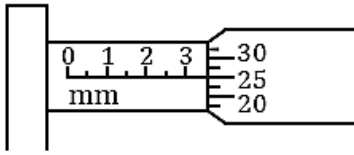
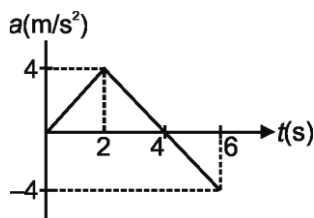


8. The number of circular division on screw gauge is 100. It moves 1 mm on main scale for one complete revolution. Find reading of micrometer.



- (1) 3.25 mm (2) 3.24 mm
 (3) 3.30 mm (4) 3.41 mm
9. A person travels along a straight road for the first $t/3$ time with a speed v_1 and for next $2t/3$ time with speed v_2 . Then the mean speed v is given by
- (1) $v = \frac{v_1 + 2v_2}{3}$ (2) $\frac{1}{v} = \frac{1}{3v_1} + \frac{2}{3v_2}$
 (3) $v = \frac{1}{3} \sqrt{2v_1 v_2}$ (4) $v = \sqrt{\frac{3v_2}{2v_1}}$
10. A train starts from rest from a station with acceleration 0.2 m/s^2 on a straight track and then comes to rest after attaining maximum speed on another station due to retardation 0.4 m/s^2 . If total time spent is half an hour, then distance between two stations is [Neglect length of train]
- (1) 216 km (2) 512 km
 (3) 728 km (4) 1296 km
11. A balloon starts rising from ground from rest with an upward acceleration 2 m/s^2 . Just after 1 s, a stone is dropped from it. The time taken by stone to strike the ground is nearly
- (1) 0.3 s (2) 0.7 s
 (3) 1 s (4) 1.4 s
12. For the acceleration-time ($a-t$) graph shown in figure, the change in velocity of particle from $t = 0$ to $t = 6 \text{ s}$ is

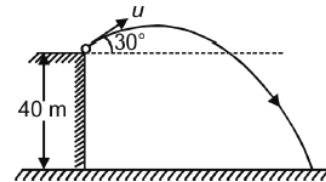


- (1) 10 m/s
 (2) 4 m/s
 (3) 12 m/s
 (4) 8 m/s

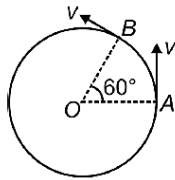
13. The position of a particle moving along the y-axis is given as $y = 3t - t^2$, where y is in metre and t is in second. The time when the particle attains maximum position in positive y direction will be

- (1) 1.5 s (2) 4 s
 (3) 2 s (4) 3 s

14. Figure shows a projectile thrown with speed $u = 20 \text{ m/s}$ at an angle 30° with horizontal from the top of a building 40 m high. Then the horizontal range of projectile is

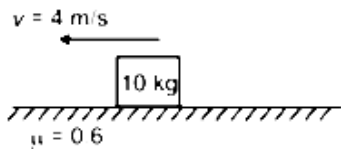


- (1) $20\sqrt{3} \text{ m}$ (2) $40\sqrt{3} \text{ m}$
 (3) 40 m (4) 20 m
15. The velocity at the maximum height of a projectile is $\frac{\sqrt{3}}{2}$ times its initial velocity of projection (u). Its range on the horizontal plane is
- (1) $\frac{\sqrt{3}u^2}{2g}$ (2) $\frac{3u^2}{2g}$
 (3) $\frac{3u^2}{g}$ (4) $\frac{u^2}{2g}$
16. A shell is fired vertically upwards with a velocity v_1 from a trolley moving horizontally with velocity v_2 . A person on the ground observes the motion of the shell as a parabola, whose horizontal range is
- (1) $\frac{2v_1^2 v_2}{g}$ (2) $\frac{2v_1^2}{g}$
 (3) $\frac{2v_2^2}{g}$ (4) $\frac{2v_1 v_2}{g}$
17. Two paper screens A and B are separated by distance 100 m. A bullet penetrates A and B, at points P and Q respectively, where Q is 10 cm below P. If bullet is travelling horizontally at the time of hitting A, the velocity of bullet at A is nearly
- (1) 100 m/s (2) 200 m/s
 (3) 600 m/s (4) 700 m/s
18. A particle is moving in a circle of radius r having centre at O, with a constant speed v . The magnitude of change in velocity in moving from A to B is



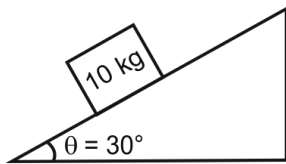
- (1) $2v$ (2) 0
 (3) $\sqrt{3}v$ (4) v

19. A block of mass 10 kg is moving on a rough surface as shown in figure. The frictional force acting on block is (Take $g = 10 \text{ m/s}^2$)



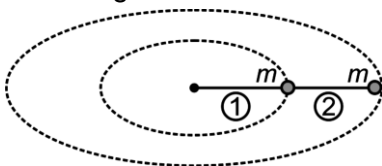
- (1) 20 N (2) 60 N
 (3) 40 N (4) 80 N

20. A block of mass 10 kg is kept at rest on a fixed rough ($\mu = 0.8$) inclined plane of angle of inclination 30° . The frictional force acting on the block is ($g = 10 \text{ m/s}^2$)



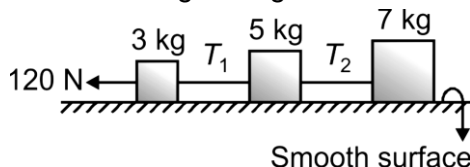
- (1) 50 N (2) $50\sqrt{3}$ N
 (3) 52 N (4) 54 N

21. Two particles each of mass m are moving in horizontal circle with same angular speed. If both string are of same length then the ratio of tension in string T_1/T_2 is



- (1) $3/2$ (2) 3
 (3) 2 (4) $1/3$

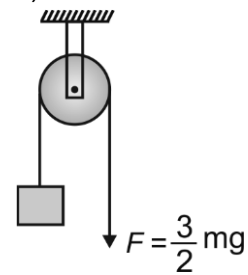
22. T_1 and T_2 in the given figure are



- (1) 28 N, 48 N
 (2) 48 N, 28 N
 (3) 96 N, 56 N
 (4) 56 N, 96 N

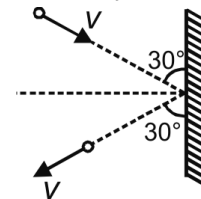
23. In the arrangement shown, the mass m will ascend with an acceleration (Pulley and rope

are massless)



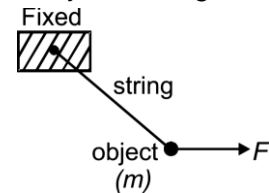
- (1) zero (2) $g/2$
 (3) g (4) $2g$

24. A particle of mass m strikes a wall with speed v at an angle 30° with the wall elastically as shown in the figure. The magnitude of impulse imparted to the ball by the wall is



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

25. In the following figure, the object of mass m is held at rest by a horizontal force as shown. The force exerted by the string on the block is



- (1) F (2) mg
 (3) $F + mg$ (4) $\sqrt{F^2 + m^2g^2}$

26. The relation $t = \sqrt{x} + 3$ describes the position of a particle where x is in meters and t is in seconds. The acceleration of particle is

- (1) 2 m/s^2 (2) 4 m/s^2
 (3) 5 m/s^2 (4) zero

27. Equation of a particle moving along the x axis is $x = u(t - 2) + a(t - 2)^2$

- (1) the initial velocity of the particle is u
 (2) the acceleration of the particle is a
 (3) the acceleration of the particle is $2a$
 (4) at $t = 2$ particle is not at origin

28. A particle is moving with a velocity of 10 m/s towards east. After 20 s its velocity changes to 10 m/s towards north. Its average acceleration is

- (1) zero
 (2) $\sqrt{2} \text{ m/s}^2$ towards N-W
 (3) $1/\sqrt{2} \text{ m/s}^2$ towards N-E
 (4) $1/\sqrt{2} \text{ m/s}^2$ towards N-W

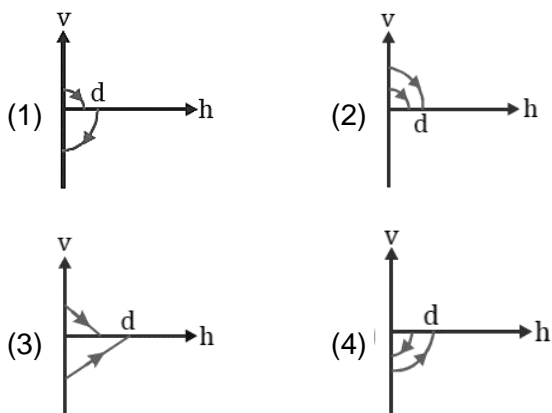
29. A bullet moving with a velocity of 200 cm/s penetrates a wooden block and comes to rest after traversing 4 cm inside it. What velocity is needed for travelling distance of 9 cm in same block

- (1) 100 cm/s (2) 136.2 cm/s
(3) 300 cm/s (4) 250 cm/s

30. Drops of water fall from the roof of a building 27m high at regular intervals of time. When the first drop reaches the ground, at the same instant fourth drop begins to fall. What are the distances of the second and third drops from the roof?

- (1) 6 m and 12 m (2) 6 m and 3 m
(3) 12 m and 3 m (4) 8 m and 2 m

31. A ball is dropped vertically from a height d above the ground. It hits the ground and bounces up vertically to a height $d/2$. Neglecting subsequent motion and air resistance, The graph according to which its velocity V varies with the height h above the ground is



32. The equation of a projectile is $y = 4x - \frac{x^2}{4}$. The horizontal range is

- (1) 16 m (2) 8 m
(3) 64 m (4) 12.8 m

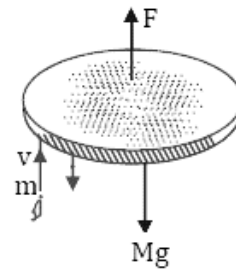
33. From the top of a tower 78.4 m high, a ball is thrown horizontally. If the line joining the point of projection to the point where it hits the ground makes an angle of 45° with the horizontal, then the initial velocity of the ball is:

- (1) 9.8 m/s (2) 4.9 m/s
(3) 19.6 m/s (4) 2.8 m/s

34. Two cars are moving in the same direction with the same speed of 60 km/h. They are separated by 10 km. What is the speed of a car moving in the opposite direction if it meets the two cars at an interval of 5 minute?

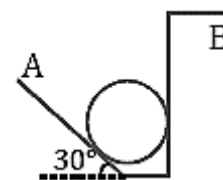
- (1) 45 km/h (2) 60 km/h
(3) 105 km/h (4) None

35. A disc of mass 2 kg is kept floating horizontally in air by firing bullets of mass 0.1 kg each vertically at it, at the rate of 5 per second. If the bullets rebound with the same speed, the speed with which these are fired will be



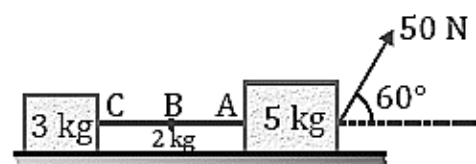
- (1) 1.96 m/s (2) 0.98 m/s
(3) 9.8 m/s (4) 19.6 m/s

36. The 50 kg homogenous smooth sphere rests on the 30° incline A and bears against the smooth vertical wall B. The contact forces at A and B are



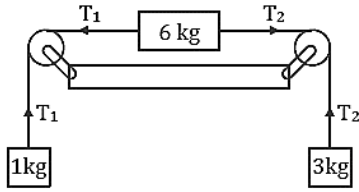
- (1) $N_A = \frac{1000}{\sqrt{3}} \text{ N}, N_B = \frac{500}{\sqrt{3}} \text{ N}$
(2) $N_A = \frac{1000}{\sqrt{3}} \text{ N}, N_B = \frac{1000}{\sqrt{3}} \text{ N}$
(3) $N_A = \frac{500}{\sqrt{3}} \text{ N}, N_B = \frac{500}{\sqrt{3}} \text{ N}$
(4) $N_A = \frac{500}{\sqrt{3}} \text{ N}, N_B = \frac{400}{\sqrt{3}} \text{ N}$

37. Two blocks of masses 5 kg and 3 kg connected by a rope of mass 2 kg are resting on a frictionless floor as shown in the following figure. If a constant force of 50 N is applied to 5 kg block, then the tension in the rope at points A, B and C are respectively given by



- (1) 7.5 N, 10 N, 12.5 N (2) 12.5 N, 10 N, 7.5 N
 (3) 20 N, 20 N, 20 N (4) 50 N, 50 N, 50 N

38. Three masses of 1 kg, 6 kg and 3 kg are connected to each other with threads and are placed on a table as shown in figure. The ratio T_1/T_2 is (Take $g = 10 \text{ m/s}^2$)

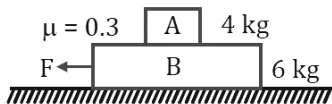


- (1) 1 : 1 (2) 2 : 1
 (3) 1 : 2 (4) 3 : 1

39. A given object takes n times as much time to slide down a 45° rough incline as it takes to slide down a perfectly smooth 45° incline. The coefficient of kinetic friction between the object and the incline is given by

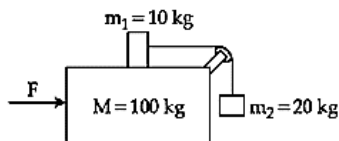
- (1) $\left(1 - \frac{1}{n^2}\right)$ (2) $\left(\frac{1}{1-n^2}\right)$
 (3) $\sqrt{\left(1 - \frac{1}{n^2}\right)}$ (4) $\sqrt{\left(\frac{1}{1-n^2}\right)}$

40. Two blocks (A) 4 kg and (B) 6 kg rest one over the other on a smooth horizontal plane. The coefficient of static and dynamic friction between (A) and (B) is the same and equal to 0.3. The maximum horizontal force F that can be applied to (B) in order that both (A) and (B) do not have any relative motion is



- (1) 30 N (2) 30 kgf
 (3) 12 kgf (4) 12 N

41. Three masses $M = 100 \text{ kg}$, $m_1 = 10 \text{ kg}$ and $m_2 = 20 \text{ kg}$ are arranged in a system as shown in figure. All the surface are frictionless and strings are inextensible and weightless. The pulleys are also weightless and frictionless. A force F is applied on the system so that the mass m_2 moves upward with an acceleration of 2 ms^{-2} . The value of F is (Take $g = 10 \text{ ms}^{-2}$)

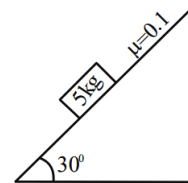


- (1) 3360 N (2) 3380 N
 (3) 3120 N (4) 3240 N

42. A ball is thrown upward with an initial velocity V_0 from the surface of the earth. The motion of the ball is affected by a drag force equal to $m\gamma v^2$ (where m is mass of the ball, v is its instantaneous velocity and γ is a constant). Time taken by the ball to rise to its zenith is

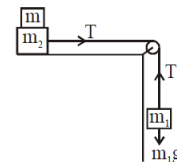
- (1) $\frac{1}{\sqrt{\gamma g}} \tan^{-1} \left(\sqrt{\frac{\gamma}{g}} V_0 \right)$ (2) $\frac{1}{\sqrt{2\gamma g}} \tan^{-1} \left(\sqrt{\frac{2\gamma}{g}} V_0 \right)$
 (3) $\frac{1}{\sqrt{\gamma g}} \sin^{-1} \left(\sqrt{\frac{\gamma}{g}} V_0 \right)$ (4) $\frac{1}{\sqrt{\gamma g}} \ln \left(1 + \sqrt{\frac{\gamma}{g}} V_0 \right)$

43. A block of mass 5 kg is placed on a rough inclined surface as shown in the figure. If \vec{F}_1 is the force required to just move the block up the inclined plane and \vec{F}_2 is the force required to just prevent the block from sliding down, then the value of $|\vec{F}_1| - |\vec{F}_2|$ is [Use $g = 10 \text{ m/s}^2$]



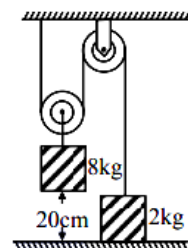
- (1) $5\sqrt{3} \text{ N}$ (2) 10 N
 (3) $25\sqrt{3} \text{ N}$ (4) $\frac{5\sqrt{3}}{2} \text{ N}$

44. Two masses $m_1 = 5 \text{ kg}$ and $m_2 = 10 \text{ kg}$ connected by an inextensible string over a frictionless pulley, are moving as shown in the figure. The coefficient of friction of horizontal surface is 0.15. The minimum weight m that should be put on top of m_2 to stop the motion is



- (1) 18.3 kg (2) 23.3 kg
 (3) 43.3 kg (4) 10.3 kg

45. The boxes of masses 2 kg and 8 kg are connected by a massless string passing over smooth pulleys. Calculate the time taken by box of mass 8 kg to strike the ground starting from rest. (use $g = 10 \text{ m/s}^2$)



- (1) 0.25 s (2) 0.34 s
 (3) 0.2 s (4) 0.4 s

CHEMISTRY

46. 12 g carbon combines with 64 g Sulphur to form CS_2 . 12 g carbon also combines with 32 g oxygen to form CO_2 . 10 g Sulphur combines with 10 g oxygen to form SO_2 . These data illustrate the
- (1) Law of multiple proportions
 - (2) Law of definite proportions
 - (3) Law of reciprocal proportions
 - (4) Law of gaseous volumes
47. There are two common oxides of Sulphur, one of which contains 50% O_2 by weight, the other almost exactly 60%. The weights of Sulphur which combine with 1 g of O_2 (fixed) are in the ratio of
- (1) 1 : 1
 - (2) 2 : 1
 - (3) 2 : 3
 - (4) 3 : 2
48. The number of oxygen atoms in 4.4 g of CO_2 is approx.
- (1) 1.2×10^{23}
 - (2) 6×10^{23}
 - (3) 6×10^{23}
 - (4) 12×10^{23}
49. The total number of protons in 10 g of calcium carbonate is ($N_0 = 6.023 \times 10^{23}$)
- (1) 1.5057×10^{24}
 - (2) 2.0478×10^{24}
 - (3) 3.0115×10^{24}
 - (4) 4.0956×10^{24}
50. The largest number of molecules is in
- (1) 34 g of water
 - (2) 28 g of CO_2
 - (3) 46 g of CH_3OH
 - (4) 54 g of N_2O_3
51. At S.T.P. the density of CCl_4 vapour in g/L will be nearest to
- (1) 6.84
 - (2) 3.42
 - (3) 10.26
 - (4) 4.57
52. If two compounds have the same empirical formula but different molecular formula, they must have
- (1) Different percentage composition
 - (2) Different molecular weights
 - (3) Same viscosity
 - (4) Same vapour density
53. The empirical formula of an acid is CH_2O_2 , the probable molecular formula of acid may be
- (1) CH_2O
 - (2) CH_2O_2
 - (3) $\text{C}_2\text{H}_4\text{O}_2$
 - (4) $\text{C}_3\text{H}_6\text{O}_4$
54. A given sample of pure compound contains 9.81 gm of Zn, 1.8×10^{23} atoms of chromium, and 0.60 mol of oxygen atoms. what is the simplest formula
- (1) ZnCr_2O_7
 - (2) ZnCr_2O_4
 - (3) ZnCrO_4
 - (4) ZnCrO_6
55. The chloride of a metal contains 71% chlorine by weight and the vapour density of it is 50. The atomic mass of the metal will be (valency of metal is 2)
- (1) 29
 - (2) 58
 - (3) 35.5
 - (4) 71
56. The average molecular mass of a mixture of gas containing nitrogen and carbon dioxide is 36. The mixture contain 280 gm of nitrogen, therefore, the amount of CO_2 present in the mixture is
- (1) 440 gm
 - (2) 44 gm
 - (3) 0.1 mole
 - (4) 880 gm
57. 20 moles of A and 14 moles of B are mixed and allowed to react according to the equation:
- $$\text{A} + 2\text{B} \rightarrow 3\text{C}$$
- What is the maximum number of moles of C which could be prepared?
- (1) 14
 - (2) 21
 - (3) 13
 - (4) 7
58. A metal oxide has the formula Z_2O_3 . It can be reduced by hydrogen to give free metal and water. 0.1596 g of the metal oxide requires 6 mg of hydrogen for complete reduction. The atomic weight of the metal is
- (1) 27.9
 - (2) 159.6
 - (3) 79.8
 - (4) 55.8
59. A hydrated salt of Na_2SO_3 loses 22.22 % of its mass on strong heating. The hydrated salt is
- (1) $\text{Na}_2\text{SO}_3 \cdot 4\text{H}_2\text{O}$
 - (2) $\text{Na}_2\text{SO}_3 \cdot 6\text{H}_2\text{O}$
 - (3) $\text{Na}_2\text{SO}_3 \cdot \text{H}_2\text{O}$
 - (4) $\text{Na}_2\text{SO}_3 \cdot 2\text{H}_2\text{O}$
60. 2.4g of pure Mg (at. mass = 24) is dropped in 100 mL of 1M HCl. Which of the following statement is wrong?
- (1) 1.12 L of hydrogen is produced at S.T.P.
 - (2) 0.01 mol of magnesium is left behind
 - (3) HCl is the limiting reagent
 - (4) None of these
61. It is found that V forms a double salt isomorphous with Mohr's salt. The oxidation number of V in this compound is
- (1) +3
 - (2) +2
 - (3) +4
 - (4) -4

62. Oxidation number of carbon in carbon suboxide is
 (1) +2/3 (2) +4/3
 (3) +4 (4) -4/3
63. The value of 'n' in the reaction
 $\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + n\text{Fe}^{2+} \rightarrow 2\text{Cr}^{3+} + n\text{Fe}^{3+} + 7\text{H}_2\text{O}$ will be
 (1) 2 (2) 3
 (3) 6 (4) 7
64. Respiration is
 (1) Oxidation (2) Reduction
 (3) Both (1) and (2) (4) None of these
65. Manganese acts as strongest oxidising agent in the oxidation state
 (1) +7 (2) +2
 (3) +4 (4) +5
66. Which change requires a reducing agent?
 (1) $\text{CrO}_4^{2-} \rightarrow \text{CrO}_7^{2-}$
 (2) $\text{BrO}_3^- \rightarrow \text{BrO}^-$
 (3) $\text{H}_2\text{O}_2 \rightarrow \text{O}_2$
 (4) $\text{Al}(\text{OH})_3 \rightarrow \text{Al}(\text{OH})_4^-$
67. Which of the following is not a redox reaction?
 (1) $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$
 (2) $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
 (3) $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$
 (4) $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$
68. A compound contains atoms X, Y, Z. The oxidation number of X is +2, Y is +5 and Z is -2. The possible formula of the compound is :
 (1) XY_1Z_2 (2) $\text{Y}_2(\text{XZ}_3)_2$
 (3) $\text{X}_3(\text{YZ}_4)_2$ (4) $\text{X}_3(\text{Y}_4\text{Z})_2$
69. 25 mL of 0.50 M H_2O_2 solution is added to 50 mL of 0.20 M KMnO_4 in acidic solution. Which of the following statements is true?
 (1) 0.010 mole of oxygen is liberated
 (2) 0.005 mole of KMnO_4 are left
 (3) 0.030 g atom of oxygen gas is evolved
 (4) 0.0025 mole H_2O_2 does not react with KMnO_4
70. M is the molecular weight of KMnO_4 . The equivalent weight of KMnO_4 when it is converted into K_2MnO_4 is
 (1) M (2) M/3
 (3) M/5 (4) M/7
71. The violent reaction between sodium and water is an example of
 (1) Reduction
 (2) Oxidation
 (3) Redox reaction
 (4) Neutralization reaction
72. Which substance serves as a reducing agent in the following reaction,
 $14\text{H}^+ + \text{Cr}_2\text{O}_7^{2-} + 3\text{Ni} \rightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O} + 3\text{Ni}^{2+}$?
 (1) H_2O (2) Ni
 (3) H^+ (4) $\text{Cr}_2\text{O}_7^{2-}$
73. CrO_5 reacts with H_2SO_4 to give $\text{Cr}_2(\text{SO}_4)_3$, H_2O and O_2 . Moles of O_2 liberated by 1 mole of CrO_5 in this reaction are
 (1) 2.5 (2) 1.25
 (3) 4.5 (4) 1.75
74. In the conversion of $\text{K}_2\text{Cr}_2\text{O}_7$ to K_2CrO_4 the oxidation number of chromium
 (1) Increases (2) Remains same
 (3) Decreases (4) None of these
75. In the following reaction,
 $4\text{P} + 3\text{KOH} + 3\text{H}_2\text{O} \rightarrow 3\text{KH}_2\text{PO}_2 + \text{PH}_3$
 (1) P is only oxidized
 (2) P is only reduced
 (3) P is both oxidized as well as reduced
 (4) None of the above
76. An electron has principal quantum number 3. The number of its (i) subshells and (ii) orbitals would be respective
 (1) 3 and 5 (2) 3 and 7
 (3) 3 and 9 (4) 2 and 5
77. If the wavelength of an electromagnetic radiation is 2000 Å, what is its energy in ergs?
 (1) 9.94×10^{-12} (2) 9.94×10^{-19}
 (3) 4.97×10^{-12} (4) 4.97×10^{-19}
78. What accelerating potential is needed to produce an electron beam with an effective wavelength of 0.090 Å?
 (1) 1.86×10^4 eV (2) 1.86×10^2 eV
 (3) 2.86×10^4 eV (4) 2.86×10^2 eV
79. If $n = 6$, the correct sequence for filling of electrons will be:
 (1) $ns \rightarrow np \rightarrow (n-1)d \rightarrow (n-2)f$
 (2) $ns \rightarrow (n-2)f \rightarrow (n-1)d \rightarrow np$
 (3) $ns \rightarrow (n-1)d \rightarrow (n-2)f \rightarrow np$
 (4) $ns \rightarrow (n-2)f \rightarrow np \rightarrow (n-1)d$
80. Oxygen consists of O^{16} , O^{17} and O^{18} isotopes and carbon consists of isotopes of C^{12} and C^{13} . Total number of CO_2 molecules possible are:
 (1) 6 (2) 12
 (3) 18 (4) 1

81. Which is the correct outermost shell configuration of chromium?
- (1)

↑	↑	↑	↑	
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↑

- (2)

↑↓	↑↓	↑↓		
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- (3)

↑↓	↑↓	↓		
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↑

- (4)

↑	↑	↑	↑	↑
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↑

82. Which of the following ion will show colour in aqueous solution?
- (1) La^{3+} ($Z = 57$) (2) Ti^{3+} ($Z = 22$)
- (3) Lu^{3+} ($Z = 71$) (4) Sc^{3+} ($Z = 21$)
83. The number of moles of KMnO_4 required FOR complete oxidation of 2 moles of ferrous oxalate in acidic medium is
- (1) 0.6 (2) 0.3
- (3) 0.8 (4) 1.2
84. The energy required to break one mole of $\text{Cl} - \text{Cl}$ bonds in Cl_2 is 242 kJ mol^{-1} . The longest wavelength of light capable of breaking a single $\text{Cl} - \text{Cl}$ bond is
- (1) 594 nm (2) 640 nm
- (3) 700 nm (4) 494 nm
85. The maximum number of electrons possible in a sublevel is equal to:
- (1) $2l + 1$ (2) $2n^2$
- (3) $2l^2$ (4) $4l + 2$
86. The atomic numbers of elements X, Y and Z are 19, 21 and 25 respectively. The number of electrons present in the M-shell of these elements follow the order
- (1) $Z > X > Y$ (2) $X > Y > Z$
- (3) $Z > Y > X$ (4) $Y > Z > X$
87. Consider the ground state of ($Z = 24$). The numbers of electrons with the azimuthal quantum numbers, $l = 1$ and 2 are respectively
- (1) 12 and 4 (2) 12 and 5
- (3) 16 and 4 (4) 16 and 5
88. An isotone of ${}^{76}_{32}\text{Ge}$ is
- (1) ${}^{77}_{32}\text{Ge}$ (2) ${}^{77}_{33}\text{As}$
- (3) ${}^{77}_{34}\text{Se}$ (4) ${}^{78}_{36}\text{Sc}$
89. Which one of the following groupings represents a collection of isoelectronic species? (At. no. Cs = 55, Br = 35)
- (1) Na, Ca^{2+} , Mg^{2+} (2) N^3 , F, Na
- (3) Be, Al^{3+} , Cl (4) Ca^{2+} , Cs, Br
90. The maximum number of spectral line and observed in transition $6 \rightarrow 1$ in one hydrogen atom is
- (1) 5 (2) 6
- (3) 15 (4) 10

BOTANY

91. Select the wrong statement:
- (1) *Fucus* and *Ficus* species show oogamy
- (2) Isogamy occurs between the non-motile gametes in *spirogyra*
- (3) Anisogamy is exhibited in *Eudorina*
- (4) Antheridiophore and archegoniophore are present on same thallus in *Marchantia*
92. Read the following statement (A-D) and answer the question which follows them
- A. Both *Cycas* and *Pinus* are heterosporous seed bearing embryophyte.
- B. Ferns gametophytes are free living.
- C. 70 species of *Porphyra*, *Laminaria* and *Sargassum* are used as food.
- D. *Ginkgo* is the seed-bearing plantae with dwarf shoot and long shoot
- How many of the above statements are **correct**?
- (1) Four (2) Three
- (3) One (4) Two
93. Which of the following are most abundant in nature?
- (1) Chemosynthetic bacteria
- (2) Heterotrophic bacteria
- (3) Photosynthetic bacteria
- (4) Cyanobacteria
94. *Spirogyra*, *Dictyota* and *Sargassum* are similar in having
- (1) Laminarin and mannitol as reserve food
- (2) Unicelled and cellulosic cell wall
- (3) Archegonia and antheridia
- (4) Multicelled and jacketed sex organs

95. Match the name of the plant (Column I), with one characteristic (Column II) and division taxon (Column III) to which it belongs. Choose the correct match.

	Column I	Column II	Column III
(1)	<i>Cycas</i>	Long & Dwarf Shoot	Plant Kingdom
(2)	<i>Ginkgo</i>	Presence of Xylem and Phloem	Gymnospermae
(3)	<i>Equisetum</i>	Presence of Strobili	Sphenopsida
(4)	<i>Selaginella</i>	Microphylls	Pteridophyta

96. Match List-I with List-II

	List-I		List-II
A.	Puffballs	I.	Mushroom
B.	<i>Agaricus</i>	II.	Club fungus
C.	Yeast	III.	<i>Saccharomyces</i>
d.	<i>Mucor</i>	IV.	Phycomycetes

Choose the correct answer (options) given below

- (1) A (II) B (I) C (III) D (IV)
 (2) A (I) B (II) C (III) D (IV)
 (3) A (IV) B (II) C (III) D (I)
 (4) A (III) B (IV) C (I) D (II)
97. Besides paddy fields, Cyanobacteria are also present inside the root of
- (1) Branched stem bearing naked seed plant
 (2) Pinnate leaves bearing gymnosperm
 (3) Redwood tree *Sequoia*
 (4) Conifers
98. Viruses could be crystallised, was shown by
- (1) D. J. Ivanowsky (2) M. W. Beijerinck
 (3) W. M. Stanley (4) T. O. Diener
99. Fruiting body of *Claviceps* is called
- (1) Conidium (2) Basidiocarp
 (3) Ascocarp (4) Sporangium
100. Dinoflagellates are
- (1) Toxic to aquatic animals
 (2) Multinucleated and lack cell wall
 (3) Marine and Chemosynthetic
 (4) Colourful and lack motility

101. A protein rich layer called pellicle instead of cell wall is found in

- (1) *E. coli* (2) *Gonyaulax*
 (3) *Euglena* (4) Diatom

102. Slime moulds

- (1) Are multicellular prokaryotes
 (2) Form fruiting body under favourable conditions
 (3) Are called prokaryotic fungi
 (4) Produce spores resistant to extreme conditions

103. Which one is **incorrect** w.r.t lichen?

- (1) Lichens are symbiotic association between algae and fungi
 (2) Algal component is known as phycobiont
 (3) Algae prepare food and fungi in return provide shelter, absorb mineral nutrients and water for its partner
 (4) Lichens are very good pollution indicators as they grow well in polluted areas

104. The **correct** sequence in the sexual life cycle of a fungus is

- (1) Meiosis → Plasmogamy → Karyogamy
 (2) Karyogamy → Plasmogamy → Meiosis
 (3) Plasmogamy → Karyogamy → Meiosis
 (4) Karyogamy → Meiosis → Plasmogamy

105. Which group includes golden algae?

- (1) Chrysophytes
 (2) Dinoflagellates
 (3) Protozoan
 (4) Slime moulds

106. Plant families like Convolvulaceae and Solanaceae are included in the order Polymoniales mainly based on

- (1) Habitat and distribution
 (2) Floral characters
 (3) Vegetative characters
 (4) Both (2) and (3)

107. In *Agaricus*, karyogamy and meiosis take place in

- (1) Hyphae of different genotype
 (2) Basidium
 (3) Basidiocarp
 (4) Hyphae of different strains

- 108.** Members of deuteromycetes differ from the members of ascomycetes as the former
- (1) Have aseptate mycelium
 - (2) Have endogenously produced asexual spores
 - (3) Lack sexual spores
 - (4) Lack parasitic members
- 109.** The unicellular eukaryote which causes sleeping sickness is a/an
- (1) Sporozoan
 - (2) Ciliated protozoan
 - (3) Flagellated protozoan
 - (4) Amoeboid protozoan
- 110. Assertion (A) :** Genome of Variola is dumbbell shaped with central core of ds DNA.
- Reason (R) :** This brick shaped virus is the causal agent of small pox.
- (1) Both (A) and (R) are true and (R) explains (A) correctly
 - (2) Both (A) and (R) are true but (R) does not explain (A) correctly
 - (3) Both (A) and (R) are false
 - (4) (A) is true but (R) is false
- 111.** Which of the following taxa belong to the same rank?
- (1) *Homo, Felis, pardus*
 - (2) Solanaceae, *leo*, Convolvulaceae
 - (3) *Atropa, Triticum, Panthera*
 - (4) Hominidae, *Triticum*, Dicotyledonae
- 112.** Causal agent of Potato spindle tuber disease
- (1) Contains RNA as genetic material
 - (2) Is larger than virus
 - (3) Is abnormally folded protein
 - (4) Contains dsDNA
- 113.** Select the incorrect match from the following.
- (1) *Albugo* - Zoospore formation
 - (2) *Rhizopus* - produce aplanospores endogenously
 - (3) *Nostoc* - Symbiotic association
 - (4) *Mucor* - Produce conidia exogenously
- 114.** The scientist who called the extract of infected tobacco plant as *Contagium vivum fluidum* was
- (1) D.J. Ivanowsky (2) Pasteur
 - (3) W.M. Stanley (4) M.W. Beijerinck
- 115. *Mycoplasma***
- (a) Presence of cell membrane
 - (b) Can survive only in the presence of oxygen
 - (c) Are primitive organisms responsible for production of biogas
 - (d) Are smallest cellular organisms
- (1) Only (a) & (b) are correct
 - (2) Only (a) & (d) are correct
 - (3) Only (d) is incorrect
 - (4) Only (a) & (d) are incorrect
- 116.** Protonema in mosses is
- (1) Filamentous, branched, diploid
 - (2) Green, creeping, haploid
 - (3) Bears sex organs and buds
 - (4) Produces spore after meiosis
- 117.** Living organisms exhibit distinctive characteristics to differentiate from non-living objects. Which one of the following statements can be considered as defining property of living things?
- (1) Increase in body mass as a criterion for growth
 - (2) Reproduction is synonymous with growth in unicellular organisms
 - (3) Ability of living organisms to sense their surroundings
 - (4) Metabolic reactions that can be demonstrated outside the body in cell-free system only
- 118.** First step of taxonomy is
- (1) Classification (2) Nomenclature
 - (3) Identification (4) Characterisation
- 119.** Hominidae, Anacardiaceae, Muscidae and Poaceae belong to
- (1) Same family
 - (2) Same order
 - (3) Same category
 - (4) Kingdom animalia

120. Which suffix is used for 'class' according to international code of Botanical Nomenclature?

- (1) – phyceae
- (2) – opsida
- (3) – ales
- (4) More than one option is correct

121. Each character is given equal importance and at the same time hundreds of characters can be considered in

- (1) Numerical taxonomy (2) Cytotaxonomy
- (3) Chemotaxonomy (4) Alpha-taxonomy

122. Select the incorrect match

Taxon	Category
(1) Insecta	- Class
(2) Tiger	- Species
(3) Cruciferae	- Family
(4) Orchid	- Order

123. Consider the following statements and find the correct one

- a. Living organisms are self-replicating, evolving and self-regulating interactive systems capable of responding to external stimuli
- b. Wheat, monocots and plants represent taxa of the same level
- c. Higher the category, greater is the difficulty of determining the relation to other taxa of same level
- d. Lower the taxa; more are the characteristics that the members within the taxon share

- (1) All are correct, except 'b'
- (2) All are correct
- (3) All are correct, except 'c'
- (4) All are correct, except 'd'

124. The approximate number of plant species which have been scientifically named and classified is

- (1) 1.2 million (2) 0.2 million
- (3) 0.5 million (4) 1.7 million

125. *Funaria*, *Marchantia* and *Riccia* plants

- (1) Belong to bryopsida
- (2) Have elaters for the spore dispersal
- (3) Show heteromorphic type of life cycle
- (4) Are vegetatively reproducing by gemmae

126. Mark the **incorrect** statement (w.r.t. gymnosperms)

- (1) *Sequoia* is one of the tallest tree species
- (2) Dimorphic root, stem and leaves in *Pinus*
- (3) Generally tap roots are present
- (4) Palmately compound leaves in *Cycas*

127. Mark the **correct** statement

- (1) All archegoniates contain vascular tissue
- (2) All tracheophytes bear seeds
- (3) All spermatophytes belong to phanerogams
- (4) All embryophytes are heterosporous

128. **Assertion (A)** : Halophiles live in extreme marshy area.

Reason (R) : Archaeobacteria are responsible for the production of methane.

- (1) Both (A) and (R) are true and (R) explains (A) correctly
- (2) Both (A) and (R) are true but (R) does not explain (A) correctly
- (3) Both (A) and (R) are false
- (4) (A) is true but (R) is false

129. **Assertion (A)** : Sexual spores in blue-green mold are ascospores produced endogenously

Reason (R) : They develop *Cleistothecium* as fruiting bodies in sexual cycle.

- (1) Both (A) and (R) are true and (R) explains (A) correctly
- (2) Both (A) and (R) are true but (R) does not explain (A) correctly
- (3) Both (A) and (R) are false
- (4) (A) is true but (R) is false

130. Rhodophycean members show which one of the following features?

- (1) Characteristic colour is due to dominance of fucoxanthin
- (2) Asexual reproduction by zoospores is quite common
- (3) Absence of flagellated gametes in their life cycle
- (4) Sexual reproduction by isogamy, anisogamy and oogamy method

131. **Assertion (A)** : Members of kingdom fungi show a great diversity in structures and habitat.

Reason (R) : Strategies of adaptation and saprophytism are more common in bacteria and fungi.

- (1) Both (A) and (R) are true and (R) explains (A) correctly
 (2) Both (A) and (R) are true but (R) does not explain (A) correctly
 (3) Both (A) and (R) are false
 (4) (A) is true but (R) is false
- 132.** Liverworts are different from mosses in
 (1) Not having multicelled jacketed sex organs
 (2) Having a completely parasitic sporophyte on gametophyte
 (3) Having a dominant independent gametophyte phase in life cycle
 (4) Being homosporous
- 133.** *Ectocarpus* and *Polysiphonia* are similar in presence of
 (1) Hemicellulosic cell wall
 (2) Unicellular thallus
 (3) Chlorophyll a
 (4) Sulphated phycocolloids
- 134.** Ovules present on loose megasporophylls, unbranched stem and dicotyledonous condition are features related to
 (1) *Cycas*
 (2) *Pinus*
 (3) *Cedrus*
 (4) *Ephedra*
- 135.** Consider the following statements (a-d) about algae:
 (a) Highly variable in form and size
 (b) Commonly asexual reproduction by exogenous motile spores
 (c) Simple, thalloid and largely aquatic organisms
 (d) A few of the marine forms such as kelps, form massive vascular plant bodies
 (1) Only (d) is incorrect
 (2) Only (c) is incorrect
 (3) (a) & (c) are correct
 (4) All statements are correct

ZOOLOGY

- 136.** The part of nephron in a human kidney which reabsorbs 70-80 per cent of the electrolytes and water from the filtrate, is lined by
 (1) Simple squamous epithelium
 (2) Simple columnar epithelium
 (3) Simple cuboidal epithelium with microvilli on its free surface
 (4) Simple cuboidal epithelium with cilia on its free surface
- 137.** The mucus secreting glands of the alimentary canal of humans are
 (1) Multicellular exocrine glands
 (2) Ductless glands consisting of cluster
 (3) Unicellular endocrine glands
 (4) Unicellular, consisting of isolated glandular cells
- 138.** Read the statements A and B carefully and select the correct option
Statement (A): Blood belongs to the type of animal tissues that is named after their special function of linking and supporting other tissue/organ of the body.
Statement (B): Macrophages are present in adipose tissue but remain absent in loose connective tissue.
- (1) Both statements (A) and (B) are correct
 (2) Both statements (A) and (B) are incorrect
 (3) Only statement (A) is correct
 (4) Only statement (B) is correct
- 139.** Dense regular connective tissue differs from dense irregular connective tissue in the
 (1) Presence of fibroblasts
 (2) Presence of collagen
 (3) Orientation of fibres
 (4) Absence of chondrocytes
- 140.** A tissue present in the tip of nose has ability to resist compression and is also present in all of the following, **except**
 (1) Outer ear joints
 (2) Between atlas and axis vertebrae
 (3) In forelimbs of an adult human
 (4) Vertebrate embryos
- 141.** In an adult human, the site of production of blood cells is mainly present in the tissues which
 (1) Lack lacunae
 (2) Lack lamellae
 (3) Has pliable ground substance
 (4) Interact with muscles attached to them to bring about movements

142. Which of the following statements is not Correct the following

- (1) The basic tissue organize to form organs which in turn dissociates to form organ systems in the multicellular organisms.
- (2) Each organ in a human body such as heart is made of a single type of tissue.
- (3) The word anatomy conventionally is used for the study of morphology of internal organs in the animals.
- (4) In case of plants, the term morphology precisely means the study of external appearance of organs and internal parts of the body.

143. Assertion (A) : The epithelial lining of small intestine has microvilli to increase absorption.

Reason (R): Microvilli are the motile structures that propel food along the intestinal lumen in a specific direction.

In the light of above statements, select the correct option.

- (1) Both (A) and (R) are true and (R) explains (A) correctly
- (2) Both (A) and (R) are true but (R) does not explain (A) correctly
- (3) Both (A) and (R) are false
- (4) (A) is true but (R) is false

144. The epithelial lining of the alveoli and capillaries is extremely thin mainly to

- (1) Allow selective absorption of oxygen only
- (2) Reduce diffusion distance for gaseous exchange
- (3) Increase the surface area for gaseous exchange by ciliary movement.
- (4) Prevent exchange of gases between air and blood.

145. Muscle fibres A in response to stimulation then B and returned to their C state in a coordinated fashion. Select the option to fill the banks A, B and C **correctly**.

- (1) A-Lengthen, B-Shorten, C-Contracted
- (2) A-Shorten, B-Lengthen, C-Uncontracted
- (3) A-Shorten, B-Lengthen, C-Contracted
- (4) A-Lengthen, B-Shorten, C-Uncontracted

146. A biopsy sample shows elongated cells with tapering ends, single central nucleus and absence of striations. The cells contract slowly and do not fatigue easily. The cells must belong to the category of

- (1) Skeletal muscle fibres
- (2) Cardiac muscle fibres
- (3) Smooth muscle fibres
- (4) Voluntary muscle fibres

147. Select the **correct** pair w.r.t. the adaptation and the function associated with it.

(1)	Cuboidal epithelium in alveoli	Facilitates gaseous exchange
(2)	Numerous mitochondria in cardiac muscle fibres	Provide energy for continuous contractions
(3)	Intercellular spaces in compound epithelium	Allow rapid transport of ions
(4)	Dense packing of collagen fibers in areolar tissue	Provide rigidity and strength

148. Which of the following tissues in humans is most closely related to communication and integration of body functions as well as exerts the greatest control over the body's responsiveness to changing conditions?

- (1) Muscular tissue
- (2) Nervous tissue
- (3) Connective tissue
- (4) Epithelial tissue

149. Match **Column I** with **Column II** and select the correct option

	Column I	Column II
(1)	Squamous epithelium	Found in lining of kidney
(2)	Cuboidal epithelium	Possesses flattened cells to allow diffusion
(3)	Columnar epithelium	Helps in absorption and secretion
(4)	Ciliated epithelium	Moves particles in specific direction in respiratory tract

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

150. All of the following statements are correct, except

- (1) Bones serve the weight-bearing functions and provide site for blood cell production
- (2) Cartilages are present between the adjacent bones of the vertebral column
- (3) Fibres and fibroblasts are present in all the types of specialized connective tissues
- (4) Fluid connective tissue helps in the transport of various substances

151. Some features are listed below w.r.t certain muscle fibres

- (a) They are multinucleated
- (b) Striations are present
- (c) Voluntary in function
- (d) Unbranched condition

The cells with above mentioned features are

(p) Present in thigh muscles (q) Absent in gut muscles (r) Present in biceps (s) Closely attached to skeletal bones

How many of the above is/are correct?

- (1) One (2) Two
(3) Three (4) Four

152. A student observes a tissue slide showing matrix with concentric rings and mature cells are present in the spaces called lacunae. Which of the following options represents the correct statement w.r.t. the above observation?

- (1) It is a ligament that connects bone to muscle
(2) It is a tendon that connects bone to bone
(3) It is a cartilage that provides motility to the joints
(4) It is a bone that supports and protects softer tissues and organs

153. Consider the following statements:

- (a) Adipose tissue is a type of areolar tissue located beneath the skin.
(b) The cells of adipose tissues are specialized to store fats.
(c) The excess of nutrients which are not used immediately are converted into polymeric fats and stored into adipose tissue.
(d) Adipose tissue has cells and fibres loosely arranged in a semi-fluid ground substance.

Which of the above are not true?

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

154. The epithelium that covers the dry surface of the skin

- (1) Has no role in secretion and absorption
(2) Provides protection against chemical stresses
(3) Covers the moist surface of buccal cavity and makes it permeable to water due to deposition of keratin
(4) Is made of more than one layer of cells and forms the inner lining of stomach wall

155. Which of the following is/are **incorrectly** matched?

- (a) Tight junctions - Connect cytoplasm of adjoining cardiac cells
(b) Gap junctions-Facilitate rapid transfer of ions between adjacent cells
(c) Adhering junctions-Perform cementing to

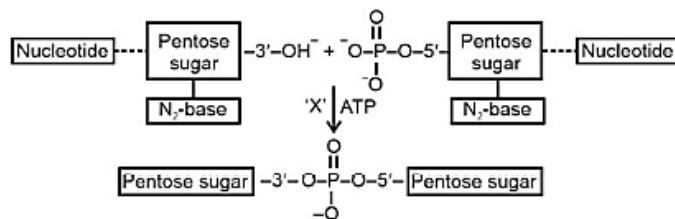
keep the neighbouring cells together

(d) Communication junctions-A type of adhering junction

Select the **correct** option.

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

156. Identify the enzyme 'X' in the given reaction and choose the **correct** option w.r.t joining of two ends of polynucleotide chains.

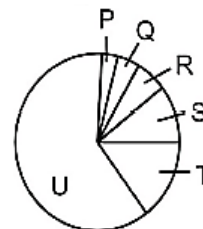


- (1) Hydrolases (2) Isomerases
(3) Transferases (4) Ligases

157. All of the following are present in acid-soluble pool obtained after the chemical analysis of a piece of liver taken from rat, except

- (1) Phosphate (2) Cytidylic acid
(3) Sucrose (4) Arachidonic acid

158. Observe the pie chart given below w.r.t. average composition of living cells.



If 'U' and 'R' are representing percentage of water and carbohydrates respectively in the given pie chart, then, the percentage of the total cellular mass of the nucleic acids in cells will be equal to

- (1) P (2) Q
(3) S (4) T

159. **Assertion (A):** When milk turns to curd yogurt, proteins present in milk becomes hyperactivated due to the lactic acid produced by the *Lactobacillus*.

Reason (R): The bacteria ferments lactose present in the milk into lactic acid, which lowers the milk's pH leading to the disruption of only the secondary structure of protein that converts milk into a gel-like substance.

In the light of above statements, select the **correct** option.

- (1) Both (A) and (R) are true and (R) correctly explains (A).
 (2) Both (A) and (R) are true but (R) does not explain (A) correctly
 (3) (A) is true but (R) is false
 (4) Both (A) and (R) are false

160. Co-enzymes are the organic compounds whose association with is only. Choose the correct option to fill the respective blanks.

- (1) Protein part of the holoenzyme; Transient
 (2) Protein part of the enzyme; Permanent
 (3) Holoenzyme; Permanent
 (4) Non-protein part of the enzyme; Constant

161. If a trisaccharide 'X' is formed by joining 3 molecules of a monosaccharide which is also found in our energy currency, then, the molecular formula of 'X' will be

- (1) $C_{15}H_{26}O_{13}$ (2) $C_{15}H_{30}O_{15}$
 (3) $C_{18}H_{32}O_{12}$ (4) $C_{18}H_{32}O_{16}$

162. Oxytocin, a hormone of hypothalamus, contains nine amino acids joined to each other via peptide bonds. Thus, how many water molecules will be formed and eliminated for the formation of a core primary structure of molecule of oxytocin?

- (1) 9 (2) 8
 (3) 10 (4) 7

163. Choose the incorrect statement w.r.t. glycogen.

- (1) Its monomeric unit has molecular weight less than 1000 Da
 (2) It is a storage homopolysaccharide.
 (3) Its right end is called the reducing end because it has a free anomeric carbon.
 (4) Its homocyclic monomeric unit contains five -OH groups in its structure.

164. Match the column I with column II.

	Column I		Column II
A.	Most abundant protein in the animal world	(i)	An insulin regulated transporter
B.	GLUT-4	(ii)	Its monomeric form possesses two heavy and two light chains and it is a part of humoral immunity

C.	Protein molecule which fights infectious agents	(iii)	Forms intercellular ground substance
		(iv)	Facilitates the transport of glucose from the blood into the cell

Choose the **correct** option.

- (1) A-(ii), B-(i), C-(iii), (iv)
 (2) A-(iii), B-(i),(iv) C-(ii)
 (3) A-(ii), B-(i),(iii) C-(iv)
 (4) A-(i),(iii) B-(ii), C-(iv)

165. Hexokinase is an enzyme that converts glucose into glucose-6-phosphate during glycolysis. The EC number for hexokinase is 2.7.1.1. This number indicates that this enzyme is a/an

- (1) Dehydrogenase (2) Lyase
 (3) Isomerase (4) Transferase

166. The enzyme carboxypeptidase is an enzyme that breaks peptide bonds near the C-terminal of proteins, removing one amino acid at a time. This enzyme

- (A) Requires metal ion for its activity
 (B) Belongs to class III of enzymes
 (C) Needs water for its action

Choose the option with the correct set.

- (1) Only (A) and (B) (2) Only (B)
 (3) (A), (B) and (C) (4) Only (A) and (C)

167. During the course of analyzing an unknown biomolecule, a student determines that the biomolecule is composed of carbon, hydrogen oxygen in the proportion of 1 : 2 : 1. Thus, the and biomolecule is most probably

- (1) Cysteine (2) RNA
 (3) Glucagon (4) Glucose

168. Comprehend the given statements:

Assertion (A):- The tertiary structure refers to the three-dimensional shape of a polypeptide chain.

Reason (R):- Every functional protein has the same tertiary structure that is determined by non-specific amino acid sequence which dictates its function.

In the light of above statements, choose the correct option. statements, choose the

- (1) Both (A) and (R) are true and (R) correctly explains (A)
- (2) (A) is true but (R) is false
- (3) Both (A) and (R) are true but (R) does not explain (A) correctly
- (4) Both (A) and (R) are false

169. Read the following features:

- (a) Belongs to the category of drugs.
- (b) Considered as an alkaloid.
- (c) Included in the category of secondary metabolites.
- (d) Used as an analgesic in post-surgery patients.

Identify the metabolite based on the above mentioned features and choose the correct option.

- (1) Abrin (2) Morphine
- (3) Concanavalin A (4) Curcumin

170. How many of the organic compounds mentioned in the box given below are not classified as heteropolymers?

Chitin, Cellulose, Glucosamine, Sucrose, Maltose, RuBisCO, Inulin, Starch, N-acetyl galactosamine

Select the **correct** option.

- (1) Five (2) Six
- (3) Seven (4) Eight

171. Choose the incorrect match from the following.

- (1) Rate of a chemical reaction -Influenced by H^+ concentration of solution
- (2) Rate doubles or decreases by half for every $10^\circ C$ change in temperature in either direction - A general thumb rule
- (3) Enzymes obtained from the bacteria of sulphur springs – Thermolabile
- (4) Competitive inhibition-Sulfa drugs are effective against bacteria because they are structural analogues of PABA

172. The number of heterocyclic ring(s) present in the structure of uridine is equal to the number of

- (1) Heterocyclic rings present in adenylic acid
- (2) Phalanges present in one limb of a man
- (3) Fatty acids produced on complete hydrolysis of lecithin
- (4) Carboxylic group present in alanine

173. Palmitic acid has a carboxyl group attached to an 'R' group. The 'R' group could be

- (1) $-C_{19}H_{37}$ (2) $-C_{20}H_{39}$
- (3) $-C_{15}H_{31}$ (4) $-C_4H_7$

174. In a double stranded B-DNA with 200 base pairs, the percentage of thymine is 35%. Calculate the number of hydrogen bonds present between guanine and cytosine in this DNA molecule.

- (1) 180 (2) 390
- (3) 140 (4) 400

175. How many from the following is/are the function(s) of proteins?

- (a) Provide strength to bones
- (b) Present in connective tissues
- (c) Bring about muscle contraction
- (d) Transport material throughout the body

Choose the correct option.

- (1) One (2) Two
- (3) Three (4) Four

176. Fatty acids and glycerol combine to form a molecule of triglyceride by a process known as

- (1) Hydrolysis
- (2) Ionization
- (3) Dehydration synthesis
- (4) Decomposition

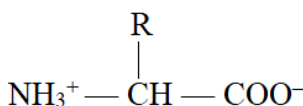
177. 'P' is a type of steroid and is found in the plasma membrane of animals. 'P' also consists of four fused rings in its structure.

Identify 'P' and choose the option which is not correct w.r.t. it.

- (1) 'P' contains a double bond and a hydroxyl group in its structure.
- (2) 'P' is a derived lipid
- (3) 'P' contains fatty acids in its structure
- (4) High level of 'P' may contribute to atherosclerosis and myocardial infarction.

178. Consider the following statements:

Statement (A):-



forms a zwitterion in solutions of different pH.

Statement (B):- Zwitterion is formed by the monomeric units of protein as they possess ionizable groups in their structure.

Choose the correct option.

- (1) Both statements (A) and (B) are correct
- (2) Both statements (A) and (B) are incorrect
- (3) Only statement (A) is correct
- (4) Only statement (B) is correct

179. Two biomolecules, M_1 and M_2 , were isolated from a cell extract:

M_1 yielded only a nitrogenous base and a sugar upon mild acid hydrolysis.

M_2 also released a nitrogenous base and sugar upon hydrolysis, and on further treatment with alkaline phosphatase, inorganic phosphate was also obtained.

Based on the given information, we can correctly conclude that

- (1) M_1 is a nucleoside and M_2 is a nucleotide
- (2) M_2 is a nucleoside and M_1 is a nucleotide
- (3) M_2 contains phosphodiester bonds that get cleaved by alkaline phosphatase to liberate phosphate
- (4) On treatment of M_1 with mild acid, ester bond present between the hexose sugar and nitrogenous base gets hydrolyzed

180. Consider the following statements:

- (a) Natural gums are polymeric secondary metabolites derived from plant products whereas fevicol is a synthetic polymer.
- (b) A lower K_m indicates higher affinity of the enzyme for its substrate.
- (c) Hemoglobin is a tetrameric protein whose structure is stabilized by various bonds like van der Waals, hydrogen bonds, etc.
- (d) In primary structure of a protein, last amino acid is present at N-terminal.

Select the correct option.

- (1) Statements (a) and (d) are incorrect while statement (c) is correct
- (2) All the statements are correct
- (3) Statement (d) is incorrect while statements (a), (b) and (c) are correct
- (4) All the statements are incorrect

