

NEW STANDARD ACADEMY

Test Type : 03

Do not open this Test Booklet until you are asked to do so.

25-11-24

PRE-MEDICAL : 11th Undergoing Students

Read carefully the Instructions on the Back Cover of this Test Booklet.

Important Instructions :

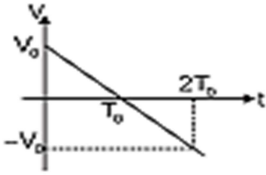
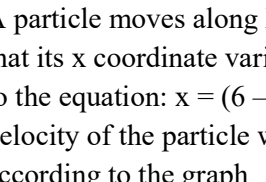
1. On the answer sheet, fill in the particulars on Side-1 and Side -2 carefully with blue/black ball point pen only.
2. The test is of 3 hours 20 minutes duration and this Test Booklet contains 200 questions. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response, one mark will be deducted from the total scores. The maximum marks are 720.
3. In this Test Paper, each subject will consist of two sections. Section A will consist of 35 questions (all questions are mandatory) and Section B will have 15 questions. Candidate can choose to attempt any 10 question out of these 15 questions. In case if candidate attempts more than 10 questions, first 10 attempted questions will be considered for marking.
4. In case of more than one option correct in any question, the best correct option will be considered as answer.
5. Use Blue/Black Ball Point Pen only for writing particulars on this page/markings responses.
6. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
7. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.
8. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Form No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
9. Use of white fluid for correction is not permissible on the Answer Sheet.

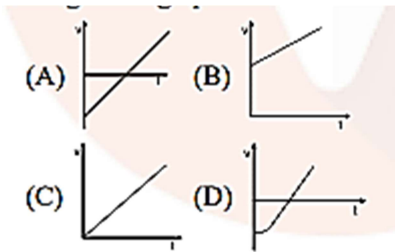
Name of the Candidate(In Capitals) _____

Date of Examination _____

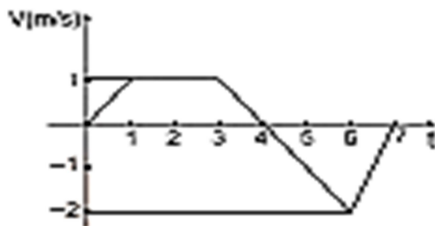
Candidate's Signature: _____ Invigilator's Signature: _____

Physics(SECTION-A)

- If the units of length and force are increased four times, then the unit of energy will:
 - Increase 8 times
 - Increase 16 times
 - Decreases 16 times
 - Increase 4 times
- If velocity, force and time are taken to be fundamental quantities find dimensions formula for (a) mass:
 - $KV^{-1} FT^{-1}$
 - $KV^{-1} FT$
 - $KVF^{-1} T^{-1}$
 - $KV^{-1} F^{-1} T$
- A rectangular plate has length (2 ± 0.02) cm and width (1 ± 0.01) cm. The maximum percentage error in the measurement of its area is:
 - 1%
 - 2%
 - 3%
 - 5%
- The dimensions of h/e ($h =$ Planck's constant and $e =$ electronic charge) are same as that of:
 - magnetic flux
 - electric flux
 - electric field
 - magnetic field
- $\frac{E^2}{\mu_0}$ has the dimensions ($E =$ electric field, $\mu_0 =$ permeability of free space)
 - $[M^2 L^{-2} T^2 A^2]$
 - $[MLT^{-4}]$
 - $[ML^3 T^{-2}]$
 - $[M^{-1} L^2 TA^{-2}]$
- The frequency of vibration f of a mass m suspended from a spring of spring constant k is given by relation of the type $f = cm^x k^y$, where c is a dimensionless constant. The values of x and y are:
 - $1/2, 1/2$
 - $-1/2, -1/2$
 - $1/2, -1/2$
 - $-1/2, 1/2$
- A rectangular plate has length (4 ± 0.04) cm and width (2 ± 0.02) cm. The maximum percentage error in the measurement of its area is:
 - 2%
 - 6%
 - 3%
 - 4%
- To keep an object moving in a circle at constant speed requires a force $F = m^a v^b r^c$. According to dimensional analysis the a, b, c are:
 - $a=1, b=2, c=-1$
 - $a=1, b=2, c=1$
 - $a=0, b=2, c=-1$
 - $a=1, b=2, c=0$
- The force F is given in terms of time t and displacement x by the equation $F = A \cos Bx + C \sin Dt$. The dimensional formula of D/B is
 - $[M^0 L^0 T^0]$
 - $[M^0 L^0 T^{-1}]$
 - $[M^0 L^{-1} T^0]$
 - $[M^0 L^1 T^{-1}]$
- If force, length and time would have been the fundamental units what would have been the dimensional formula for mass?
 - $FL T^{+2}$
 - $FL^{-1} T^2$
 - FLT^{-2}
 - F
- The velocity of a freely falling body changes as $g^p h^q$ where g is acceleration due to gravity and h is the height. The values of p and q are
 - $1, \frac{1}{2}$
 - $\frac{1}{2}, \frac{1}{2}$
 - $\frac{1}{2}, 1$
 - $1, 1$
- A particle travels A to M along a straight line with a velocity of 8 m/s and M to A with a velocity of 2 m/s, then the average velocity for the whole journey is –
 - 3.2 m/s
 - 5 m/s
 - 3.2 m/s
 - 0 m/s
- A car travels first $1/3$ of the distance AB at 30 km/hr, next $1/3$ of the distance at 40 km/hr, last $1/3$ of the distance at 24 km/hr. Its average speed in km/hr for the whole journey is –
 - 40
 - 35
 - 30
 - 28
- From the velocity time graph of a particle moving in straight line decide which of the following is/ are incorrect statement(s)
 
 - the particle crosses its initial position
 - the acceleration of the particle is constant
 - the force on the particle is constant
 - the speed of the particle increases continuously
- A particle moves along X-axis in such a way that its x coordinate varies with time t according to the equation: $x = (6 - 4t + 6t^2)$ metre. The velocity of the particle will vary with time according to the graph
 



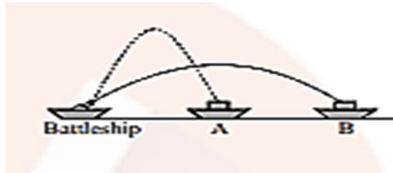
16. Two cars A and B are travelling towards each other on a single-lane road at 24 m/s and 21 m/s respectively. They notice each other when 180 m apart and apply brakes simultaneously. They just succeed in avoiding collision, both stopping simultaneously at the same position. Assuming constant retardation for each car, the distance travelled by car A while slowing down is
 (A) 96 m (B) 84 m
 (C) 67 m (D) 113 m
17. The velocity-time graph of a body travelling along a straight line is given below. The distance travelled and displacement of the body are respectively



- (A) 6m, 0 (B) 6m, 3m
 (C) 6m, -3m (D) 0, 0
18. A particle passes through point A and B which are 90 m apart. It takes 6 s to cover this distance with uniform acceleration. Velocity of particle when it passes through B point is 20 m/s. What is initial velocity at point A?
 (A) 10 m/s
 (B) 30 m/s
 (C) 15 m/s
 (D) 20 m/s
19. A thief is running away on a straight road in jeep moving with a speed of 9 ms^{-1} . A police man chases him on a motor cycle moving at a speed of 10 ms^{-1} . If the instantaneous separation of the jeep from the motorcycle is 100 m, how long will it take for the police to catch the thief
 (A) 1 s (B) 19 s
 (C) 90 s (D) 100 s
20. A particle, initially at rest, starts moving in a straight line with an acceleration $a = 6t + 4 \text{ m/s}^2$. The distance covered by it in 3 s is
 (A) 30 m (B) 60 m
 (C) 45 m (D) 15 m

21. A man in a balloon rising vertically with an acceleration of 4.9 m/sec^2 releases a ball 2 sec after the balloon is let go from the ground. The greatest height above the ground reached by the ball is ($g = 9.8 \text{ m/sec}^2$)
 (A) 14.7 m (B) 19.6 m
 (C) 9.8 m (D) 24.5 m
22. A body falls freely from rest. It covers as much distance in the last second of its motion as covered in the first three seconds. The body has fallen for a time of
 (A) 3 s
 (B) 5 s
 (C) 7 s
 (D) 9 s
23. A cricketer can throw a ball to a maximum horizontal distance of 100 m. With the same effort, he throws the ball vertically upwards. The maximum height attained by the ball is
 (A) 100 m
 (B) 80 m
 (C) 60 m
 (D) 50 m
24. If time of flight of a projectile is 10 seconds. Range is 500 m. The maximum height attained by it will be
 (A) 125 m
 (B) 50 m
 (C) 100 m
 (D) 150 m
25. One fielder throws a ball and in 4secs it reaches to another player. So, the maximum height reached by the ball above the point of projection would be about
 (A) 10m
 (B) 7.5m
 (C) 5m
 (D) 20m
26. Two balls are projected from top of a tower of height 120 m, one with initial upward velocity of 36 km/h and other with initial downward velocity of 36 km/h. The speed of each ball just before hitting the ground is (Take $g = 10 \text{ m/s}^2$)
 (A) 50 m/s, 70 m/s
 (B) 50 m/s, 50 m/s
 (C) 70 m/s, 50 m/s
 (D) 50 m/s, $5\sqrt{2} \text{ m/s}$
27. A projectile is fired at 30° with momentum p. Neglecting friction, the change in kinetic energy when it returns to the ground will be
 (A) Zero
 (B) 30%
 (C) 60%

- (D) 100%
28. The position vector of a particle is given as $\vec{r} = (t^2 - 4t + 6)\hat{i} + (t^2)\hat{j}$. Find the time after which the velocity vector and acceleration vector becomes perpendicular to each other.
- (A) $t = 1$ sec
 (B) $t = 2$ sec
 (C) $t = 3$ sec
 (D) $t = 4$ sec
29. A body is projected with kinetic energy K at an angle of 60° with the horizontal. Its kinetic energy at the highest point of its trajectory will be
- (A) $2K$
 (B) K
 (C) $K/2$
 (D) $K/4$
30. Two guns on a battleship simultaneously fires two shells with same speed at enemy ships. If the shells follow the parabolic trajectories as shown, which ship will get hit first?



- (A) A
 (B) B
 (C) both at same time
 (D) need more information
31. A cricketer throws a ball up to a horizontal distance of 150 meters. If he throws the ball vertically upwards with the same effort. Then, what will the maximum height projected by the ball?
- (A) 100m
 (B) 75m
 (C) 50m
 (D) 150m
32. Three stones A, B and C are projected with same speed. A is thrown upwards B is thrown horizontally & C is thrown downwards from a building. When the distance between stone A & C becomes 10 m, then distance between A and B will be –
- (A) 10 m
 (B) 5 m
 (C) $5\sqrt{2}$
 (D) $10\sqrt{2}$
33. A passenger is walking on a walkalator (horizontal escalator) at a speed of 6 km/hr relative to escalator. He starts from point P on the ground and reaches point Q on ground. The

walkalator is moving at 3 km/hr relative to ground in the direction of point Q. The distance PQ is 120 m. The time taken by him to reach point Q is :

- (A) 16 s
 (B) 48 s
 (C) 32 s
 (D) 72 s
34. A particle is projected with velocity $(3\hat{i} + 4\hat{j})$ m/s from horizontal. What will be the height attained by it when velocity becomes perpendicular to acceleration?
- (A) 0.8 m
 (B) 5 m
 (C) 0.4 m
 (D) 1.6 m

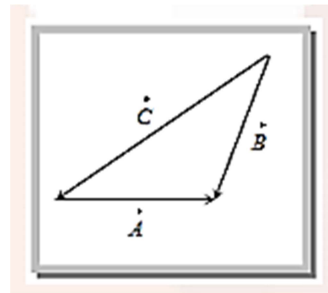
SECTION -B

35. The speed of boat is 5 km/h in still water. It crosses a river of width 1 km along shortest possible path in 15 min. The velocity of river water is
- (A) 1 km/h
 (B) 3 km/h
 (C) 4 km/h
 (D) 5 km/h
36. Two projectiles A and B are thrown with the same speed such that A makes angle q with the horizontal and B makes angle q with the vertical, then
- (A) Both must have same time of flight
 (B) Both must achieve same maximum height
 (C) A must have more horizontal range than B
 (D) Both may have same time of flight
37. From a tower of height h a particle is projected horizontally with velocity u and another thrown down with the same velocity u . If the time taken by these be t_1 and t_2 what is true?
- (A) $t_1 = t_2$
 (B) $t_1 > t_2$
 (C) $t_1 < t_2$
 (D) $t_1 = 3t_2$
38. Two men A and B, A standing on the extended floor nearby a building and B is standing on the roof of the building. Both throw a stone each towards each other. Then which of the following will be correct.
- (A) stone will hit A, but not B
 (B) stone will hit B, but not A
 (C) stone will not hit either of them, but will collide with each other.
 (D) none of these.
39. The expression $\frac{1}{\sqrt{2}}\hat{i} + \frac{1}{\sqrt{2}}\hat{j}$ is a
- (a) Unit vector

- (b) Null vector
 (c) Vector of magnitude $\sqrt{2}$
 (d) Scalar
40. The magnitude of a given vector with end points $(4, -4, 0)$ and $(-2, -2, 0)$ must be
 (a) 6
 (b) $5\sqrt{2}$
 (c) 4
 (d) $2\sqrt{10}$
41. The angle made by the vector $A = \hat{i} + \hat{j}$ with x-axis is
 (a) 90°
 (b) 45°
 (c) 22.5°
 (d) 30°
42. A vector \vec{A} points vertically upward and \vec{B} points towards north. The vector product $\vec{A} \times \vec{B}$ is
 (a) Zero
 (b) Along west
 (c) Along east
 (d) Vertically downward
43. What vector must be added to the two vectors $\hat{i} - 2\hat{j} + 2\hat{k}$ and $2\hat{i} + \hat{j} - \hat{k}$ so that the resultant may be a unit vector along x-axis
 (a) $2\hat{i} + \hat{j} - \hat{k}$
 (b) $-2\hat{i} + \hat{j} - \hat{k}$
 (c) $2\hat{i} - \hat{j} + \hat{k}$
 (d) $-2\hat{i} - \hat{j} - \hat{k}$
44. Three vectors \vec{a}, \vec{b} and \vec{c} satisfy the relation $\vec{a} \cdot \vec{b} = 0$ and $\vec{a} \cdot \vec{c} = 0$. The vector \vec{a} is parallel to
 (a) \vec{b} (b) \vec{c}
 (c) $\vec{b} \cdot \vec{c}$ (d) $\vec{b} \times \vec{c}$
45. An object originally at the point $(2, 5, 1)$ cm is given a displacement $8\hat{i} - 2\hat{j} + \hat{k}$ cm. The coordinates of the new position are
 (a) $(10, 3, 2)$ cm
 (b) $(8, -2, +1)$ cm
 (c) $(0, 0, 0)$
 (d) data not correct
46. A force of 6kg and another of 8kg can be applied together to produce the effect of a single force of
 (a) 1 kg
 (b) 11 kg
 (c) 15 kg
 (d) 16 kg
47. The resultant of two forces, one double the other in magnitude, is perpendicular to the smaller of the two forces. The angle between the two forces is

- (a) 60°
 (b) 120°
 (c) 150°
 (d) 90°

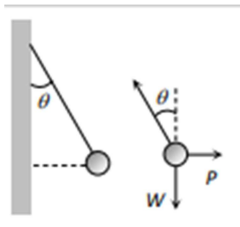
48. For the fig. \vec{A}, \vec{B} and \vec{C}



- (a) $\vec{A} + \vec{B} = \vec{C}$
 (b) $\vec{B} + \vec{C} = \vec{A}$
 (c) $\vec{C} + \vec{A} = \vec{B}$
 (d) $\vec{A} + \vec{B} + \vec{C} = 0$

49. What is the angle between $(\vec{P} + \vec{Q})$ and $(\vec{P} \times \vec{Q})$
 (a) 0 (b) $\pi/2$
 (c) $\pi/4$ (d) π

50. A metal sphere is hung by a string fixed to a wall. The sphere is pushed away from the wall by a stick. The forces acting on the sphere are shown in the diagram. Which of the following statements is wrong if the sphere is in equilibrium



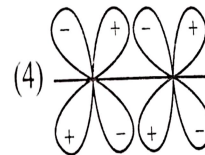
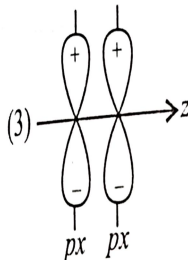
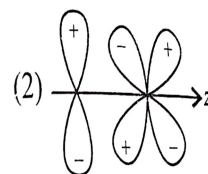
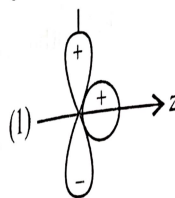
- (a) $P W \tan = \theta$
 (b) $\vec{T} + \vec{P} + \vec{W} = 0$
 (c) $T^2 = P^2 + W^2$
 (d) $T = P + W$

CHEMISTRY SECTION -A

51. Among LiCl , BeCl_2 , BCl_3 and CCl_4 , the covalent bond character varies as
 (1) $\text{LiCl} < \text{BeCl}_2 > \text{BCl}_3 > \text{CCl}_4$
 (2) $\text{LiCl} > \text{BeCl}_2 < \text{BCl}_3 < \text{CCl}_4$
 (3) $\text{LiCl} < \text{BeCl}_2 < \text{BCl}_3 < \text{CCl}_4$
 (4) $\text{LiCl} > \text{BeCl}_2 > \text{BCl}_3 > \text{CCl}_4$
52. AlCl_3 , is covalent while AlF_3 , is ionic. This can be justified on the basis of
 (1) The valence bond theory
 (2) Fajans' rules
 (3) The molecular orbital theory

- (4) Hydration energy
53. Which of the following oxyacids of phosphorus are monoprotic (monobasic)?
- (1) H_3PO_4
 - (2) H_3PO_3
 - (3) H_3PO_2
 - (4) $\text{H}_4\text{P}_2\text{O}_7$
54. Which of the following has been arranged in order of increasing covalent character?
- (1) $\text{KCl} < \text{CaCl}_2 < \text{AlCl}_3 < \text{SnCl}_4$
 - (2) $\text{SnCl}_4 < \text{AlCl}_3 < \text{CaCl}_2 < \text{KCl}$
 - (3) $\text{AlCl}_3 < \text{CaCl}_2 < \text{KCl} < \text{SnCl}_4$
 - (4) $\text{CaCl}_2 < \text{SnCl}_4 < \text{KCl} < \text{AlCl}_3$
55. Which has maximum ionic mobility?
- (1) Li^\oplus
 - (2) Na^\oplus
 - (3) K^\oplus
 - (4) Cs^\oplus
56. In which of the following species the bonds are non-directional?
- (1) NCl_3
 - (2) RbCl
 - (3) BeCl_2
 - (4) BCl_3
57. The bond angle between two hybrid orbitals is 180° . The percentage s-character of hybrid orbital is between
- (1) 50 and 55%
 - (2) 9 and 12%
 - (3) 22 and 23%
 - (4) 11 and 12%
58. Which type of bond is not present in HNO_2 molecule?
- (1) Covalent
 - (2) Coordinate
 - (3) Ionic
 - (4) Both ionic and coordinate
59. KF combines with HF to form KHF_2 . The compound contains the species
- (1) K^\oplus , F^\ominus and H^\oplus
 - (2) K^\oplus , F^\ominus and HF
 - (3) K^\oplus and $[\text{HF}_2]^\ominus$
 - (4) $[\text{KHF}]^\oplus$ and F_2
60. Among the following, electron-deficient compound is
- (1) CCl_4
 - (2) PCl_5
 - (3) OF_2
 - (4) BCl_3
61. Which of the following bond is the strongest?
- (1) I - I
 - (2) F - F
 - (3) H - H
 - (4) O - O
62. The bond present in N_2O_5 are
- (1) Only ionic
 - (2) Covalent and coordinate
 - (3) Only covalent
 - (4) Covalent and ionic

63. Which of the following is a positive overlap which leads to non-bonding?



64. The molecule which have zero dipole moment is
- (1) CH_2Cl_2
 - (2) BF_3
 - (3) NF_3
 - (4) ClO_2
65. The resultant dipole moment (μ) of two compounds NOF and NO_2F is 1.81 D and 0.47 D respectively. Which dipole moment do you predict?
- (1) 1.81 D for NO_2F and 0.47 D for NOF
 - (2) 0.47 D for NO_2F and 1.81 D for NOF
 - (3) For both NO_2F and NOF , dipole moment (μ) is 1.81 D
 - (4) For both NO_2F and NOF , dipole moment (μ) is 0.47 D
66. In terms of polar character, the correct order is
- (1) $\text{H}_2\text{S} > \text{HF} > \text{H}_2\text{O} > \text{NH}_3$
 - (2) $\text{HF} > \text{H}_2\text{O} > \text{NH}_3 > \text{H}_2\text{S}$
 - (3) $\text{HF} > \text{H}_2\text{S} > \text{NH}_3 > \text{H}_2\text{O}$
 - (4) $\text{H}_2\text{S} > \text{NH}_3 > \text{H}_2\text{O} > \text{HF}$
67. How many σ and π bonds are there in the molecule of tetracyano ethylene?
- (1) 4sigma 14pi
 - (2) 5sigma 13pi
 - (3) 8sigma 10pi
 - (4) 9sigma 9pi
68. Which molecule is T or arrow (\rightarrow) shaped?
- (1) BeF_2
 - (2) BCl_3
 - (3) NH_3
 - (4) ClF_3
69. The molecule which has pyramidal shape is
- (1) PCl_3
 - (2) SO_3
 - (3) CO_3^{2-}
 - (4) NO_3^-
70. CO_2 has same geometry as
- (1) HgCl_2
 - (2) NO_2
 - (3) SnCl_2
 - (4) CH_4
71. SF_2 , SF_4 and SF_6 have the hybridisation at sulphur atom respectively as:

- (1) sp^2, sp^3, sp^2d^2
 (2) sp^3, sp^3, sp^3d^2
 (3) sp^3, sp^3d, sp^3d^2
 (4) sp^3, spd^2, d^2sp^3
72. AsF_5 molecule is sp^3d hybridised and is trigonal bipyramidal (Tbp) shape. Which d-orbital is involved in sp^3d hybridisation.
 (1) dx^2-y^2 (2) dz^2
 (3) dxy (4) dzx
73. The maximum number of 90° angles between bp-bp of electrons is observed in:
 (1) sp^3d hybridisation
 (2) dsp^3 hybridisation
 (3) dsp^2 hybridisation
 (4) sp^3d^2 hybridisation
74. Which one of the following hydrogen halides has the lowest boiling point?
 (1) HF (2) HCl
 (3) HBr (4) HI
75. In compound X all the bond angles around central atom are $109^\circ 28''$ which one of the following will be X?
 (1) Chloromethane
 (2) Carbon tetrachloride
 (3) Iodoform
 (4) Chloroform
76. The bond angles of NH_3 , NH_4^+ and NH_2^- are in the order
 (1) $NH_2^- > NH_3 > NH_4^+$
 (2) $NH_4^+ > NH_3 > NH_2^-$
 (3) $NH_3 > NH_2^- > NH_4^+$
 (4) $NH_3 > NH_4^+ > NH_2^-$
77. Decreasing order of bond angle of (I) NO_2 , (II) NO_2^+ and (III) NO_3^- is
 (1) I > II > III
 (2) II > I > III
 (3) III > II > I
 (4) III > I > II
78. The formal charge of the O- atoms in the ion $[:N = \ddot{O}:]^-$ is
 (1) 0 (2) +1
 (3) -1 (4) -2
79. In the MO diagram for O_2^- ion the highest occupied orbital is
 (1) πMO orbital
 (2) σMO orbital
 (3) $\pi^* MO$ orbital
 (4) $\sigma^* MO$ orbital
80. The bond order of CO and NO is
 (1) 3 and 2
 (2) 3 and 2.5
 (3) 3 and 1.3
 (4) 3 and 3.5
81. The bond order in NO is 2.5 while that in NO^+ is 3. Which of the following statement is true for these two species?
 (1) Bond length in $NO >$ in NO^+
 (2) Bond length in $NO^+ = NO$.
 (3) Bond length in $NO^+ > NO$.
 (4) Bond length is unpredictable.
82. Which of the following the double bond consists of the pi bonds?
 (1) O_2
 (2) Be_2
 (3) C_2
 (4) S_2
83. Which one of the following combination is not allowed in the LCAO method for the formation of a molecular orbital (consider Z -axis as the molecular axis)?
 (1) $S+P_x$ (2) $S+P_z$
 (3) P_x+P_x (4) p_z+p_z
84. The set representing the correct order of ionic radius is
 (1) $Li^+ > Na^+ > Mg^{2+} > Be^{2+}$
 (2) $Mg^{2+} > Be^{2+} > Li^+ > Na^+$
 (3) $Li^+ > Be^{2+} > Na^+ > Mg^{2+}$
 (4) $Na^+ > Li^+ > Mg^{2+} > Be^{2+}$
85. The EN's of F, Cl, Br and I are 4.0, 3.0, 2.8 and 2.5 respectively. The hydrogen halide with a highest percentage of ionic character is
 (1) HI (2) HBr
 (3) HCl (4) HF

Section-B

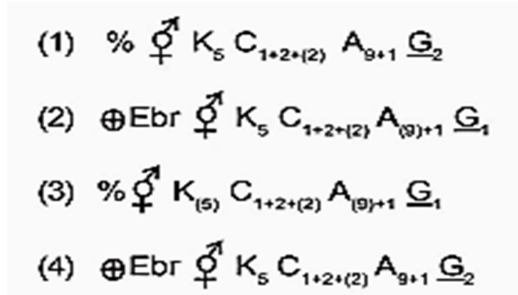
86. Consider the following species:
 CN^+ , CN^- , NO and CN
 Which one of these will have the highest bond order?
 (a) CN^- (b) CN^+
 (c) NO (d) CN
87. Which of the following is planar?
 (a) XeO_4
 (b) XeO_3F
 (c) XeO_2F_2
 (d) XeF_4
88. The bond between carbon atom (1) and carbon atom (2) in compound

$$N \equiv C - \overset{1}{C} = \overset{2}{C}H_2$$
 involves the hybrid orbitals.
 (a) $s p^2$ and sp^2
 (b) sp^3 and sp
 (c) sp and sp^2
 (d) sp and sp

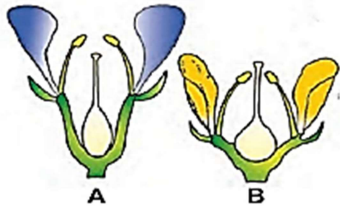
89. The hybridisation of carbon atoms in C-C single bond of $\text{HC} \equiv \text{C} - \text{CH} = \text{CH}_2$ is?
 (a) $\text{sp}^3 - \text{sp}^3$
 (b) $\text{sp}^2 - \text{sp}^3$
 (c) $\text{sp} - \text{sp}^2$
 (d) $\text{sp}^3 - \text{sp}$
90. In which of the following species the central atom has the type of hybridisation which is not the same as that present in the other three?
 (a) PCl_5
 (b) SF_4
 (c) I_3^-
 (d) SbCl_5^{2-}
91. Which of the following has regular geometry?
 (a) CHCl_3 ,
 (b) PCl_3
 (c) XeF_6
 (d) SF_4
92. The pairs of species of oxygen and their magnetic behaviours are noted below. Which of the following presents the correct description ?
 (a) O_2^- , O_2^{2-} Both diamagnetic
 (b) O^+ , O_2^{2-} Both paramagnetic
 (c) O_2^+ , O_2 Both paramagnetic
 (d) O , O_2^{2-} Both paramagnetic
93. Which one of the following pairs is isostructural (i. e.. having the same shape and hybridization)?
 (a) [BCl_3 and BrCl_3]
 (b) [NH_3 and NO_3^-]
 (c) [NF_3 and BF_3]
 (d) [BF_4^- and NH_4^+]
94. The pair of species with the same bond order is:
 (a) O_2^{2-} , B_2 (b) O_2^+ , NO^+
 (c) NO , CO (d) N_2 , O_2
95. Bond order of 1.5 is shown by:
 (a) O_2^+
 (b) O_2^-
 (c) O_2^{2-}
 (d) O_2
96. Which of the following is a polar molecule?
 (a) SiF_4
 (b) XeF_4
 (c) BF_3
 (d) SF_4
97. Dipole-induced dipole interactions are present in which of the following pairs?
 (a) HCl and He atoms
 (b) SiF_4 and He atoms
 (c) H_2O and alcohol
 (d) Cl_2 and CCl_4
98. Which of the following molecule has the maximum dipole moment ?
 (a) CO_2
 (b) CH_4
 (c) NH_3
 (d) NF_3
99. Which one of the triangular shape? following species has planar triangular shape
 (a) N_3^-
 (b) NO
 (c) NO_2^-
 (d) CO_2
100. Assuming 2s - 2p mixing is not operative, the paramagnetic species among the following is:
 (a) Be_2
 (b) B_2
 (c) C_2
 (d) N_2

BOTANY
SECTION-A

101. Match the following column I and column II:
- | column I | column II |
|--------------|----------------|
| a) Valvate | i. Pea |
| b) Twisted | ii. Cotton |
| c) Imbricate | iii. Gulmohar |
| d) Vaxillary | iv. Calotropis |
- (1) a-iv, b-ii, c-iii, d-i
 (2) a-iv, b-iii, c-ii, d-i
 (3) a-I, b-ii, c-iv, d-iii
 (4) a-ii, b-iv, c-iii, d-i
102. Match the following column I and column II:
- | column I | column II |
|------------------|---------------|
| a. Marginal | i. Lemon |
| b. Axil | ii. Pea |
| c. Parietal | iii. Primrose |
| d. Free- central | iv. Argemone |
| e. Basal | v. Marigold |
- (1) a-i, b-ii, c-iii, d-iv, e-v
 (2) a-v, b-iv, c-iii, d-ii, e-i
 (3) a-ii, b-i, c-iv, d-iii, e- v
 (4) a-ii, b-i, c-v, d-iii, e-v
103. Find out the correct floral formula of family Fabaceae:



104. In given diagram A and B represent:



- (1) A- Epigynous, B- Perigynous
 (2) A- Perigynous, B- Perigynous
 (3) A- Epigynous, B- Hypogynous
 (4) A- Hypogynous, B- Epigynous

105. Prop roots are:

- (1) Top roots
 (2) Adventitious roots
 (3) Secondary roots
 (4) All of these

106. How many plants among these are medicinal-
 Lupin, Aloe, Muliathi, Belladonna, Gloriosa

- (1) 3 (2) 2
 (3) 5 (4) 1

107. Outermost covering of endosperm which separates it from embryo in monocots is

- (1) Proteinous
 (2) Scutellum
 (3) starchy layer
 (4) All of these

108. Given below are two statements:

Statement I:

Fibrous root system present in monocotyledonous

Statement II:

Roots arise from parts of plants other than radicle are called adventitious roots

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

- (1) Both Statement I and Statement II are incorrect
 (2) Statement I is correct but Statement II is incorrect
 (3) Statement I is incorrect but Statement II is correct
 (4) Both Statement I and Statement II are correct.

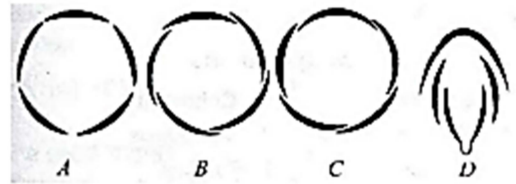
109. Which of the following family has tricarpeal, syncarpous, ovary superior with many ovules and axile placentation:

- (1) Liliaceae (2) Solanaceae
 (3) Fabaceae (4) All of these

110. Keel is characteristic of flowers of:

- (1) Bean (2) Gulmohar
 (3) Cassia (4) Calotropis

111. The following diagrams represent the types of aestivation in corolla. Identify the correct combination of labelling.



- (1) A- Valvate, B- Twisted, C- Vexillary, D- Imbricate
 (2) A- Valvate, B- Vexillary, C- Twisted, D- Imbricate
 (3) A- Valvate, B- Twisted, C- Imbricate, D- Vexillary
 (4) A- Valvate, B- Twisted, C- Imbricate, D- Vexillary

112. Match the following and choose the correct option:

Group A

Group B

- | | |
|--------------------------|---------------------------|
| (a) Aleurone layer | i. Without fertilization |
| (b) Parthenocarpic fruit | ii. Covering of endosperm |
| (c) Ovule | iii. Double fertilization |
| (d) Endosperm | iv. Seed |
- (1) a - I, b - ii, c - iii, d - iv
 (2) a - ii, b - i, c - iv, d - iii
 (3) a-iv, b - ii, c - i, d - ii
 (4) a - ii, b - iv, c-i, d - ii

113. Find the correct matching of the following

- | | |
|---------------------------|---------------|
| (A) Marginal placentation | (i) Sunflower |
| (B) Parietal placentation | (ii) Gram |
| (C) Axile placentation | (iii) Mustard |
| (D) Basal placentation | (iv) Chinrose |
- (1) A-ii, B-iii, C-iv, D-i
 (2) A-ii, B-iv, C-iii, D-i
 (3) A-iv, B-ii, C-i, D-iii
 (4) A-ii, B-iii, C-i, D-iv

114. Match the following column I and column II :

Column -I

Column -II

- | | |
|------------------|-----------------|
| a. Epipetalous | i. Brinjal |
| b. Epiphylous | ii. Lilly |
| c. Monodelphous | iii. China rose |
| d. Diadelphous | iv. Pea |
| e. Polyadelphous | v. Citrus |
- (1) a-v, b-iv, c-iii, d-ii, e-i
 (2) a-i, b-iii, c-ii, d-iv, e-v
 (3) b-ii, c-iii, d-iv, e-v
 (4) a-iv, b-v, c-iii, d-i, e-ii

115. Find out the correct statements

- a. The roots which store food in Turnip are modified tap roots
 b. Stems of maize & sugarcane have stilt roots coming out from upper nodes
 c. In Mastera, roots arise from parts other than radicle

d. Colocasia has organ of perennation

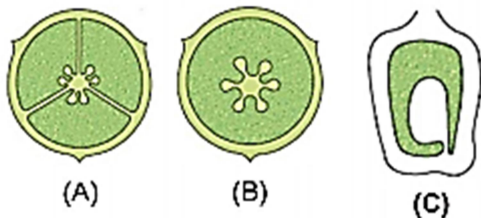
- (1) c, d (2) a, c, d
 (3) b, c, d (4) a, b

116. Read the following statements and choose correct answer:

- (i) Tap root system present in dicotyledonous plants
 (ii) Fibrous root system present in monocotyledonous
 (iii) Roots arise from parts of plants other than radicle are called adventitious roots
 (iv) Fibrous roots arises from the base of the stem after death of primary root.

- (1) i, ii correct and iii, iv incorrect
 (2) i, ii, iii correct and iv incorrect
 (3) i, iii correct and ii, iv incorrect
 (4) i, ii, iii and iv correct

117. In following diagram placentation represent



- (1) A- Axile, B-Free central, C- in marigold
 (2) A- Axile, B- Free central, C- in primrose
 (3) A-Free central, B- Axile, C- in Dianthus
 (4) A-Free central, B- Parietal, C- in pea

118. Apocarpous Condition is found in

- (1) Lotus & Tomato
 (2) Tomato & tomato
 (3) Mustards tomato
 (4) Lotus & rose

119. Androecium is composed of stamens, which have pollen sacs, producing pollen grains.

However, some stamens do not produce pollen grains are :

- (1) Diadelphous
 (2) Adnate
 (3) Adelphous
 (4) Staminode

120. Phyllotaxy is:

- (1) Arrangement of young leaves in floral bud
 (2) Arrangement of leaves on branches
 (3) Arrangement of branches
 (4) Arrangement of floral leaves in a floral bud

121. Match the following Column I and II

- | | |
|---------------|------------|
| Column -I | Column-II |
| a. Hypogynous | i. Mustard |
| b. Perigynous | ii. Peach |
| c. Epigynous | iii. Guava |

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

(4) a - i b-ii, c-iii

122. The covering of radicle in monocot seed is known as:

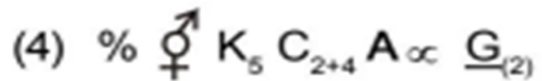
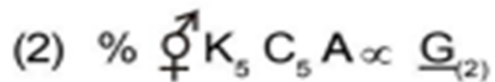
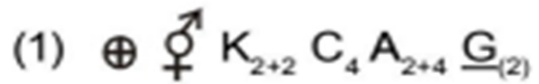
- (1) Coleoptile
 (2) Coleorhiza
 (3) Testa
 (4) Tegmen

123. Select the correct match:

- (i) Tomato - Actinomorphic Flower
 (ii) Canna -Asymmetric Flower
 (iii) Trifolium -Zygomorphic Flower
 (iv) Cassia -Asymmetric Flower

- (1) (i), (ii) & (iii) only
 (2) (i) and (iii) only
 (3) (ii) and (iv) only
 (4) (ii), (iii) and (iv) only

124. Which is floral formula of family Brassicaceae:



125. Prop or pillar roots in banyan tree are

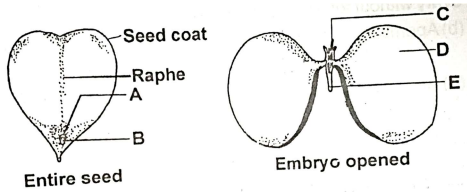
- (1) Fasciculated roots
 (2) Tap roots
 (3) Adventitious roots
 (4) Secondary roots

126. Match the Column

Column I	Column II	Column III
A. Marginal	I.	1. Sunflower, Marigold
B. Axile	II.	2. Dianthus, Primrose
C. Parietal	III.	3. Mustard, Argemone
D. Free Central	IV.	4. China rose, Tomato, Lemon
E. Basal	V.	5. Pea

- (1) A-V,5;B-II,4;C-I,3;D-III,2;E-IV,1
- (2) A-I,5;B-II,4;C-III,3;D-IV,2;E-V,1
- (3) A-V,1;B-II,4;C-I,2;D-III,3;E-IV,5
- (4) A-V,1;B-II,2;C-II,4;D-I,5;E-IV,3

127. Given below is the diagram of a typical structure of dicotyledonous seeds . In which one of the options all the five parts A,B,C D and E are correct?



- (1) A – Hilum ,B – Micropyle ,C- Radicle ,D – Cotyledon, E –Plumule
- (2) A-Hilum ,B-Micropyle, C-Plumule ,D – Cotyledon, E-Radicule
- (3) A-Micropyle, B-Hilum, C-Plumule, D – Cotyledon, E-Radicule
- (4) A-Hilum, B-Micropyle, C-Plumule, D- Radicle, E- Cotyledon

128. Axile placentation is found in syncarpous .In This placentation the ovules are arranged along the-

- (1) Base of the ovary
- (2) Margin of the ovary
- (3) Axis in the centre of the ovary
- (4) None of the above

129. The wall of fruit is called-

- (1) Epicarp (2)Sporocarp
- (3) Pericarp (4) Cytocarp

130. In mango and coconut the fruit (drupe) develops from –

- (1) Monocarpellary superior ovaries and are one seeded
- (2) Monocarpellary superior ovaries and are many seeded
- (3) Polycarpellary superior ovaries and are one seeded
- (4) Polycarpellary superior ovaries and are many seeded

131. Which of the following statements is correct?

- (1) The ovules after fertilization develop in to seeds
- (2) A seed consists of a seed coat and an embryo
- (3) The embryo consists of a radicle an embryonal axis and one or 2 cotyledons
- (4) All

132. The structure coleoptile in a maize grain is the covering of-

- (1) Radicle (2) Plumule
- (3) Scutellum (4) Aleurone layer

133. Find out the False statement from below ones-

I Calyx and corolla are reproductive organs of a flower

II. Zygomorphic flower can be divided into two equal radial halves in any radial plane

III. Flowers without bracts are termed as bracteate

IV Parthenocarpic fruit is formed after fertilization of the ovary

V In legumes seed is ion-endospermic

VI Ovary is inferior in Fabaceae

VII. A fertile stamen is called staminode

VIII. Radical buds develop on roots

(1) I, II, III, IV, VI, VII

(2) I, II, V, VIII

(3) III, IV, VIII

(4) IV. V, VIII

134. Pentamerous actinomorphic flowers bicarpellary ovary with oblique septa and fruit as a capsule or berry are characteristic feature of

- (1) Liliaceae (2) Asteraceae
- (3) Brassicaceae (4) Solanaceae

135. Trimerous flowers, superior ovary axile placentation

- (1) Liliaceae
- (2) Papilionaceae
- (3) Cucurbitaceae
- (4) Solanaceae

136. Which of the following represents the floral characters of crucifrae?

- (1) Six tepals, zygomorphic, six stamens, bilocular ovary, axile placentation
- (2) Tetramerous, actinomorphic tetradynamous paritel placentation
- (3) Trimerous, actinomorphic, polyandrous, superior ovary, axile placentation
- (4) Bisexual, zygomorphic, gamophyllous, inferior ovary, marginal placentation

137. Following diagram shows the cohesion of stamens .It is the characteristic of pulse family . Identify the type of cohesion-



- (1) Monoadelphous
- (2) Diadelphous
- (3) Polyadelphous
- (4) Synandrous

138. Which of the following is a subfamily of family Leguminosae?

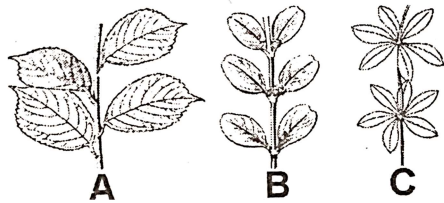
- (1) Papilionoideae / Fabaceae
- (2) Solanaceae

- (3) Liliaceae
 (4) None
139. Which of the following is a monocot family?
 (1) Solanaceae
 (2) Fabaceae
 (3) Liliaceae
 (4) none

140. Persistent calyx is the character of plants belonging to
 (1) Solanaceae
 (2) Malvaceae
 (3) Cruciferae
 (4) Asteraceae

141. Albuminous seeds store their reserve food mainly in
 (1) Perisperm
 (2) Endosperm
 (3) Cotyledons
 (4) Hypocotyl

142. Different types of Phyllotaxy are shown in the following figures . Identify the types of phyllotaxy (A,B and C)



- (1) A –Alternate ,B-Opposite ,C-Whorled
 (2) A –Whorled ,B Opposite , C Alternate
 (3) Alternate B- Whorled , C-Opposite
 (4) A-Whorled ,B –Alternate , C-Opposite
143. One of the following statement is not applicable to Solanaceae-
 (1) Adnation
 (2) Swollen axile placenta
 (3) Bicarpellary superior ovary
 (4) Monocarpellary superior ovary
144. Whorled simple leaves with reticulate venation are present in:
 (1) Calotropis
 (2) Neem
 (3) China Rose
 (4) Alstonia

145. Vexillary aestivation is characteristic of the family
 (1) Fabaceae
 (2) Asteraceae
 (3) Solanaceae
 (4) Brassicaceae

146. Which of these is an example for a zygomorphic flower with diadelphous stamens and marginal placentation?
 (a) Pea

- (b) Lemon
 (c) Brinjal
 (d) Cucumber
147. Keel is the characteristic feature of flower of
 (a) Aloe (2) Tomato
 (c) Tulip (d) indigofera
148. Flowers are unisexual in
 (a) China rose
 (b) Onion
 (c) Pea
 (d) Cucumber
149. Stilt roots are reported from-
 (a) Maize (b) Radish
 (c) Mango , Ginger (d) Bryophyllum
150. Tricarpellary syncarpous gynoecium is found in flowers of
 (a) Liliaceae (b) Solanaceae
 (c) Fabaceae (d) Poaceae

Section B Zoology

151. The head of cockroach consists of fusion of _____ segments-
 (a) 6 (b) 10
 (c) 14 (d) 18
152. In cockroach a pair of antennae arises from membranous socket. Antennae are-
 (a) Without any sensory receptors
 (b) Many segmented
 (c) Sensory receptors that help in monitoring the environment
 (d) b and c are correct
153. Mouth parts of cockroach are-
 (a) Sponging type
 (b) Biting and sucking type
 (c) Biting and chewing type
 (d) Piercing and sucking type
154. In cockroach mouth part consists of a labrum a pair of mandibles a pair of maxillae and a labium labrum and labium act as-
 (a) Upper and lower jaws respectively
 (b) Lower and Upper jaws respectively
 (c) Upper jaw and lips respectively
 (d) Upper and lower lips respectively
155. The two pairs of wings in periplaneta are situated on-
 (a) Prothorax and metathorax
 (b) Prothorax and mesothorax
 (c) mesothorax and metathorax
 (d) metathorax and first abdominal segment
156. The abdomen in both male and female cockroach consists of-
 (a) 10 segments (b) 8 segments
 (c) 12 segments (d) 18 segments

157. The respiratory system in the body of cockroach consists of-
- (a) Bronchi (b) Bronchioles
(c) Network of trachea (d) Haemocyanin
158. The main excretory product in cockroach is
- (a) Urea (b) Ammonia
(c) Guanine (d) Uric acid
159. The visual unit of cockroach are-
- (a) Ocelli (b) Ctenidia
(c) Ommatidia (d) Rhabdoma
160. Cockroach are
- (a) Dioecious and without sexual dimorphism
(b) Monoecious and without sexual dimorphism
(c) Dioecious and with sexual dimorphism
(d) Dioecious with sexual dimorphism
161. The ovaries of cockroach are located in the abdominal segments-
- (a) 2-6 (b) 5-6
(c) 1-2 (d) 5-8
162. Each ovary of cockroach consists of how many ovarian tubules / ovarioles-
- (a) 6 (b) 8
(c) 10 (d) 12
163. Eggs of cockroach are fertilized in-
- (a) CoCoon
(b) Ootheca
(c) Fallopian tube
(d) Genital pouch of female
164. The body of frog is divisible into-
- (a) Head and trunk
(b) Head, neck, trunk and tail
(c) Head, neck, thorax, abdomen and tail
(d) Head, trunk and tail
165. Both male and female frog have-
- (a) Long hindlimbs with five webbed fingers
(b) Short forelimbs with four unwebbed fingers
(c) Both a and b
(d) External ears
166. The glands present in the skin of frogs are
- (a) Sweat and mucous
(b) Sweat and mammary
(c) Sweat and sebaceous
(d) Mucous and poisonous
167. One of the main functions of frog's skin is-
- (a) Diffusion of respiratory gases
(b) Absorption of ultraviolet rays to produce vitamin D
(c) storage of excess food in the form of subcutaneous fat
(d) Excretion of nitrogenous waste in the form of uric acid
168. The structure present in man but absent in frog is -
- (a) Pancreas
(b) Salivary gland
(c) Thyroid gland
(d) Adrenal gland
169. In frog, digestion of fats occurs mostly in -
- (a) Rectum
(b) Stomach
(c) Duodenum
(d) Small intestine
170. Amphibian heart is -
- (a) 2-chambered
(b) 3-chambered
(c) 4-chambered
(d) 5-chambered
171. In frog, ventricle opens into _____ on the _____ side of heart-
- (a) Sinus venosus, dorsal
(b) Sinus venosus, ventral
(c) Conus arteriosus, ventral
(d) Conus arteriosus, dorsal
172. In frog, a triangular structure called _____ joins the right _____ -
- (a) Conus arteriosus, ventricle
(b) Conus arteriosus, auricle
(c) Sinus venosus, auricle
(d) Sinus venosus, ventricle
173. In frog, which of the following receives blood through vena cava?
- (a) Sinus venosus
(b) Conus arteriosus
(c) Auricle
(d) Ventricle
174. Which of the following special venous systems is present in frog?
- (a) Hepatic portal system
(b) Renal portal system
(c) Both a and b
(d) Neither hepatic nor renal portal system is present
175. In frog the excretory system consists of -
- (a) Kidneys, ureters and urinary bladder only
(b) Kidneys and urinary bladder only
(c) Kidneys, ureters, urinary bladder and cloaca Only
(d) Kidneys and cloaca only
176. Chief nitrogenous waste product in frog is-
- (a) Ammonia (b) Urea
(c) Uric acid (d) Allantoin
177. In frog the ureter acts as urinogenital duct in
- (a) Male (b) Female
(c) male or female (d) Neither in male nor female

178. In frog how many pairs of cranial nerves are found?
 (a) 10 (b) 12
 (c) 8 (d) 31
179. Frog shows sexual dimorphism . Male frog can be distinguished from female one in having-
 (a) Sound producing vocal sac
 (b) Copulatory pad on the first digit of the fore Arm
 (c) Cloaca
 (d) a and b
180. Bidder's canal is meant for passage of-
 (a) Ova (b) Urine
 (c) Sperms (d) All of these
181. For female frog, which of the following is false?
 I. One pair of ovaries is situated near kidneys
 II. Ovary has functional connection with kidney
 III. Convulated, tubular, ciliated and glandular oviduct arises from ovary and opens into cloaca
 IV. Oviduct and ureter open separately into the cloaca
 V. A female frog can lay 2500-3000 ova at a time
 (a) I and III
 (b) Only II
 (c) I and IV
 (d) IV and V
182. Out of the four basic types of tissues, which is not the one?
 (a) Muscular tissue
 (b) Skeletal tissue
 (c) Neural tissue
 (d) Epithelial tissue
183. The outside or inside lining of a body organ is formed by
 (a) Epithelial tissue
 (b) neural tissue
 (c) Muscular tissue
 (d) Variable and differs from organ to organ
184. The epithelium of air sacs of lungs and the walls of blood vessels is
 (a) Simple cuboidal epithelium
 (b) Simple squamous epithelium
 (c) Stratified squamous epithelium
 (d) Simple columnar epithelium
185. The function of following epithelium is not secretion and absorption
 (a) Simple cuboidal epithelium
 (b) Simple columnar epithelium
 (c) Simple squamous epithelium
 (d) Brush bordered epithelium
186. Goblet glands are
 (a) Unicellular exocrine glands of intestine
 (b) Unicellular endocrine glands of intestine
 (c) Multicellular exocrine glands of gut
 (d) Multicellular endocrine glands of gut
187. The epithelium of following structure provides protection against chemical and mechanical stresses
 (a) Skin
 (b) Pharynx
 (c) Buccal cavity
 (d) All of these
188. Which of the following type of cell junction is not found in animal tissues
 (a) Desmosome
 (b) Tight junction
 (c) Gap junction
 (d) Plasmodesmata
189. Dermis of skin has
 (a) Loose connective tissue
 (b) Dense regular c.t.
 (c) Dense Irregular c.t.
 (d) Epithelial tissue
190. Mast cells are associated with
 (a) Exocrine glands
 (b) Endocrine glands
 (c) Areolar connective tissue
 (d) Neural tissue
191. In all connective tissues except the following the cells secretes the fibres of collagen or elastin protein
 (a) Bone
 (b) Cartilage
 (c) Areolar connective tissue
 (d) Fluid connective tissue
192. The fibres of the following muscles are fusiform and do not show striations
 (a) Skeletal muscles
 (b) Cardiac muscles
 (c) Both of these
 (d) Smooth muscles
193. The chondrocytes of connective tissue are
 (a) fibre secreting cells
 (b) Bone forming cells
 (c) Cartilage cells
 (d) Bone eating cells
194. Muscles of intestine and blood vessels are
 (a) Involuntary and smooth
 (b) Voluntary and smooth
 (c) Involuntary and striated
 (d) Voluntary and striated
195. Intercalated discs are the communication Junctions between the cells of
 (a) Cardiac muscles
 (b) Striped muscles

- (c) Adipose tissue
 - (d) Nerve and Striated muscles
196. The following are the major proteins of plasma
- (a) Globulin, Bilirubin and fibrinogen
 - (b) Haemoglobin, fibrinogen and albumin
 - (c) Globulin, albumin and Haemoglobin
 - (d) Albumin, globulin and fibrinogen
197. Consider the following three statements and mark the
- A. The plasma without clotting factor is called semen
 - B. Thymus is called the graveyard of RBCs
 - C. Thrombocytes are the cell fragments produced from megakaryocytes
- (a) Only A is correct
 - (b) Both A and C are correct
 - (c) Both B and C are correct
 - (d) Only c is correct
198. Bidder's canal in frog is found in –
- (a) Liver
 - (b) Testis
 - (c) Ovary
 - (d) Kidney
199. Albumin in plasma helps in
- (a) Osmotic balance
 - (b) Defense mechanism
 - (c) Blood clotting
 - (d) Nourishing the blood elements
200. RBCs in human are
- (a) Biconcave and nucleated
 - (b) Biconvex and nucleated
 - (c) Biconcave and enucleated
 - (d) Biconvex and enucleated