1) Chromosomes lie at equator of cell
(2) Initiation of condensation of chromosomal material occurs
(3) Chromosomes migrate towards opposite poles
(4) Centromere splits

148. Hydrolytic enzymes rich cell organelle is
(1) Vacuole
(2) Lysosome
(3) Golgi apparatus
(4) Chloroplast

149. In 80S ribosome
a. 'S' is Svedberg's unit
b. Two subunits are 50S and 30S
c. 'S' stands for sedimentation coefficient
d. RNA and proteins are found
Select the **incorrect** one(s)
(1) b and c
(2) a, c and d
(3) c and d
(4) b only

150. Which of the given pairs is **wrongly** matched?

(1) Chromatin	–	Flemming
(2) Nucleolus	–	Membrane bound structure
(3) Golgi apparatus	–	Site for glycoprotein synthesis
(4) Primary cell wall	–	Gradually diminishes as the cell matures

ZOOLOGY

SECTION-A

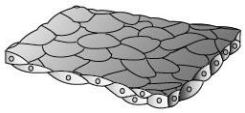
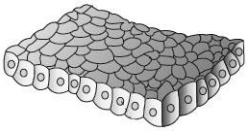
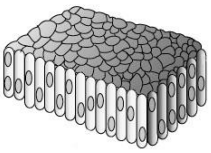
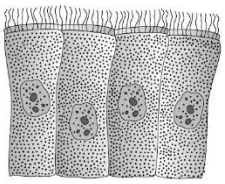
151. In which of the following organisms, a group of similar cells along with intercellular substances perform a specific function?
(1) *Paramecium* (2) *Spongilla*
(3) *Sycon* (4) *Hydra*

152. The tissue which consists of two or more cell layers with little intercellular matrix is found in lining/dry surface of
(1) Alveolar sac (2) Veins
(3) Body cavities (4) Skin

153. The type of epithelium which forms the endothelium as well as lines the walls of alveoli is
(1) Squamous epithelium
(2) Columnar epithelium
(3) Cuboidal epithelium
(4) Compound epithelium

154. All the cells in the epithelium lining following structures have centrally located nucleus, **except**
(1) Proximal convoluted tubule
(2) Air sacs of lungs
(3) Intestine
(4) Distal convoluted tubule

155. Match the columns w.r.t. epithelium and their location.

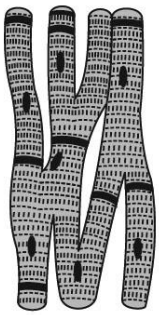
	Column I		Column II
(i)		a.	Ducts of glands
(ii)		b.	Bronchioles
(iii)		c.	Walls of blood vessels
(iv)		d.	Stomach

(1) (i)a, (ii)b, (iii)c, (iv)d (2) (i)c, (ii)a, (iii)d, (iv)b

(3) (i)b, (ii)c, (iii)a, (iv)d (4) (i)d, (ii)c, (iii)b, (iv)a

156. Choose the **correct** option w.r.t common feature of the given tissues A and B.

A



B

(1) Location of tissues

(2) Branching

(3) Striated

(4) Number of nuclei per cell

157. Dense connective tissue and loose connective tissue are differentiated on the basis of :

a. Presence of fibroblast

b. Presence of blood vessels

c. Amount of intercellular matrix

d. Number of fibres

(1) a, b, c, d (2) c, d only

(3) b, c only (4) d only

158. Read the following statements and select the **correct** option.

Statement A : Elemental analysis shows that all the elements present in a sample of earth's crust are also present in a sample of living tissue.

Statement B: The relative abundance of carbon and hydrogen with respect to other elements is lower in any living organism than in earth's crust.

(1) Both statements A and B are correct

(2) Both statements A and B are incorrect

(3) Only statement A is correct

(4) Only statement B is correct

159. How many of the given compounds are found in acid soluble fraction in a chemical analysis?

Sulphate, Phosphate, Sodium chloride, Simple sugars, Nucleotides, Amino acids

(1) Six (2) Four

(3) Three (4) Five

160. Amino acids are substituted methane, in which four valency positions are occupied by four groups. Which amino acid has a methyl group as 'R' group and is considered as neutral amino acid?

(1) Glycine (2) Valine

(3) Alanine (4) Lysine

161. Choose the **correct** option which consists of the substances that are present in acid insoluble fraction during chemical analysis of a living tissue.

a. Phenylalanine

b. Uridylic acid

c. Cellulose

d. Glucose

e. Insulin

f. Deoxyribonucleic acid

(1) a, b, c, d (2) c, e, f

(3) b, c, d, e (4) d, e, f

162. Which of the following is not a heteropolymer?

(1) RuBisCO (2) DNA

(3) Insulin (4) Chitin

163. Glycerol, present in phospholipids is

a. Sugar alcohol

b. Trihydroxy propane

c. Trihydric alcohol

Choose the **correct** option.

(1) Only a and b (2) Only b and c

(3) a, b and c (4) Only a and c

164. On hydrolysis, adenosine will not yield

(1) Pentose sugar

(2) Heterocyclic compound

(3) Phosphate group

(4) Ribose

165. **Assertion (A):** Zwitterionic form is one in which the monomeric unit of proteins exists as electrically neutral moiety.

Reason (R): This is true for all amino acids that exist at same pH and temperature.

(1) Both (A) and (R) are true and (R) is the correct explanation of (A).

(2) Both (A) and (R) are true but (R) is not the correct explanation of (A).

(3) (A) is true but (R) is false.

(4) Both (A) and (R) are false.

166. Select the **correct** option representing the positions at which purine possesses nitrogen.

(1) Only 1, 3 (2) 1, 3, 7, 9

(3) 1, 3, 6, 7, 9 (4) Only 1, 3, 7

167. Deoxyribonucleotides found in DNA do not include

(1) Deoxyuridylic acid (2) Deoxyadenylic acid

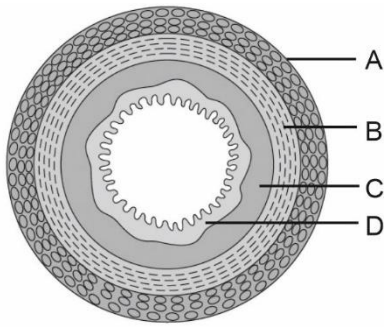
(3) Deoxycytidylic acid (4) Deoxyguanylic acid

168. Select the odd one w.r.t. major compounds of our food.

(1) Carbohydrates (2) Proteins

(3) Fats (4) Vitamins

169. Given below is the diagram representing transverse section of gut in which layers of alimentary canal are labelled as A, B, C and D.



Choose the **correct** option regarding the labelled layers.

(1) A – It is the outermost layer and is made up of a thick endothelium with some connective tissue.

(2) B – It is formed of spindle-shaped muscle fibres with centrally located nucleus under the control of ANS.

(3) C – This layer is formed of dense connective tissue containing nerves, blood and lymph vessels.

(4) D – It is innermost layer lining the lumen of the alimentary canal. This layer forms irregular folds called villi in the stomach.

170. Read the given statements and choose the **correct** option.

Statement A : Stomach has an ability to protect itself from the corrosive action of HCl.

Statement B : Mucosal epithelium has mucus secreting cells which secrete mucus that helps in lubrication.

(1) Both statements A and B are correct

(2) Both statements A and B are incorrect

(3) Only statement A is correct

(4) Only statement B is correct

171. All of the following enzymes are present in succus entericus **except**

(1) Nucleotidase (2) Nucleosidase

(3) Nuclease (4) Lipase

172. Which teeth have three roots in upper jaw?

(1) Incisor (2) Canine

(3) Pre-molar (4) Molar

173. If all the salivary glands are removed, then which of the following condition is likely to occur?
(1) Buccal cavity will become alkaline
(2) Tongue glands will start producing saliva
(3) Amylase will be unable to act on starch in intestine
(4) It may lead to dental caries

174. Trypsinogen is activated by an enzyme secreted from the
(1) Pancreas
(2) Brush border cells of the intestinal mucosa
(3) Intestinal submucosa
(4) Liver

175. Salivary glands are
(1) Of six types
(2) Situated just inside the buccal cavity
(3) Three in number
(4) Multicellular glands

176. Which among the following is generally not absorbed by simple diffusion across luminal surface of the enterocytes?
(1) Glucose (2) Amino acids
(3) Fructose (4) Chloride ions

177. Select the **correct** statement w.r.t. digestive system in humans.
(1) Deglutition is the entry of bolus into oesophagus through glottis.
(2) The initial step of milk protein digestion in human infants occurs in small intestine.
(3) Humans lack rennin so they have only chymotrypsin to digest milk protein.
(4) Hormonal control of the secretion of digestive juices is carried out by local hormones produced by the gastric and intestinal mucosa.

178. The cells which make up more than fifty percent of the volume of tissue that controls the body's responsiveness to the surrounding are
(1) Neurons (2) Neuroglia
(3) Nerves (4) Adipocytes

179. The air that we breathe in and the food that we ingest travel through various tubes and organs as they move through the body.
Choose the structure which helps in the conduction of food as well as air, from the given options.
(1) Pharynx (2) Oesophagus
(3) Jejunum (4) Trachea

180. Choose the odd one w.r.t. secondary metabolites which impart colour as well.
(1) Carotenoid (2) Curcumin
(3) Morphine (4) Anthocyanin

181. How many substances are present in bile from the box given below?

Enzymes, Bilirubin, Cholesterol, Bile salts, Phospholipids

(1) Two (2) Three
(3) Four (4) Five

182. Select the **correct** statement about the epithelium present in the inner lining of oviducts.
(1) The non-ciliated epithelium helps in moving particles in a specific direction.
(2) Ciliated epithelium is also known as brush border epithelium.
(3) The hair-like projections on the free surface of columnar or cuboidal epithelium help in the movement of ovum in random directions.
(4) Simple ciliated columnar epithelium helps in movement of ovum.

183. The intrinsic factor secreted by oxyntic cells is essential for the absorption of vitamin _____.
Select the option which fills the blank correctly.
(1) B_6 (2) B_{12}
(3) C (4) A

184. Match column I with column II and choose the **correct** option.

	Column I		**Column II**
a.	Rennin	(i)	Intestinal juice
b.	Amylase	(ii)	Pancreatic juice
c.	Maltase	(iii)	Gastric juice

(1) a(ii), b(i), c(iii) (2) a(iii), b(i), c(ii)
(3) a(i), b(ii), c(iii) (4) a(iii), b(ii), c(i)

185. **Assertion (A):** The enzyme carboxypeptidase which helps in the breakdown of proteins requires zinc for its activity.

Reason (R) : The removal of co-factor does not affect the catalytic activity of the enzyme.

(1) Both (A) and (R) are true and (R) is the correct explanation of (A)

(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false

(4) (A) is false but (R) is true

SECTION-B

186. Choose the **incorrect** statement w.r.t. cartilage.

(1) Most of the cartilages in vertebrate embryos are replaced by bones in adults.

(2) It is present in between adjacent bones of the vertebral column and hands in adults.

(3) Intracellular material is solid and pliable.

(4) Its matrix resists compression.

187. Gap junctions are present in all **except**

(1) Multinucleated striated muscles

(2) Uninucleated fusiform muscles

(3) Electrical synapse

(4) Uninucleated branched muscles

188. All the cells in the epithelium lining the following structures show brush-bordered appearance, **except**

(1) Jejunum (2) Fallopian tube

(3) PCT (4) Ileum

189. On the basis of compound analysis of living tissue, the organic compounds that constitute minimum percentage of total cellular mass are

(1) Proteins (2) Ions

(3) Carbohydrates (4) Nucleic acids

190. Read the given statements and select the **correct** option.

Statement A : An active site of a substrate is a crevice or pocket into which the enzyme fits.

Statement B : Enzyme-substrate complex formed is transient and stable.

(1) Both statements A and B are correct

(2) Both statements A and B are incorrect

(3) Only statement A is correct

(4) Only statement B is correct

191. Synthesis of _____ does not require the formation of glycosidic bond.

Choose the option that fills the blank correctly.

(1) Ribose (2) Adenylic acid

(3) Sucrose (4) Cellulose

192. If a long protein chain is folded upon itself like a hollow woolen ball, it can represent all the following features, **except**

(1) It gives a 3-dimensional view

(2) Give rise to tertiary structure

(3) Necessary for the many biological activities of proteins

(4) It can maintain its shape only by peptide bonds

193. Which of the following is the cofactor for the enzyme which breaks peptide bonds present at C-terminal of peptides and the enzyme which converts carbon dioxide into carbonic acid?

(1) Iron (Fe^{2+}), Zinc (Zn^{2+})

(2) Zinc (Zn^{2+}), Zinc (Zn^{2+})

(3) Copper (Cu^{2+}), Zinc (Zn^{2+})

(4) Manganese (Mn^{2+}), Iron (Fe^{2+})

194. Physiological value of protein is

(1) More than its gross calorific value

(2) Equal to the physiological value of carbohydrate

(3) Equal to the gross calorific value of carbohydrates

(4) More than the physiological value of fats

195. Which of the following statement is **incorrect** w.r.t. villi of small intestine?

(1) The cells lining the villi produce numerous microscopic projections called microvilli.

(2) Crypts of Lieberkuhn are present between the bases of villi in the intestine.

(3) Villi of small intestine do not contain any unicellular glands which produce a proteinaceous viscous substance.

(4) Villi are supplied with a network of capillaries and a large lymph vessel called lacteal.

196. Read the given statements carefully w.r.t. protein energy malnutrition. Choose the option with all the **correct** statements.

a. Causes impairment in the growth and development of brain and mental faculties

b. Causes wasting of muscles in infants and toddlers

c. Marasmus is found in children who are more than one year old

d. Kwashiorkor in infants often happens if the mother has second pregnancy or childbirth when the older infant is still too young

(1) a and d

(2) a and b

(3) c and d

(4) a, b, c and d

197. The egestion of faeces to the outside through the anal opening (defaecation) is a/an _____ process. Choose the option that fills the blank correctly.

(1) Voluntary

(2) Involuntary

(3) Assimilatory

(4) Secretory

198. This part of the brain controls sneezing and vomiting.

Name the part of the brain which is being described.

(1) Medulla oblongata

(2) Cerebrum

(3) Cerebellum

(4) Pons

199. How many terms from the box given below can be used to describe human dentition?

Homodont, Acrodont, Polyphyodont, Thecodont, Heterodont, Diphyodont

(1) Two

(2) Three

(3) Five

(4) Six

200. The addition of the enzyme carbonic anhydrase increases the original reaction rate by about

(1) 1 million times

(2) 100 million times

(3) 1000 times

(4) 10 million times

❑ ❑ ❑

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Test – 3

Answer key

1. (4)	41. (3)	81. (1)	121. (2)	161. (2)
2. (3)	42. (4)	82. (1)	122. (4)	162. (4)
3. (3)	43. (2)	83. (3)	123. (4)	163. (3)
4. (3)	44. (4)	84. (3)	124. (1)	164. (3)
5. (2)	45. (2)	85. (2)	125. (4)	165. (3)
6. (2)	46. (3)	86. (1)	126. (1)	166. (2)
7. (3)	47. (1)	87. (1)	127. (1)	167. (1)
8. (2)	48. (2)	88. (1)	128. (4)	168. (4)
9. (3)	49. (4)	89. (1)	129. (3)	169. (2)
10. (4)	50. (3)	90. (3)	130. (4)	170. (1)
11. (4)	51. (1)	91. (2)	131. (3)	171. (3)
12. (2)	52. (2)	92. (3)	132. (2)	172. (4)
13. (1)	53. (4)	93. (2)	133. (4)	173. (4)
14. (3)	54. (2)	94. (1)	134. (1)	174. (2)
15. (2)	55. (3)	95. (2)	135. (3)	175. (4)
16. (3)	56. (1)	96. (2)	136. (2)	176. (3)
17. (4)	57. (4)	97. (4)	137. (3)	177. (4)
18. (4)	58. (2)	98. (4)	138. (1)	178. (2)
19. (3)	59. (2)	99. (1)	139. (1)	179. (1)
20. (2)	60. (2)	100. (2)	140. (3)	180. (3)
21. (1)	61. (4)	101. (4)	141. (3)	181. (3)
22. (3)	62. (3)	102. (4)	142. (1)	182. (4)
23. (3)	63. (4)	103. (4)	143. (4)	183. (2)
24. (2)	64. (2)	104. (3)	144. (4)	184. (4)
25. (3)	65. (1)	105. (2)	145. (2)	185. (3)
26. (4)	66. (3)	106. (3)	146. (4)	186. (3)
27. (2)	67. (3)	107. (2)	147. (2)	187. (1)
28. (2)	68. (4)	108. (3)	148. (2)	188. (2)
29. (3)	69. (3)	109. (1)	149. (4)	189. (3)
30. (2)	70. (2)	110. (3)	150. (2)	190. (2)
31. (3)	71. (4)	111. (4)	151. (4)	191. (1)
32. (4)	72. (1)	112. (3)	152. (4)	192. (4)
33. (3)	73. (3)	113. (3)	153. (1)	193. (2)
34. (4)	74. (3)	114. (4)	154. (3)	194. (2)
35. (1)	75. (2)	115. (2)	155. (2)	195. (3)
36. (4)	76. (2)	116. (4)	156. (3)	196. (2)
37. (2)	77. (4)	117. (2)	157. (2)	197. (1)
38. (2)	78. (4)	118. (1)	158. (3)	198. (1)
39. (2)	79. (4)	119. (3)	159. (1)	199. (2)
40. (3)	80. (1)	120. (4)	160. (3)	200. (4)

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Hints and Solutions

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3. Answer (3)
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175. Answer (4)
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176. Answer (3)
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177. Answer (4)
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178. Answer (2)
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179. Answer (1)
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180. Answer (3)
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181. Answer (3)
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182. Answer (4)
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183. Answer (2)
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184. Answer (4)
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185. Answer (3)
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186. Answer (3)
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187. Answer (1)
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188. Answer (2)
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189. Answer (3)
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190. Answer (2)
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191. Answer (1)
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192. Answer (4)
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193. Answer (2)
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194. Answer (2)
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195. Answer (3)
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196. Answer (2)
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197. Answer (1)
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198. Answer (1)
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199. Answer (2)
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200. Answer (4)
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