Sky Tutorials
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IIT-JEE | NEET | Foundation

NEET

Time: 200 Minute   **M.M. 720**

ALL INDIA SKY TEST SERIES

Pulse Batch – Neet

Date : 28/08/2023

SYLLABUS

PHYSICS	CHEMISTRY	BOTANY	ZOOLOGY
N.L.M + Friction	Previous + Chemical Equilibrium	Cell : The unit of life, Cell cycle & Cell division, Biomolecules	Animal Tissue

Please read the instructions carefully. You are allotted **5** minutes specifically for this purpose.

INSTRUCTIONS:

1. This Question paper is divided in to four parts physics, chemistry, botany, zoology and each part is further divided into two sections.

    Section –A contains 35 Questions Section B contains 15 questions. Please ensure that the Questions paper you have received contains **ALL THE QUESTIONS** in each Part.

2. **In Section A all the 35 Questions are compulsory and in Section B Contain 15 Question, out of these**

    15 Questions, candidates can choose to attempt any 10 Questions.

    Each Question has four choices (a), (b), (c), (d) out of which **only one is correct & Carry 4 marks each 1 mark** will be deducted for each wrong answer.

GENERAL INSTRUCTION

1. Use only **blue/black pen (avoid gel pen)** for darkening the bubble.
2. Indicate the correct answer for each question by filling appropriate bubble in your **OMR** answer sheet.
3. The answer sheet will be checked through computer hence; the answer of the question must be marked by –shading the circles against the question by dark **blue/black pen**
4. Blank papers, Clipboards, Log tables, Slide Rule, Calculator, Cellular Phones Papers and Electronic Gadgets in any form are **not** allowed to be carried inside the examination hall.
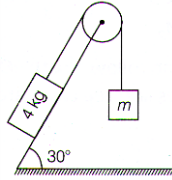
Name of the candidate: _____

Signature of the candidate: _____Signature of the invigilator: _____
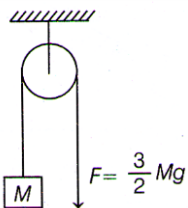
PHYSICS

SECTION - A

1. If coefficient of friction between block and the surface is $\dfrac{1}{\sqrt{3}}$ and m is such a mass that the 4 kg block is moving up the plane with constant speed, then m is.
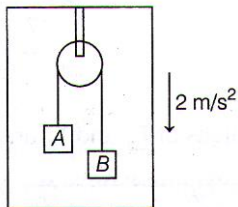

   (a) 2 kg   (b) 2.8 kg   (c) 3.4 kg   (d) 4 kg

2. In the arrangement shown in figure, acceleration of the block is.

   (a) zero   (b) g/2   (c) 3g/2   (d) g

3. Block A and B of masses 2 kg and 4kg are suspended through a string using a pulley, inside an elevator moving downward with constant acceleration 2 m/s². The tension in the string which is joining the two blocks is:
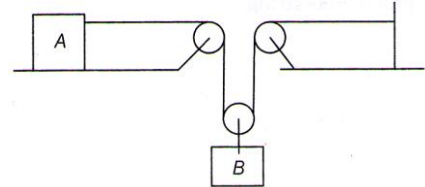

   (a) $\dfrac{64}{3}N$ (b) $\dfrac{32}{3}N$ (c) $\dfrac{8}{3}N$ (d) $\dfrac{16}{3}N$

4. In the diagram shown, block A of mass 2 kg is hanging from the string passing over a smooth pulley and block B is placed on the top of a table. If the reaction of the table is 10 N, mass of block B is (Take, g = 10 m/s²)
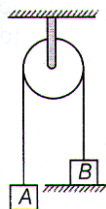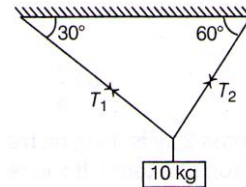

   (a) 1 kg   (b) 2 kg   (c) 3 kg   (d) 4 kg

5. The velocity of A, at an instant is 4 m/s rightwards. Then, the velocity of block B is.
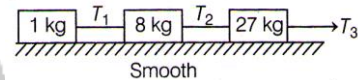

   (a) 4 m/s downwards   (b) 2 m/s upwards
   (c) 2 m/s downwards   (d) 1 m/s upwards

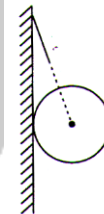6. If the block is in equilibrium, then values of T_1 and T_2 are.

   (a) 50 N, $50\sqrt{3}$ N   (b) 80 N, 60 N
   (c) 30 N, 40N (d) 100 N, 0 N

7. If T_3 = 36 N, then value of T_2 is.
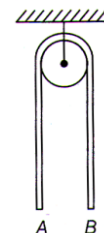

   (a) 18 N   (b) 9 N   (c) 3.375 N   (d) 1.75 N

8. A uniform disk of radius R and mass m is connected to a wall by string of length 2R. The string is connected at the centre of the disk. The normal reaction of the wall is.

   (a) mg   (b) $\dfrac{mg}{2}$ (c) $\dfrac{mg}{\sqrt{3}}$ (d) 2 mg

9. A uniform chain of length 2L is hanging in equilibrium position. If end B is given a slightly downward displacement, the imbalance causes an acceleration. Here, pulley is small and smooth and string is inextensible. The acceleration of end B when it has been displaced by distance x, is.

   (a) $\dfrac{x}{L}g$ (b) $\dfrac{2x}{L}g$ (c) $\dfrac{x}{2}g$ (d) g

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10. A spring balance fastened to the roof of a lift accelerating upward indicates 120 N as the weight of a 80 N body. The acceleration of the lift is (Take, $g = 10 \text{ m/s}^2$)
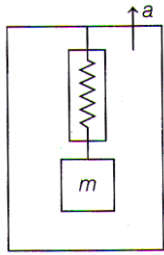
   (a) 5 m/s²

   (b) $\dfrac{20}{3} m/s^2$

   (c) $\dfrac{10}{3} m/s^2$

   (d) 4 m/s²

11. An elevator and its load have a total mass of 300 kg. If the elevator originally moving downward at 10 m/s is brought to rest with constant deceleration in a distance of 25m, the tension in the supporting cable will be
   (Take, $g = 10 \text{ m/s}^2$)
   (a) 8000 N   (b) 2400 N
   (c) 11200 N   (d) 3600 N

12. A monkey of mass 20 kg is holding a vertical rope. The rope will break, if the mass suspended from it exceed 25 kg. What is the maximum acceleration with which the monkey can climb up along the rope? (Take, $g = 10 \text{ m/s}^2$)
   (a) 10 m/s²   (b) 25 m/s²
   (c) 2.5 m/s²   (d) 5 m/s²

13. In the system shown in figure, the acceleration of the 1 kg mass is.
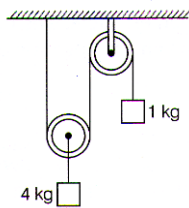

   (a) $\dfrac{g}{4}$ downward

   (b) $\dfrac{g}{4}$ upward

   (c) $\dfrac{g}{2}$ downward

   (d) $\dfrac{g}{2}$ upward

14. A rope of length 10 m and linear mass density 4kg/m is lying lengthwise on a horizontal smooth table. One end of the rope is pulled horizontally by a force of 40N. The tension in te rope at a point 4m from point of application of force will be.
   (a) 40 N   (b) 24 N   (c) 49 N   (d) 15 N

15. Consider the shown arrangement, where the blocks A and B connected by means of a uniform string is being moved vertically up by the force F. Each block weight 2 kg while the mass of string is 1000 g. The tension at bottom of the string equals
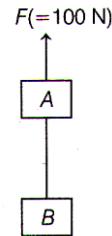
   (a) 20 N   (b) 40 N   (c) 10 N   (d) 270 N

16. Two blocks are in contact on a frictionless table. One has mass m and the others 2m. Same force F is applied from left and right on m and 2m. The ratio of contact force between the blocks in the two cases will be.
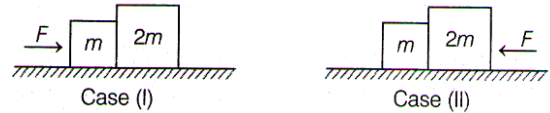
   (a) 1 : 4   (b) 1 : 2   (c) 1 : 1   (d) 2 : 3

17. In the figure shown, if mass of the rope is 2 kg, then tension at the mid – point of the rope is
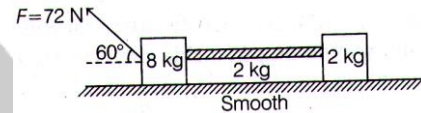
   (a) 12 N   (b) 9 N   (c) 6 N   (d) 18 N

18. In the given diagram with what force must the man pull the rope to hold the plank in position? Mass of the man is 80 kg, neglect the weight of rope, plank and pulley.
   (Take, $g = 10 \text{ m/s}^2$)
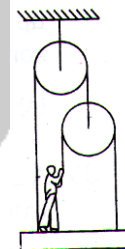
   (a) 200 N   (b) 300 N
   (c) 600 N   (d) 266.66 N

19. In the figure shown, 100 kg block is moving up with constant velocity, then tension at point P is (Take, $g = 9.8 \text{ m/s}^2$)
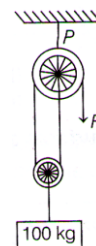
   (a) 1330 N   (b) 490 N   (c) 1470 N   (d) 980 N

20. An empty plastic box of mass m is found to accelerate up at the rate of g/6 when placed deep inside water. How much sand should be put inside the box, so that it may accelerate down at the rate of g/6?

    (a) $\dfrac{2m}{3}$ (b) $\dfrac{2m}{5}$ (c) $\dfrac{3m}{4}$ (d) $\dfrac{3m}{5}$

21. A 10 kg stone is suspended with a rope of breaking strength 30 kg – wt. The minimum time in which the stone can be raised through a height 10 m starting from rest is
    (Take, g = 10 N/kg)

    (a) 0.5 s   (b) 1.0 s   (c) $\sqrt{\dfrac{2}{3}}$ s   (d) 2.0 s

22. Find the acceleration of block B.

    (a) 0   (b) $\dfrac{5}{2}$ m/s²   (c) $\dfrac{5}{7}$ m/s²   (d) $\dfrac{5}{14}$ m/s²

23. A 14 kg block is hanged using a system of pulley as shown in figure. Tension in string connecting celling and topmost pulley is.
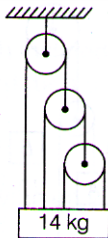
    (a) 17.5 N   (b) 70 N   (c) 140 N   (d) 280 N

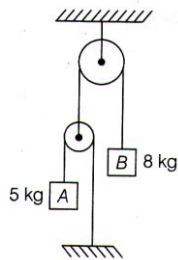24. A smooth ring A can slide on a fixed horizontal rod as shown. The pulley is fixed. If some instant velocity of ring is v, find the velocity of block at that instant.
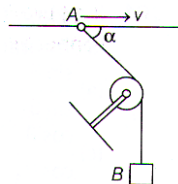
    (a) $\dfrac{v}{\cos\alpha}$ (b) $v\cos\alpha$ (c) $v\sin\alpha$ (d) $\dfrac{v}{\sin\alpha}$

25. In the set up shown, find acceleration of the block C. Given $a_A = 2m/s^2$ and a_B with respect to pulley D is 1 m/s² downwards.
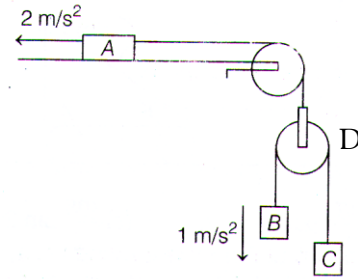
    (a) 3 m/s² ↑   (b) 3 m/s² ↓
    (c) 5 m/s² ↑   (d) 5 m/s² ↓

26. In figure blocks A and B move with velocities v_1 and v_2 along horizontal direction. Find the ratio of v_1 / v_2.
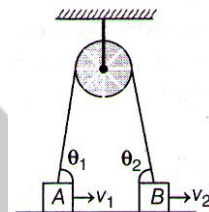
    (a) $\dfrac{\sin\theta_1}{\sin\theta_2}$ (b) $\dfrac{\sin\theta_2}{\sin\theta_1}$ (c) $\dfrac{\cos\theta_2}{\cos\theta_1}$ (d) $\dfrac{\cos\theta_1}{\cos\theta_2}$

27. Reading of the spring balance as shown in figure, is (assume string and spring are ideal and neglect friction, g = 10 m/s²)
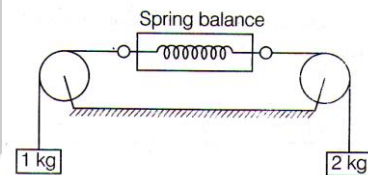
    (a) 20 N   (b) 10 N   (c) $\dfrac{40}{3}$ N   (d) zero

28. If acceleration of block B is 4 m/s² upward and that of C is 6 m/s² downward. Find acceleration of A.
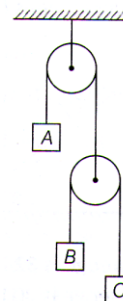
    (a) 2 m/s² upward   (b) 1 m/s² upward
    (c) 1 m/s² downward   (d) 2 m/s² downward

29. A pulley fixed to the ceiling of an elevator car carries a thread whose ends are attached to the loads of masses 3 m and m. The car starts going up with acceleration g/5. Assuming the masses of the pulley and the thread, as well as friction, to be negligible, find the force exerted by the pulley on the ceiling of car.
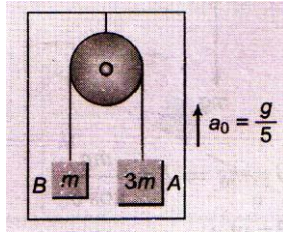
(a) $\dfrac{18mg}{5}$ (b) $\dfrac{17mg}{5}$

(c) $\dfrac{13mg}{5}$ (d) $\dfrac{19mg}{5}$

30. A string of negligible mass going over a clamped pulley of mass *m* supports a block of mass *M* as shown in the figure. The force on the pulley by the clamp is given by

(a) $\sqrt{2}\mathrm{Mg}$

(b) $\sqrt{2}\mathrm{mg}$

(c) $\sqrt{(M+m)^2 + m^2}\,g$

(d) $\sqrt{(M+m)^2 + M^2}\,g$

31. The acceleration of system over the wedge as shown in the figure is.
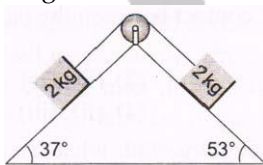
(a) 1 m/s²   (b) 2 m/s²   (c) 3 m/s² (d) 4 m/s²

32. Block A and B have masses of 2 kg and 3 kg, respectively. The ground is smooth P is an external force of 10 N. The force exerted by B on A is.
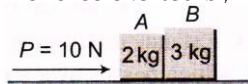
(a) 4N   (b) 6 N   (c) 8 N   (d) 10 N

33. All the surfaces are smooth and the strings and pulleys are light. The force exerted by the 20 cm part of the rod on the 10 cm part is.

(a) 6 N   (b) 12 N   (c) 24 N   (d) 36 N

34. The acceleration of light pulley is.
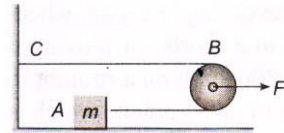
(a) F/m   (b) F/2 m   (c) F/4 m   (d) F/8 m

35. A bird is sitting in a large closed cage which is placed on a spring balance. It records a weight of 25 *N*. The bird (mass m = 0.5 *kg*) flies upward in the cage with an acceleration of $2\,m/s^2$. The spring balance will now record a weight of

(a) 24 *N*   (b) 25 *N*   (c) 26 *N*   (d) 27 *N*

SECTION -B

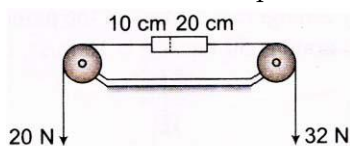36. A uniform metal chain is placed on a rough table such that one end of chain hangs down over the edge of the table. When one-third of its length hangs over the edge, the chain starts sliding. Then, the coefficient of static friction is

(a) $\dfrac{3}{4}$ (b) $\dfrac{1}{4}$ (c) $\dfrac{2}{3}$ (d) $\dfrac{1}{2}$

37. A car is moving along a straight horizontal road with a speed v_0. If the coefficient of friction between the tyres and the road is μ, the shortest distance in which the car can be stopped is

(a) $\dfrac{v_0^2}{2\mu g}$ (b) $\dfrac{v_0}{\mu g}$ (c) $\left(\dfrac{v_0}{\mu g}\right)^2$ (d) $\dfrac{v_0}{\mu}$

38. A vehicle of mass *m* is moving on a rough horizontal road with momentum *P*. If the coefficient of friction between the tyres and the road be μ, then the stopping distance is

(a) $\dfrac{P}{2\mu mg}$ (b) $\dfrac{P^2}{2\mu mg}$ (c) $\dfrac{P}{2\mu m^2 g}$ (d) $\dfrac{P^2}{2\mu m^2 g}$

39. Two iron blocks of equal mass but with double surface area slide down an inclined plane with friction coefficient μ. If the first block with surface area A experience a frictional force *f*, then the second block with surface area 2A will experience a frictional force

(a) f/2   (b) f   (c) 2f   (d) 4f

40. The upper half of an inclined plane of inclination θ is perfectly smooth while the lower half is rough. A body starting from the rest at top comes back to rest at the bottom if the coefficient of friction for the lower half is given by

(a) $\mu = \sin\theta$ (b) $\mu = \cot\theta$

(c) $\mu = 2\cos\theta$ (d) $\mu = 2\tan\theta$

41. A block of weight 5 N is pushed against a vertical wall by a force 12 N. The coefficient of friction between the wall and block is 0.6. The magnitude of the force exerted by the wall on the block is

    (a) 12 N   (b) 5 N   (c) 7.2 N   (d) 13 N
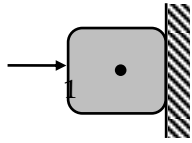
42. The acceleration of the block is.
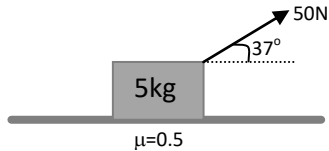
    (a) 6 m/s²   (b) 8 m/s²
    (c) 10 m/s²   (d) 12 m/s²

43. Find the minimum normal force to be applied by each hand to hold three identical books in vertical position. Each book has mass 'm' and value of coefficient of friction between the books as well as between hand and the book is μ.

    (a) $\dfrac{3mg}{2\mu}$ (b) $\dfrac{1mg}{2\mu}$ (c) $\dfrac{1mg}{1\mu}$ (d) $\dfrac{4mg}{1\mu}$

44. In the arrangement shown in the figure, mass of the block B and A is 2m and m respectively. Surface between B and floor is smooth. The block B is connected to the block C by means of a string pulley system. If the whole system is released, then find the minimum value of mass of block C so that block A remains stationary w.r.t B. Coefficient of friction between A and B is μ.
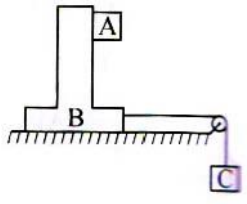
    (a) $\dfrac{m}{\mu}$ (b) $\dfrac{2m+1}{\mu+1}$ (c) $\dfrac{3m}{\mu-1}$ (d) $\dfrac{6m}{\mu+1}$

45. In fig. a person wants to rise a block lying on the ground to a height h. In both the cases, if the time required is same, then in which case he has to exert more force? Assume pulley and string light.
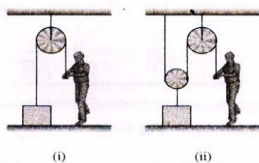
    (a) (i)   (b) (ii)
    (c) Same in both   (d) Cannot be determined

46. A block of mass 10 kg is kept on a horizontal surface. A force F is acted on the block as shown in figure. For what minimum value of F, the block will be lifted up?
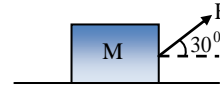
    (a) 98 N   (b) 49 N   (c) 200 N   (d) N.O.T.

47. A flexible chain of weight W hangs between two fixed points a and B at the same level. The inclination of the chain with the horizontal at the two points of support is θ. What is the tension of the chain at the end point.
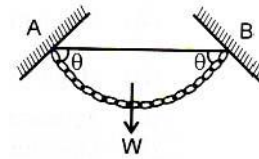
    (a) $\dfrac{W}{2}\operatorname{cosec}\theta$ (b) $\dfrac{W}{2}\sec\theta$

    (c) $W\cos\theta$ (d) $\dfrac{W}{3}\sin\theta$

48. A light string passing over a smooth light pulley connects two blocks of masses m_1 and m_2 (vertically). If the acceleration of the system is $g/8$ then the ratio of the masses is

    (a) 8 : 1   (b) 9 : 7   (c) 4 : 3   (d) 5 : 3

49. If the force of gravity suddenly disappears:
    (a) The mass of all bodies will become zero
    (b) The weight of all bodies will become zero
    (c) Both mass and weight of all bodies will become zero
    (d) Neither mass nor weight of all bodies will become zero

50. Two persons are holding a rope of negligible weight tightly at its ends so that it is horizontal. A 15 kg weight is attached to the rope at the mid point whichnow no longer ramins horizontal. The minimum tension required to completely straighten the top is
    (a) 15 kg   (b) 15/2 kg
    (c) 3 kg   (d) Infinitely large

CHEMISTRY

SECTION – A

51. What is the unit of K_P for the reaction?
$$CS_2(g) + 4H_2(g) \rightleftharpoons CH_4(g) + 2H_2S(g)$$
(a) atm   (b) atm^{-2} (c) atm^2 (d) atm^{-1}

52. Ratio of active masses of 22 g CO_2, 3g H_2 and 7g N_2 in a gaseous mixture :
(a) 22 : 3 : 7   (b) 0.5 : 3 : 7
(c) 1 : 3 : 1   (d) 1 : 3 : 0.5

53. For the reaction : $2HI \rightleftharpoons H_{2(g)} + I_{2(g)}$; the degree of dissociation (α) of HI(g) is related to equilibrium constant K_P by the expression

(a) $\dfrac{1 + 2\sqrt{K_P}}{2}$ (b) $\sqrt{\dfrac{1 + 2K_P}{2}}$

(c) $\sqrt{\dfrac{2K_P}{1 + 2K_P}}$ (d) $\dfrac{2\sqrt{K_P}}{1 + 2\sqrt{K_P}}$

54. K_c for the esterification reaction :
$$CH_3COOH + C_2H_5OH \rightleftharpoons CH_3COOC_2H_5 + H_2O$$
is 4. If 4 mol each of acid and alcohol are taken initially, what is the equilibrium concentration of the acid:-

(a) $\dfrac{2}{3}$ (b) $\dfrac{4}{3}$ (c) $\dfrac{3}{4}$ (d) $\dfrac{3}{2}$

55. For a reaction at equilibrium
$A(g) \rightleftharpoons B(g) + \dfrac{1}{2}C(g)$ the relation between dissociation constant (K), degree of dissociation (α) and equilibrium pressure (p) is given by.

(a) $K = \dfrac{\alpha^{1/2} p^{2/3}}{\left(1 + \dfrac{3}{2}\alpha\right)^{\frac{1}{2}}(1-\alpha)}$

(b) $K = \dfrac{\alpha^{3/2} p^{1/2}}{(2+\alpha)^{\frac{1}{2}}(1-\alpha)}$

(c) $K = \dfrac{(\alpha p)^{\frac{3}{2}}}{\left(1 + \dfrac{3}{2}\alpha\right)^{\frac{1}{2}}(1-\alpha)}$

(d) $K = \dfrac{(\alpha p)^{\frac{3}{2}}}{(1+\alpha)(1-\alpha)^{\frac{1}{2}}}$

56. The value of K_P of for the equilibrium reaction $N_2O_4(g) \rightleftharpoons 2NO_2(g)$ is 2. The percentage dissociation of $N_2O_4(g)$ at a pressure of 0.5 atm. is.
(a) 71   (b) 50   (c) 88   (d) 25

57. In the following equilibrium reaction
$$2A \rightleftharpoons B + C,$$
the equilibrium concentrations of A, B and C are 1×10^{-3} M, 2×10^{-3} M and 3×10^{-3} M respectively at 300 K. The value of K_c for this equilibrium at the same temperature is

(a) $\dfrac{1}{6}$ (b) 6   (c) $\dfrac{1}{36}$ (d) 36

58. Given the reaction between 2 gases represented by A_2 and B_2 to give the compound AB(g).
$A_2(g) + B_2(g) \rightleftharpoons 2AB(g)$.
At equilibrium, the concentration
of $A_2 = 3.0 \times 10^{-3}$ M
of $B_2 = 4.2 \times 10^{-3}$ M
of $AB = 2.8 \times 10^{-3}$ M
If the reaction takes place in a sealed vessel at 527^{0}C, then the value of K_C will be :
(a) 2.0   (b) 1.9   (c) 0.62   (d) 4.5

59. A reaction is $A + B \rightleftharpoons C + D$. initially we start with equal concentrations of A and B. At equilibrium we find that the moles of C is two times of A. What is the equilibrium constant of the reaction?

(a) $\dfrac{1}{4}$ (b) $\dfrac{1}{2}$ (c) 4   (d) 2

60. For the reaction $C(s) + CO_2(g) \rightleftharpoons 2CO(g)$, the partial pressure of CO_2 and CO are 2.0 and 4.0 atm respectively at equilibrium. The K_P for the reaction is.
(a) 0.5   (b) 4.0   (c) 8.0   (d) 32.0

61. In which of the following equilibrium K_c and K_P are not equal?
(a) $2NO(g) \rightleftharpoons N_2(g) + O_2(g)$
(b) $SO_2(g) + NO_2(g) \rightleftharpoons SO_3(g) + NO(g)$
(c) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$
(d) $2C(s) + O_2(g) \rightleftharpoons 2CO_2(g)$

62. The K_P/K_C ratio will be highest in case of
(a) $CO(g) + \dfrac{1}{2}O_2(g) \rightleftharpoons CO_2(g)$
(b) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$
(c) $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$
(d) $7H_2(g) + 2NO_2(g) \rightleftharpoons 2NH_3(g) + 4H_2O(g)$

63. The rate constant for forward and backward reaction of hydrolysis of ester are 1.1×10^{-2} and 1.5×10^{-3} per minute respectively. Equilibrium constant for the reaction

$$CH_3COOC_2H_5 + H^+ \rightleftharpoons CH_3COOH + C_2H_5OH$$

is
(a) 4.33   (b) 5.33   (c) 6.33   (d) 7.33

64. Which of the following is an example of homogeneous equilibrium?

(a) $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$

(b) $C(s) + H_2O(g) \rightleftharpoons CO(g) + H_2(g)$

(c) $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$

(d) $NH_4HS(s) \rightleftharpoons NH_3(g) + H_2S(g)$

65. Unit of equilibrium constant for the given reaction is $Ni(s) + 4CO(g) \rightleftharpoons Ni(CO)_4(g)$

(a) $(mol/l)^{-3}$ (b) $(mol/l)^3$
(c) $(mol/l)^{-4}$ (d) $(mol/l)^4$

66. If K_c is in the range of ……………. Appreciable concentrations of both reactants and are present.
(a) 10^{-4} to 10^4 (b) 10^{-3} to 10^3
(c) 10^{+3} to 10^{-3} (d) 10^{-5} to 10^3

67. The correct relationship between free energy change in a reaction and the corresponding equilibrium constant, K_c is
(a) $\Delta G = RT \ln K_C$ (b) $-\Delta G = RT \ln K_C$
(c) $\Delta G^0 = RT \ln K_C$ (d) $-\Delta G^0 = RT \ln K_C$

68. Using the equation $(K = e^{-\Delta G^\Theta / RT})$, the reaction spontaneity can be interpreted in terms of the value of ΔG^0 is/are

(a) If $\Delta G^\Theta > 0$, then $-\Delta G^\Theta / RT$ is positive, and $e^{-\Delta G^\Theta / RT} > 1$ making K > 1, which implies a spontaneous reaction or the reaction which proceeds in the forward direction to such an extent that the products are present predominantly.

(b) If $\Delta G^\Theta > 0$, then $-\Delta G^\Theta / RT$ is negative, and $e^{-\Delta G^\Theta / RT} < 1$ making K < 1, which implies a non-spontaneous reaction or a reaction which proceeds in the forward direction to such a small degree that only a very minute quantity of product is formed.

(c) Both (a) and (b)
(d) None of the above

69. According to Le-chatelier's principle adding heat to a solid $\rightleftharpoons$ liquid equilibrium will cause the

(a) temperature to increase
(b) temperature to decrease

(c) amount of liquid to decrease
(d) amount of solid to decrease

70. For the manufacture of ammonia by the reaction

$$N_2 + 3H_2 \rightleftharpoons 2NH_3 + 2Kcal$$

the favourable conditions are
(a) Low temperature, low pressure and catalyst
(b) Low temperature, high pressure and catalyst
(c) High temperature, low pressure and catalyst
(d) High temperature

71. The equilibrium which remains unaffected by pressure change is

(a) $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$

(b) $2NO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$

(c) $2O_3(g) \rightleftharpoons 3O_2(g)$

(d) $2NO_2(g) \rightleftharpoons N_2O_4(g)$

72. Le-Chatelier principle is not applicable to

(a) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

(b) $Fe(s) + S(s) \rightleftharpoons FeS(s)$

(c) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

(d) $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$

73. Effect of a catalyst on a equilibrium reaction.
(i) A catalyst increase the rate of the chemical reaction by making available a new low energy pathway for the conversion of reaction to products.
(ii) It increases the rate of forward and reverse reactions that pass through the same transition state and does not affect equilibrium.
(iii) It lowers the activation energy for forward and reverse reactions by exactly the same amount.
Which of the above statement(s) is/are correct?
(a) Only (i) (b) (i) and (ii)
(c) (i), (ii) and (iii)   (d) (ii) and (iii)

Statement Type Question

74. Read the following statements carefully and choose the correct answer
(i) Water and water vapour remain in equilibrium position at atmospheric pressure (1.013 bar) and at 100^0C in a closed vessel.
(ii) The boiling point of water is 100^0C at 1.013 bar pressure
(iii) Boiling point of the liquid depends on the atmospheric pressure.
(iv) Boiling point depends on the altitude of the place; at high altitude the boiling point increases.
(a) (i), (ii) and (iv) are correct
(b) (i), (iii) and (iv)
(c) (i), (ii) and (iii) are correct
(d) only (iii) is correct

75. You must have seen that when a soda water bottle is opened, some of the carbon dioxide gas dissolved in it fizzes out rapidly. There is equilibrium between the molecules in the gaseous state and the molecules dissolved in the liquid under pressure i.e.,

$CO_2(gas) \rightleftharpoons CO_2(in\ solution)$

Which of the following statements is/are correct regarding this?
   (i) The phenomenon arises due to difference in solubility of carbon dioxide at different pressures.
   (ii) This equilibrium is governed by Henry's law
   (iii) The amount of CO_2 gas dissolved in liquid increases with decrease of temperature.
   (iv) The amount of CO_2 gas dissolved in liquid decreases with increase of temperature.
   (a) (i), (ii) and (iv) are correct
   (b) (i), (iii) and (iv)
   (c) (i), (ii) and (iii) are correct
   (d) only (iii) is correct

76. Identify the CORRECT statements below regarding chemical equilibrium:
   (i) All chemical reactions which are in equilibrium are irreversible.
   (ii) Equilibrium is achieved when the forward reaction rate equals the reverse reaction rate.
   (iii) Equilibrium is achieved when the concentrations of reactants and product remain constant.
   (iv) Equilibrium is dynamic in nature
   (a) (i), (ii) and (iv) are correct
   (b) (i), (ii), (iii) and (iv) are correct
   (c) (i), (ii) and (iii) are correct
   (d) only (ii) is correct

77. Read the following statements and choose the correct option
   (i) The numerical value of the equilibrium constant for a reaction indicates the extent of the reaction.
   (ii) An equilibrium constant give information about the rate t which the equilibrium is reached.
   (iii) If $K_c > 10^3$, products predominate over reactants, i.e., if K_c is very large, the reaction proceeds nearly to completion.
   (iv) If $K_c < 10^{-3}$, reactants predominate over products, i.e., if K_c is very small, the reaction proceeds rarely.
   (a) (i), (ii) and (iv) are correct
   (b) (i), (iii) and (iv)
   (c) (i), (ii) and (iii) are correct
   (d) only (iii) is correct

78. Match the columns :

A	For the equilibrium $NH_4I(s) \rightleftharpoons$ $NH_3(g) + HI(g)$, if pressure is increased at equilibrium	(p)	Forward shift
B	For the equilibrium $N_2 + 3H_2 \rightleftharpoons 2NH_3$ If volume is increased at equilibrium	(q)	No change
C	For the equilibrium $H_2O(g) + CO(g) \rightleftharpoons H_2(g) + CO_2(g)$ inert gas is added at constant pressure at equilibrium	(r)	Backward shift
D	For the equilibrium $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ what happens if more PCl_5 is added	(s)	More N_2 and H_2 is formed.

   (a) A – (p), B – (q), C – (r), D - (s)
   (b) A – (r), B – (s), C – (q), D - (p)
   (c) A – (s), B – (p), C – (q), D - (r)
   (d) A – (q), B – (s), C – (r), D - (p)

79. $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g), K_1$ (1)

$N_2(g) + O_2(g) \rightleftharpoons 2NO(g), K_2$ (2)

$H_2(g) + \frac{1}{2}O_2(g) \rightleftharpoons H_2O(g), K_3$ (3)

The equation for the equilibrium constant of the reaction

$2NH_3(g) + \frac{5}{2}O_2(g) \rightleftharpoons 2NO(g) + 3H_2O(g), (K_4)$

in terms of K_1, K_2 and K_3 is :

   (a) $\dfrac{K_1 K_2}{K_3}$ (b) $\dfrac{K_1 . K_3^2}{K_2}$

   (c) $K_1 K_2 K_3$ (d) $\dfrac{K_2 . K_3^3}{K_1}$

80. Two moles of PCl_5 were heated in a closed vessel of 2L. At equilibrium 40% of PCl_5 is dissociated into PCl_3 and Cl_2. The value of equilibrium constant is
   (a) 0.53   (b) 0.267   (c) 2.63   (d) 5.3

81. PCl_5 is dissociating 50% at 250°C at a total pressure of P atm. If equilibrium constant is K_p, then which of the following relation is numerically correct?
   (a) $K_p = 3P$ (b) $P = 3K_p$

   (c) $P = \dfrac{2K_p}{3}$ (d) $K_p = \dfrac{2P}{3}$

82. For the decomposition of the compound, represented as

$$NH_2COONH_4(s) \rightleftharpoons 2NH_3(g) + CO_2(g)$$

the $K_p = 2.9 \times 10^{-5} atm^3$.

If the reaction is started with 1 mol of the compound, the total pressure at equilibrium would be :

(a) $1.94 \times 10^{-2} atm$　　(b) $5.82 \times 10^{-2} atm$

(c) $7.66 \times 10^{-2} atm$　　(d) $38.8 \times 10^{-2} atm$

83. The dissociation equilibrium of a gas AB_2 can be represented as :

$$2AB_2(g) \rightleftharpoons 2AB(g) + B_2(g)$$

The degree of dissociation is 'x' and is small compared to 1. The expression relating the degree of dissociation (x) with equilibrium constant K_p and total pressure P is :

(a) $(2K_p / P)$　　　　(b) $(2K_p / P)^{1/3}$

(c) $(2K_p / P)^{1/2}$　　　　(d) (K_p / P)

84. The exothermic formation of ClF_3 is represented by the equation :

$$Cl_2(g) + 3F_2(g) \rightleftharpoons 2ClF_3(g);$$

$$\Delta H = -329\,kJ$$

Which of the following will increase the quantity of ClF_3 in an equilibrium mixture of Cl_2, F_2 and ClF_3?
(a) Adding F_2
(b) Increasing the volume of the container
(c) Removing Cl_2
(d) Increasing the temperature

85. If 3.01×10^{20} molecules are removed from 98 mg. of H_2SO_4, then the number of moles of H_2SO_4 left are:

(a) 0.1×10^{-3}　　　　(b) 0.5×10^{-3}

(c) 1.66×10^{-3}　　　　(d) 9.95×10^{-2}

SECTION – B

86. Vapour densit of gas is 11.2 volume occupied by 2.4 gms of this at STP will be.
(a) 11.2 It　(b) 2.24 It　(c) 22.4 It　(d) 2.4 It

87. Caffine has a molecular weight of 194. It contains 28.9% by mass of nitrogen Number of atoms of nitrogen in one molecular of it.
(a) 2　　(b) 3　　(c) 4　　(d) 5

88. A compound contains 38.8% C, 16.0% H and 45.2% N. The formula of the compound would be.
(a) CH_3NH_2　　　　(b) CH_3CN
(c) C_2H_5CN　　　　(d) $CH_2(NH)_2$

89. The orbital angular momentum for an electron revolving in an orbit is given by $\sqrt{\ell(\ell+1)}.\dfrac{h}{2\pi}$. This momentum for an s – electron will be given by

(a) $\sqrt{2}\dfrac{h}{2\pi}$　(b) $+\dfrac{1}{2}.\dfrac{h}{2\pi}$　(c) zero　(d) $\dfrac{h}{2\pi}$

90. If λ_o and λ be the threshold wavelength and wavelength of incident light, the velocity of photoelectron ejected from the metal surface is

(a) $\sqrt{\dfrac{2hc}{m}\left(\dfrac{\lambda_o - \lambda}{\lambda\lambda_o}\right)}$　　　(b) $\sqrt{\dfrac{2h}{m}\left(\dfrac{1}{\lambda_o} - \dfrac{1}{\lambda}\right)}$

(c) $\sqrt{\dfrac{2h}{m}(\lambda_o - \lambda)}$　　　(d) $\sqrt{\dfrac{2hc}{m}(\lambda_o - \lambda)}$

91. If the kinetic energy of an electron is increased four times, the wavelength of the de – Broglie wave associated with it would become:
(a) Two times　　　(b) Half
(c) One fourth　　　(d) Four times

92. The work function (ϕ) of some metals is listed below. The number of metal which will show photoelectric effect when light of 300 nm wavelength falls on the metal is

Metal	Li	N	K	Mg	Cu	Ag	Fe	Pt	W
ϕ (eV)	2.4	2.3	2.2	2.7	4.8	4.3	4.7	6.3	4.75

(a) 3　　　(b) 4　　　(c) 5　　　(d) 6

93. Which of the following combination of statements is true regarding the interpretation of the atomic orbitals?
 (A) An electron in an orbital of high angular momentum atays away from the nucleus than an electron in the orbital of lower angular moementum.
 (B) For a given value of the principal quantum number, the size of the robit is inversely proportional to the azimuthal quantum number.
 (C) According to wave mechanics, the ground state angular momentum is equal to $\dfrac{h}{2\pi}$
 (D) The plot of ψ Vs r for various aximuthal quantum numbers, shows peak shifting towards higher r value.
(a) (A), (C)　　　　(b) (A), (D)
(c) (B), (C)　　　　(d) (A), (B)

94. Ionization energy of He^+ is 19.6×10^{-18} J atom[-1]. The energy of the first stationary state (n = 1) of Li^{2+} is:
(a) 8.82×10^{-17} J atom[-1]　(b) 4.41×10^{-16} J mol^{-1}
(c) -4.41×10^{-17} J atom[-1]　(d) -2.2×10^{-15} J atom[-1]

95. Each question contains STATEMENT – 1 (Assertion) and STATEMENT – 2 (Reason)
Examine the statements carefully and mark the correct answer according to the instructions given below.
(A) If both the statements are correct and STATEMENT – 2 is the correct explanation of STATEMENT – 1
(B) If both the statements are correct but STATEMENT – 2 is NOT the correct explanation of STATEMENT – 1
(C) If STATEMENT – 1 is correct and STATEMENT – 2 is incorrect
(D) If STATEMENT – 1 is incorrect and STATEMENT – 2 is correct

96. Statement – 1: The angular momentum of d – orbitals is $\sqrt{6}\dfrac{h}{2\pi}$
Statement – 2: Angular momentum of electron in orbit is mvr = $\dfrac{nh}{2\pi}$
(a) A　　(b) B　　(c) C　　(d) D

97. Statement – 1: Emitted radiation will fall invisible range when an electron jump from n = 4 to n = 2 in H – atom.
Statement – 2: Balmer series radiation belong to visible range for hydrogen atom only
(a) A　　(b) B　　(c) C　　(d) D

98. Statement – 1: Kinetic energy of photoelectrons is directly proportional to the intensity of the incident radiation
Statement – 2: Each photon of light causes the emission of only one photoelectorns
(a) A　　(b) B　　(c) C　　(d) D

Examine the statements carefully and mark the correct answer according to the instructions given below.
(A) If both the statements are correct and STATEMENT – 2 is the correct explanation of STATEMENT – 1
(B) If both the statements are correct but STATEMENT – 2 is NOT the correct explanation of STATEMENT – 1
(C) If STATEMENT – 1 is correct and STATEMENT – 2 is incorrect
(D) If STATEMENT – 1 is incorrect and STATEMENT – 2 is correct

99. **Statement – 1:** In CrO_5 oxidation number of Cr is +6.
Statement – 2: CrO_5 has butterfly structure in which peroxide bonds are present.
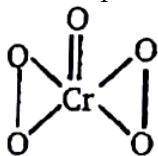
(a) A　　(b) B　　(c) C　　(d) D

100. **Statement – 1:** Equivalent weight of any element represents the part by weight of the element which combines with or displaces 1 part by weight of hydrogen or 8 parts by weight of oxygen or 35.5 parts by weight of chlorine.
Statement -2: The atomic weight or hydrogen, oxygen or chlorine are taken as reference for the determination of equivalent weights of all other elements.
(a) A　　(b) B　　(c) C　　(d) D

BOTANY

SECTION – A

101. Identify the unmber of compounds from the given box below that form a part of acid – insoluble fraction.
Polysaccharides, Monosaccharides, Lipids, Proteins
Choose the correct option
(a) One　　(b) Two　　(c) Three　　(d) Four

102. Read the following given statements and choose the correct option.
Statement A: All the carbon compounds that we get from livng tissues can be called biomolecules.
Statement B: Living organisms do not posses inorganic elements.
(a) Both statement are correct
(b) Both statements are incorrect
(c) Only statement A is correct
(d) Only statement B is correct

103. Observe the following given structure and select the correct option naming it.
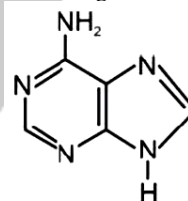
(a) Uracil　　(b) Thymin
(c) Cytosine　(d) Adenine

104. Read the following given statements and select the correct option w.r.t. lipids
Statement A: Lipids are generally water insoluble
Statement B: Oils have lower melting point than ghee.
(a) Both statement are correct
(b) Both statement are incorrect
(c) Only statement A is correct
(d) Only statement B is correct

105. Choose the correct option to complete the analogy
Acidic amino acid:
Aspartic acid : : Basic amino acid : _____
(a) Thyrosine　　(b) Tryptophan
(c) Phenylalanine　　(d) Lysine

106. Match column I with column II and choose the correct option

	Column – I		Column – II
A.	Pigment	(i)	Concanavalin A
B.	Alkaloid	(ii)	Ricin
C.	Toxin	(iii)	Morphine
D.	Lectin	(iv)	Carotenoid

(a) A (iii), B (i), C (ii), D (iv)
(b) A (ii), B (iii), C (i), D (iv)
(c) A (i), B (ii), C (iii), D (iv)
(d) A (iv), B (iii), C (ii), D (i)

107. Select the incorrect match

(a)	GLUT – 4	-	Enables glucose transport into cells
(b)	Receptor	-	Sensory reception (smell, taste etc)
(c)	Antibody	-	Do not fight against infectious agents
(d)	Trypsin	-	Proteolytic enzyme

108. Which among the following given option do not hold true for nucleic acids?
    (a) They are polymer of nucleotides
    (b) A nucleotide has two chemically distinct component
    (c) A nucleic acid containing ribose sugar is called RNA
    (d) A nucleic acid containing 2 – deoxyriboese sugar is called DNA

109. A protein is imagined as a line where
    (a) The left end is represented by the first amino acid and the right end is represented by the last amino acid
    (b) The left end is represented by the last amino acid and the right end is represented by the first amino acid.
    (c) The left end is represented by the first amino acid and the right end is represented by the second last amino acid
    (d) Both the left and right ends are represented by the first amino acids

110. Exoskeleton of arthropods is made up of repeating units of.
    (a) N – acetyl glucosamine
    (b) N – acetyl muramic acid
    (c) Galacturonic acid
    (d) Glucuronic acid

111. Identify the incorrect statement w.r.t. the structure of B – DNA.
    (a) The rise per base pair would be 3.4 Å
    (b) The pitch would be 34 Å
    (c) At each step of ascent, the strand turns 36°
    (d) One full turn of the helical strand would involve five base pairs

112. The metabolic pathway from glucose to tactic acid which occurs in ten metabolic steps is called.
    (a) Electron transport chain
    (b) TCA cycle
    (c) Glycolysis
    (d) Kreb's cycle

113. In a particular double stranded DNA, 18% of bases were shown to be guanine (G). The percentage of other three bases are expected to be.
    (a) A – 32%, T – 30%, C – 20%
    (b) A – 18%, T – 18%, C – 46%
    (c) A – 20%, T – 20%, C – 52%
    (d) A – 32%, T – 32%, C – 18%

114. Following graphs represent activity of enzyme versus pH. Choose the graph which correctly represents the effect of pH on activity of enzyme.

(a)

(b)

(c)

(d)
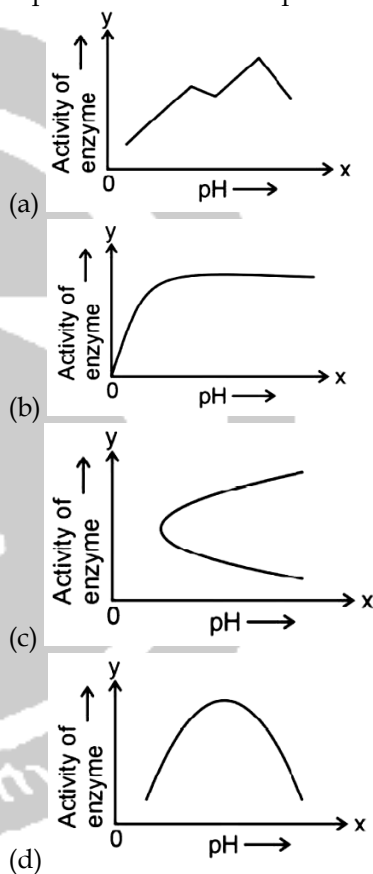
115. Match column I with column II and choose the correct option.

	Column – I		Column – II
A.	Peptide bond	(i)	Branched structure
B.	Glycosidic bond	(ii)	Most abundant protein in whole of the biosphere
C.	RuBisCO	(iii)	Maltose
D.	Amylopectin	(iv)	Keratin

(a) A (iii), B (i), C (ii), D (iv)
(b) A (ii), B (iii), C (i), D (iv)
(c) A (i), B (ii), C (iii), D (iv)
(d) A (iv), B (iii), C (ii), D (i)

116. Choose the correct option to complete the analogy.
Reducing sugar : Glucose : : Non – reducing sugar : _____
(a) Fructose   (b) Galactose
(c) Sucrose   (d) Lactose

117. Zwitterionic from of an amino acid possesses
(a) Partial positive charge
(b) Partial negative charge
(c) Equal number of negative and positive charge
(d) Only negative charge

118. Choose the class of enzyme which is responsible for carrying out the following given reaction.

$$\begin{matrix} X & Y \\ | & | \\ C & - & C \end{matrix} \longrightarrow X - Y + C = C$$

(a) Hydrolase   (b) Isomerase
(c) Ligase   (d) Lyase

119. Read the following given statement and choose the correct option
Statement A: Zinc is a cofactor for the proteolytic enzyme, carboxypeptidase
Statement B: The essential chemical components of many coenzymes are vitamins
(a) Both statement are correct
(b) Both statement are incorrect
(c) Only statement A is correct
(d) Only statement B is correct

120. Enzymes are divided into __A__ classes and each with __B__ subsclasses
Fill the blanks A and B with a suitable option

	A	B
(a)	8	4 – 12
(b)	6	4 – 13
(c)	10	1 – 4
(d)	16	1 – 4

121. Select the incorrect statement w.r.t. rate of a rection
(a) Rate of a physical or chemical process refers to the amount of product fromed per unit time.
(b) Rate can blso be called velocity if the direction is specified
(c) Rates of physical and chemical processes are influenced by temperature among other factors
(d) A general thumb rule is that rate doubles or decreases by half for every 30^oC change in either direction.

122. All of the following enzymes are proteinaceous in nature except.
(a) Chymotrypsinogen
(b) Procarboxypeptidase
(c) Ribozyme
(d) Pepsinogen

123. Match column I with column II and choose the correct option.
Column I (Metabolic end products)
Column II (Conditions)

	Column I		Column II
A.	Lacitic acid	(i)	Fementation in yeast
B.	Pyruvic acid	(ii)	Anaerobic respiration in human skeletal muscle
C.	Ethanol	(iii)	Aerobic respiration in animal cell

(a) A (i), B (ii), C (iii)   (b) A (i), B (iii), C (ii)
(c) A (ii), B (i), C (iii)   (d) A (ii), B (iii), C (i)

124. Cabonic anhydrase accelerates the rate of conversion of CO_2 and H_2O into H_2CO_3 by about
(a) 100 million times   (b) 10 milliion times
(c) 40 million times   (d) 50 million times

125. In a normal healthy individual , the blood concentration of glucose is
(a) 1.5 to 3.8 m mol L^{-1} (b) 4.2 to 6.1 m mol L^{-1}
(c) 6.8 to 8.4 m mol L^{-1} (d) 8.5 to 11.2 m mol L^{-1}

126. Anthocyanis belongs to the category of
(a) Polymeric substance
(b) Drugs
(c) Toxins
(d) Pigments

127. Which of the following is an important quality of enzyme, isolated from thermophilic organisms?
(a) Thermal instability   (b) Saline stability
(c) Thermal stability   (d) Pressure stability

128. Competitve inhibition of succinic dehydrogenase occurs by
(a) Succinate   (b) Malonate
(c) Melanin   (d) Melatonin

129. Read the following given statement w.r.t. cellulose and choose the correct option
Statement A: It does not contain complex helices.
Statement B: It cannot hold I_2
(a) Both statements are correct
(b) Both statement are incorrect
(c) Only statement A is correct
(d) Only statement B is correct

130. Select an incorrect statement w.r.t. living state.
(a) It is non – equilibrium state
(b) It is a non - steady state which is unable to perform work
(c) Living state and metabolism are synonymous
(d) Any chemical or physical process moves spontaneously to equilibrium

131. Statement, which is correct w.r.t. double helical structure of DNA given by Wastson and Crick.
    (a) A of one strand bonds with G of another strand.
    (b) C of one strand bonds with T of another strand.
    (c) The backbone is formed by sugar – phosphate – sugar chain
    (d) The nitrogen bases are projected more or less parallel to this backbone but face outside.

132. Organic chemist always write a _____ view of the molecules while representing the structure of the molecules.
    Fill the blank with a suitable option.
    (a) One – dimensional
    (b) Two – dimensional
    (c) Three – dimensional
    (d) Four – dimensional

133. How many among the following statements hold true for structure of proteins?
    A. In proteins, only left handed helices are observed
    B. Tertiary structure is absolutely necessary for biological activities of proteins.
    C. A protein thread exhibiting primary structure does not exist throughout as an extended rigid rod.
    Choose the suitable option
    (a) Zero　　(b) One　　(c) Two　　(d) Three

134. Biomacromolecules without any exception have molecular weights in the range of
    (a) 20 Daltons – 100 Daltons
    (b) 100 Daltons – 500 Daltons
    (c) 600 Daltons – 1000 Daltons
    (d) 10,000 Daltons

135. Glycerol is a simple lipid which is
    (a) Tricarboxypropane
    (b) Trihydropentane
    (c) Trihydroxypropane
    (d) Tetrahydroxypentane

SECTION - B

136. Identify the structure on the basis of below given features.
    (A) Can occupy more than 90% volume of a plant cell
    (B) Membrane bounds space
    (C) Help in excretion in *Amoeba*
    (a) Vacuole　　　　　(b) Lysosome
    (c) Peroxisome　　　(d) Nucleus

137. Read the below given statements and select the correct option.
    A. In 70S ribosome, S stands for sedimentation coefficient
    B. Only prokaryotes have 70S ribosome
    (a) Only A is correct
    (b) Only B is correct
    (c) Both A and B are correct
    (d) Both A and B are incorrect

138. Mark the following statements as true (**T**) or false (**F**) and select the **correct** option
    A. Acrocentric chromosome appears J – shaped during anaphase
    B. Centromere holds two chromatids together
    C. Outer membrane of nucleus in connected with SER only

	A	B	C
(a)	T	F	F
(b)	F	T	T
(c)	T	T	F
(d)	F	F	T

139. Axonemal arrangement of microtubules is referred to as 9 + 2 array in
    (a) Flagella of prokaryotes
    (b) Cillia of eukaryotes
    (c) Centrosome of animal cells
    (d) Both (a) and (c)

140. Secondary constriction is
    (a) Non staining region of chromosome
    (b) Also called centromere
    (c) Found in all chromosomes
    (d) Seen in humans only

141. Choose the odd one w.r.t. inclusion bodies.
    (a) Phosphate granules
    (b) Cyanophycean granules
    (c) Glycogen granules
    (d) Food vacuole in protists

142. Protein synthesis in a plant cell occurs in
    (a) Cytoplasm and nucleus
    (b) Mitochondria, chloroplast and cytoplasm
    (c) ER and nucleus
    (d) Chloroplast and nucleoplasm

143. Plasmodesmat
    (A) Is found in cell wall
    (B) Are lined by plasma membrane
    (C) Are found in both plant and animal cells
    Choose the correct one(s)
    (a) (A) only　　　　　(b) (B) only
    (c) Both (A) and (B)　　(d) All (A), (B) and (C)

144. During G$_o$ stage of the cell cycle
    (a) Cells are metabolically inactive
    (b) Centriole duplicates in the cytoplasm
    (c) Chromosome number inceases
    (d) Cells do not proliferate unless called on to do so

145. Prophse
    (a) Is the second stage of karyokinesis of mitosis
    (b) Follows the S and G$_2$ phase of interphase
    (c) Is marked by the initiation of condensation of chromosomal material
    (d) Both (b) and (c)

146. Select the incorrect statement w.r.t. metaphase
    (a) Condensation of chromosome in completed
    (b) Chromosomes get aligned along metaphase plate
    (c) Nucleolus, Golgi complex and ER reform
    (d) Spindle fibres attach to kinetochores of chromosomes

147. Cytokinesis in plants occurs by
    (a) Formation of a furrow in the plasma membrane
    (b) Formation of cell – plate
    (c) Formation of syncytium
    (d) Both (a) and (b)

148. During which stage of meiosis I does the chromsomes start pairing together?
    (a) Leptotene   (b) Diplotene
    (c) Diakinesis   (d) Zygotene

149. Interkinesis is
    (a) Generally long lived
    (b) The stage between two meiotic divisions
    (c) Followed by prophase I
    (d) The stage in which DNA replication takes place

150. Select the incorrect statement w.r.t. meiosis
    (a) Increasing the genetic variability in the population from one generation to the next
    (b) Involves two sequential cycles of nuclear and cytoplasm division
    (c) Meiosis I is also called as equational division
    (d) Resuits in reduction of chromosome number to half as of the parent cell

ZOOLOGY

SECTION - A

151. The ciliated columnar epithelial cells in humans occur in
    (a) Eustachian tube and stomach lining
    (b) bronchioles and fallopian tubes
    (c) bile duct and oesophagus
    (d) fallopian tubes and urethra

152. Compound squamous epithelium is found in
    (a) stomach   (b) intestine
    (c) trachea   (d) pharynx

153. Which of the following type of cell junction is not found in animal tissues ?
    (a) Adhering junction   (b) Tight junction
    (c) Gap junction   (d) Plasmodesmata

154. Tendons and ligaments are the examples of
    (a) areolar connective tissue
    (b) adipose tissue
    (c) dense regular connective tissue
    (d) loose connective tissue

155. In all connective tissues, except which of the following, the cells secrete fibres of collagen or elastin protein?
    (a) Bone
    (b) Cartilage
    (c) Areolar connective tissue
    (d) Fluid connective tissue

156. The fibres of which of the following muscles are fusiform and do not show striations
    (a) Skeletal muscles   (b) Cardiac muscles
    (c) Both (a) and (b)   (d) Smooth muscles

157. Intercalated discs are the communication junctions between the cells of
    (a) cardiac muscles
    (b) striped muscles
    (c) adipose tissue
    (d) nerve and striated muscles

158. Smooth muscles are_____.
    (a) voluntary, branched, uninucleate
    (b) voluntary, multinucleate, cylindrical
    (c) involuntary, cylindrical, multinucleate
    (d) involuntary, spindle shaped, uninucleated, tapering

159. Neuroglia are
   (a) excitable cells of neural tissue.
   (b) supporting and non-excitable cells of neural tissue.
   (c) two to three times in volume of neural tissue.
   (d) protective and excitable cells of neural tissue.

160. Which of the following statement(s) is/are correct regarding compound epithelium?
   (a) It is made of more than one layer of cells and thus has a limited role in secretion and absorption.
   (b) Their main function is to provide protection against chemical and mechanical stresses.
   (c) They cover the dry surface of the skin, moist surface of buccal cavity, pharynx, inner lining of ducts of salivary glands and pancreatic ducts.
   (d) All of the above

161. Which of the following statement(s) is/are correct about muscle tissue?
   (a) Each muscle is made of many long, cylindrical fibres arranged in parallel arrays.
   (b) Muscle fibres contract (shorten) in response to stimulation, then relax (lengthen) and return to their uncontracted state in a coordinated fashion.
   (c) Muscles play an active role in all movements of the body.
   (d) All of the above

162. Which of the following statement(s) regarding cell junctions is/are correct?
   (a) Tight junctions help to stop substances from leaking across a tissue.
   (b) Adhering junctions perform cementing to keep neighbouring cells together.
   (c) Gap junctions facilitate the cells to communicate with each other by connecting the cytoplasm of adjoining cells, for rapid transfer of ions, small molecules and sometimes big molecules.
   (d) All of the above

163. Read the following statements and answer the question.
   (i) It is made of a single thin layer of flattened cells with irregular boundaries.
   (ii) They are found in the walls of blood vessels and air sacs of lungs.
   (iii) They are involved in functions like forming a diffusion boundary.
   Which of the following characteristics of tissue is being described by the above statements?
   (a) Squamous epithelium
   (b) Columnar epithelium
   (c) Ciliated epithelium
   (d) Compound epithelium

164. Which of the following type of tissue is being described by the given statements?
   (i) They are named because of their special function of linking and supporting other tissues/organs of the body.
   (ii) They include cartilage, bone, adipose and blood.
   (iii) They provide strength, elasticity and flexibility to the tissue.
   (iv) They also secrete modified polysaccharides, which accumulate between cells and fibres and act as matrix.
   (a) Epithelial tissue   (b) Connective tissue
   (c) Muscle tissue   (d) Neural tissue

165. Which of the following statement (s) is/are correct?
   (i) Loose connective tissue contains fibroblasts, macrophages and mast cells.
   (ii) Adipose tissue is a type of dense connective tissue located mainly beneath the skin.
   (iii) Tendons and ligaments are examples of dense irregular connective tissue.
   (iv) Cartilage, bones and blood are various types of specialized connective tissue.
   (a) Only (i)   (b) Both (ii) and (iv)
   (c) Both (i) and (iii)   (d) (i), (iii) and (iv)

166. Read the following statements and answer the question.
   (i) They have a hard and non-pliable ground substance rich in calcium salts and collagen fibres.
   (ii) They support and protect softer tissues and organs.
   (iii) Osteocytes are present in the spaces called lacunae.
   (iv) They also interact with skeletal muscles attached to them to bring about movements.
   Which of the following type of tissue is being described by above statements ?
   (a) Cartilage   (b) Bone
   (c) Blood   (d) Neurons

167. Which of the following types of connective tissue is mismatched with its matrix?
   (a) Areolar – Loosely packed matrix of protein fibres
   (b) Bone – Mineralized matrix
   (c) Cartilage – Highly vascular matrix
   (d) Blood – Liquid matrix

168. Which of the following statement(s) is/are correct about nervous system of cockroach?
     (i) It consists of a series of fused segmentally arranged ganglia joined by paired longitudinal connectives on the ventral side.
     (ii) There are six ganglia lie in the thorax, and three in the abdomen.
     (iii) The sense organs are antennae, eyes, maxillary pulps, labial pulps and anal cerci etc.
     (iv) Each eye consists of about 5000 hexagonal ommatidia.
     (a) Both (i) and (iii)   (b) Only (ii)
     (c) Both (i) and (iv)   (d) All of these

169. Match the epithetial tissue given in column-I with its location given in column-II and choose the correct option.

	Column – I (Epithelial tissue)		Column – II (Location)
A.	Cuboidal	I.	Epidermis of skin
B.	Ciliated	II.	Inner lining of blood vessels
C.	Columnar	III.	Inner surface of gall bladder
D.	Squamous	IV.	Inner lining of fallopian tube
E.	Keratinized squamous	V.	Lining of pancreatic duct

     (a) A – V; B – IV; C – II; D – III; E – I
     (b) A – III; B – IV; C – V; D – II; E – I
     (c) A – V; B – IV; C – III; D – II; E – I
     (d) A – III; B – IV; C – V; D – I; E – II

170. Match column-I (type of epithelium) with column-II (Description) and choose the correct option.

	Column – I (Types of epithelium)		Column – II (Description)
A.	Squamous	I.	It is composed of a single - layer of cube – like cells
B.	Cuboidal epithelium	II.	Having cilia on their free surface
C.	Columnar	III.	It is composed of a single layer of tall and slender cells
D.	Ciliated epithelium	IV.	It is made up ofa single thin layer of flattened cells with irregular boundaries

     (a) A – IV; B – I; C – III; D – II
     (b) A – I; B – IV; C – III; D – II
     (c) A – IV; B – I; C – II; D – III
     (d) A – IV; B – III; C – I; D – II

171. Match the types of connective tissue given in column-I with their examples given column-II and choose the correct option.

|	Column – I (Types of connective)		Column – II (Examples)
A.	Loose connective tissue	I.	Tendons and ligaments
B.	Dense regular tissue	II.	Skin
C.	Dense irregular tissue	III.	Cartilage, bones, blood
D.	Specialized connective tissue	IV.	Fibroblasts, macrophages and mast cells

     (a) A – I; B – IV; C – II; D – III
     (b) A – I; B – IV; C – III; D – II
     (c) A – IV; B – I; C – II; D – III
     (d) A – IV; B – II; C – I; D – III

172. Match the terms given in column-I with their feature given in column-II and choose the correct option.

	Column – I (Terms)		Column – II (Features)
A.	Exocrine gland	I.	They help to stop substances from leaking across a tissue
B.	Endocrine gland	II.	Hormones are secreted directly into the fluid bathing the gland
C.	Tight junction	III.	They perform cementing to keep neighbouring cells together
D.	Adhering junction	IV.	Secretes mucus, saliva, earwax, oil, milk, digestive enzyme and other cell products

     (a) A – IV; B – II; C – I; D – III
     (b) A – II; B – IV; C – I; D – III
     (c) A – IV; B – II; C – III; D – I
     (d) A – IV; B – I; C – II; D – III

173. In the given diagram of areolar connective tissue, the different cells and parts have been marked by alphabets (A, B, C & D). Choose the answer in which these alphabets correctly match with the parts and cells they indicate.
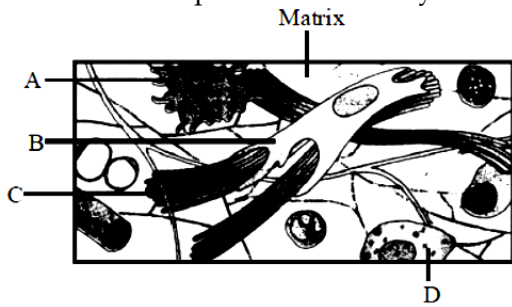
(a) A-Adipocyte, B-Collagen fibres, C-Microfilament, D-Mast cells
(b) A-Macrophage, B-Collagen fibres, C-Microfilament, D-Mast cells
(c) A-Macrophage, B-Collagen fibres, C-Microtubule, D-RBC
(d) A-Macrophage, B-Fibroblast, C-Collagen fibres, D-Mast cells
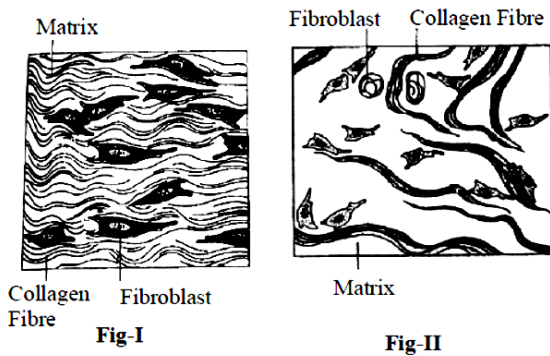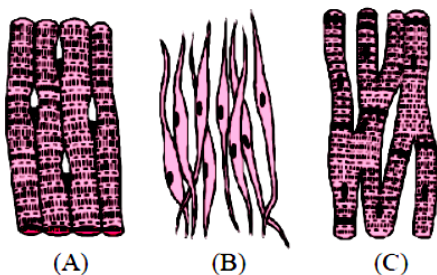
174. Identify figures – I and II.

	Figure – I	Figure – II
(a)	Dense regular connective tissue,	Dense irregular connective tissue
(b)	Loose irregular connective tissue,	Loose regular connective tissue
(c)	Adipose tissue,	Specilized connective tissue
(d)	Connective tissue proper	Areolar tissue

175. The following figures A, B and C are types of muscle tissue. Identify A, B and C.

(a) A – Smooth muscle, B – Cardiac muscle, C – Skeletal muscle

(b) A – Skeletal muscle, B – Smooth muscle, C – Cardiac muscle
(c) A – Cardiac muscle, B – Smooth muscle, C – Skeletal muscle
(d) A – Smooth muscle, B –Skeletal muscle , C – Cardiac muscle

176. In which of the following tissues, the cells are compactly packed with little intercellular matrix?
(a) Nervous tissue   (b) Connective tissue
(c) Muscular tissue   (d) Epithelial tissue

177. Which of the following lacks duct?
(a) Salivary gland   (b) Pituitary gland
(c)Sweat gland   (d) Gastric gland

178. Refer the given figure and identify the correct characteristic feature.
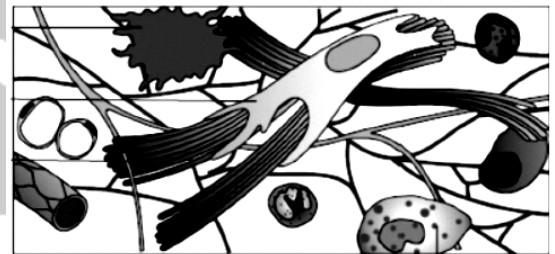
(i) It is a type of loose connective tissue.
(ii) It contains fibroblast, macrophages, collagen fibres and mast cells.
(iii) The cells of this tissue are specialized to store fats.
(iv) The wall of internal organs such as the blood vessels, stomach and intestine contains this type of tissue.
(a) (i) & (ii)   (b) (i) & (iii)
(c) (ii) & (iii)   (d) (iii) & (iv)

179. What are the three basic components of connective tissues?
(a) Ground substance, cells and basement membrane
(b) Cartilage, intercellular matrix and serum
(c) Cells, protein fibers and ground substance
(d) Collagen, elastin and reticular fibers

180. Which of the following vertebrate tissues would be an excellent source of collagen?
(a) Liver   (b) Nerve
(c) Muscle   (d) Tendon

181. A student was given a sample of two tissues. He observes the tissues under the microscope and draws their figures (1 and 2) as shown below.
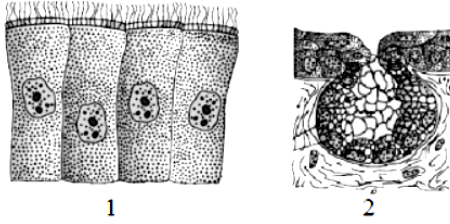
Identify the tissues (1 and 2).
(a) 1: Columnar cells bearing cilia; 2: Unicellular glandular epithelium
(b) 1: Cuboidal cells bearing cilia; 2: Multicellular glandular epithelium
(c) 1: Compound cells bearing cilia; 2: Unicellular glandular epithelium
(d) 1: Columnar cells bearing cilia; 2: Multicellular glandular epithelium

182. The secretions of endocrine glands are released directly
(a) into the skin surface
(b) into the blood stream
(c) into a gland duct
(d) into the brain tissue

183. Which of the following is involved in the production of new blood cells ?
(a) Adipose cell   (b) Bone marrow
(c) Liver   (d) Matrix

184. Nervous tissue cells that play several supporting roles but do not transmit impulses are called
(a) glial cells   (b) dendrites
(c) nerve cells   (d) neurons

185. A student was given a sample of tissue. He observes and concludes the following characters.
(i) The cells are composed of a single layer of tall and slender cells.
(ii) Their nuclei are located at the base.
(iii) Free surface may have microvilli.
(iv) It is found in the lining of stomach and intestine
(v) They help in secretion and absorption.
Based on the above features identify the epithelium.
(a) Cuboidal epithelium
(b) Columnar Epithelium
(c) Squamous epithelium
(d) Glandular epithelium

SECTION - B

186. Muscle tissue cells are contractile, which means they
(a) are responsible for the production and secretion of enzymes.
(b) are specialized in contraction and relaxation.
(c) help in the movement of involuntary organs only.
(d) all of the above

187. The supportive skeletal structures in the human external ears and in the nose tip are examples of
(a) ligament   (b) areolar tissue
(c) bone   (d) cartilage

188. Which one of the following pairs of structures distinguishe a nerve cell from other types of cell ?
(a) Vacuoles and Fibres
(b) Flagellum and Medullary sheath
(c) Nucleus and Mitochondria
(d) Cell body and Dendrites

189. Which of the following statement is incorrect regarding cuboidal epithelium?
(a) It is an epithelial tissue.
(b) It is composed of a single layer of cube-like cells.
(c) They are found in the walls of blood vessels and air sacs of lungs.
(d) Secretion and absorption are the main functions of these tissue.

190. Which of the following statements is not correct regarding neural tissue?
(a) It exerts the greatest control over the body's responsiveness to changing conditions.
(b) Chondrocytes, the unit of neural system are excitable cells.
(c) Neuroglial cells protect and support neurons.
(d) When a neuron is suitably stimulated, an electrical disturbance is generated.

191. Which of the following type of muscle tissue is being described on the basis of given statements ?
(i) These muscle fibres taper at both ends and do not show striations.
(ii) The wall of internal organs such as the blood vessels, stomach and intestine contain this type of muscle tissue.
(iii) They are 'involuntary' as their function cannot be directly controlled.
(a) Skeletal muscle   (b) Smooth muscle
(c) Cardiac muscle   (d) All of these

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192. Find the incorrectly matched pair.
     (a) Unicellular glandular cells - Goblet cell
     (b) Saliva   -   Exocrine secretion
     (c) Fusiform fibres -   Smooth muscle
     (d) Cartilage   -   Areolar tissue

193. The intercellular material of the given figure is solid and resists compression. Identify the figure and the label marked as A & B.
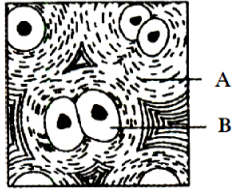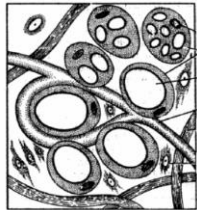

	Fig.	A	B
(a)	Cartilage	Collagen	Chondrocyte
(b)	Cartilage	Collagen	Chondroclast
(c)	Bone	Microtubule	Chondroclast
(d)	Bone	Collagen fibres	Osteoblast

194. Identify the figure with its correct function

     (a) Areolar connective tissue – Serves as a support framework for epithelium.
     (b) Adipose tissue – Store fats and act as heat insulators.
     (c) Dense regular tissue – Provide flexibility.
     (d) Dense irregular tissue – Provide strength and elasticity.

195. Cartilage tissues are likely to be slow in healing following an injury because
     (a) cartilage cells cannot reproduce.
     (b) they lack direct blood supplies.
     (c) the intercellular material is missing.
     (d) cartilage cells are surrounded by fluids.

196. The major functions of loose connective tissue include
     (a) occupying spaces between organs and supporting epithelia.
     (b) supporting and surrounding blood vessels and nerves
     (c) cushioning organs, storing lipids and facilitating diffusion.
     (d) All of the above

197. Non-ciliated simple columnar epithelium often contains _____, which increase the surface area for secretion and absorption.
     (a) flagella   (b) collagen fibres
     (c) microvilli   (d) all of these

198. Antibodies are secreted by.
     (a) Mast cell   (b) Fibroblast
     (c) Macrophages   (d) Plasma cells

199. Ligament is:
     (a) Modified white fibrous tissue
     (b) Modified yellow elastic fibrous tissue
     (c) Inelastic fibrous tissue
     (d) Modified irregular dense connective tissue

200. The functional unit of contractile system in striated muscle is:
     (a) Z – band   (b) Sarcomere
     (c) Cross – bridges (d) Myofibril

TEST ASSESMENT AND ANALYSIS SHEET

Name…………..…….….…………….Test topic - ….….…..……….……….…….……..Date ………………

Physics	Marks per question	Total Ques.	Attempted	Unattempted	Correct	Incorrect	Net score
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Chemistry	Marks per question	Total Ques.	Attempted	Unattempted	Correct	Incorrect	Net score
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Biology	Marks per question	Total Ques.	Attempted	Unattempted	Correct	Incorrect	Net score
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Total net score							