

HORIZON ACADEMY[®] Since 2003

Medical | IIT-JEE | Foundations

(Divisions of Horizon Study Circle Pvt. Ltd.)

Name.:

Date :

Test No.:

Subject Code.:

Time : 3 Hrs.

M.M. : 720

HORIZON TEST SERIES

for
**Medical
Entrance Exam.**
2016

[Test No. 12]

INSTRUCTIONS FOR STUDENTS

1. Read each question carefully.
2. It is mandatory to use Blue/Black Ball Point Pen to darken the appropriate circle in the answer sheet.
3. Mark should be dark and should complete fill the circle.
4. Rough work must be done on the Question Paper, no additional sheet will be provided for this purpose.
5. Do not use white-fluid or any other rubbing material on answer sheet. No change in the answer once marked.
6. Student cannot use log tables and calculators or any other material in the examination hall.
7. Before attempting the question paper, student should ensure that the test paper contains all pages and no page is missing.
8. Each correct answer carries four marks. One mark will be deducted for each incorrect answer from the total score.
9. Before handing over the answer sheet to the invigilator, candidate should check the particulars have been filled and marked correctly.
10. Immediately after the prescribed examination time is over, the answer sheet to be returned to the invigilator.
11. Use of Calculator and other Electronic device is not permitted.

Test No. 12

Topics of The Test

Physics	Rotational motion.
Chemistry	Equilibrium.
Biology	Zoology : Endocrine system. Botany : Plant physiology.

Test No. 12

[PHYSICS]

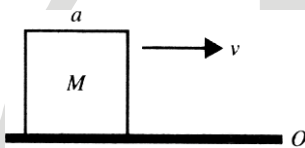
1. Four identical rods, each of mass m and length l , are joined to form a rigid square frame. The frame lies in the xy plane, with its centre at the origin and the sides parallel to the x and y axes. Its moment of inertia about
- (A) the x -axis is $\frac{2}{3}ml^2$
- (B) the z -axis is $\frac{4}{3}ml^2$
- (C) an axis parallel to the z -axis and passing through a corner is $\frac{10}{3}ml^2$
- (D) All of these
2. The density of a rod AB increases linearly from A to B . Its midpoint is O and its centre of mass is at C . Four axes pass through A , B , O and C , all perpendicular to the length of the rod. The moments of inertia of the rod about these axes are I_A, I_B, I_O and I_C respectively.
- (A) $I_A > I_B$ (B) $I_A < I_B$
- (C) None of these (D) $I_O < I_C$
3. If linear density of a rod of length 3 m varies as $\lambda = 2 + x$, then the position of the centre of gravity of the rod is
- (A) $\frac{7}{3}$ m (B) $\frac{12}{7}$ m
- (C) $\frac{10}{7}$ m (D) $\frac{9}{7}$ m
4. Four spheres each of mass M and radius R are placed with their centres on the four corners A, B, C and D of a square of side b . The spheres A and B are hollow and C and D are solid. The moment of inertia of the system about side AD of square is
- (A) $\frac{8}{3}MR^2 + 2Mb^2$ (B) $\frac{8}{5}MR^2 + 2Mb^2$
- (C) $\frac{32}{15}MR^2 + 2Mb^2$ (D) $32MR^2 + 4Mb^2$
5. The moment of inertia of a solid sphere about an axis passing through centre of gravity is $\frac{2}{5}MR^2$, then its radius of gyration about a parallel axis at a distance $2R$ from first axis is
- (A) $5R$ (B) $\sqrt{\frac{22}{5}}R$
- (C) $\frac{5}{2}R$ (D) $\sqrt{\frac{12}{5}}R$
6. The ratio of the radii of gyration of a circular disc and a circular ring of the same radii about a tangential axis perpendicular to plane of disc or ring is
- (A) 1:2 (B) $\sqrt{5} : \sqrt{6}$
- (C) 2:3 (D) $\frac{\sqrt{3}}{2}$

Space for Rough Work

7. The beam and pans of a balance have negligible mass. An object weighs W_1 , when placed in one pan and W_2 when placed in the other pan. The weights W of the object is

- (A) $\sqrt{W_1 W_2}$ (B) $\sqrt{W_1^2 + W_2^2}$
 (C) $\frac{W_1 + W_2}{2}$ (D) $\frac{2W_1 W_2}{W_1 + W_2}$

8. A cubical block of side a is moving with velocity v on a horizontal smooth plane as shown in the figure. It hits a ridge at point O . The angular speed of the block after it hits O is



- (A) $3v/(4a)$ (B) $3v/(2a)$
 (C) $\sqrt{3}v/\sqrt{2}a$ (D) Zero

9. The radius of gyration of a rod length L and mass M about an axis perpendicular to its length and passing through a point at a distance $L/3$ from one of its ends is

- (A) $\frac{\sqrt{7}}{6}L$ (B) $\frac{L}{9}$
 (C) $\frac{L}{3}$ (D) $\frac{\sqrt{5}}{2}L$

10. P is the centre of mass of four point masses A, B, C and D , which are coplanar but not collinear.

- (A) P most not coincide with one of the point masses.
 (B) P must lie within the quadrilateral $ABCD$.
 (C) P must lie within or on the edge of at least one of the triangles formed by taking A, B, C and D three at a time.
 (D) P must lie on a line joining two of the points A, B, C, D .

11. The radius of gyration of a solid sphere of radius r about a certain axis is r . The distance of this axis from the centre of the sphere is

- (A) r (B) $0.5r$
 (C) $\sqrt{0.6}r$ (D) $\sqrt{0.4}r$

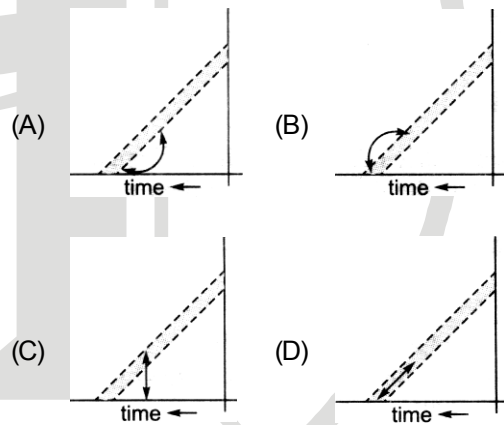
12. The centre of mass of three particles of masses 1 kg, 2 kg and 3 kg is at $(3,3,3)$ with reference to a fixed coordinate system. Where should a fourth particle of mass 4 kg be placed, so that the centre of mass of the system of all particles shifts to a point $(1,1,1)$?

- (A) $(-1,-1,-1)$ (B) $(-2,-2,-2)$
 (C) $(2,2,2)$ (D) $(1,1,1)$

13. The motion of the centre of mass is the result of

- (A) internal forces (B) external forces
 (C) attractive forces (D) repulsive forces

14. A ladder is leaned against a smooth wall and it is allowed to slip on a frictionless floor. Which figure represents the track of its centre of mass?

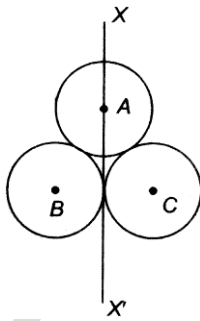


15. A man of mass 60 kg starts moving on a 6 m long, 240 kg stationary boat, at a speed of 1.2 m/s relative to water. If the man starts from one end of the boat and ends at the other, find the distance by which the boat is shifted relative to water.

- (A) 1.5 m (B) 2.5 m
 (C) 1.2 m (D) 3.2 m

Space for Rough Work

16. Three rings each of mass M and radius R are arranged as shown in figure. The moment of inertia of the system about the axis XX' will be



- (A) $\frac{7}{2}MR^2$ (B) $3R^2$
 (C) $\frac{3}{2}MR^2$ (D) $5MR^2$
17. A thin rod of length L and mass M is bent at its midpoint into two halves so that the angle between them is 90° . The moment of inertia of the bent rod about an axis passing through the bending point and perpendicular to the plane defined by the two halves of the rod is
- (A) $\frac{ML^2}{24}$ (B) $\frac{ML^2}{12}$
 (C) $\frac{ML^2}{6}$ (D) $\frac{\sqrt{2}ML^2}{24}$
18. A uniform rod of mass m and length l rotates in a horizontal plane with an angular velocity ω about a vertical axis passing through one end. The tension in the rod at a distance x from the axis is
- (A) $\frac{1}{2}m\omega^2x$ (B) $\frac{1}{2}m\omega^2\frac{x^2}{l}$
 (C) $\frac{1}{2}m\omega^2l\left(1-\frac{x}{l}\right)$ (D) $\frac{1}{2}\cdot\frac{m\omega^2}{l}[l^2-x^2]$

19. A uniform circular disc of radius R lies in the X-Y plane with its centre coinciding with the origin of the coordinate system. Its moment of inertia about an axis lying in the X-Y plane, parallel to the X-axis and passing through a point on the Y-axis at a distance $y = 2R$ is I_1 . Its moment of inertia about an axis lying in a plane perpendicular to X-Y plane passing through a point on the X-axis at a distance $x = d$ is I_2 . If $I_1 = I_2$, the n value of d is

(A) $\frac{\sqrt{19}}{2}R$ (B) $\frac{\sqrt{17}}{2}R$

(C) $\frac{\sqrt{15}}{2}R$ (D) $\frac{\sqrt{13}}{2}R$

20. A car moves on a circular road. It describes equal angles about the centre in equal intervals of time. Which of the following statements about the velocity of the car is true ?

- (A) Magnitude of velocity is not constant
 (B) Both magnitude and direction of velocity change
 (C) Velocity is directed towards the centre of the circle
 (D) Magnitude of velocity is constant but direction changes

21. A thin rod of mass m and length $2l$ is made to rotate about an axis passing through its centre and perpendicular to it. If its angular velocity changes from 0 to ω in time t , the torque acting on it is

(A) $\frac{ml^2\omega}{12t}$ (B) $\frac{ml^2\omega}{3t}$

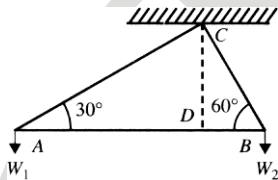
(C) $\frac{ml^2\omega}{t}$ (D) $\frac{4ml^2\omega}{3t}$

22. A particle of mass (m) = 5 units is moving with a uniform speed $v = 3\sqrt{2}$ units in the XOY-plane along the line $y = x + 4$. The magnitude of the angular momentum of the particle about the origin is

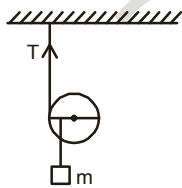
- (A) 60 units (B) $40\sqrt{2}$ units
 (C) zero (D) 7.5 units

Space for Rough Work

23. If r denotes the distance between the sun and the earth, then the angular momentum of the earth around the sun is proportional to
 (A) r^3 (B) r
 (C) \sqrt{r} (D) r^2
24. A triangular set square of angles 30° , 60° , 90° and of negligible mass is suspended freely from the right angled corner and weights are hung at the two corners. If the hypotenuse of the set square sets horizontally, then the ratio of the weights W_1/W_2 is



- (A) 1:1 (B) 1:3
 (C) $\sqrt{3}:1$ (D) $1:\sqrt{3}$
25. A disc is moving down via a rope as shown in figure. If we hang a body of mass m from the cord, the tangential acceleration of the disc is



- (A) $\frac{mg}{M+m}$ (B) $\frac{mg}{M+2m}$
 (C) $\frac{2mg}{M+2m}$ (D) $\frac{M+2m}{2mg}$
26. A solid cylinder of mass M and radius R rolls down an inclined plane of height h without slipping. The speed of its centre when it reaches the bottom is
 (A) $\sqrt{2gh}$ (B) $\sqrt{(4/3)gh}$
 (C) $\sqrt{(3/4)gh}$ (D) $\sqrt{(4g/h)}$

27. A uniform rod AB of mass m and length l is at rest on a smooth horizontal surface. An impulse J is applied to the end B perpendicular to the rod in the horizontal direction. Speed of particle P at a distance $1/6$ from the centre towards A of the rod after time $t = \frac{\pi ml}{12J}$ is

- (A) $2\frac{J}{m}$ (B) $\frac{J}{\sqrt{2}m}$
 (C) $\frac{J}{m}$ (D) $\sqrt{2}\frac{J}{m}$

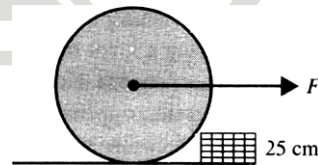
28. A body of mass m and radius r is released from rest along a smooth inclined plane of angle of inclination θ . The angular momentum of the body about the instantaneous point of contact after a time t from the instant of release is equal to

- (A) $mgt \cos \theta$ (B) $mgt \sin \theta$
 (C) $(3/2)mgt \sin \theta$ (D) none of these

29. The moment of inertia of a body about a given axis is 1.2 kgm^2 . Initially the body is at rest. In order to produce a rotational KE of 1500 J an angular acceleration of 25 rad/s^2 must be applied about the axis for a duration of

- (A) 4 s (B) 2 s
 (C) 8 s (D) 10 s

30. A vertical disc of mass 5 kg and radius 50 cm rests against a step of height 25 cm as shown in the figure. What minimum horizontal force applied perpendicular to the axle will make the disc to climb the step? Take $g = 10 \text{ m/s}^2$.



- (A) 50 N (B) $50\sqrt{3} \text{ N}$
 (C) 25 N (D) None of these

Space for Rough Work

31. A uniform rod kept vertically on the ground falls from rest. Its foot does not slip on the ground. Which of the following not correct.
- (A) No part of the rod can have acceleration greater than g in any position.
 (B) At any one position of the rod, different points on it have different accelerations.
 (C) Any one particular point on the rod has different accelerations at different positions of the rod.
 (D) The maximum acceleration of any point on the rod, at any position, is $1.5g$.
32. A horizontal disc rotates freely about a vertical axis through its centre. A ring, having the same mass and radius as the disc, is now gently placed on the disc. After some time, the two rotate with a common angular velocity. Which of the following is not correct.
- (A) Some friction exists between the disc and the ring.
 (B) The angular momentum of the 'disc plus ring' is conserved.
 (C) The final common angular velocity is $\frac{2}{3}$ rd of the initial angular velocity of the disc.
 (D) $\frac{2}{3}$ rd of the initial kinetic energy changes to heat.
33. A solid sphere starts from rest at the top of an incline of height h and length l , and moves down. The force of friction between the sphere and the incline is F . This is insufficient to prevent slipping. The kinetic energy of the sphere at the bottom of the incline is W .
- (A) The work done against the force of friction is zero.
 (B) The heat produced is Fl
 (C) $W = mgh - Fl$
 (D) $W > (mgh - Fl)$
34. A constant external torque τ acts for a very brief period Δt on a rotating system having moment of inertia I . Which of following is not correct
- (A) The angular momentum of the system will change by $\tau \Delta t$
 (B) The angular velocity of the system will change by $\frac{\tau \Delta t}{I}$
- (C) If the system was initially at rest, it will acquire rotational kinetic energy $\frac{(\tau \Delta t)^2}{2I}$.
- (D) The kinetic energy of the system will change by $\frac{(\tau \Delta t)^2}{I}$.
35. A particle with the position vector \mathbf{r} has linear momentum \mathbf{p} . Which of the following statements is true in respect of its angular momentum \mathbf{L} about the origin ?
- (A) \mathbf{L} acts along \mathbf{p}
 (B) \mathbf{L} acts along \mathbf{r}
 (C) \mathbf{L} is maximum when \mathbf{p} and \mathbf{r} are parallel
 (D) \mathbf{L} is maximum when \mathbf{p} is perpendicular to \mathbf{r}
36. A ring and a disc of different masses are rotating with the same kinetic energy. If we apply a retarding torque τ on the ring, it stops after completing n revolutions in all. If same torque is applied to the disc, how many revolutions would it complete in all before stopping ?
- (A) $4n$ (B) $2n$
 (C) n (D) $\frac{n}{2}$
37. A horizontal platform is rotating with uniform angular velocity around the vertical axis passing through its centre. At some instant of time a viscous fluid of mass m is dropped at the centre and is allowed to spread out and finally fall, the angular velocity during this period
- (A) decreases continuously
 (B) decreases initially and increases again
 (C) remains unaltered
 (D) increases continuously
38. A ball rolls without slipping. The radius of gyration of the ball about an axis passing through its centre of mass is K . If radius of the ball be R , then the fraction of total energy associated with its rotational energy will be
- (A) $\frac{K^2}{K^2 + R^2}$ (B) $\frac{R^2}{K^2 + R^2}$
 (C) $\frac{K^2 + R^2}{R^2}$ (D) $\frac{K^2}{R^2}$

Space for Rough Work

39. The reduced mass of two particles having masses m and $2m$ is
 (A) $2m$ (B) $3m$
 (C) $2m/3$ (D) $m/2$

For Problem Q.40

A string is wrapped around a cylinder of mass M and radius R . The string is pulled vertically upwards to prevent the centre of mass from falling as the cylinder moves upward the string.

40. Work done on the cylinder for reaching an angular speed ω is

- (A) $\frac{MR^2\omega^2}{4}$ (B) $\frac{MR^2\omega^2}{2}$
 (C) $\frac{MR^2\omega^2}{3}$ (D) $\frac{2MR^2\omega^2}{3}$

41. Particles of masses $m, 2m, 3m, \dots, nm$ gm are placed on the same line at distances $1, 2, 3, \dots, n$ cm from a fixed point. The distance of centre of mass of the particles from the fixed point in centimeters is

- (A) $\frac{(2n+1)l}{3}$ (B) $\frac{l}{n+1}$
 (C) $\frac{n(n^2+1)l}{2}$ (D) $\frac{2l}{n(n^2+1)}$

42. When a ceiling fan is switched off, its angular velocity falls to half while it makes 36 rotations. How many more rotations will it make before coming to rest? (Assume uniform angular retardation.)

- (A) 36 (B) 24
 (C) 18 (D) 12

43. A flywheel rotates about an axis. Due to friction at the axis, it experiences an angular retardation proportional to its angular velocity. If its angular velocity falls to half while it makes n rotations, how many more rotations will it make before coming to rest?

- (A) $2n$ (B) n
 (C) $n/2$ (D) $n/3$

44. A uniform solid spherical ball is rolling down a smooth inclined plane from a height h . The velocity attained by the ball when it reaches the bottom of the inclined plane is v . If the ball is now thrown vertically upwards with the same velocity v , the maximum height to which the ball will rise is

- (A) $\frac{5h}{8}$ (B) $\frac{3h}{5}$
 (C) $\frac{5h}{7}$ (D) $\frac{7h}{9}$

45. When a uniform solid sphere and a disc of the same mass and of the same radius roll down an inclined smooth plane from rest to the same distance, then the ratio of the times taken by them is

- (A) 15 : 14 (B) $15^2 : 14^2$
 (C) $\sqrt{14} : \sqrt{15}$ (D) 14 : 15

[CHEMISTRY]

46. Which one of the following reactions is reversible?

- (A) $2KClO_3(s) \xrightarrow{\Delta} 2KCl(s) + 3O_2(g)$
 (B) $AgNO_3 + HCl \longrightarrow AgCl \downarrow + HNO_3$
 (C) $2SO_2(g) + O_2(g) \longrightarrow 2SO_3(g)$
 (D) $CuSO_4 + Zn \longrightarrow ZnSO_4 + Cu$

47. An acid is a compound whose solution in water

- (i) conducts electricity
 (ii) reacts with metals like Zn or Mg liberating hydrogen
 (iii) turns red litmus blue
 (iv) tastes sour

Among the above statements

- (A) all are true
 (B) only (i) and (iv) are true
 (C) (ii) and (iii) are false
 (D) (iii) is false

Space for Rough Work

48. Which one of the following is acid conjugate to the Base HSO_4^- ?
- (A) SO_4^{2-} (B) H_2SO_4
(C) SO_3 (D) SO_3^{2-}
49. Which one of the following is wrong ?
- (A) $\text{pH} = \log_{10}[\text{H}^+]^{-1}$
(B) $\text{pH} = 14 - \text{pOH}$
(C) K_w is independent of temperature
(D) The pH of ammonium chloride solution is always less than 7.
50. The pH of the solutions of strong acids A and B are 3 and 5 respectively. The normality of A will be obtained by multiplying that of B by a factor equal to
- (A) $\frac{5}{3}$ (B) $\frac{3}{5}$
(C) 0.01 (D) 100
51. K_{sp} of lead chloride is 3.2×10^{-17} . Its solubility in mol dm^{-3} will be
- (A) 1.6×10^{-9} (B) 2×10^{-6}
(C) 4×10^{-6} (D) 4×10^{-9}
52. The solubility product of calcium sulphate is 6.4×10^{-5} . The solubility of the salt in mol dm^{-3} is.
- (A) 8×10^{-10} (B) 8×10^{-2}
(C) 8×10^{-3} (D) 1.6×10^{-3}
53. The solubility product of MnS is 1.6×10^{-16} . The minimum concentration in mol dm^{-3} of S^{2-} ions needed to precipitate MnS from 3.2×10^{-6} M solution of Mn^{2+} ions will be
- (A) 2×10^{10} (B) 5.12×10^{-22}
(C) 0.5×10^{-10} (D) 1.6×10^{-10}
54. In acidic medium, by passing H_2S , the sulphides of II group radicals and not of III B radicals are precipitated. This is due to
- (A) low values of K_{sp} of II group sulphides than those for III B sulphides.
(B) low values of K_{sp} of III B group sulphides than those for II group sulphides.
(C) the heavier nature of II group radicals than III B radicals.
(D) the placement of II group radicals earlier to III B in the procedure of qualitative analysis.
55. In respect of a buffer solution the following statements are made.
- (i) It has a constant pH
(ii) It is a mixture of strong acid and its salt with a weak base
(iii) Its pH does not alter at all on adding either a strong acid or strong base.
(iv) Its pH does not change on dilution.
Among the above, the true statements are
- (A) only (i), (ii) and (iii)
(B) only (i)
(C) only (i) and (iv)
(D) only (iv)
56. If the solubility of sparingly soluble salt increases with temperature, its solubility product
- (A) will increase
(B) will decrease
(C) will remain constant.
(D) may change either way depending on the nature of the salt.
57. Ammonium chloride, when added to the solution of ammonium hydroxide, the % ionisation of the latter
- (A) increases
(B) decreases
(C) remains unaffected
(D) changes unpredictably
58. Which of the following, when added to 10 ml of 1 M NaOH, would cause a maximum change in pH ?
- (A) 10 ml of 1 M HCl (B) 5 ml of 2 M HCl
(C) 5 ml of 1 M HCl (D) 10 ml of 2 M HCl
59. 0.05 mole each of monobasic acids A, B, C and D are separately dissolved in 1000 cm^3 of water. The pK_a values of these acids are 9.4, 3.75, 4.75 and 3.0 respectively. The hydrogen ion concentration will be the greatest in case of
- (A) D (B) C
(C) A (D) B

Space for Rough Work

60. The pH of an acid buffer is given by
- (A) $pH = \log K_a + \log \frac{[salt]}{[acid]}$
- (B) $pH = K_a + \log \frac{[salt]}{[acid]}$
- (C) $pH = -\log K_a - \log \frac{[salt]}{[acid]}$
- (D) $pH = -\log K_a + \log \frac{[salt]}{[acid]}$
61. In case of sodium acetate solution which one of the following is false?
- (A) $pH > 7$ (B) $[OH^-] > [H^+]$
- (C) $K_w = [H^+][OH^-]$ (D) $1 \times 10^{-pH} > 1 \times 10^{-pOH}$
62. The solution containing sodium acetate and acetic acid is diluted with a little of water, then
- (A) acetate ion concentration increases.
- (B) H^+ ion concentration increases.
- (C) OH^- ion concentration increases.
- (D) H^+ ion concentration remains unaltered.
63. To a mixture of CH_3COOH and CH_3COONa , more of latter is added, then the pH of the mixture will
- (A) decrease (B) increase
- (C) not change (D) change unpredictably
64. The addition of which one of the following would decrease the pH of 25 cm³ of 0.1 M solution of HCl?
- (A) Magnesium metal
- (B) 25 cm³ of 0.2M HCl
- (C) 25 cm³ of 0.05M HCl
- (D) 25 cm³ of 0.1M NaOH
65. For a mixture of a weak acid and its salt with a strong base, both at equal molar concentrations, the correct statement is
- (A) $pH = pK_a$ (B) $pH > pK_a$
- (C) $pH < pK_a$ (D) $pH = pK_a = 0$
66. M_2SO_4 has $K_{sp} = 3.2 \times 10^{-5}$. The maximum concentration of SO_4^{2-} ions that could be attained in a saturated solution of M_2SO_4 is
- (A) $3 \times 10^{-3}M$ (B) $2 \times 10^{-2}M$
- (C) $7 \times 10^{-2}M$ (D) $2.89 \times 10^{-4}M$
67. In the reaction, $NH_3 + BF_3 = NH_3 - BF_3$, BF_3 is
- (A) a Lewis acid
- (B) a Lewis base
- (C) neither Lewis acid nor Lewis base
- (D) both a Lewis acid and a Lewis base
68. The K_{sp} values of CuS , Ag_2S and HgS are 1×10^{-31} , 1×10^{-44} and 1×10^{-54} respectively. The solubilities of these sulphide are in the order
- (A) $CuS > HgS > Ag_2S$
- (B) $Ag_2S < CuS < HgS$
- (C) $Ag_2S > CuS > HgS$
- (D) $HgS > Ag_2S > CuS$
69. Aqueous solution of acetic acid contains
- (A) CH_3COO^- and H^+
- (B) CH_3COOH , CH_3COO^- and H_3O^+
- (C) CH_3COO^- and H_3O^+
- (D) CH_3COOH , CH_3COO^- and H^+
70. Which one of the following salts will undergo hydrolysis in its aqueous solution?
- (A) $NaCl$ (B) Na_2SO_4
- (C) $(NH_4)_2SO_4$ (D) KCl
71. At 90°C pure water has $[H_3O^+] = 10^{-6} \text{ mol dm}^{-3}$. The value of K_w at 90°C is
- (A) 10^{-14} (B) 10^{-12}
- (C) 10^{-6} (D) 10^{-8}

Space for Rough Work

72. Which of the following expressions is false ?
- (A) For neutral solution, $[H^+] = \sqrt{K_w}$
 (B) For pure water, $[H^+] = [OH^-]$
 (C) For acidic solution, $[H^+] < \sqrt{K_w}$
 (D) For basic solution, $[H^+] < \sqrt{K_w}$
73. Which of the following turns moist blue litmus red?
- (A) aqueous NaCl
 (B) sodium metal
 (C) aqueous solution of CO_2
 (D) aqueous NaOH
74. Among the following the acid salt is
- (A) Na_2SO_4 (B) $NaHSO_4$
 (C) Na_2SO_3 (D) K_2SO_4
75. A solution contains 5×10^{-4} moles of $Ba(OH)_2$ in 100 ml of water. Assuming complete ionization, the pH of the solution is
- (A) 2 (B) 10
 (C) 12 (D) 9.6
76. As the concentration of H^+ of a solution is increased 10 times its pH will
- (A) increase by one unit
 (B) decrease by one unit
 (C) remain same
 (D) decrease by a factor of 0.1
77. The molar concentration of H^+ ions in 0.01 M H_2SO_4 is
- (A) 1×10^{-12} (B) 1×10^{-2}
 (C) 2×10^{-2} (D) 1×10^{-10}
78. 1 M aqueous solution of which of following substances has the highest pH ?
- (A) $Al(OH)_3$ (B) $NaOH$
 (C) Na_2CO_3 (D) NH_4OH
79. The value of pK_w at $25^\circ C$ is
- (A) -14 (B) 7
 (C) 1×10^{-14} (D) 14
80. Which one of the following solutions has the lowest pH ?
- (A) 0.02M H_2SO_4 (B) 2M NaCl
 (C) 0.02M HCl (D) 0.02M CH_3COOH
81. The pH of NaCl solution at 298 K will be
- (A) 7
 (B) less than 7
 (C) more than 7
 (D) depending on the concentration of the solution
82. The pH of 0.1 M acetic acid ($K_a = 1.8 \times 10^{-5}$) is
- (A) 0.1 (B) 1.0
 (C) 1.873 (D) 2.873
83. "Whenever a stress is applied to a system at equilibrium, the equilibrium shifts in such a way that the effect of the stress is nullified". This is the statement of
- (A) Ostwald's dilution law
 (B) Law of mass action
 (C) Equilibrium condition
 (D) Le-chatelier's principle
84. If NH_4OH is added to the solution of H_2S in water then
- (A) dissociation of H_2S decreases
 (B) sulphur will be precipitated
 (C) concentration of sulphide ions in the solution increases
 (D) none of these happens
85. The pH of 0.01 M solution of a weak monoacid base is 10.2. Its degree of dissociation is nearly
- (A) 0.016 (B) 0.1585
 (C) 0.1 (D) 0.02

Space for Rough Work

86. For the reaction, $SO_3(g) \rightleftharpoons SO_2(g) + \frac{1}{2}O_2(g)$, the equilibrium constant, $K_c = 4.9 \times 10^{-2}$. The value of K_c for the reaction, $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$, will be

- (A) 2.40×10^{-3} (B) 416
(C) 9.8×10^{-2} (D) 4.9×10^{-2}

87. The value of equilibrium constant of the reaction

$HI(g) \rightleftharpoons \frac{1}{2}H_2(g) + \frac{1}{2}I_2(g)$; is 8.0. The equilibrium

constant of the reaction, $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ will be

- (A) $\frac{1}{8}$ (B) $\frac{1}{16}$

- (C) $\frac{1}{64}$ (D) 16

88. The acids, (I) ClOH, (II) BrOH and (III) IOH, the correct order of decreasing acid strength is

- (A) I>II>III (B) II>I>III
(C) III>II>I (D) I>III>II

89. The pH of a 0.1 molar solution of the acid HQ is 3. The value of the ionisation constant, K_a of this acid is

- (A) 3×10^{-1} (B) 1×10^{-3}
(C) 1×10^{-5} (D) 1×10^{-7}

90. In a buffer solution containing equal concentrations of B^- and HB, the K_b for B^- is 10^{-10} . The pH of buffer solution is

- (A) 6 (B) 4
(C) 7 (D) 10

[ZOOLOGY]

91. The term "hormone" was coined by:

- (A) Starling (B) Bayliss
(C) Addison (D) Sanger

92. The first hormone isolated was _____ by _____.

- (A) Thyroxine; bayliss
(B) Estrogen: Bernard
(C) Secretin, Starling
(D) Adrenaline, Addison

93. In humans, the anterior pituitary produce:

- (A) melanocyte-stimulating hormone
(B) gonadotropin-releasing hormone
(C) thyroid-stimulating hormone
(D) HCG

94. The saddle-shaped depression in the sphenoid bone at the base of the human skull, called as sella turcica, lodges:

- (A) Hypothalamus (B) Pineal
(C) Pituitary (D) Parathyroid

95. Consider the following lobes of pituitary gland:

- I. Adenohypophysis
II. Pars intermedia
III. Neurohypophysis

The functional lobes in humans are :

- (A) I, II, III (B) I, II
(C) II, III (D) I, III

96. The _____ arises from an invagination of the oral ectoderm and forms Rathke's pouch.

- (A) Neurohypophysis (B) Adenohypophysis
(C) Hypothalamus (D) Pineal

97. The acidophils of the anterior pituitary include:

- (A) Lactotrophs and Gonadotrophs
(B) Thyrotrophs and Gonadotrophs
(C) Corticotrophs and Somatotrophs
(D) Somatotrophs and lactotrophs

98. Prolactin inhibitory hormone has been identified as:

- (A) Serotonin (B) Glycine
(C) Dopamine (D) cAMP

Space for Rough Work

99. Consider the following statements:
- The hypophyseal portal system is the system of blood vessels that link the hypothalamus and the anterior pituitary in the brain.
 - The pituitary stalk is the connection between the hypothalamus and the posterior pituitary.
- (A) Both I and II are correct
(B) Both I and II are incorrect
(C) Only I is correct
(D) Only II is correct
100. The cause of Simmond's disease is :
- (A) Hypoadrenalism (B) Hyperadrenalism
(C) Hyperpituitarism (D) Hypopituitarism
101. Consider the following statements regarding hypothalamus:
- The anti diuretic hormone is largely produced by the paraventricular nucleus
 - Oxytocin is synthesized by the supraoptic nucleus
 - The secretions of the hypothalamus (releasing and inhibiting regulatory hormones) collect in median eminence before entering the portal system
- The correct statements are :
- (A) I and II (B) III only
(C) II and III (D) I, II and III
102. Identify the correct statements regarding the thyroid gland :
- Thyroid follicles are filled with a colloid that is rich in thyroglobulin.
 - The follicular cells secrete T3 and T4.
 - The parafollicular cells produce calcitonin.
- (A) I, II, III (B) I and II
(C) I and III (D) II and III
103. Autoimmune thyroiditis results in:
- (A) Simmond's disease
(B) Minimata disease
(C) Graves disease
(D) Hashimoto's disease
104. Consider the following statements about the metabolic functions of the growth hormone :
- It promotes protein deposition in tissues
 - It enhances fat utilization for energy
 - It increases carbohydrate utilization by the body
- The correct functions are :
- (A) I, II, III (B) II and III
(C) I and II (D) I and III
105. The growth hormone produces effects on target organs through the intermediate proteins called as :
- (A) Somatotropins
(B) Somatostatin
(C) Somatomedin
(D) Somatotrophic hormone
106. Whether a molecule acts as a neurotransmitter or a hormone, which statement about physiological regulation by these molecules is false ?
- (A) Target cells must have specific receptor proteins with which these molecules combine.
(B) When these molecules bind to target cells, specific sequences of changes must occur.
(C) There must be an "off-switch" that will stop the induced changes.
(D) Second messengers will always be involved in the response of the target cell.
107. Which of the following has a synergistic effect with growth hormone ?
- (A) Thyroxine (B) Insulin
(C) Cortisol (D) Epinephrine
108. Which of the following glands secretes the hormone melatonin ?
- (A) anterior pituitary gland
(B) melanocytes
(C) pineal gland
(D) suprachiasmatic nucleus of hypothalamus

Space for Rough Work

109. When a concentrated electrolyte solution is injected into the artery that supplies the hypothalamus :
- (A) An increased amount of ADH will be produced
 (B) The ADH production will be suppressed
 (C) Nothing happens as the hypothalamus is protected by the blood brain barrier
 (D) The production of oxytocin is increased
110. The milk let-down and contraction of smooth muscles of gravid uterus during parturition are the functions of :
- (A) ADH (B) Oxytocin
 (C) Epinehrine (D) Melatonin
111. Which of the following are the functions of thyroxine?
- I. To regulate metabolic rate
 II. To maintain normal body temperature
 III. To help in the metamorphosis of tadpole into frog
 IV. To regulate the development of mental faculties
 V. To inhibit the actions of neurotransmitters such as adrenaline and noradrenaline
- (A) All (B) I, II, III
 (C) I, III, IV (D) I, II, III, IV
112. Lack of thyroid hormones:
- (A) Increases the quantity of blood cholesterol
 (B) Increases the free fatty acids in the blood
 (C) Causes a relative deficiency of vitamins in the body
 (D) Increases the basal metabolism of the body
113. Oxytocin and ADH reach the posterior pituitary by way of :
- (A) the anterior pituitary gland
 (B) lymphatic vessels
 (C) blood vessels
 (D) axons
114. Insulin was first isolated from the pancreas by:
- (A) Banting and Best
 (B) Fred Sanger
 (C) Starling and Bayliss
 (D) Fire and Mello
115. Hypocalcemia causes :
- (A) Progressive depression of the nervous system
 (B) Nervous system excitement and tetany
 (C) Muscle weakness and paralysis
 (D) Cardiac arrest
116. Parathyroid hormone:
- I. Increases calcium and phosphate absorption from bone
 II. Decreases calcium excretion and increases phosphate excretion by the kidneys
 III. Increases intestinal absorption of phosphate
- (A) I, II and III are correct
 (B) I and II are correct
 (C) I and III are correct
 (D) II and III are correct
117. Rickets in childhood is caused by the deficiency of:
- (A) Parathyroid hormone
 (B) Calcitonin
 (C) Calcium in diet
 (D) Vitamin D
118. The pineal gland:
- I. is located near to the center of the brain, between the two hemispheres, tucked in a groove where the two rounded thalamic bodies join.
 II. produces melatonin, a hormone that affects the modulation of wake/sleep patterns and photoperiodic (seasonal) functions
 III. is part of the thalamus.
- (A) I, II, III are correct
 (B) I and II are correct
 (C) I and III are correct
 (D) II and III are correct
119. Melatonin:
- I. is a derivative of the amino acid tryptophan
 II. its production by the pineal gland is stimulated by darkness and inhibited by light
 III. stimulates the development of gonads in animals
- (A) I, II, III are correct
 (B) I and II are correct
 (C) II and III are correct
 (D) I and III are correct

Space for Rough Work

120. Between which of the following hormone pairs is the interaction between hormones not an example of the permissive effect of a first hormone for a second hormone?
- (A) estrogen for prolactin on the mammary glands during pregnancy
 (B) parathyroid hormone (PTH) for vitamin D₃ on blood Ca²⁺ levels
 (C) estrogen for progesterone on the uterus
 (D) glucocorticoids for catecholamine actions
121. How will you differentiate the pituitary dwarf from a cretin?
- I. The pituitary dwarf will be a proportionate dwarf but the cretin would be a disproportionate dwarf.
 II. The pituitary dwarf will not be mentally retarded but the cretin would be mentally retarded.
- (A) Both I and II are correct
 (B) Only I is correct
 (C) Only II is correct
 (D) Both I and II are incorrect
122. Hormones involved in carbohydrate metabolism are:
- (A) Insulin, glucagon, epinephrine and parathormone
 (B) Insulin, glucagon, epinephrine and glucocorticoids
 (C) Insulin, glucagon, glucocorticoids and calcitonin
 (D) Insulin, glucagon, norepinephrine and melatonin
123. Consider the following statements regarding the hypothalamic control of pituitary function.
- I. All the hypothalamic hormones are synthesized and secreted by neurons.
 II. Anterior pituitary is connected to the hypothalamus by a portal circulation.
 III. The hypothalamic releasing hormones reach the general circulation in significant amounts.
 IV. Loss of dopaminergic neurons in the hypothalamus is likely to lead to a fall in the secretion of prolactin.
- The correct statements are :
- (A) I, II, III, IV (B) III, IV
 (C) I, II (D) I, II, III
124. Which one is correctly matched?
- (A) Relaxin–Gigantism
 (B) Prolactin–Cretinism
 (C) Parathyroid hormone–Tetany
 (D) Insulin–Diabetes insipidus
125. Both the ovaries are removed from a female rat. Hormone titre decreases in case of:
- (A) Oxytocin (B) Prolactin
 (C) Estrogen (D) GnRH
126. Acromegaly is caused by:
- (A) Hypersecretion of FSH
 (B) Hypersecretion of ACTH
 (C) Hyposecretion of ACTH
 (D) Hypersecretion of GH
127. Hormone controlling metabolism is :
- (A) ACTH (B) FSH
 (C) Thyroxine (D) Adrenaline
128. Identify the group of antagonistic hormones amongst the following:
- (A) thyroxine and calcitonin
 (B) insulin and glucagon
 (C) growth hormone and epinephrine
 (D) ACTH and glucocorticoids
129. The hormone melatonin is secreted by:
- (A) Adrenal (B) Thymus
 (C) Pituitary (D) Pineal
130. Hormone oxytocin controls:
- (A) Growth (B) Lactation
 (C) Child birth (D) Both (B) and (C)
131. ADH primarily acts on _____ and Aldosterone primarily acts on _____ of the nephron.
- (A) Collecting duct, DCT
 (B) DCT, PCT
 (C) PCT, Collecting duct
 (D) DCT, Collecting duct

Space for Rough Work

132. Regarding parathyroid glands:
- They usually include four small paired (superior and inferior) glands.
 - They are embedded in the posterior surfaces of the lateral lobes of the thyroid gland.
 - They secrete many hormones including parathyroid hormone (PTH), among others.
 - PTH acts on tissues such as bone, kidney, and intestines to raise the levels of calcium in the blood.
- The correct statements are :
- (A) I, II, III, IV (B) I, II, IV
(C) I, II, III (D) II, III, IV
133. The latest definition of hormone would be :
- they are organic components in food that are needed in very small amounts for growth and for maintaining good health.
 - Any of numerous proteins or conjugated proteins produced by living organisms and functioning as biochemical catalysts.
 - The secretion of the endocrine glands only
 - Non nutrient chemicals which act as intercellular messengers and are produced in trace amounts.
134. Which of the following is a hypercalcemic hormone?
- (A) PTH (B) Calcitonin
(C) Thyroxine (D) Epinephrine
135. The immune responses of old persons become weak due to :
- Atrophy of thymus
 - Inefficient DNA repair
 - Increased metabolism in the body
 - Mutations
- [BOTANY]**
136. What is the function of molecular oxygen in cellular respiration?
- It causes the breakdown of citric acid.
 - To combine with glucose to produce carbon dioxide.
 - To combine with carbon from organic molecules to produce carbon dioxide.
 - To combine with hydrogen from organic molecules to produce water.
137. The major reason that glycolysis is not as energy productive as respiration is that
- NAD⁺ is regenerated by alcohol or lactate production, without the high-energy electrons passing through the electron transport chain.
 - it is the pathway common to fermentation and respiration.
 - it does not take place in a specialized membrane-bound organelle.
 - pyruvate is more reduced than CO₂; it still contains much of the energy from glucose.
138. The R.Q. value of Oxalic acid is
- (A) 1.0 (B) 0.7
(C) 1.5 (D) ∞
139. How many ATP molecules could maximally be generated from one molecule of glucose, if the complete oxidation of one mole of glucose in CO₂ and H₂O yields 686 kcal and the useful chemical energy available in the high energy phosphate bond of one mole of ATP is 12 kcal?
- (A) Thirty (B) Fifty - seven
(C) One (D) Two
140. Which of the following statements regarding metabolic pathways is incorrect ?
- Many of the steps of glycolysis can run in reverse
 - Starch, sucrose or glycogen must be hydrolysed before it can enter the glycolysis.
 - After fats are digested, glycogen enters glycolysis by forming DHAP.
 - After fat digestion, fatty acids can no longer participate in cellular respiration.
141. In Krebs cycle GTP is formed in
- Substrate level phosphorylation
 - Oxidative phosphorylation
 - Photophosphorylation
 - Decarboxylation

Space for Rough Work

142. Match Column-I with Column-II and select the correct option from the codes given below.

- | Column - I | Column - II |
|----------------|----------------------------------|
| (A) Glycolysis | (i) Inner mitochondrial membrane |
| (B) TCA cycle | (ii) Mitochondrial matrix |
| (C) ETS | (iii) Cytoplasm |
- (A) A – (iii), B – (i), C – (ii)
 (B) A – (iii), B – (ii), C – (i)
 (C) A – (i), B – (ii), C – (iii)
 (D) A – (ii), B – (i), C – (iii)

143. Substrate level phosphorylation occurs during which step of Krebs' cycle ?

- (A) Succinyl - CoA @ Succinic acid
 (B) Isocitric acid @ Oxalosuccinic acid
 (C) Oxalosuccinic acid @ α -keto glutaric acid
 (D) Malic acid @ OAA

144. Match Column - I with Column - II and select the correct option from the codes given below.

- | Column - I | Column - II |
|---------------------------|----------------------------------|
| A. Molecular oxygen | (i) α - Ketoglutaric acid |
| B. Electron acceptor | (ii) Hydrogen acceptor |
| C. Pyruvate dehydrogenase | (iii) Cytochrome C |
| D. Decarboxylation | (iv) Acetyl CoA |
- (A) A - (ii), B - (iii), C - (iv), D - (i)
 (B) A - (iii), B - (iv), C - (ii), D - (i)
 (C) A - (ii), B - (i), C - (iii), D - (iv)
 (D) A - (iv), B - (iii), C - (i), D - (ii).

145. When two molecules of acetyl-CoA enter the TCA cycle, net gain at the end of the cycle is

- (A) $2\text{NADH}_2 + 2\text{FADH}_2 + 1\text{GTP}$
 (B) $3\text{NADH}_2 + 2\text{FADH}_2 + 2\text{GTP}$
 (C) $6\text{NADH}_2 + 2\text{FADH}_2 + 2\text{GTP}$
 (D) $3\text{NADH}_2 + 1\text{FADH}_2 + 4\text{GTP}$

146. Cyclic photophosphorylation links to

- (A) PS-II (B) PS-I
 (C) dark reaction (D) both (A) and (B)

147. In C_3 cycle for the fixation of every CO_2 molecules, the reduction and regeneration steps required

- (A) 3 ATP and 2 NADPH_2
 (B) 2 ATP and 2 NADPH_2
 (C) 2 ATP and 3 NADPH_2
 (D) 3 ATP and 1 NADPH_2

148. Cyclic-photophosphorylation results in the formation of

- (A) NADPH
 (B) ATP AND NADPH
 (C) ATP, NADPH and oxygen
 (D) ATP

149. The mineral involved in the photolysis of water are

- | | |
|----------------|--------------|
| I. Manganese | II. Calcium |
| III. Magnesium | IV. Chloride |
- (A) I and II only (B) I, II and IV only
 (C) I, II and III only (D) I and IV only

150. Photolysis of water during photosynthesis occurs with the help of

- (A) PS-II (B) PS-I
 (C) ferredoxin (D) cytochrome

151. The net requirement of assimilatory power for the formation of 6 hexose molecules in maize plant is

- (A) 72 ATP, 48 NADPH
 (B) 90 ATP, 60 NADPH
 (C) 108 ATP, 72 NADPH
 (D) 180 ATP, 72 NADPH

Space for Rough Work

152. Identify the correct combinations of the following :

	Substrate	Enzyme	Product
I.	Phosphoenol pyruvate	PEP carboxylase	C_4 acid
II.	Malate	Malic enzyme	C_4 acid
III.	RuBP	Ribulose-5-phosphate kinase	C_3 acid
IV.	Pyruvate	Pyruvate dikinase	C_3 acid

(A) III and IV (B) I and II
(C) II and III (D) I and IV

153. Compensation point refers to

- (A) little photosynthesis
- (B) beginning of photosynthesis
- (C) rate of photosynthesis equals to the rate of respiration
- (D) None of these

154. Solarisation is

- (A) formation of chlorophyll
- (B) destruction of chlorophyll
- (C) utilisation of sunlight
- (D) effects of solar light

155. To form one molecule of glyceraldehyde phosphate in Calvin cycle

- (A) 9 ATP and 36 NADPH are required
- (B) 6 ATP and 6 NADPH are required
- (C) 3 ATP and 3 NADPH are required
- (D) 9 ATP and 6 NADPH are required

156. What will be zero in a fully turgid cell ?

- (A) T.P. (B) W. P.
- (C) S.P. (D) O.P.

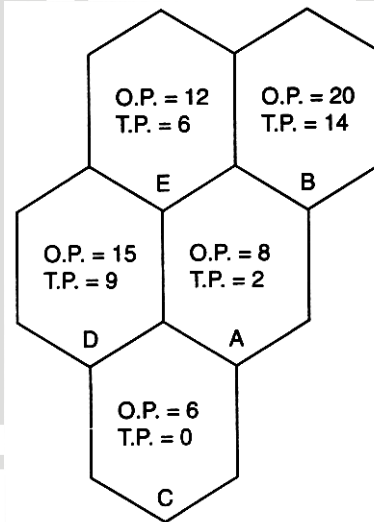
157. In a flaccid cell :

- (A) S.P. = 0 (B) S.P. = O.P.
- (C) S.P. > O.P. (D) S.P. < O.P.

158. Cell A with O.P. = 6 and W.P. = 5 is surrounded by the cells with O.P. = 3 and T.P. = 2, what will be direction of water movement ?

- (A) From A to other cells
- (B) From other cells to A
- (C) No movement
- (D) Water will move up

159. In the following diagram, if the T.P. of cell B increases to 18, what would be the changes with regard to water movement ?

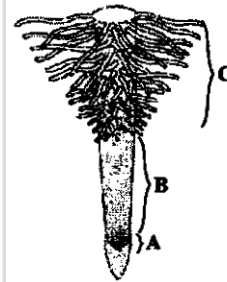


- (A) A, C, D and E absorb water from B
- (B) Water diffuses into B
- (C) B actively absorbs water from neighbouring cells
- (D) No movement

Space for Rough Work

160. Girdling experiment cannot be performed in sugarcane because :
- (A) It cannot withstand injury
 (B) Vascular bundles in it are scattered
 (C) Phloem in it situated internal to xylem
 (D) Sugarcane plants are too delicate
161. Water potential in a cell of root hair absorbing water is :
- (A) Zero
 (B) Less than zero
 (C) More than zero
 (D) More than that of soil water
162. At incipient plasmolysis, water potential (ψ_w) is equal to :
- (A) $\psi_s + \psi_p$ (B) ψ_s
 (C) $\psi_s + \psi_p + \psi_m$ (D) $\psi_p + \psi_m$
163. Farmers in a particular region were concerned that premature yellowing of leaves of a pulse crop might cause decrease in the yield. Which treatment could be most beneficial to obtain maximum seed yield?
- (A) Removal of all yellow leaves and spraying the remaining green leaves with 2, 4, 5-trichlorophenoxy acetic acid.
 (B) Application of iron and magnesium to promote synthesis of chlorophyll
 (C) Frequent irrigation of the crop
 (D) Treatment of the plants with cytokinins alongwith a small dose of nitrogenous fertilizer.
164. Criteria for essentiality in mineral nutrition were shown firstly by
- (A) Amon (B) Liebig
 (C) Steward (D) Levitt
165. Where does most nutrient uptake occur in roots?
- (A) At the root tip, where root tissue first encounters soil away from the zone of nutrient depletion.
 (B) At the casparian strip, where ions must enter the symplast prior to entering xylem cells.
 (C) In the symplastic and apoplastic pathways.
 (D) In root hairs and in the zone of maturation.

166. The major portion of the dry weight of plants comprises of –
- (A) Nitrogen, phosphorus and potassium
 (B) Calcium, magnesium and sulphur
 (C) Carbon, nitrogen and hydrogen
 (D) Carbon, hydrogen and oxygen
167. The function of leghaemoglobin in the root nodules of legumes is :
- (A) inhibition of nitrogenase activity
 (B) oxygen removal
 (C) nodule differentiation
 (D) expression of nif gene
168. Identify the different regions of root and select the correct option.



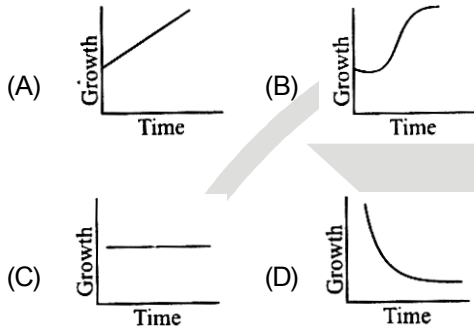
- | A | B | C |
|-----------------------|----------------------|----------------------|
| (A) Meristematic zone | Maturation zone | Differentiation zone |
| (B) Meristematic zone | Elongation zone | Maturation zone |
| (C) Elongation zone | Maturation zone | Differentiation zone |
| (D) Elongation zone | Differentiation zone | Maturation zone |
169. Read the following statements regarding arithmetic growth and select the correct answer.
- (i) Rate of growth is constant
 (ii) One daughter cell remains meristematic while the other one differentiates and matures
 (iii) Mathematical expression is $L_t = L_0 + rt$
- (A) Statements (i) and (ii) are correct
 (B) Statements (ii) and (iii) are correct
 (C) Statements (i) and (iii) are correct
 (D) All statements are correct.

Space for Rough Work

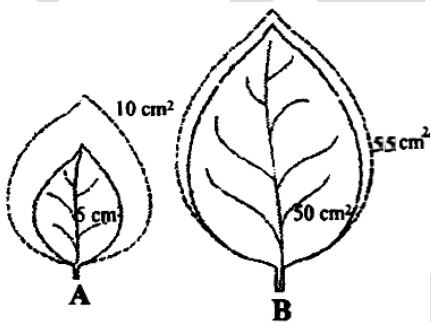
170. The exponential growth can be mathematically expressed as

- (A) $L_t = L_0 + rt$ (B) $W_1 = W_0 + e^{rt}$
 (C) $W_1 = W_0 e^{rt}$ (D) $L_t = L_0 - rt$

171. Which one is the correct graph for arithmetic growth?



172. The given figure shows growth of two leaves over the period of one day. If, AG = absolute growth and RGR = relative growth rate, then select the correct option.



	AG for leaf A	RGR for leaf A	AG for leaf B	RGR for leaf B
(A)	1%	1	2%	2
(B)	100%	5	10%	5
(C)	5	100%	5	10%
(D)	5	100%	5	100%

173. Increase in growth (diameter) of plant as a result of the activities of lateral meristems is called

- (A) primary growth
 (B) secondary growth
 (C) open form of growth
 (D) diffuse growth.

174. Growth can be measured in various ways. Which of these can be used as parameters to measure growth?

- (A) Increase in cell number
 (B) Increase in cell size
 (C) Increase in length and weight
 (D) All of these.

175. Growth is maximum in zone of

- (A) cell elongation
 (B) cell division
 (C) cell maturation
 (D) all of these

176. Seed dormancy is regulated by

- (A) C_2H_4 (B) ABA
 (C) IAA (D) GA_3 .

177. A primary root grows from 5 cm to 19 cm in a week. Calculate the actual growth rate (AGR) and relative growth rate (RGR) over the period.

	AGR	RGR
(A)	14 cm	2.8
(B)	14 cm	3.8
(C)	3.8 cm	14
(D)	24 cm	2.8

Space for Rough Work

Direction for (Q. No. 178 to Q. Nos. 180)

178. Read the given statements and select the correct option.

- (A) Both statements 1 and 2 are correct and statement 2 is the correct explanation of statement 1.
- (B) Both statements 1 and 2 are correct but statement 2 is not the correct explanation of statement 1.
- (C) Statement 1 is correct and statement 2 is incorrect.
- (D) Both statements 1 and 2 are incorrect.

Statement 1 : Glycolysis occurs in mitochondrial matrix.

Statement 2 : Krebs' cycle occurs on cristae of mitochondria.

179. **Statement 1** : Under conditions of high light intensity and limited carbon dioxide supply, photorespiration has a useful role in protecting the plants from photooxidative damage.

Statement 2 : If enough carbon dioxide is not available to utilize light energy for carboxylation to processed, the excess energy may not cause damage to plants.

180. **Statement 1** : C_4 - photosynthetic pathway is more efficient than the C_3 - pathway.

Statement 2 : Photorespiration is suppressed in C_4 - plants.



Space for Rough Work

