

Practice Test - 02

Physics

Motion in a Straight Line and Motion in a Plane

Chemistry

IUPAC Naming and Isomerism

Biology

Mineral Nutrition

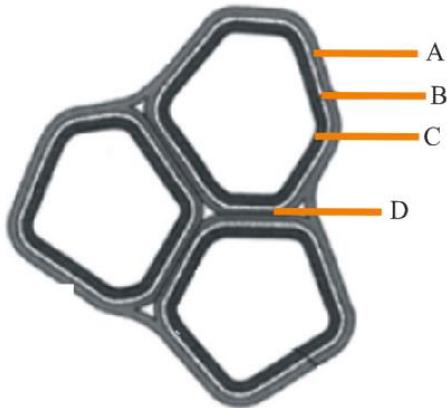
Digestion and Absorption

Note:- Time given for the test is 180 minutes

- * Test Will Contain Total 180 Questions,
- * 45 Question of Physics, 45 Question of Chemistry and 90 Questions of Biology
- * Marking is +4 for every correct answer & -1 for every wrong answer
- * Test will start at 8 am and Students can attempt test at any time of their own preferences
- * You can reattempt the test in case of any technical issue.
- * You can access test in test section of our Physicswallah App.
- * **Test window will be open time is 8 am**

(Botany)

91. Calcium is a component of

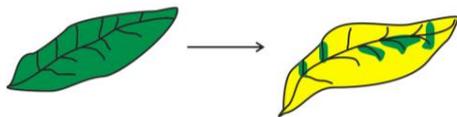


- (A) A (B) B
(C) C (D) D

92. Critical elements are

- (A) Na, N and Si
(B) Na, Si and Se
(C) Mn, Zn and Mo
(D) N, P and K

93.



In plants the change that occurs like this is due to

- (A) High sunlight intensity
(B) Low sunlight intensity
(C) Absorption of yellow pigments from the soil
(D) Deficiency of Mg and Fe in the soil
94. Enzymes involved in respiration are activated by which minerals?
- (A) Sulphur and iron
(B) Potassium and calcium
(C) Nitrogen and phosphorus
(D) Magnesium and manganese

95. Which concentration will be considered as highest for any mineral when provided in hydroponics–

- (A) Optimum range
(B) Critical concentration
(C) Toxic
(D) Concentration at which deficiency symptoms appear

96. Which among the following are set of micronutrients?

- (A) Boron, zinc and calcium
(B) Zinc, calcium and copper
(C) Magnesium, molybdenum and chlorine
(D) Molybdenum, zinc and boron.

97. What is the function of leg-haemoglobin in root nodules of legumes?

- (A) they act as a catalyst during transamination
(B) it carries oxygen to root nodules
(C) they provide energy to nitrogen-fixing bacteria
(D) it acts as a scavenger of oxygen

98. Name the element that fails to move from old senescent leaves–

- (A) Potassium. (B) Sulphur.
(C) Phosphorus. (D) Calcium.

99. Activator of Rubisco is –

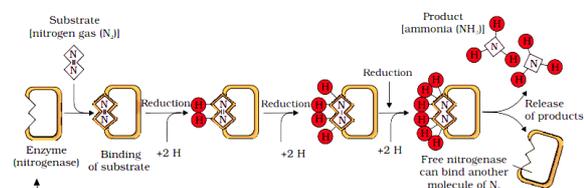
- (A) Mg (B) Cu
(C) S (D) Fe.

100. Julius von Sachs developed hydroponics in which

- (A) 19th century (B) 18th century
(C) 20th century (D) 21st century

101. *Beijerinckia* is a bacterium
 (A) Free living aerobe
 (B) Saprotrophic
 (C) Nitrogen fixer
 (D) All of the above
102. Decomposition of organic nitrogen from dead and waste materials produces
 (A) N_2
 (B) N_2O , NO , NO_2 , N_2O_5
 (C) NH_3
 (D) Ureides
103. Select the incorrect match
 (A) Mg^{2+} -----Ribulose biphosphate carboxylaseoxygenase .
 (B) Ca^{2+} -----Phosphoenol pyruvate carboxylase.
 (C) Zn^{2+} ----- Activator of alcohol dehydrogenase .
 (D) Mo ----- Nitrogenase during nitrogen metabolism.
104. Deficiency symptoms of nitrogen, magnesium and potassium are visible first in
 (A) Senescent leaves
 (B) Young leaves
 (C) Roots
 (D) Buds
105. Delay flowering is caused due to
 (A) Deficiency of Molybdenum
 (B) Excess of Molybdenum
 (C) Hyperconcentration of Molybdenum
 (D) Both B and C
106. In plants element Manganese can also inhibit calcium
 (A) for its translocation in root apex.
 (B) for its translocation in shoot apex.
 (C) for its translocation in bud apex.
 (D) for its translocation in leaf apex.

107. Minerals can be absorbed passively from –
 (A) Root hair zone
 (B) Zone of elongation
 (C) Both 1 and 2
 (D) Zone of division
108. How many of the following statements are correct –
 (1) Plants can be grown to maturity in a defined mineral solution.
 (2) Mineral study can be done only in soil.
 (3) The basic needs of all living organism are essentially different.
 (4) Plants require carbohydrate and lipids for their growth.
 (A) 1 (B) 2
 (C) 3 (D) 4
109. Statement1-Mineral involve in biosynthesis of Auxin is zinc.
 Statement2-Plants obtain zinc as Zn^{3+} ions.
 (A) Statement 1 is correct.
 (B) Statement 2 is correct.
 (C) Both are correct
 (D) Both are incorrect.
110. Thiamine, biotin, Coenzyme A contain-
 (A) C, H, O
 (B) C, H, O, N
 (C) C, H, O, P, S
 (D) C, H, O, N, S
111. Bacteria that convert ammonia to nitrite is
 (A) *Nitrobacter* (B) *Nitrosomonas*
 (C) *Pseudomonas* (D) *Mycobacterium*
112. The following step which occurs in root nodules utilises how many ATP molecules-



- (A) 4 (B) 8
 (C) 12 (D) 16

- 113.** Select the correct option-
 Statement 1- Ureides have a particularly high nitrogen to carbon ratio.
 Statement 2- Amides contain more nitrogen than the amino acids.
 Statement 3- Ammonification, Transamination, Reductive amination are the steps that occur in leguminous plants.
 (A) Statement 1 is correct.
 (B) Statement 1 and 2 are correct.
 (C) Statement 1 and 3 are correct
 (D) All are correct

- 114.** Match the following concerning essential elements and their functions in plants:

1. Iron	(i)	Photolysis of water
2. Zinc	(ii)	Pollen germination
3. Boron	(iii)	Required for chlorophyll biosynthesis
4. Manganese	(iv)	IAA biosynthesis

Options

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

- 115.** Which mineral is transported in plants as positive charge -
 (A) Mg (B) S
 (C) P (D) Cl

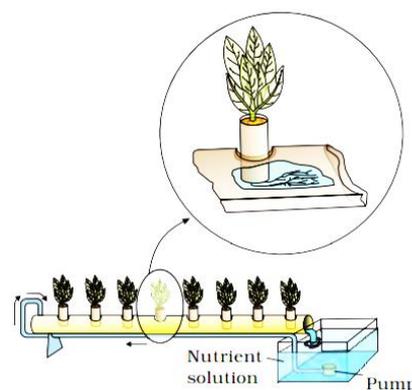
- 116.** Which one of the following is not an essential mineral element for plants while the remaining three are?
 (A) Cadmium (B) Phosphorus
 (C) Iron (D) Manganese

- 117.** Best defined function of manganese in green plants is:
 (A) Water absorption
 (B) Photolysis of water
 (C) Calvin cycle
 (D) Nitrogen fixation

- 118.** The criteria for essentiality of an element are given below:

- (A) The element must be absolutely necessary for supporting normal growth and reproduction. In the absence of the element the plants do not complete their life cycle or set the seeds.
 (B) The requirement of the element must be specific and not replaceable by another element. In other words, deficiency of any one element cannot be met by supplying some other element.
 (C) The element must be directly involved in the metabolism of the plant.
 (D) All of these

- 119.** The technique shown below



has been successfully employed as a technique for the commercial production of-

- (A) Lettuce
 (B) Tomato
 (C) Seedless cucumber
 (D) All of these
- 120.** Which among the following mineral is involved in protein synthesis and maintaining the turgidity -
 (A) K (B) B
 (C) Fe (D) Cu

Answer Key

- | | | |
|----------|----------|----------|
| 91. (D) | 101. (D) | 111. (B) |
| 92. (D) | 102. (C) | 112. (D) |
| 93. (D) | 103. (B) | 113. (D) |
| 94. (D) | 104. (A) | 114. (B) |
| 95. (B) | 105. (A) | 115. (A) |
| 96. (D) | 106. (B) | 116. (A) |
| 97. (D) | 107. (A) | 117. (B) |
| 98. (D) | 108. (B) | 118. (D) |
| 99. (A) | 109. (A) | 119. (D) |
| 100. (A) | 110. (D) | 120. (A) |

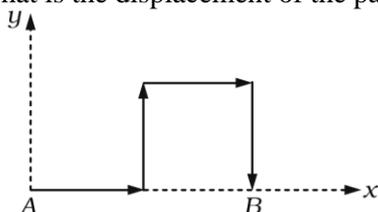
HINT AND SOLUTIONS

- 91.** (D)
Hint- During cell division it is used in the synthesis of cell wall, particularly as calcium pectate in the middle lamella.
- 92.** (D)
Nitrogen, phosphorus and potassium are three critical elements which are essential for proper growth of plants e.g., crop plants
- 93.** (D) [NCERT pg.No -199]
Chlorosis is the loss of chlorophyll leading to yellowing in leaves. This symptom is caused by the deficiency of elements N, K, Mg, S, Fe, Mn, Zn and Mo.
- 94.** (D) [NCERT pg.No -197-198]
Magnesium: It is absorbed by plants in the form of divalent Mg^{2+} . It activates the enzymes of respiration.
Manganese: It is absorbed in the form of manganous ions (Mn^{2+}). It activates many enzymes involved in photosynthesis, respiration and nitrogen metabolism.
- 95.** (B)[NCERT pg.No -198]
The concentration of the essential element below which plant growth is retarded is termed as critical concentration.
- 96.** (D)[NCERT pg.No-197]
Micronutrients or trace elements, are needed in very small amounts (less than 10 mmole Kg⁻¹ of dry matter). These include iron, manganese, copper, molybdenum, zinc, boron, chlorine and nickel.
- 97.** (D) [NCERT pg.No-203]
The enzyme nitrogenase is highly sensitive to the molecular oxygen; it requires anaerobic conditions. The nodules have adaptations that ensure that the enzyme is protected from oxygen. To protect these enzymes, the nodule contains an oxygen scavenger called leg-haemoglobin
- 98.** (D) [NCERT pg.No-198-199]
The deficiency symptoms tend to appear first in the young tissues whenever the elements are relatively immobile and are not transported out of the mature organs, for example, element like sulphur and calcium are a part of the structural component of the cell and hence are not easily released.
- 99.** (A) [NCERT pg.No-196]
 Mg^{2+} is an activator for both ribulose biphosphate carboxylaseoxygenase and phosphoenol pyruvate carboxylase, both of which are critical enzymes in photosynthetic carbon fixation
- 100.** (A) [NCERT pg.No-194]
Hydroponics (1860) technique of growing plants in a nutrient solution is known as hydroponics and used for the commercial production of vegetables such as tomato, seedless cucumber and lettuce.
- 101.** (D) [NCERT pg.No-202]
The nitrogen-fixing microbes could be free-living or symbiotic. Examples of free-living nitrogen-fixing aerobic microbes are *Azotobacter* and *Beijerinckia* while *Rhodospirillum* is anaerobic and free-living. In addition, a number of cyanobacteria such as *Anabaena* and *Nostoc* are also freelifing nitrogen-fixers.
- 102.** (C) [NCERT pg.No-201]
Decomposition of organic nitrogen of dead plants and animals into ammonia is called ammonification.
- 103.** (B) [NCERT pg.No-196]
 Mg^{2+} is an activator for both ribulose biphosphate carboxylaseoxygenase and phosphoenol pyruvate carboxylase, both of which are critical enzymes in photosynthetic carbon fixation; Zn^{2+} is an activator of alcohol dehydrogenase and Mo of nitrogenase during nitrogen metabolism

- 104.** (A) [NCERT pg.No-198]
For elements that are actively mobilised within the plants and exported to young developing tissues, the deficiency symptoms tend to appear first in the older tissues. For example, the deficiency symptoms of nitrogen, potassium and magnesium are visible first in the senescent leaves.
- 105.** (A) [NCERT pg.No-199]
N, S, Mo delay flowering if their concentration in plants is low.
- 106.** (B) [NCERT pg.No-199]
Manganese also inhibit calcium translocation in shoot apex.
- 107.** (A)
Through root hairs ,In the first phase, an initial rapid uptake of ions into the ‘free space’ or ‘outer space’ of cells – the apoplast, is passive. In the second phase of uptake, the ions are taken in slowly into the ‘inner space’ – the symplast of the cells
- 108.** (B)
Hint: Plants can be grown to maturity in a defined mineral solution technique also known as Hydroponics.
Plants require carbohydrate and lipids for their growth.
- 109.** (A) [NCERT pg.No-198]
Zinc: Plants obtain zinc as Zn^{2+} ions. It activates various enzymes, especially carboxylases. It is also needed in the synthesis of auxin.
- 110.** (D) [NCERT pg.No-197]
Sulphur is present in two amino acids – cysteine and methionine and is the main constituent of several coenzymes, vitamins (thiamine, biotin, Coenzyme A) and ferredoxin.
- 111.** (B) NCERT [NCERT pg.No-202]
- 112.** (D) [NCERT pg.No-203]
 $N_2 + 8e^- + 8H^+ + 16ATP \rightarrow 2NH_3 + H_2 + 16ADP + 16P_i$
- 113.** (D) [NCERT pg.No-204]
- 114.** (B) NCERT pg.No-[197-198]
- 115.** (A) NCERT pg.No-[197-198] Phosphorus-
 HPO_4^{4-} or HPO_4^{2-}
Plants obtain sulphur in the form of sulphate SO_4^{2-}
Magnesium: It is absorbed by plants in the form of divalent Mg^{2+}
Chlorine: It is absorbed in the form of chloride anion (Cl^-)
- 116.** (A) [NCERT pg.No-197]
Others are micro and macronutrients.
- 117.** (B) [NCERT pg.No-198]
The best defined function of manganese is in the splitting of water to liberate oxygen during photosynthesis.
- 118.** (D) [NCERT pg.No-195]
- 119.** (D) [NCERT pg.No-195]
- 120.** (A) [NCERT pg.No-197]

(Physics)

1. In the diagram shown, a particle is moving from the point A to the point B. Length of each arrow is 1 m and the particle is moving at a constant speed of 1 m s^{-1} . What is the displacement of the particle?



- (A) 2 m (B) 3 m
(C) 4 m (D) None of these
2. In the previous question, what is the average velocity of the particle?
(A) 1 m s^{-1} (B) 0.5 m s^{-1}
(C) 3 m s^{-1} (D) None of these
3. A particle had a speed of 18 m/s at a certain time, and 2.5 s later its speed was 30 m/s in the opposite direction. The average acceleration of the particle in the duration is :
(A) 19.2 m/s^2 in the direction of initial velocity
(B) 19.2 m/s^2 in the direction opposite to the initial velocity
(C) 4.8 m/s^2 in the direction of initial velocity
(D) 4.8 m/s^2 in the direction opposite to the initial velocity
4. A particle starts moving from the point $(1, 2, 3)$ under velocity $\hat{i} + 2\hat{j} + 3\hat{k}$ for two seconds. After that it moves under velocity $\hat{i} - 2\hat{j} + 3\hat{k}$ for the next two seconds. What is the coordinate of the final point?
(A) $(5, 2, 5)$ (B) $(5, 2, 15)$
(C) $(1, 2, 15)$ (D) None of these
5. A person travelling on a straight line moves with a uniform velocity v_1 for some time and with uniform velocity v_2 for the next equal time. The average velocity v is given by :
(A) $v = \frac{v_1 + v_2}{2}$ (B) $v = \sqrt{v_1 v_2}$
(C) $\frac{2}{v} = \frac{1}{v_1} + \frac{1}{v_2}$ (D) $\frac{1}{v} = \frac{1}{v_1} + \frac{1}{v_2}$
6. A particle travelling on a straight line moves with a uniform velocity v_1 , for a distance x and with a uniform velocity v_2 for the next equal distance. The average velocity v is given by :

(A) $v = \frac{v_1 + v_2}{2}$ (B) $v = \sqrt{v_1 v_2}$
(C) $\frac{2}{v} = \frac{1}{v_1} + \frac{1}{v_2}$ (D) $\frac{1}{v} = \frac{1}{v_1} + \frac{1}{v_2}$

7. If a car covers $\frac{2}{5}$ th of the total distance with v_1 speed and $\frac{3}{5}$ th distance with v_2 then average speed is:
(A) $\frac{1}{2}\sqrt{v_1 v_2}$ (B) $\frac{v_1 + v_2}{2}$
(C) $\frac{2v_1 v_2}{v_1 + v_2}$ (D) $\frac{5v_1 v_2}{3v_1 + 2v_2}$
8. Which of the following statements is wrong?
(A) If speed of a particle changes, its velocity must change.
(B) If velocity of a particle doesn't change, its speed must remain constant
(C) If speed of a particle doesn't change, its velocity must remain constant
(D) If velocity of a particle changes, its speed may or may not change
9. Mark the correct statement.
(A) The magnitude of the velocity of a particle is equal to its speed
(B) The magnitude of average velocity in an interval is equal to its average speed in that interval
(C) It is possible to have a situation in which the speed of a particle is always zero but the average speed is not zero
(D) It is possible to have a situation in which the speed of the particle is never zero but the average speed in an interval is zero
10. A 210 m long train is moving due North at a speed of 25 m/s . A small bird is flying due South a little above the train with speed 5 m/s . The time taken by the bird to cross the train is :
(A) 6 s (B) 7 s
(C) 7 s (D) 10 s
11. A 120 m long train is moving in a straight line path with speed 20 m/s . Another train moving with 30 m/s in the opposite direction and 130 m long crosses the first train completely in a time:
(A) 6 s (B) 36 s
(C) 38 s (D) 5 s

12. A car at rest accelerates uniformly to a speed of 144 km/h in 20 s. The distance covered in 20s is:
 (A) 20 m (B) 400 m
 (C) 1440 m (D) 2880 m

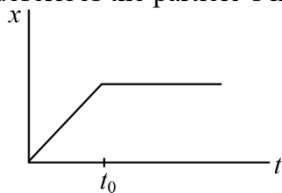
13. A particle moving with a uniform acceleration travels 24 m and 64 m in the first two consecutive intervals of 4 sec each. Its initial velocity is:
 (A) 1 m/sec (B) 10 m/sec
 (C) 5 m/sec (D) 2 m/sec

14. A particle travels 10m in first 5 sec and 10m in next 3 sec. Assuming constant acceleration what is the distance travelled in next 2 sec ?
 (A) 8.3 m (B) 9.3 m
 (C) 10.3 m (D) None of above

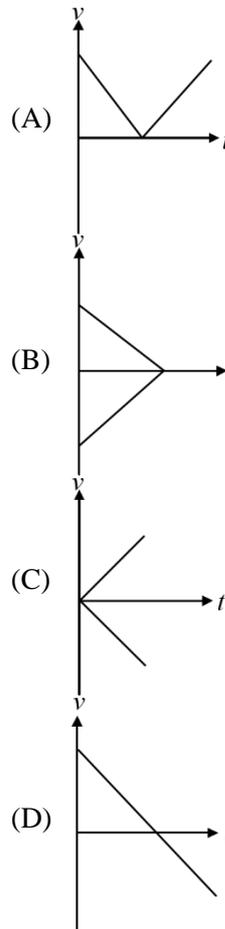
15. A body starts from rest and accelerates uniformly. What is the ratio of the distance travelled by the body during the 4th and 3rd second?
 (A) 7/5 (B) 5/7
 (C) 7/3 (D) 3/7

16. The position-time graph for two particles A and B are straight lines inclined at angles of 30° and 60° with the time axis. The ratio of velocities $V_A : V_B$ is :
 (A) 1 : 2 (B) $1 : \sqrt{3}$
 (C) $\sqrt{3} : 1$ (D) 1 : 3

17. Figure shows the position-time graph of a particle moving on the X-axis. Which of these option correctly describes the particle's motion?



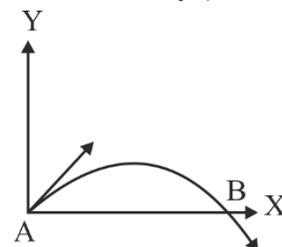
- (A) the particle is continuously going in positive x direction
 (B) the particle is at rest
 (C) the velocity increases up to a time t_0 , and then becomes constant
 (D) the particle moves at a constant velocity up to a time t_0 , and then stops
18. A ball is thrown vertically upward and it returns back. Which of the following graph represents the velocity of the ball against time correctly? Upward direction is taken as positive.



19. A particle moves along x-axis as $x = t(t - 2) + (t - 2)^2$. Which of the following is true?
 (A) The initial velocity of particle is 4
 (B) The acceleration of particle varies with time
 (C) The particle is at origin at $t = 0$
 (D) None of these

20. The displacement x of a particle moving in one dimension under a constant acceleration is related to time t as $t = \sqrt{x} + 3$. The displacement of the particle when the velocity is zero is :
 (A) zero (B) 3 units
 (C) $\sqrt{3}$ units (D) 9 units

21. The velocity of a projectile at the initial point A is $(2\hat{i} + 3\hat{j})$ m/s. It's velocity (in m/s) at point B is



- (A) $-2\hat{i} + 3\hat{j}$ (B) $2\hat{i} - 3\hat{j}$
 (C) $2\hat{i} + 3\hat{j}$ (D) $-2\hat{i} - 3\hat{j}$

22. The horizontal range and the maximum height of a projectile are equal. The angle of projection of the projectiles is
 (A) $\theta = \tan^{-1}\left(\frac{1}{4}\right)$ (B) $\theta = \tan^{-1}(4)$
 (C) $\theta = \tan^{-1}(2)$ (D) $\theta = 45^\circ$
23. A missile is fired for maximum range with an initial velocity of 20 m/s. If $g = 10 \text{ m/s}^2$, then range of the missile is
 (A) 40 m (B) 50 m
 (C) 60 m (D) 20 m
24. A particle has initial velocity $(2\vec{i} + 3\vec{j})$ and acceleration $(0.3\vec{i} + 0.2\vec{j})$. The magnitude of velocity after 10 seconds will be
 (A) $9\sqrt{2}$ units (B) $5\sqrt{2}$ units
 (C) 5 units (D) 9 units
25. A boat which has a speed of 5 km/hr in still water crosses a river of width 1 km along the shortest possible part in 15 minutes. The velocity of the river water in km/hr is
 (A) 3 (B) 4
 (C) $\sqrt{21}$ (D) 1
26. For angles of projection of projectiles $(45^\circ - \theta)$ and $(45^\circ + \theta)$, the horizontal ranges described by the projectile are in the ratio of
 (A) 1 : 3 (B) 1 : 2
 (C) 2 : 1 (D) 1 : 1
27. A cricketer can throw a ball to a maximum horizontal distance of 100m. With the same effort, he throws the ball vertically upwards. The maximum height attained by the ball is
 (A) 100 m (B) 80 m
 (C) 60 m (D) 50
28. If time of flight of projectile is 10 seconds. Range is 500 m. the maximum height attained by it will be
 (A) 125m (B) 50m
 (C) 100m (D) 150m
29. In a projectile motion, velocity at maximum height is
 (A) $\frac{u \cos \theta}{2}$ (B) $u \cos \theta$
 (C) $\frac{u \sin \theta}{2}$ (D) None of these
30. One fielder throws a ball and in 4 sec it reaches to another player. So, the maximum height reached by the ball above the point of projection would be about
 (A) 10m (B) 7.5m
 (C) 5m (D) 20m
31. Two balls are projected from top of a tower of height 120 m, one with initial upward velocity of 36 km/h and other with initial downward velocity of 36 km/h. The speed of each ball just before hitting the ground is (Take $g = 10 \text{ m/s}^2$)
 (A) 50 m/s, 70 m/s (B) 50 m/s, 50 m/s
 (C) 70 m/s, 50 m/s (D) 50 m/s, $5\sqrt{2}$ m/s
32. Two projectiles A and B are projected with same speed at angle 30° and 60° to horizontal, then choose the wrong statement? (Symbols have their usual meaning)
 (A) $R_A = R_B$ (B) $H_B = 3H_A$
 (C) $\sqrt{3}T_B = T_A$ (D) All of these
33. Wind is blowing in the east direction at speed of 2 m/s which causes the rain to fall at some angle with the vertical. With what velocity should a cyclist drive so that the rain appears vertical to him
 (A) 2 m/s south (B) 2 m/s east
 (C) 4 m/s west (D) 4 m/s south
34. A flag is mounted on a car moving due North with velocity of 20 km/hr. Strong winds are blowing due East with velocity of 20 km/hr. the flag will point in direction
 (A) East (B) North - East
 (C) South - East (D) South - West
35. If the position vector of a particle is $\vec{r} = 3t\hat{i} - 4\hat{j} + \hat{k}$, the particle will be-
 (A) moving with uniform velocity
 (B) stationary
 (C) moving with uniform acceleration
 (D) insufficient data
36. A ship A is moving Westwards with a speed of 10 kmh^{-1} and a ship B 100 km South of A, is moving Northwards with a speed of 10 kmh^{-1} . The time after which the distance between them becomes shortest is
 (A) 0h (B) 5h
 (C) $5\sqrt{2}$ h (D) $10\sqrt{2}$ h

37. The x and y coordinates of the particle at any time are $x = 5t - 2t^2$ and $y = 10t$ respectively, where x and y are in meters and t in seconds. The acceleration of the particle at $t = 2$ s is
 (A) -8m/s^2 (B) 0
 (C) 5m/s^2 (D) -4m/s^2
38. A body is moving with velocity 30 m/s towards east. After 10s its velocity becomes 40 m/s towards north. The average acceleration of the body is
 (A) 7 m/s^2 (B) $\sqrt{7}\text{m/s}^2$
 (C) 5 m/s^2 (D) 1 m/s^2
39. The speed of a projectile at its maximum height is half of its initial speed. The angle of projection is
 (A) 60° (B) 15°
 (C) 30° (D) 45°
40. A person swims in a river aiming to reach exactly opposite point on the bank of a river. His speed of swimming is 0.5 m/s at an angle 120° with the direction of flow of water. The speed of water in stream is:
 (A) 1.0 m/s (B) 0.5 m/s
 (C) 0.25 m/s (D) 0.43 m/s
41. A particle moves in $x - y$ plane according to rule $x = a \sin \omega t$ and $y = a \cos \omega t$. The particle follows
 (A) an elliptical path
 (B) a circular path
 (C) a parabolic path
 (D) a straight line path inclined equally to x and y - axes
42. A moves with 65 km/h while B is coming back of A with 80 km/h. The relative velocity of B with respect to A is
 (A) 15 km/h (B) 145 km/h
 (C) 60 km/h (D) 80 km/h
43. A boat crosses a river with a velocity of 8 km/h. If the resulting velocity of boat is 10 km/h then the velocity of river water is
 (A) 6 km/h (B) 8 km/h
 (C) 10 km/h (D) 4 km/h
44. A man travelling in a bus moves from west to east with a speed of 40 km/hr. He observes that the raindrops are falling vertically down. To another man standing on the ground, the rain will appear
 (A) to be falling vertically down
 (B) to be falling at an angle going from east to west
 (C) to be falling at an angle going from west to east
 (D) insufficient information is given to determine the direction of the rain
45. A 150 m long train moves towards south at a speed of 10 m/s. A sparrow flying at a speed of 5 m/s towards north crosses the train. What is the time taken by the sparrow to cross the train?
 (A) 30 s (B) 15 s
 (C) 8 s (D) 10 s

ANSWER KEY

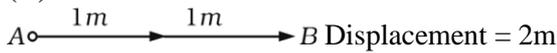
1. (A)
2. (B)
3. (B)
4. (B)
5. (A)
6. (C)
7. (D)
8. (C)
9. (A)
10. (B)
11. (D)
12. (B)
13. (A)
14. (A)
15. (A)

16. (D)
17. (D)
18. (D)
19. (D)
20. (A)
21. (B)
22. (B)
23. (A)
24. (B)
25. (A)
26. (D)
27. (D)
28. (A)
29. (B)
30. (D)

31. (B)
32. (C)
33. (B)
34. (D)
35. (A)
36. (B)
37. (D)
38. (C)
39. (A)
40. (C)
41. (B)
42. (A)
43. (A)
44. (C)
45. (D)

HINT AND SOLUTIONS

1. (A)



2. (B)

Time taken to go from A to B :

$$\text{time} = \frac{\text{distance}}{\text{speed}} = \frac{4}{1} = 4\text{s}$$

$$\text{Average velocity} = \frac{\text{Total displacement}}{\text{Total time}}$$

$$= \frac{2}{4} = 0.5\text{ms}^{-1}$$

3. (B)

$$\Rightarrow a_{\text{avg}} = \frac{-30 - (+18)}{2.5}$$

$$= -19.2 \text{ m/s}^2$$

4. (B)

$$S_1 = \hat{i} + 2\hat{j} = 3\hat{k}$$

$$S_2 = 2(\hat{i} + 2\hat{j} + 3\hat{k}) = 2\hat{i} + 4\hat{j} + 6\hat{k}$$

$$S_3 = 2(\hat{i} - 2\hat{j} + 3\hat{k}) = 2\hat{i} - 4\hat{j} + 6\hat{k}$$

$$S = S_1 + S_2 + S_3 = 5\hat{i} + 2\hat{j} + 15\hat{k}$$

5. (A)

$$\text{Average velocity} = \frac{v_1 t + v_2 t}{2t} = \frac{v_1 + v_2}{2}$$

6. (C)

$$\text{Average velocity} = \frac{x + x}{x/v_1 + x/v_2}$$

$$\Rightarrow v_{\text{av}} = \frac{2}{\frac{1}{v_1} + \frac{1}{v_2}} \Rightarrow \frac{2}{v_{\text{av}}} = \frac{1}{v_1} + \frac{1}{v_2}$$

7. (D)

$$\text{Average speed} = \frac{\text{Total distance travelled}}{\text{Total time taken}};$$

$$= \frac{x}{\frac{2x}{5} + \frac{3x}{5}} = \frac{5v_1 v_2}{3v_1 + 2v_2}$$

8. (C)

Magnitude of instantaneous velocity is equal to instantaneous speed. So, if speed changes, velocity must change. However, velocity can change without change in speed (e.g. uniform circular motion)

9. (A)

From concept of instantaneous velocity and instantaneous speed.

10. (B)

Relative velocity of bird w.r.t train = 25 + 5 = 30 m/s
time taken by the bird to cross the train

$$t = \frac{210}{30} = 7\text{sec}$$

11. (D)

Total distance = 130 + 120 = 250 m

Relative velocity = 30 - (-20) = 50 m/s;

Hence t = 250/50 = 5s

12. (B)

Here v = 144 km/h = 40m/s

$$v = u + at \Rightarrow 40 = 0 + 20 \times a \Rightarrow a = 2 \text{ m/s}^2$$

$$\therefore s = \frac{1}{2}at^2 = \frac{1}{2} \times 2 \times (20)^2 = 400\text{m.}$$

13. (A)

Distance travelled in 4 sec

$$24 = 4u + \frac{1}{2}a \times (4)^2 \quad \dots(i)$$

Distance travelled in total 8 sec

$$88 = 8u + \frac{1}{2}a \times (8)^2 \quad \dots(ii)$$

After solving (i) and (ii), we get u = 1m/s.

14. (A)

Let initial (t = 0) velocity of particle = u

For first 5 sec s₅ = 10 m ;

$$\Rightarrow 10 = 5u + \frac{1}{2}a(5)^2$$

$$\Rightarrow 2u + 5a = 4 \quad \dots(i)$$

For first 8 sec s₈ = 20 m

$$20 = 8u + \frac{1}{2}a(8)^2 \Rightarrow 2u + 8a = 5$$

By solving u = $\frac{7}{6}$ m/s and a = $\frac{1}{3}$ m/s²;

Now distance travelled by particle in Total 10 sec.

$$s_{10} = u \times 10 + \frac{1}{2}a(10)^2$$

By substituting the value of u and a we get

$$s_{10} = 28.3 \text{ m}$$

So the distance in last 2 sec = s₁₀ - s₈ = 28.3 - 20 = 8.3m

15. (A)

$$S_n = u + \frac{a}{2}(2n-1) = \frac{a}{2}(2n-1) \text{ because } u = 0;$$

$$\text{Hence } \frac{S_4}{S_3} = \frac{7}{5}.$$

16. (D)

$$\frac{v_A}{v_B} = \frac{\tan \theta_A}{\tan \theta_B} = \frac{\tan 30^\circ}{\tan 60^\circ} = \frac{1/\sqrt{3}}{\sqrt{3}} = \frac{1}{3}$$

17. (D)

Slope of $x - t$ graph gives velocity. Slope is +ve constant till t_0 and then it is zero.

18. (D)

$$v = u - gt$$

19. (D)

$$x = t(t-2) + (t-2)^2 \Rightarrow v = [2t - 2 + 2(t-2)] \text{ m/s}$$

$$\text{and } a = 4 \text{ m/s}^2$$

$$= (4t - 6) \text{ m/s};$$

$$\text{At } t = 0, x = 4 \text{ m and } v = -6 \text{ m/s}$$

20. (A)

$$x(t) = (t-3)^2 = t^2 + 9 - 6t$$

$$\Rightarrow v(t) = 2t - 6 \text{ and } a(t) = 2$$

$$\Rightarrow v(t) = 0 \text{ when } t = 3 \text{ s and } x(3) = 0$$

21. (B)

At point B the direction of velocity component of the projectile along Y-axis reverses.

$$\text{Hence, } \vec{V}_B = 2\hat{i} - 3\hat{j}$$

22. (B)

Horizontal range

$$R = \frac{u^2 \sin 2\theta}{g} \dots(1)$$

Maximum height

$$R = \frac{u^2 \sin 2\theta}{g} \dots(1)$$

Maximum height

$$H = \frac{u^2 \sin^2 \theta}{2g} \dots(2)$$

According to the problem $R = H$

$$\frac{u^2 \sin 2\theta}{g} = \frac{u^2 \sin^2 \theta}{2g}$$

23. (A)

For maximum range, the angle of projection, $\theta = 45^\circ$.

$$\therefore R = \frac{u^2 \sin 2\theta}{g}$$

$$= \frac{(20)^2 \sin(2 \times 45^\circ)}{10}$$

$$= \frac{400 \times 1}{10} = 40 \text{ m.}$$

24. (B)

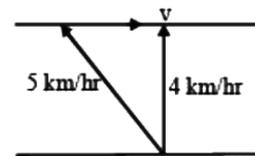
$$\vec{v} = \vec{u} + \vec{a}t$$

$$v = (2\hat{i} + 3\hat{j}) + (0.3\hat{i} + 0.2\hat{j}) \times 10 = 5\hat{i} + 5\hat{j}$$

$$|\vec{v}| = \sqrt{5^2 + 5^2}$$

$$|\vec{v}| = 5\sqrt{2}$$

25. (A)



Speed along the shortest path

$$= \frac{1}{15/60} = 4 \text{ km/hr}$$

$$\text{Speed of water } v = \sqrt{5^2 - 4^2} = 3 \text{ km/hr}$$

26. (D)

$(45^\circ - \theta)$ & $(45^\circ + \theta)$ are complementary angles as $45^\circ - 45^\circ + \theta = 90^\circ$. We know that if angle of projection of two projectiles make complementary angles, their ranges are equal.

In this case also, the range will be same. So the ratio is 1 : 1

27. (D)

$$R_{\max} \frac{u^2}{g} = 100 \text{ m}$$

$$\therefore u^2 = 100 \times 10 = 10000$$

$$H_{\max} = \frac{u^2}{2g} = \frac{10000}{2 \times 10} = 50 \text{ metre. (when } \theta = 90^\circ)$$

28. (A)

$$T = \frac{2u \sin \theta}{g} = 10 \text{ sec} \Rightarrow u \sin \theta = 50$$

$$\text{So } H = \frac{u^2 \sin^2 \theta}{2g} = \frac{(50)^2}{2 \times 10} = 125 \text{ m.}$$

29. (B)
 $u \cos \theta$

30. (D)
 $\frac{2u \sin \theta}{g} = 4 \text{ sec}$

$\Rightarrow u \sin \theta = 20$

$\therefore H = \frac{u^2 \sin^2 \theta}{2g} = \frac{400}{2 \times 10} \Rightarrow 20 \text{ m}$

31. (B)
 Both will reach on the ground with same speed
 $v = \sqrt{u^2 + 2gh} = \sqrt{100 + 2400} = 50 \text{ m/s}$

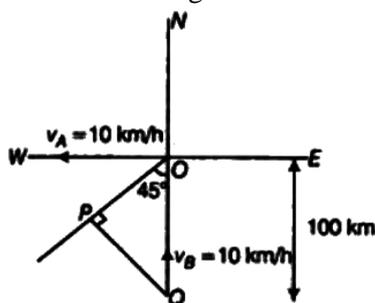
32. (C)
 $\frac{T_A}{T_B} = \frac{2u \sin 30^\circ}{\frac{g}{2u \sin 60^\circ}} = \frac{1}{\sqrt{3}}$
 $\Rightarrow T_B = \sqrt{3} T_A$

33. (B)
 2 m/s east

34. (D)
 Both wind and car speed will force the flag to point towards S - W

35. (A)
 $r = (3t)\hat{i} - 4\hat{j} + \hat{k}$
 $\vec{v} = \frac{d\vec{r}}{dt} = 3\hat{i}$

36. (B)
 It is clear from the diagram that the shortest distance



Hence $\sin 45^\circ = \frac{PQ}{OQ}$

$\Rightarrow PQ = 100 \times \frac{1}{\sqrt{2}} = 50\sqrt{2} \text{ m}$

37. (D)
 [d] $x = 5t - 2t^2$ $y = 10t$
 $\frac{dx}{dt} = 5 - 4t$ $\frac{dy}{dt} = 10$
 $v_x = 5 - 4t$ $v_y = 10$
 $\frac{dv}{dt}_x = -4$ $\frac{dv}{dt}_y = 10$
 $A_x = -4$ $a_y = 0$ Acceleration of P

38. (C)
 Average acceleration: = $\frac{\text{Change in velocity}}{\text{Total time}}$

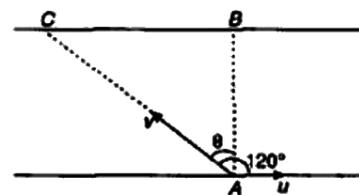
$a = \frac{|V_f - v_i|}{\Delta t}$
 $= \frac{\sqrt{30^2 + 40^2}}{10} = \frac{\sqrt{900 + 1600}}{10}$
 $= 5 \text{ ms}^{-2}$

39. (A)
 The speed of a projectile at its maximum height
 $v' = v_0 \cos \theta$

$\frac{v_0}{2} = v_0 \cos \theta$
 $\cos \theta = \frac{1}{2}$

$\theta = 60^\circ$

40. (C)
 Let u be the speed of stream and v the speed of



As given, v makes an angle of 120° with $u = v \sin \theta$
 $= v \sin 30^\circ$

$\therefore u = \frac{v}{2} = \frac{0.5}{2} (v = 0.5 \text{ m/s})$
 $= 0.25 \text{ m/s}$

41. (B)

$$x = a \sin \omega t \Rightarrow \frac{x}{a} = \sin \omega t$$

$$x = a \cos \omega t \Rightarrow \frac{x}{a} = \cos \omega t$$

$$\therefore \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \text{ or } x^2 + y^2 = a^2$$

42. (A)

15 km/h

43. (A)

6 km/h

44. (C)

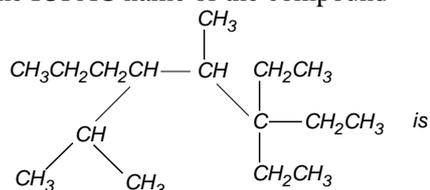
To be falling at an angle going from west to east

45. (D)

10s

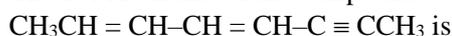
(Chemistry)

46. The IUPAC name of the compound



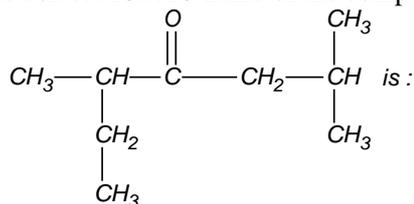
- (A) 3,3-diethyl-4-methyl-5-isopropyl octane
 (B) 3,3-diethyl-5-isopropyl-4-methyl octane
 (C) 4-isopropyl-5-methyl-6,6-diethyl octane
 (D) 6,6-diethyl-4-isopropyl-5-methyl octane

47. The IUPAC name of the compound



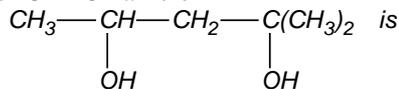
- (A) 4,6-octadien-2-yne
 (B) 2,4-octadien-6-yne
 (C) 2-octyn-4,6-diene
 (D) 6-octyn-2,4-diene

48. The correct IUPAC name of the compound



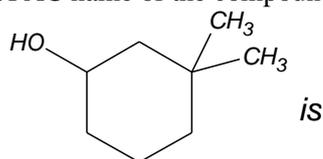
- (A) 2,5-dimethyl heptan-4-one
 (B) 3,6-dimethyl heptan-4-one
 (C) 2-ethyl-5-methyl hexan-3-one
 (D) 1,1-dimethyl-4-ethyl pentan-3-one

49. The IUPAC name of



- (A) 1,1-dimethyl-1,3-butanediol
 (B) 2-methyl-2,4-pentane diol
 (C) 1,3,3-trimethyl-1,3-propane diol
 (D) 4-methyl-2,4-pentane diol

50. The IUPAC name of the compound

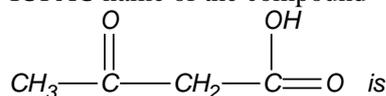


- (A) 1,1-dimethyl-3-hydroxy cyclohexane
 (B) 3,3-dimethyl-1-hydroxy cyclohexane
 (C) 3,3-dimethyl cyclohexanol
 (D) 1,1-dimethyl-3-cyclohexanol

51. Which of the following compounds represents 2,2,3-trimethylhexane?

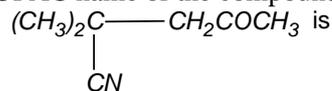
- (A) $\text{CH}_3\text{C}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)_2$
 (B) $\text{CH}_3\text{C}(\text{CH}_3)_2\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_3$
 (C) $\text{CH}_3\text{C}(\text{CH}_3)_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{CH}_3$
 (D) $\text{CH}_3\text{C}(\text{CH}_3)_2\text{CH}_2\text{C}(\text{CH}_3)_2\text{CH}_3$

52. The IUPAC name of the compound



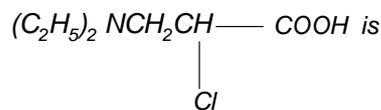
- (A) 1-hydroxy butan-1,2-dione
 (B) 4-hydroxy butan-2,4-dione
 (C) 3-oxo butanoic acid
 (D) 1-hydroxy-1,3-dioxo butane

53. The IUPAC name of the compound



- (A) 4-cyano-4-methyl-2-oxo pentane
 (B) 2-cyano-2-methyl-4-oxo pentane
 (C) 2,2-dimethyl-4-oxo pentanenitrile
 (D) 4-cyano-4-methyl-2-pentanone

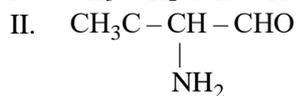
54. The IUPAC name of



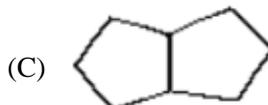
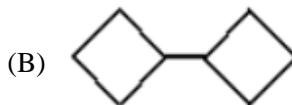
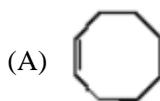
- (A) 2-chloro-4-(N-ethyl) pentanoic acid
 (B) 2-chloro-3-(N,N-diethyl amino) propanoic acid
 (C) 2-chloro-2-oxo diethyl amine
 (D) 2-chloro-2-carboxy-N-ethyl ethane

66. Numbers of possible isomers of glucose are
 (A) 10
 (B) 14
 (C) 16
 (D) 20
67. Draw all structurally isomeric alkenes with molecular formula C_4H_8 .
 (A) 3
 (B) 4
 (C) 5
 (D) 6
68. Draw all structurally isomeric 2° chlorides with molecular formula $C_5H_{11}Cl$
 (A) 7
 (B) 3
 (C) 2
 (D) 6
69. How many structurally isomeric benzene can be formed by molecular formula C_7H_8O
 (A) 9
 (B) 4
 (C) 8
 (D) 5
70. How many structurally isomeric cyclic bromides can be formed having molecular formula C_4H_7Br
 (A) 5
 (B) 4
 (C) 8
 (D) 3
71. Isomers have essentially identical
 (A) Structural formula
 (B) Chemical properties
 (C) Molecular formula
 (D) Physical properties
72. What is the correct relationship between the following compounds?
 $CH_3 - CH_2 - \underset{\text{CH}_3}{\text{CH}} - CH_2 - CH_3$, $CH_3 - CH_2 - CH_2 - CH_2 - \underset{\text{CH}_3}{CH_2}$
- (A) Chain isomers
 (B) Position isomers
 (C) Functional isomers
 (D) Identical

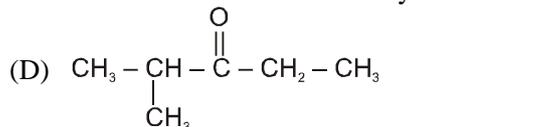
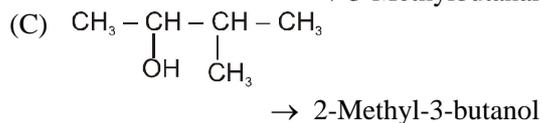
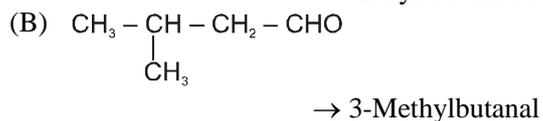
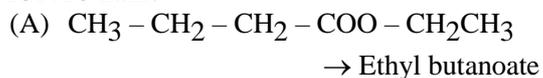
73. Which type of isomerism is observed between I and II.



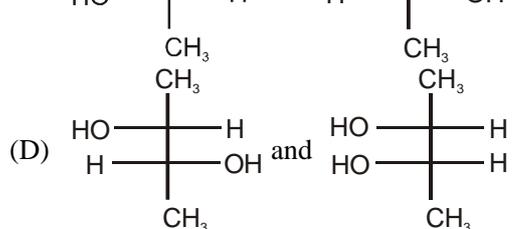
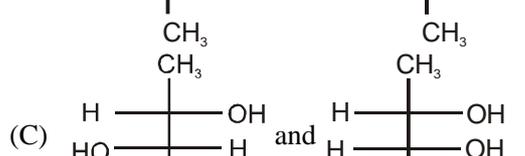
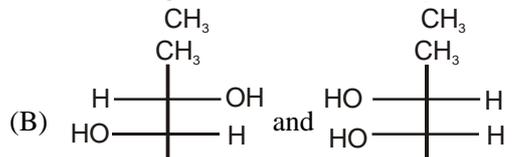
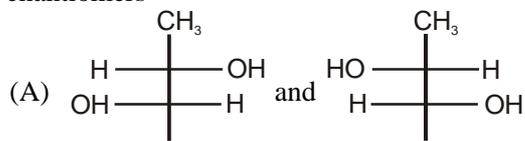
- (A) Chain isomers
 (B) Position isomers
 (C) Functional isomers
 (D) Metamers
74. How many positional isomers are possible for dimethylcyclohexane?
 (A) 3
 (B) 4
 (C) 5
 (D) 6
75. How many structural isomers of all the tertiary alcohols with molecular formula $C_6H_{14}O$.
 (A) 2
 (B) 3
 (C) 4
 (D) 5
76. Number of structurally isomeric ethers with molecular formula $C_5H_{12}O$.
 (A) 4
 (B) 5
 (C) 6
 (D) 7
77. What is the number of all (structurally isomeric) alkynes with molecular formula C_6H_{10} .
 (A) 6
 (B) 7
 (C) 8
 (D) 9
78. Which one of the compound is not isomer of others?



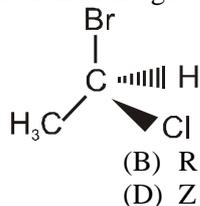
79. Which of the following compounds has wrong IUPAC name



80. Which of the following pairs of compounds are enantiomers



81. The configuration of the given compound is



- (A) E
(C) S

- (B) R
(D) Z

82. Which one of the following pair represents stereo isomerism

- (A) Linkage isomerism and Geometrical isomerism
(B) Chain isomerism and Rotational isomerism
(C) Optical isomerism and Geometrical isomerism
(D) Structural isomerism and Geometrical isomerism

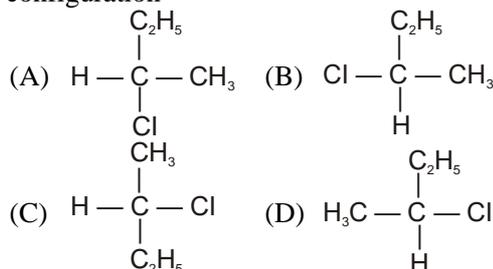
83. Which of the following is not chiral?

- (A) 2-Butanol
(B) 2, 3-Dibromo pentane
(C) 3-Bromo pentane
(D) 2-Hydroxy propanoic acid

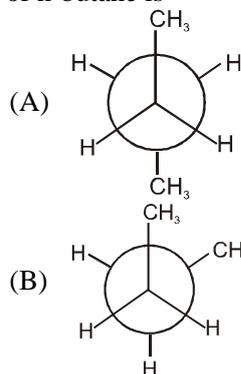
84. Among the following which one can have a meso form?

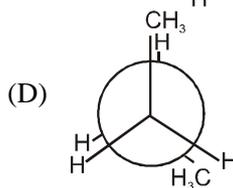
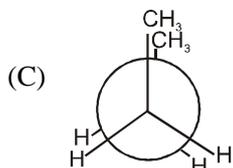
- (A) $\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{Cl})\text{C}_2\text{H}_5$
(B) $\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_3$
(C) $\text{C}_2\text{H}_5\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_3$
(D) $\text{HOCH}_2\text{CH}(\text{Cl})\text{CH}_3$

85. $\text{CH}_3 - \text{CHCl} - \text{CH}_2 - \text{CH}_3$ has a chiral centre which one of the following represents its R configuration

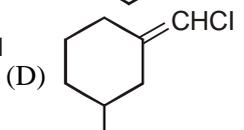
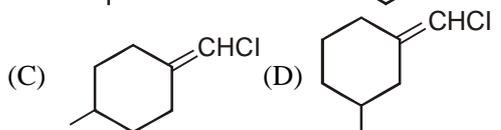
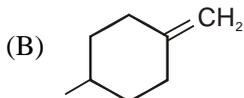
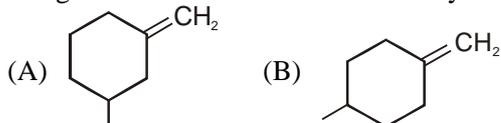


86. In the following the most stable conformation of n-butane is

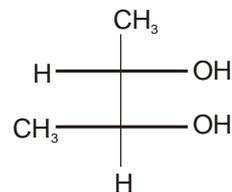




87. The geometrical isomerism is shown by



88. Correct configuration of the following is



(A) 2S, 3S

(B) 2S, 3R

(C) 2R, 3S

(D) 2R, 3R

89. Which of the following compound is expected to be optically active?

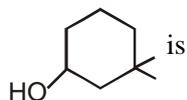
(A) $(\text{CH}_3)_2\text{CHCHO}$

(B) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$

(C) $\text{CH}_3\text{CH}_2\text{CHBrCHO}$

(D) $\text{CH}_3\text{CH}_2\text{CBr}_2\text{CHO}$

90. The IUPAC name of the compound



(A) 3, 3 - dimethyl - 1 - hydroxy cyclohexane

(B) 1, 1 - dimethyl - 3 - hydroxy cyclohexane

(C) 3, 3 - dimethyl - 1 - cyclohexanol

(D) 1, 1 - dimethyl - 3 - cyclohexanol

Answer Key

- 46. (B)
- 47. (B)
- 48. (A)
- 49. (B)
- 50. (C)
- 51. (C)
- 52. (C)
- 53. (C)
- 54. (B)
- 55. (A)
- 56. (A)
- 57. (D)
- 58. (C)
- 59. (C)
- 60. (D)
- 61. (B)
- 62. (A)
- 63. (C)
- 64. (B)
- 65. (B)
- 66. (C)
- 67. (A)
- 68. (B)
- 69. (D)
- 70. (B)
- 71. (C)
- 72. (A)
- 73. (C)
- 74. (B)
- 75. (B)
- 76. (C)
- 77. (B)
- 78. (D)
- 79. (C)
- 80. (A)
- 81. (B)
- 82. (C)
- 83. (C)
- 84. (B)
- 85. (B)
- 86. (A)
- 87. (D)
- 88. (A)
- 89. (C)
- 90. (C)

Hint and Solutions

46. (B)

47. (B)

48. (A)

49. (B)

50. (C)

51. (C)

52. (C)

53. (C)

54. (B)

55. (A)

56. (A)

57. (D)

58. (C)

59. (C)

60. (D)

61. (B)

62. (A)

63. (C)

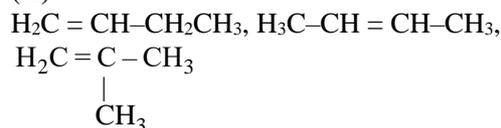
64. (B)

65. (B)

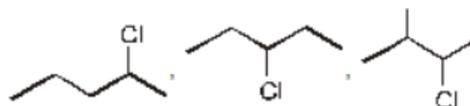
66. (C)

Glucose has four dissimilar asymmetric carbon atoms; $a = 2^4$.
Hence, (C) is the correct answer.

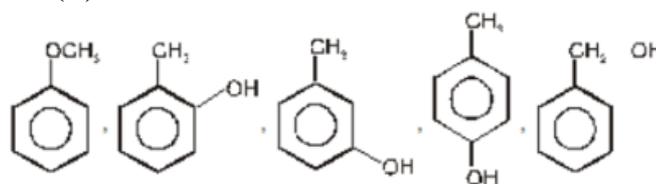
67. (A)



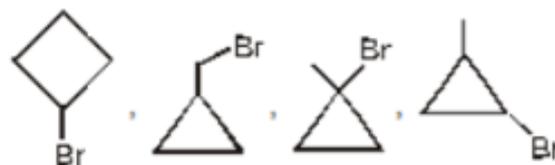
68. (B)



69. (D)



70. (B)

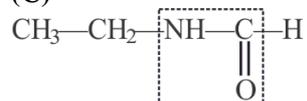


71. (C)

72. (A)

Carbon skeleton is different in both compounds.

73. (C)



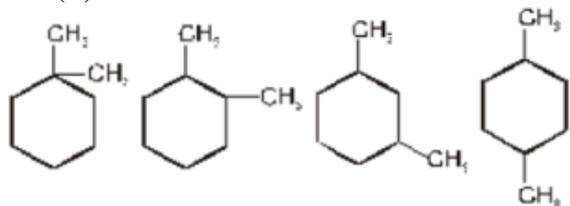
Amide functional group

$\text{CH}_3-\text{CH}-\text{CHO} \leftarrow$ Aldehyde

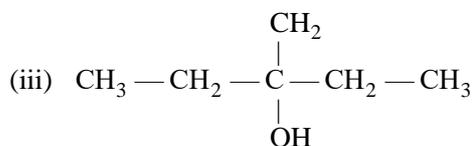
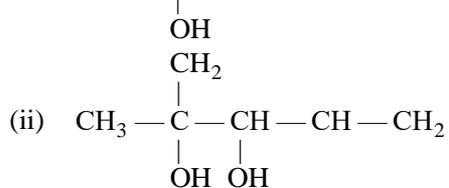
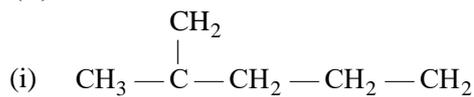
$\text{NH}_2 \leftarrow$ 1° Amine

Aldehyde and 1° Amine

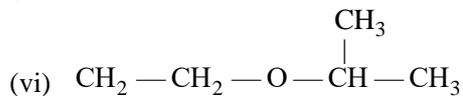
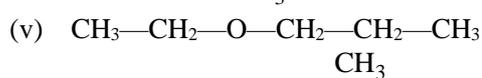
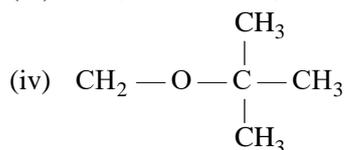
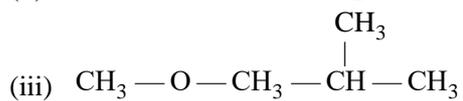
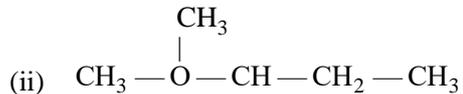
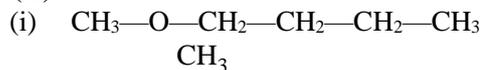
74. (B)



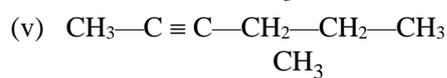
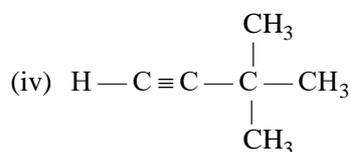
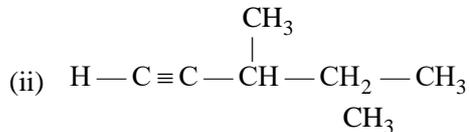
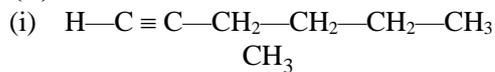
75. (B)



76. (C)



77. (B)



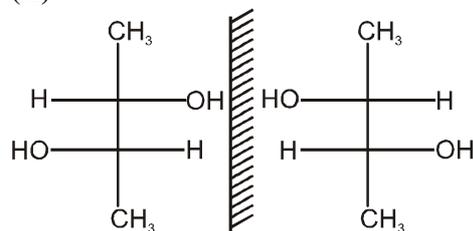
78. (D)



It has different molecular formula with different DU.

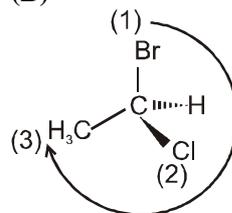
79. (C)

80. (A)



non-super impossible mirror image stereoisomers

81. (B)



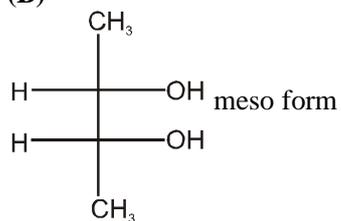
Clockwise arrow represents 'R' configuration

82. (C)

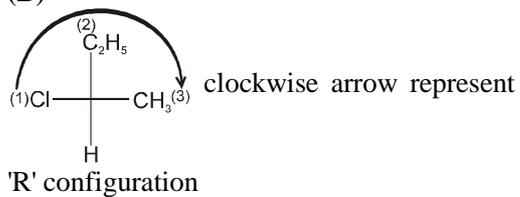
83. (C)

3-Bromopentane does not have chiral carbon

84. (B)



85. (B)



86. (A)

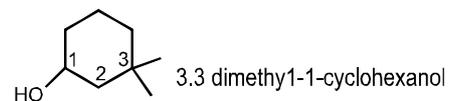
Anti form of butane is more stable because of less strains.

87. (D)

88. (A)

89. (C)

90. (C)



Practice Test - 02

- 121.** Which of the following statement is incorrect?
(A) Succus entericus is the name given to intestinal juice.
(B) In terrestrial vertebrates lungs are used for the exchange of gases.
(C) Book gills are respiratory organs of scorpion
(D) Gills perform respiratory function in crustaceans
- 122.** Air from the nasal chambers moves immediately into _____ during inspiration?
(A) Alveoli (B) Nasopharynx
(C) Trachea (D) Larynx
- 123.** Volume of air inspired during normal inspiration is?
(A) 500 ml (B) 1000 ml
(C) 3500 ml (D) 1200 ml
- 124.** Different types of respiratory organs are found in:
(A) Aves (B) Arthropods
(C) Mammals (D) Sponges
- 125.** Respiratory organ of insects is
(A) Moist cuticle (B) Tracheal tubes
(C) Lungs (D) Pharynx
- 126.** Type of dentition in human is:
(A) Heterodont and diphyodont
(B) Heterodont and pleurodont
(C) Thecodont and homodont
(D) Thecodont and pleurodont
- 127.** Muscular sphincter which regulates the opening of oesophagus into the stomach is?
(A) Pyloric sphincter
(B) Gastro-oesophageal sphincter
(C) Gastric valve
(D) Ileo-Caecal valve
- 128.** Opening of common hepato-pancreatic duct into duodenum is guarded by:
(A) Sphincter of Boyden
(B) Cardiac sphincter
(C) Pyloric sphincter
(D) Sphincter of Oddi
- 129.** Function of gall bladder is:
(A) Storage of bile juice
(B) Formation of enzymes
(C) Synthesis of bile
(D) Formation of bile salts
- 130.** Digestive enzymes responsible for breaking down disaccharides includes:
(A) Pepsin, Trypsin
(B) Lactase, Lipase
(C) Maltase, Lactase
(D) Chymotrypsin, pepsin
- 131.** Which of the following is not the function of HCl in stomach?
(A) Break down of proteins into peptones
(B) Killing the bacteria ingested with food and drinks
(C) Softening food particles
(D) Convert inactive protein digesting enzymes into active protein digesting enzymes
- 132.** Why do the eyes of patient turn yellow during jaundice?
(A) Due to the deposition of bile pigment
(B) Due to ejection of stomach content through mouth
(C) Due to stomach malfunctioning
(D) Due to excessive vomiting
- 133.** Wind pipe of humans divide into bronchi at the level of -
(A) 3rd cervical vertebra
(B) 5th Lumbar vertebra
(C) 5th thoracic vertebra
(D) 3rd thoracic vertebra

- 134.** Liver is the largest gland and is associated with various functions, choose the one which is not correct
 (A) Metabolism of carbohydrate
 (B) Digestion of fat
 (C) Formation of bile
 (D) Secretion of hormone called gastrin
- 135.** Contraction of diaphragm _____ volume of the thoracic cavity in _____
 (A) Increases, antero-posterior axis
 (B) Increases, Dorso-ventral axis
 (C) Decreases, antero-posterior axis
 (D) Decreases, Dorso-ventral axis
- 136.** In alveolar air, the partial pressure of CO₂ is-
 (A) 42 mm Hg (B) 44 mm Hg
 (C) 40 mm Hg (D) 45 mm Hg
- 137.** The successive waves of muscular contractions by which the bolus further passes down through the oesophagus is called:
 (A) Deglutition
 (B) Churning movement
 (C) Mastication
 (D) Peristalsis
- 138.** 30% starch is hydrolysed in Buccal cavity by which of the following enzyme?
 (A) Pancreatic a-amylase
 (B) Lipase
 (C) Maltase
 (D) Salivary amylase
- 139.** Which of the following enzymes is not found in the pancreatic juice?
 (A) Amylases
 (B) Lipases
 (C) Enterokinase
 (D) Trypsinogen
- 140.** Which of the following help in protection of gastric mucosal epithelium from excoriation by HCl?
 (A) Castle's intrinsic factor
 (B) Mucous and bicarbonates
 (C) Mucous and pepsin
 (D) Pepsin and Rennin
- 141.** On an average, a healthy human breathes _____ times/minute:
 (A) 20 – 40 (B) 1 – 6
 (C) 12 – 16 (D) 16 – 25
- 142.** Succus entericus is the name given to
 (A) Junction between ileum and large intestine
 (B) Intestinal juice
 (C) Swelling in the gut
 (D) Appendix
- 143.** Which word best describes the action of bile on fats
 (A) Neutralisation (B) Digestion
 (C) Emulsification (D) Absorption
- 144.** Amount of Air, inhaled and exhaled during normal breathing is called as -
 (A) Residual volume
 (B) Dead space volume
 (C) Tidal volume
 (D) Vital capacity
- 145.** Total lung capacity includes
 (A) TV + RV + ERV
 (B) IRV + ERV + TV
 (C) RV + IRV + ERV + TV
 (D) RV + TV + IRV
- 146.** Surgical removal of gall bladder in human beings would lead to
 (A) Impairment of the digestion of fat
 (B) Increased acidity in the intestine
 (C) Jaundice
 (D) None of the above
- 147.** Trypsinogen is an inactive enzyme secreted by the pancreas. It is activated by
 (A) Pepsin of stomach
 (B) Chymotrypsin
 (C) Bile
 (D) Enterokinase
- 148.** Thoracic cage is covered by
 (A) Ventral surface - sternum and ribs
 (B) Posterior surface - Diaphragm
 (C) Dorsal surface - Vertebral column & ribs
 (D) All above statements are correct

- 149.** Find the odd one out regarding Respiratory Tree:
 (A) Pharynx
 (B) Alveoli
 (C) Respiratory bronchiole
 (D) Alveolar duct
- 150.** Gastric juice of infants contains -
 (A) Nuclease, pepsinogen, lipase
 (B) Pepsinogen, lipase, rennin
 (C) Amylase, rennin, pepsinogen
 (D) Maltase, pepsinogen, rennin
- 151.** Which one of the following pairs of the kind of cells and their secretion are correctly matched
 (A) Oxyntic cells - A secretion with acidic pH
 (B) Alpha cells of islets of Langerhans - Secretion that decreases blood sugar level
 (C) Kupffer cells - A digestive enzyme that hydrolyses nucleic acids
 (D) Submaxillary glands - Succus entericus
- 152.** A person consuming 30g Ghee, 100 gm dal 250 gm chapatis in restaurant. Find out the total physiological value of this food.
 (A) 1670 cal (B) 1620 cal
 (C) 3420 cal (D) 16,70,000 cal
- 153.** Under weight, stunted growth, oedema on lower leg and face are symptoms of one disease related to digestive system is-
 (A) Marasmus
 (B) Kwashiorkor
 (C) Hypervitaminosis
 (D) Fluorosis
- 154.** Which of the following enzyme is not present in pancreatic juice?
 (A) Rennin (B) Trypsin
 (C) Amylopsin (D) Steapsin
- 155.** Chylomicrons are concerned with
 (A) Digestion of fat
 (B) Absorption of proteins
 (C) Digestion of protein
 (D) Absorption of fat
- 156.** Curdling of Milk in children's is done in the presence of enzyme
 (A) Ptyalin (B) Pepsinogen
 (C) Renin (D) Rennin
- 157.** Partial pressure of carbon dioxide in Alveoli, atmospheric air and tissues will be:
 (A) 0.3, 40, 45 (B) 40, 0.3, 45
 (C) 0.3, 104, 28 (D) 40, 0.3, 28
- 158.** Brunner's glands are located in
 (A) Mucosa layer of Duodenum
 (B) Sub-mucosa layer of jejunum
 (C) Sub-mucosa layer of Duodenum
 (D) Mucosa layer of Stomach
- 159.** Read the following statements (A - D):
 (A) The stomach stores the food for 4 - 5 hours.
 (B) The food mixes thoroughly with the acidic intestinal juice.
 (C) Trypsinogen is activated by an enzyme enterogastrone, secreted by the intestinal mucosa.
 (D) Rennin is an enzyme found in gastric juice of infants which helps in digestion of milk proteins.
 How many of the above statement are wrong?
 (A) Four (B) Two
 (C) One (D) Three
- 160.** Which of the following statement is correct with reference to normal breathing
 (A) Inspiration and expiration are active processes
 (B) Inspiration and expiration are passive processes
 (C) Inspiration is a passive process where as expiration is active
 (D) Inspiration is a active process where as expiration is passive
- 161.** Simplest respiratory organ presents in
 (A) Pheretima (B) Labeo
 (C) Cobra (D) Rhesus
- 162.** Which of the following is not a part of respiratory tract
 (A) Nasal chamber (B) Pharynx
 (C) Trachea (D) Oesophagus

- 163.** Partial pressure of O_2 in alveoil and tissues is respectively _____ mm Hg
 (A) 40, 40 (B) 104, 95
 (C) 159, 104 (D) 104, 40
- 164.** Which one of the following is incorrect statement
 (A) Lungs are covered by pleural membranes
 (B) Respiratory tree has alveolar duct & atria
 (C) Approximately 300 million alveoil are present in each lung
 (D) Thyroid cartilage is largest cartilage in the larynx
- 165.** Residual volume in human is
 (A) 500 ml (B) 1100 - 1200 ml
 (C) 4800 ml (D) 2500 - 3000 ml
- 166.** Cholecystokinin is a secretion of
 (A) Stomach which stimulates pancreas to release the pancreatic juice
 (B) Liver, synthesised from cholesterol and controls secondary sexual characters
 (C) Duodenum and contracts gall bladder to release bile
 (D) Goblet cells of ileum and stimulates the secretion of succus entericus
- 167.** Digestion of which component of the food is likely to be most adversely affected if the pH of stomach is made neutral
 (A) Sucrose (B) Starch
 (C) Protein (D) Lactose
- 168.** Respiratory organ of insects is
 (A) Moist cuticle
 (B) Tracheal tubes
 (C) Lungs
 (D) Pharynx
- 169.** Mark the correct statement for GIT ailments.
 (A) Vomiting is a reflex action controlled by vomit centre in hypothalamus
 (B) In indigestion there is abnormal frequency of bowel movement and increased liquidity of faecal discharge
 (C) Prolonged constipation can lead to haemmorhoids
 (D) Purgatives can treat diarrhoea
- 170.** The diffusion rate of gases across alveolar membranes is
 (A) Directly proportional to the thickness of diffusion membranes
 (B) Directly proportional to the solubility of gas being diffused
 (C) Inversely proportional to the thickness of diffusion membranes
 (D) Both (B) & (C)
- 171.** The $TV + IRV + ERV$ is same as
 (A) $TLC - FRC$ (B) $IC + FRC$
 (C) $EC + IRV$ (D) $TLC - EC$
- 172.** The correct values of pCO_2 (in mm of Hg) in pulmonary veins and systemic veins is
 (A) 45 in both of them
 (B) 40 & 45 respectively
 (C) 45 & 40 respectively
 (D) 32 & 95 respectively
- 173.** The volume of air involved in breathing movements can be estimated by spirometer, except
 (A) Tidal volume
 (B) Inspiratory reserve volume
 (C) Residual volume
 (D) Vital capacity
- 174.** Whether a child died after normal birth or died before birth can be confirmed by measuring -
 (A) Tidal volume of air
 (B) Residual volume of air
 (C) The weight of the child
 (D) The dead space air
- 175.** Primary site for gaseous exchange in human is
 (A) Tissue (B) Alveoli
 (C) Bronchus (D) Trachea
- 176.** Proteolytic enzymes do not corrode lining of alimentary canal as.
 (A) They are secreted in inactive form
 (B) Lining layer of alimentary canal does not contain protein
 (C) The enzymes are not capable of digesting fat
 (D) None of the above

177. Partial pressure of oxygen in alveolar air, atmospheric air, tissue are respectively
(A) 40, 159, 95 (B) 159, 40, 45
(C) 104, 159, 45 (D) 104, 159, 40

178. Trypsin differs from pepsin in digestion of proteins in.
(A) Acidic medium
(B) Alkaline medium
(C) Neutral medium
(D) Making peptide bond

179. Functional units of food absorption are
(A) Villi
(B) Brunner's glands
(C) Crypts of Lieberkuhn
(D) Peyer's patches

180. Bilirubin and biliverdin are found in
(A) Intestinal juice (B) Bile
(C) Pancreatic juice (D) Saliva

ANSWER KEY

- | | | |
|----------|----------|----------|
| 121. (C) | 142. (B) | 163. (D) |
| 122. (B) | 143. (C) | 164. (C) |
| 123. (A) | 144. (C) | 165. (B) |
| 124. (B) | 145. (C) | 166. (C) |
| 125. (B) | 146. (A) | 167. (C) |
| 126. (A) | 147. (D) | 168. (B) |
| 127. (B) | 148. (D) | 169. (C) |
| 128. (D) | 149. (A) | 170. (D) |
| 129. (A) | 150. (B) | 171. (C) |
| 130. (C) | 151. (A) | 172. (B) |
| 131. (A) | 152. (D) | 173. (D) |
| 132. (A) | 153. (B) | 174. (B) |
| 133. (C) | 154. (A) | 175. (B) |
| 134. (D) | 155. (C) | 176. (A) |
| 135. (A) | 156. (D) | 177. (D) |
| 136. (C) | 157. (B) | 178. (B) |
| 137. (D) | 158. (C) | 179. (A) |
| 138. (D) | 159. (B) | 180. (B) |
| 139. (C) | 160. (D) | |
| 140. (B) | 161. (A) | |
| 141. (C) | 162. (D) | |

Hints & Solutions

- 121.** (C)
Sol. NCERT Pg. # 53, 267, 268 Book gills are respiratory organs of Limulus (king crab)
- 122.** (B)
Sol. NCERT (XIth) Pg. # 269
Nasal chamber opens into Pharynx which is a common chamber for air and food
- 123.** (A)
Sol. NCERT (XIth) Pg. # 271 Tidal volume is the volume of air inspired or expired during a normal respiration.
- 124.** (B)
Sol. NCERT (XIth) Pg. # 268 Insects use trachea and aquatic arthropods have gills.
- 125.** (B)
Sol. NCERT Pg. # 268
- 126.** (A)
Sol. NCERT (XIth) Pg. # 258 Majority of mammals including human being forms two sets of teeth during their life, a set of temporary milk or deciduous teeth replaced by a set of permanent or adult teeth. This type of dentition is called diphyodont. An adult human has 32 permanent teeth which are of four different types (Heterodont dentition)
- 127.** (B)
Sol. NCERT (XIth) Pg. # 259 A muscular sphincter (gastro-oesophageal) regulates the opening of oesophagus into the stomach.
- 128.** (D)
Sol. NCERT (XIth) Pg. # 261 The bile duct and the pancreatic duct open together into the duodenum as the common hepato-pancreatic duct which is guarded by a sphincter called the sphincter of Oddi.
- 129.** (A)
Sol. NCERT (XIth) Pg. # 259 The bile secreted by the hepatic cells passes through the hepatic ducts and is stored and concentrated in a thin muscular sac called the gall bladder.
- 130.** (C)
Sol. NCERT (XIth) Pg. # 262 The secretions of the brush border cells of the mucosa along with the secretions of the goblet cells constitute the intestinal juice or succus entericus. This juice contains a variety of enzymes like disaccharidases (e.g., maltase), dipeptidases, lipases, nucleosidases, etc
- 131.** (A)
Sol. NCERT (XIth) Pg. # 262 HCl provides the acidic pH (pH 1.8) optimal for pepsins. Rennin is a proteolytic enzyme found in gastric juice of infants which helps in the digestion of milk proteins
- 132.** (A)
Sol. NCERT (XIth) Pg. # 265, Jaundice: The liver is affected, skin and eyes turn yellow due to the deposit of bile pigments
- 133.** (C)
Sol. NCERT Pg. # 269, Trachea is a straight tube extending up to the mid-thoracic cavity, which divides at the level of 5th thoracic vertebra into a right and left primary bronchi
- 134.** (D)
Sol. NCERT (XIth) Pg. # 260 Liver is the largest gland of the body weighing about 1.2 to 1.5 kg in an adult human. It is situated in the abdominal cavity, just below the diaphragm and has two lobes
- 135.** (A)
Sol. NCERT (XIth) Pg. # 270, 271 The contraction of external inter-costal muscles lifts up the ribs and the sternum causing an increase in the volume of the thoracic chamber in the dorso-ventral axis
- 136.** (C)
Sol. NCERT (XIth) Pg. # 272, table 17.1
- 137.** (D)
Sol. NCERT XI Pg # 261 The bolus is then conveyed into the pharynx and then into the oesophagus by swallowing or deglutition. The bolus further passes down through the oesophagus by successive waves of muscular contractions called peristalsis.
- 138.** (D)
Sol. NCERT XI Pg # 262 About 30 per cent of starch is hydrolysed in Buccal cavity by this enzyme (optimum pH 6.8) into a disaccharide – maltose
- 139.** (C)
Sol. NCERT XI Pg # 262 The pancreatic juice contains inactive enzymes – trypsinogen,

chymotrypsinogen, procarboxypeptidases, amylases, lipases and nucleases.

140. (B)

Sol. NCERT XI Pg # 262, The mucus and bicarbonates present in the gastric juice play an important role in lubrication and protection of the mucosal epithelium from excoriation by the highly concentrated hydrochloric acid.

141. (C)

Sol. NCERT XI Pg # 271, On an average, a healthy human breathes 12-16 times/minute. The volume of air involved in breathing movements can be estimated by using a spirometer which helps in clinical assessment of pulmonary functions.

142. (B)

Sol. NCERT XI Pg # 262, The secretions of the brush border cells of the mucosa alongwith the secretions of the goblet cells constitute the intestinal juice or succus entericus.

143. (C)

Sol. NCERT XI Pg # 262 The bile released into the duodenum contains bile pigments (bilirubin and bili-verdin), bile salts, cholesterol and phospholipids but no enzymes. Bile helps in emulsification of fats, i.e., breaking down of the fats into very small micelles

144. (C)

Sol. NCERT XI Pg # 271, Tidal Volume (TV): Volume of air inspired or expired during a normal respiration.

145. (C)

Sol. NCERT XI Pg # 272, Total volume of air accommodated in the lungs at the end of a forced inspiration. This includes RV, ERV, TV and IRV or vital capacity + residual volume.

146. (A)

Sol. NCERT XI Pg # 260, The bile secreted by the hepatic cells passes through the hepatic ducts and is stored and concentrated in a thin muscular sac called the gall bladder.

147. (D)

Sol. NCERT XI Pg # 262, Trypsinogen is activated by an enzyme, enterokinase, secreted by the intestinal mucosa into

active trypsin, which in turn activates the other enzymes in the pancreatic juice

148. (D)

Sol. NCERT XI Pg # 270, The thoracic chamber is formed dorsally by the vertebral column, ventrally by the sternum, laterally by the ribs and on the lower side by the dome-shaped diaphragm

149. (A)

Sol. NCERT XI Pg # 269

150. (B)

Sol. NCERT XI Pg # 262, Rennin is a proteolytic enzyme found in gastric juice of infants which helps in the digestion of milk proteins

151. (A)

Sol. NCERT XI Pg # 261, 262

152. (D)

30 g of ghee (fat) $30 * 9 = 270$ K cal
100 g of dal (protein) $100 * 4 = 400$ K cal
250 g of chapathi (carbohydrate) $250 * 4 = 1000$ K cal
Total = 1,670K cal, total cal = 16,70,000

153. (B)

Sol. NCERT XI Pg # 266, Kwashiorkar is produced by protein deficiency unaccompanied by calorie deficiency. It results from the replacement of mother's milk by a high calorie low protein diet in a child more than one year in age

154. (A)

Sol. NCERT XI Pg # 262, The pancreatic juice contains inactive enzymes – trypsinogen, chymotrypsinogen, procarboxypeptidases, amylases, lipases and nucleases

155. (C)

Sol. NCERT XI Pg # 265, Fatty acids and glycerol being insoluble, cannot be absorbed into the blood. They are first incorporated into small droplets called micelles which move into the intestinal mucosa. They are re-formed into very small protein coated fat globules called the chylomicrons which are transported into the lymph vessels (lacteals) in the villi

156. (D)

Sol. NCERT XI Pg # 262, Rennin is a proteolytic enzyme found in gastric juice of infants which helps in the digestion of milk proteins

157. (B)
Sol. NCERT XI Pg # 272, table 17.1

158. (C)
Sol. NCERT XI Pg # 262

159. (B)
Sol. NCERT XI Pg # 262

160. (D)
Sol. NCERT XI Pg # 270, 271

161. (A)
Sol. NCERT XI Pg # 268, Lower invertebrates like sponges, coelenterates, flatworms, etc., exchange O₂ with CO₂ by simple diffusion over their entire body surface. Earthworms use their moist cuticle

162. (D)
Sol. NCERT XI Pg # 269, 258

163. (D)
Sol. NCERT XI Pg # 272, table 17.1

164. (C)
Sol. NCERT XI Pg # 269

165. (B)
Sol. NCERT XI Pg # 272

166. (C)
Sol. NCERT XI Pg # 260, 262

167. (C)
Sol. NCERT XI Pg # 262

168. (B)

169. (C)
Sol. NCERT XI Pg # 265

170. (D)
Sol. NCERT XI Pg # 272

171. (C)
Sol. NCERT XI Pg # 272

172. (B)
Sol. NCERT XI Pg # 273

173. (D)
Sol. NCERT XI Pg # 271, 272

174. (B)
Sol. NCERT XI Pg # 272

175. (B)
Sol. NCERT XI Pg # 272

176. (A)
Sol. NCERT XI Pg # 262

177. (D)
Sol. NCERT XI Pg # 272, table 17.1

178. (B)
Sol. NCERT XI Pg # 262

179. (A)
Sol. NCERT XI Pg # 260

180. (B)
Sol. NCERT XI Pg # 262