

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. 6 Batch 2]

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 (4) marks. One (1) 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. 6

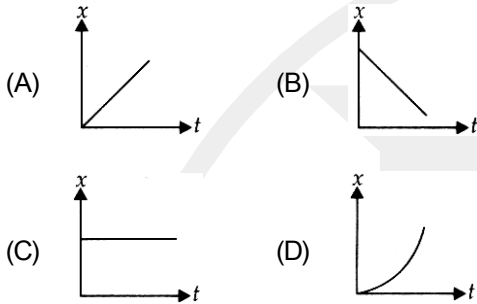
Topics of The Test

Physics	Motion in 1 D and Motion in 2 D.
Chemistry	Some basic concepts of chemistry.
Biology	Zoology : Respiration system in human. Botany : Plant respiration.

Test No. 6

[PHYSICS]

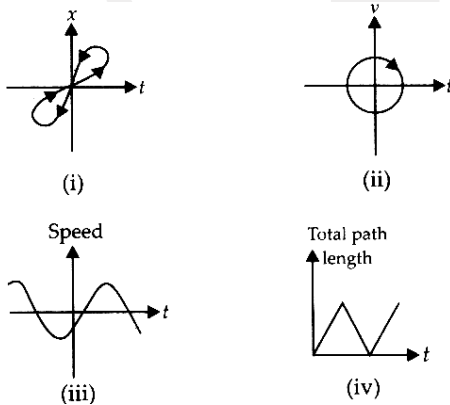
1. Which of the following graphs represents the position-time graph of a particle moving with negative velocity?



2. The position of an object moving along x-axis is given by $x = a + bt^2$, where $a = 8.5$ m and $b = 2.5$ m s⁻² and t is measured in seconds. The velocity of the object at $t = 2$ s is

- (A) 5 m s⁻¹ (B) 10 m s⁻¹
 (C) 15 m s⁻¹ (D) 20 m s⁻¹

3. Which of the following graphs cannot possibly represent one dimensional motion of a particle ?



- (A) (i) and (ii) (B) (ii) and (iii)
 (C) (i), (ii) and (iii) (D) All four

4. The velocity of the particle at any time t is given by $v = 2t(3 - t)$ m s⁻¹

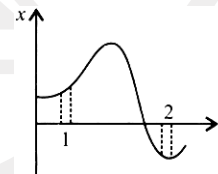
At what time is its velocity maximum ?

- (A) 2 s (B) 3 s
 (C) $\frac{2}{3}$ s (D) $\frac{3}{2}$ s

5. The motion of a particle is described by $x = x_0(1 - e^{-kt})$; $t \geq 0, x_0 > 0, k > 0$. With what velocity does the particle start ?

- (A) $\frac{x_0}{k}$ (B) x_0k
 (C) $\frac{k}{x_0}$ (D) $2x_0k$

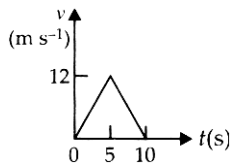
6. Figure shows the x-t plot of a particle in one-dimensional motion. Two different equal intervals of time are shown. Let v_1 and v_2 be average speed in time intervals 1 and 2 respectively. Then



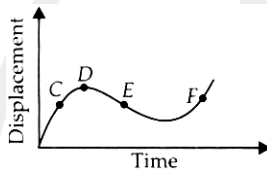
- (A) $v_1 > v_2$ (B) $v_2 > v_1$
 (C) $v_1 = v_2$ (D) data is insufficient

Space for Rough Work

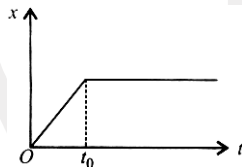
7. The speed-time graph of a particle moving along a fixed direction as shown in the figure. The distance traversed by the particle between $t = 0$ s to $t = 10$ s is



- (A) 20 m (B) 40 m
(C) 60 m (D) 80 m
8. The displacement-time graph of a moving particle is as shown in the figure. The instantaneous velocity of the particle is negative at the point



- (A) C (B) D
(C) E (D) F
9. Figure shows the displacement (x)-time (t) graph of the particle moving on the x -axis.



- (A) The particle is at rest.
(B) The particle is continuously going along x -direction.
(C) The velocity of the particle increases upto time t_0 and then becomes constant.
(D) The particle moves at a constant velocity up to a time t_0 and then stops.

10. The motion of a body is given by the equation $\frac{dv}{dt} = 6 - 3v$ where v is the speed in m s^{-1} and t is time in s. The body is at rest at $t = 0$. The speed varies with time as

- (A) $v = (1 - e^{-3t})$ (B) $v = 2(1 - e^{-3t})$
(C) $v = (1 + e^{-2t})$ (D) $v = 2(1 + e^{-2t})$

11. A particle moves rectilinearly. Its displacement x at time t is given by $x^2 = at^2 + b$ where a and b are constants. Its acceleration at time t is proportional to

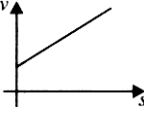
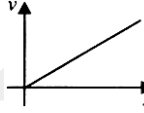
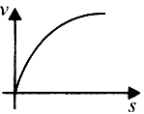
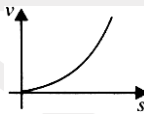
- (A) $\frac{1}{x^3}$ (B) $\frac{1}{x} - \frac{1}{x^2}$
(C) $-\frac{t}{x^2}$ (D) $\frac{1}{x} - \frac{t^2}{x^3}$

12. The given acceleration-time graph represents which of the following physical situations ?



- (A) A cricket ball moving with a uniform speed is hit with a bat for a very short time interval.
(B) A ball is falling freely from the top of a tower.
(C) A car moving with constant velocity on a straight road.
(D) A football is kicked into the air vertically upwards.
13. Which of the following statements is not correct ?
- (A) The zero velocity of a body at any instant does not necessarily imply zero acceleration at that instant.
(B) The kinematic equation of motions are true only for motion in which the magnitude and the direction of acceleration are constants during the course of motion.
(C) The sign of acceleration tells us whether the particle's speed is increasing or decreasing.
(D) All of these.

Space for Rough Work

14. Two trains A and B each of length 400 m are moving on two parallel tracks with a uniform speed 72 km h^{-1} in the same direction with A ahead of B. The driver of B decides to overtake A and accelerates by 1 m s^{-2} . If after 50 s the guard of B just brushes past A, what was the original distance between them?
 (A) 750 m (B) 1000 m
 (C) 1250 m (D) 2250 m
15. A body initially at rest is moving with uniform acceleration a . Its velocity after n seconds is v . the displacement of the body in last 2 s is
 (A) $\frac{2v(n-1)}{n}$ (B) $\frac{v(n-1)}{n}$
 (C) $\frac{v(n+1)}{n}$ (D) $\frac{2v(n+1)}{n}$
16. The distances covered by a freely falling body in its first, second, third,, n^{th} seconds of its motion
 (A) forms an arithmetic progression
 (B) forms a geometric progression
 (C) do not form any well defined series
 (D) form a series corresponding to the difference of square root of the successive natural numbers.
17. A body starting from rest moves along a straight line with a constant acceleration. The variation of speed (v) with distance (s) is given by
 (A)  (B) 
 (C)  (D) 
18. An object falling through a fluid is observed to have acceleration given by $a = g - bv$, where g = gravitational acceleration and b is constant. After a long time of release, it is observed to fall with constant speed. The value of constant speed is
 (A) $\frac{g}{b}$ (B) $\frac{b}{g}$
 (C) bg (D) b
19. A body covers 20 m, 22 m, 24 m, in 8th, 9th and 10th seconds respectively. The body starts
 (A) from rest and moves with uniform velocity.
 (B) from rest and moves with uniform acceleration.
 (C) with an initial velocity and moves with uniform acceleration.
 (D) with an initial velocity and moves with uniform velocity.
20. A particle is released from rest from a tower of height 3h. The ratio of the intervals of time to cover three equal heights h is
 (A) $t_1 : t_2 : t_3 = 3 : 2 : 1$
 (B) $t_1 : t_2 : t_3 = 1 : (\sqrt{2} - 1) : (\sqrt{3} - 2)$
 (C) $t_1 : t_2 : t_3 = \sqrt{3} : \sqrt{2} : 1$
 (D) $t_1 : t_2 : t_3 = 1 : (\sqrt{2} - 1) : (\sqrt{3} - \sqrt{2})$
21. A jet airplane travelling at the speed of 500 km h^{-1} ejects its products of combustion at the speed of 1500 km h^{-1} relative to the jet plane. The speed of the products of combustion with respect to an observer on the ground is
 (A) 500 km h^{-1} (B) 1000 m s^{-1}
 (C) 1500 km h^{-1} (D) 2000 km h^{-1}
22. Two cars A and B are running at velocities of 60 km h^{-1} and 45 km h^{-1} . What is the relative velocity of car A with respect to car B, if both are moving eastward?
 (A) 15 km h^{-1} (B) 45 km h^{-1}
 (C) 60 km h^{-1} (D) 105 km h^{-1}

Space for Rough Work

23. A ball A is dropped from a building of height 45 m. Simultaneously another identical ball B is thrown up with a speed 50 m s^{-1} . The relative speed to ball B w.r.t. ball A at any instant of time is (Take $g = 10 \text{ m s}^{-2}$)

- (A) 0 m s^{-1} (B) 10 m s^{-1}
 (C) 25 m s^{-1} (D) 50 m s^{-1}

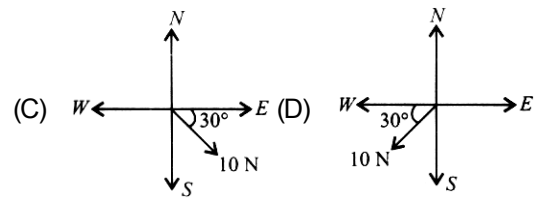
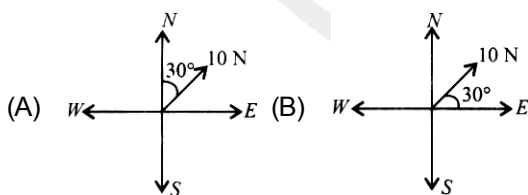
24. Rain is falling vertically with a speed of 35 m s^{-1} . Winds starts blowing after sometime with a speed of 12 m s^{-1} in east to west direction. At what angle with the vertical should a boy waiting at a bus stop hold his umbrella to protect himself from rain ?

- (A) $\sin^{-1}\left(\frac{12}{35}\right)$ (B) $\cos^{-1}\left(\frac{12}{35}\right)$
 (C) $\tan^{-1}\left(\frac{12}{35}\right)$ (D) $\cot^{-1}\left(\frac{12}{35}\right)$

25. Two vectors \vec{A} and \vec{B} inclined at an angle have a resultant \vec{R} which makes an angle α with \vec{A} and angle β with \vec{B} . Let the magnitudes of the vectors \vec{A}, \vec{B} and \vec{R} be represented by A, B and R respectively. Which of the following relations is not correct ?

- (A) $\frac{R}{\sin(\alpha + \beta)} = \frac{A}{\sin \alpha} = \frac{B}{\sin \beta}$
 (B) $R \sin \alpha = B \sin(\alpha + \beta)$
 (C) $A \sin \alpha = B \sin \beta$
 (D) $R \sin \beta = A \sin(\alpha + \beta)$

26. Which of the following figures represents the force of 10 N in a direction of 30° east of north ?



27. If $|\vec{A} + \vec{B}| = |\vec{A} - \vec{B}|$, then the angle between \vec{A} and \vec{B} will be

- (A) 30° (B) 45°
 (C) 60° (D) 90°

28. Vectors \vec{A} and \vec{B} include an angle θ between them. If $(\vec{A} + \vec{B})$ and $(\vec{A} - \vec{B})$ respectively subtend angle α and β with \vec{A} , then $(\tan \alpha + \tan \beta)$ is

- (A) $\frac{AB \sin \theta}{(A^2 + B^2 \cos^2 \theta)}$ (B) $\frac{2AB \sin \theta}{(A^2 - B^2 \cos^2 \theta)}$
 (C) $\frac{A^2 \sin^2 \theta}{(A^2 + B^2 \cos^2 \theta)}$ (D) $\frac{B^2 \sin^2 \theta}{(A^2 - B^2 \cos^2 \theta)}$

29. Which of the following quantities is dependent of the choice of orientation of the coordinate axes ?

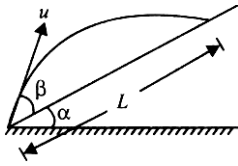
- (A) $\vec{A} + \vec{B}$
 (B) $A_x + B_y$
 (C) $|\vec{A} + \vec{B}|$
 (D) Angle between \vec{A} and \vec{B}

30. In a two dimensional motion, instantaneous speed v_0 is a positive constant. Then which of the following are necessarily true ?

- (A) The average velocity is not zero at any time.
 (B) Average acceleration must always vanish.
 (C) Displacements in equal time intervals are equal.
 (D) Equal path lengths are traversed in equal intervals.

Space for Rough Work

31. A particle is projected in air at an angle β to a surface which itself is inclined at an angle α to the horizontal. Then distance L is equal to



- (A) $\frac{2u^2 \sin \alpha \cos(\alpha + \beta)}{g \cos^2 \alpha}$
 (B) $\frac{2u^2 \sin \beta \cos(\alpha + \beta)}{g \cos^2 \beta}$
 (C) $\frac{2u^2 \sin \beta \cos(\alpha + \beta)}{g \cos^2 \alpha}$
 (D) $\frac{2u^2 \sin \alpha \cos(\alpha + \beta)}{g \cos^2 \beta}$
32. A football is kicked into the air vertically upwards with velocity u . The velocity of the ball at the highest point is
 (A) u (B) $2u$
 (C) zero (D) $4u$
33. Which of the following is true regarding projectile motion?
 (A) Horizontal velocity of projectile is constant.
 (B) Vertical velocity of projectile is constant.
 (C) Acceleration is not constant.
 (D) Momentum is constant.
34. The equations of motion of a projectile are given by $x = 36t$ m and $2y = 96t - 9.8t^2$. The angle of projection is
 (A) $\sin^{-1}\left(\frac{4}{5}\right)$ (B) $\sin^{-1}\left(\frac{3}{5}\right)$
 (C) $\sin^{-1}\left(\frac{4}{3}\right)$ (D) $\sin^{-1}\left(\frac{3}{4}\right)$

35. Two balls are projected at an angle θ and $(90^\circ - \theta)$ to the horizontal with the same speed. The ratio of their maximum vertical heights is
 (A) 1 : 1 (B) $\tan \theta : 1$
 (C) $1 : \tan \theta$ (D) $\tan^2 \theta : 1$
36. The relation between the time of flight of projectile T_f and the time to reach the maximum height t_m is
 (A) $T_f = 2t_m$ (B) $T_f = t_m$
 (C) $T_f = \frac{t_m}{2}$ (D) $T_f = \sqrt{2}(t_m)$
37. When air resistance is taken into account while dealing with the motion of the projectile which of the following properties of the projectile, shows an increase?
 (A) range
 (B) maximum height
 (C) speed at which it strikes the ground
 (D) the angle at which the projectile strikes the ground
38. Four bodies A, B, C and D are projected with equal velocities having angles of projection 15° , 30° , 45° and 60° with the horizontal respectively. The body having the shortest range is
 (A) A (B) B
 (C) C (D) D
39. A body executing uniform circular motion has at any instant its velocity vector and acceleration vector
 (A) along the same direction
 (B) in opposite direction
 (C) normal to each other
 (D) not related to each other
40. A particle is moving on a circular path of radius r with uniform speed v . What is the displacement of the particle after it has described an angle of 60° ?
 (A) $r\sqrt{2}$ (B) $r\sqrt{3}$
 (C) r (D) $2r$

Space for Rough Work

41. An insect trapped in a circular groove of radius 12 cm moves along the groove steadily and completes 7 revolutions in 100 s. The linear speed of the insect is
 (A) 4.3 cm s^{-1} (B) 5.3 cm s^{-1}
 (C) 6.3 cm s^{-1} (D) 7.3 cm s^{-1}
42. The projection of the vector $\vec{A} = \hat{i} - 2\hat{j} + \hat{k}$ on the vector $\vec{B} = 4\hat{i} - 4\hat{j} + 7\hat{k}$ is
 (A) $\frac{19}{9}$ (B) $\frac{38}{9}$
 (C) $\frac{8}{9}$ (D) $\frac{4}{9}$
43. If \vec{A} and \vec{B} are two vectors, the value of $(\vec{A} + \vec{B}) \times (\vec{A} - \vec{B})$ is
 (A) $2(\vec{B} \times \vec{A})$ (B) $-2(\vec{B} \times \vec{A})$
 (C) $\vec{B} \times \vec{A}$ (D) $\vec{A} \times \vec{B}$
44. The area of the triangle formed by the adjacent sides with $\vec{A} = -3\hat{i} + 2\hat{j} - 4\hat{k}$ and $\vec{B} = -\hat{i} + 2\hat{j} + \hat{k}$ is
 (A) $\frac{\sqrt{165}}{2}$ units (B) $\frac{\sqrt{137}}{2}$ units
 (C) $\sqrt{165}$ units (D) $\sqrt{137}$ units
45. $|\vec{A} \times \vec{B}|^2 + |\vec{A} \cdot \vec{B}|^2 =$
 (A) zero (B) $A^2 B^2$
 (C) AB (D) \sqrt{AB}
- [CHEMISTRY]**
46. Few quantities with their units are listed below. Mark the units which are not correctly matched.
 (i) Density : kg m^{-3}
 (ii) Velocity of light : m s^{-1}
 (iii) Planck's constant : $\text{J}^{-1}\text{s}^{-1}$
 (iv) Acceleration : m s^{-2}
 (v) Force: kg m
- (A) (ii) and (iv) (B) (i) and (iii)
 (C) (iii) and (v) (D) (iv) and (v)
47. What should be the volume of the milk (in m^3) which measures 5 L ?
 (A) $5 \times 10^{-3} \text{m}^3$ (B) $5 \times 10^3 \text{m}^3$
 (C) $5 \times 10000 \text{m}^3$ (D) $5 \times 10^6 \text{m}^3$
48. Which of the following options is not correct ?
 (A) $2.300 + 0.02017 + 0.02015 = 2.3403$
 (B) 126,000 has 3 significant figures.
 (C) $15.15 \mu\text{s} = 1.515 \times 10^{-5} \text{s}$
 (D) $0.0048 = 48 \times 10^{-3}$
49. How many seconds are there in 3 days ?
 (A) 259200 s (B) 172800 s
 (C) 24800 s (D) 72000 s
50. Which of the following rules regarding the significant figures and calculations involving them is not correct?
 (A) The result of an addition or subtraction is reported to the same number of decimal places as present in number with least decimal places.
 (B) Result of multiplication or division should have same number of significant figures as present in most precise figure.
 (C) The result of multiplication or division should be rounded off to same number of significant figures as present in least precise figure.
 (D) The non-significant figures in the measurements are rounded off.
51. 4.88 g of KClO_3 when heated produced 1.92 g of O_2 and 2.96 g of KCl . Which of the following statements regarding the experiment is correct ?
 (A) The result illustrates the law of conservation of mass.
 (B) The result illustrates the law of multiple proportions.
 (C) The result illustrates the law of constant proportion.
 (D) None of the above laws is followed.

Space for Rough Work

52. What mass of hydrochloric acid is needed to decompose 50 g of limestone ?
 (A) 36.5 g (B) 73 g
 (C) 50 g (D) 100 g
53. The statements for laws of chemical combinations are given below. Mark the statement which is not correct.
 (A) Matter can neither be created nor destroyed: Law of conservation of mass
 (B) A compound always contains exactly the same proportion of elements by weight : Law of definite proportions
 (C) When gases combine they do so in a simple ratio by weight : Gay Lussac's Law
 (D) Equal volumes of gases at same temperature and pressure contain same number of molecules: Avogadro's Law
54. What mass of sodium chloride would be decomposed by 9.8 g of sulphuric acid if 12 g of sodium bisulphate and 2.75 g of hydrogen chloride were produced in a reaction ?
 (A) 14.75 g (B) 3.8 g
 (C) 4.95 g (D) 2.2 g
55. Which of the following pairs illustrates the law of multiple proportions ?
 (A) PH_3 , HCl (B) PbO , PbO_2
 (C) H_2S , SO_2 (D) CuCl_2 , CuSO_4
56. Calcium carbonate decomposes on heating to give calcium oxide and carbon dioxide. How much volume of CO_2 will be obtained by thermal decomposition of 50 g of CaCO_3 ?
 (A) 1 L (B) 11.2 L
 (C) 44 L (D) 22.4 L
57. A balanced equation for combustion of methane is given below :

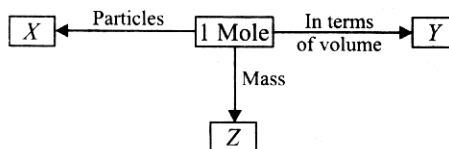
$$\text{CH}_4(g) + 2\text{O}_{2(g)} \rightarrow \text{CO}_{2(g)} + 2\text{H}_2\text{O}_{(g)}$$

 Which of the following statements is not correct on the basis of the above chemical equation ?
- (A) One mole of CH_4 reacts with 2 moles of oxygen to give one mole of CO_2 and 2 moles of water.
 (B) One molecule of CH_4 reacts with 2 molecules of oxygen to give one molecule of CO_2 and 2 molecules of water.
 (C) 22.4 L of methane reacts with 44.8 L of oxygen to give 44.8 L of CO_2 and 22.4 L of water.
 (D) 16 g of methane reacts with 64 g of O_2 to give 44g of CO_2 and 36 g of water.
58. Oxygen occurs in nature as a mixture of isotopes ^{16}O , ^{17}O and ^{18}O having atomic masses of 15.995 u, 16.999 u and 17.999 u and relative abundance of 99.763%, 0.037% and 0.200% respectively. What is the average atomic mass of oxygen ?
 (A) 15.999 u (B) 16.999 u
 (C) 17.999 u (D) 18.999 u
59. For every one ^{37}Cl isotope there are three ^{35}Cl isotopes in a sample of chlorine. What will be the average atomic mass of chlorine ?
 (A) 35 (B) 37
 (C) 35.5 (D) 35.6
60. Which of the following statements about the molecular mass is correct ?
 (A) Molecular formula shows the exact number of different types of atoms present in a molecule.
 (B) Molecular formula can be obtained from empirical formula if molar mass is known.
 (C) Percentage composition of a compound can be calculated from its molecular formula.
 (D) All the statements are correct.
61. The number of oxygen atoms present in 1 mole of oxalic acid dihydrate is
 (A) 6×10^{23} (B) 6.022×10^{34}
 (C) 7.22×10^{23} (D) 36.13×10^{23}
62. Which of the following gases will have least volume if 10 g of each gas is taken at same temperature and pressure ?
 (A) CO_2 (B) N_2
 (C) CH_4 (D) HCl

Space for Rough Work

63. How many atoms in total are present in 1 kg of sugar?
 (A) 7.92×10^{25} atoms (B) 6×10^{23} atoms
 (C) 6.022×10^{25} atoms (D) 1000 atoms
64. Which of the following formulae is not correctly depicted?
 (A) $\text{Molar mass} = \frac{\text{Mass of substance}}{\text{Moles of substance}}$
 or $M = \frac{w}{n} \text{ g mol}^{-1}$
 (B) Number of moles of a substance
 $= \frac{\text{Mass of substance}}{\text{Molar mass}}$ or $x = \frac{w}{M} \text{ mol}$
 (C) Number of molecules
 $= \frac{\text{Mass of the substance}}{\text{Molar mass}} \times \text{Avogadro's no.}$
 or no. of molecules $= \frac{w}{M} \times 6.023 \times 10^{23}$ molecules
 (D) $\text{Mole} \times \text{Molar mass} = \text{Number of molecules}$ or $n \times M = \text{Number of molecules}$
65. What is the mass of carbon dioxide which contains the same number of molecules as are contained in 40 g of oxygen?
 (A) 40 g (B) 55 g
 (C) 32 g (D) 44 g
66. What will be the weight of CO having the same number of oxygen atoms as present in 22 g of CO_2 ?
 (A) 28 g (B) 22 g
 (C) 44 g (D) 72 g

67. Fill in the blanks by choosing the correct options.



- | | X | Y | Z |
|-----|---|---------------------------------|------------------------|
| (A) | 6.023×10^{23}
molecules | 22.4 L at
any pressure | Gram
molecular mass |
| (B) | 6.023×10^{23}
atoms/molecules | 22.4 L at
NTP | Gram atomic
mass |
| (C) | 6.023×10^{23}
atoms | 22.4 L
at any
temperature | 1 gram mole |
| (D) | 6.023×10^{23}
particles | 11.2 L at
NTP | Molar volume |
68. How many number of aluminium ions are present in 0.051 g of aluminium oxide?
 (A) 6.023×10^{20} ions (B) 3 ions
 (C) 6.023×10^{23} ions (D) 9 ions
69. Which of the following correctly represents 180 g of water?
 (i) 5 moles of water
 (ii) 10 moles of water
 (iii) 6.023×10^{23} molecules of water
 (iv) 6.023×10^{24} molecules of water
 (A) (i) and (ii) (B) (i) and (iv)
 (C) (ii) and (iv) (D) (ii) and (iii)
70. 1 mole of water contains
 (A) 6.023×10^{23} atoms
 (B) 6.023×10^{23} molecules
 (C) $3 \times 6.023 \times 10^{23}$ molecules
 (D) None of these

Space for Rough Work

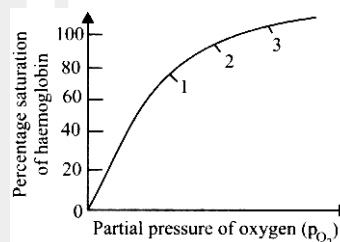
71. What will be the number of hydrogen atoms in 8.5 g of NH_3 ?
 (A) 6.023×10^{23} (B) 5.31×10^{-23}
 (C) 9.034×10^{23} (D) 3×10^{23}
72. Which of the following statements about Avogadro's hypothesis is correct ?
 (A) Under similar conditions of temperature and pressure, gases react with each other in simple ratio.
 (B) Under similar conditions of temperature and pressure, equal volumes of all gases contain same number of molecules.
 (C) At NTP all gases contain same number of molecules.
 (D) Gases always react with gases only at the given temperature and pressure.
73. One atom of an element weighs 3.32×10^{-23} g. How many number of gram atoms are there in 20 kg of the element ?
 (A) 2000 (B) 20
 (C) 200 (D) 1000
74. A compound of magnesium contains 21.9% magnesium, 27.8% phosphorus and 50.3% oxygen. What will be the simplest formula of the compound ?
 (A) $\text{Mg}_2\text{P}_2\text{O}_7$ (B) MgPO_3
 (C) $\text{Mg}_2\text{P}_2\text{O}_2$ (D) MgP_2O_4
75. A compound contains two elements 'X' and 'Y' in the ratio of 50% each. Atomic mass of 'X' is 20 and 'Y' is 40. What can be its simplest formula ?
 (A) XY (B) X_2Y
 (C) XY_2 (D) X_2Y_3
76. Choose the molecular formula of an oxide of iron in which the mass per cent of iron and oxygen are 69.9 and 30.1 respectively and its molecular mass is 160.
 (A) FeO (B) Fe_3O_4
 (C) Fe_2O_3 (D) FeO_2
77. 0.48 g of a sample of a compound containing boron and oxygen contains 0.192 g of boron and 0.288 g of oxygen. What will be the percentage composition of the compound ?
 (A) 60% and 40% B and O respectively
 (B) 40% and 60% B and O respectively
 (C) 30% and 70% B and O respectively
 (D) 70% and 30% B and O respectively
78. Two elements 'P' and 'Q' combine to form a compound. Atomic mass of 'P' is 12 and 'Q' is 16. Percentage of 'P' in the compound is 27.3. What will be the empirical formula of the compound ?
 (A) P_2Q_2 (B) PQ
 (C) P_2Q (D) PQ_2
79. How much mass of sodium acetate is required to make 250 mL of 0.575 molar aqueous solution ?
 (A) 11.79 g (B) 15.38 g
 (C) 10.81 g (D) 25.35 g
80. How much copper is present in 50 g of CuSO_4 ?
 (A) 19.90 g (B) 39.81 g
 (C) 63.5 g (D) 31.71 g
81. Molarity equation of a mixture of solutions of same substance is given by
 (A) $M_1 + V_1 \times M_2 + V_2 \times M_3 + V_3 + \dots = M_1 + M_2 + M_3$
 (B) $M_1V_1 + M_2V_2 + M_3V_3 + \dots = M(V_1 + V_2 + V_3)$
 (C) $\frac{M_1}{V_1} + \frac{M_2}{V_2} + \frac{M_3}{V_3} + \dots = M \left(\frac{1}{V_1} + \frac{1}{V_2} + \frac{1}{V_3} \right)$
 (D) $\frac{M_1}{V_1} \times \frac{M_2}{V_2} \times \frac{M_3}{V_3} + \dots = M_1 \left(\frac{1}{V_1} \times \frac{1}{V_2} \times \frac{1}{V_3} \right)$
82. A solution is made by dissolving 49 g of H_2SO_4 in 250 mL of water. The molarity of the solution prepared is
 (A) 2 M (B) 1 M
 (C) 4 M (D) 5 M

Space for Rough Work

83. The weight of AgCl precipitated when a solution containing 5.85 g of NaCl is added to a solution containing 3.4 g of AgNO₃ is
 (A) 28 g (B) 9.25 g
 (C) 2.870 g (D) 58 g
84. Which mode of concentration does not change with temperature?
 (A) Molarity (B) Normality
 (C) Molality (D) All of these
85. What is the concentration of copper sulphate (in mol L⁻¹) if 80 g of it is dissolved in enough water to make a final volume of 3 L?
 (A) 0.0167 (B) 0.167
 (C) 1.067 (D) 10.67
86. A solution is prepared by adding 5 g of a solute 'X' to 45 g of solvent 'Y'. What is the mass per cent of the solute 'X'?
 (A) 10% (B) 11.1%
 (C) 90% (D) 75%
87. An impure sample of silver (1.5 g) is heated with S to form 0.124 g of Ag₂S. What was the per cent yield of Ag₂S?
 (A) 21.6% (B) 7.2%
 (C) 1.7% (D) 24.8%
88. 4.28 g of NaOH is dissolved in water and the solution is made to 250 cc. What will be the molarity of the solution?
 (A) 0.615 mol L⁻¹ (B) 0.428 mol L⁻¹
 (C) 0.99 mol L⁻¹ (D) 0.301 mol L⁻¹
89. In a reaction container, 100 g of hydrogen and 100 g of Cl₂ are mixed for the formation of HCl gas. What is the limiting reagent and how much HCl is formed in the reaction?
 (A) H₂ is limiting reagent and 36.5 g of HCl are formed.
 (B) Cl₂ is limiting reagent and 102.8 g of HCl are formed.
 (C) H₂ is limiting reagent and 142 g of HCl are formed.
 (D) Cl₂ is limiting reagent and 73 g of HCl are formed.
90. If 40 g of CaCO₃ is treated with 40 g of HCl. Which of the reactants will act as limiting reagent?
 (A) CaCO₃ (B) HCl
 (C) Both are equal (D) Cannot be calculated

[ZOOLOGY]

91. Respiration in Annelida occurs through
 (A) Lungs (B) General body surface
 (C) Buccal cavity (D) All of these
92. Which of the following equations is correct?
 (A) $CO_2 \longrightarrow H_2CO_3 \longrightarrow HCO_3^- + H^+$
 (B) $CO_2 + H_2O \xrightleftharpoons{\text{Carbonic anhydrase}} H_2CO_3 \xrightleftharpoons{\text{Carbonic anhydrase}} H^+ + HCO_3^-$
 (C) $CO_2 + H_2O \longrightarrow CH_4 + 2O_2$
 (D) $CO_2 + H_2O \rightleftharpoons CO + H_2O_2$
93. Respiratory coefficient is the
 (A) Amount of carbon dioxide produced to oxygen absorbed
 (B) Amount of ATP used to burn complex substance
 (C) Carbon dioxide released
 (D) Amount of oxygen absorbed
94. The graph given shows an oxygen dissociation curve for haemoglobin



Where in the body will haemoglobin be saturated at the percentages shown at points 1, 2 and 3 on the graph?

	Left ventricle	Pulmonary vein	Vena cava
(A)	1	2	3
(B)	2	1	3
(C)	2	3	1
(D)	3	2	1

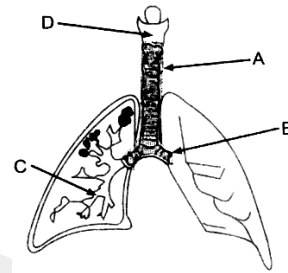
Space for Rough Work

95. If a man from sea coast, goes to Everest mountain peak, his
- Breathing and heart beat will increase
 - Breathing and heart beat will decrease
 - Respiratory rate will decrease
 - Heart beat will decrease
96. Which of the following statements correctly defines Bohr's effect ?
- Rise in P_{50} with a decrease in CO_2 concentration
 - Rise in P_{50} with decrease in pH
 - Rise in P_{50} with a increase in pH
 - Fall in P_{50} with a decrease in pH
97. How much amount of air can be inspired or expired during normal breathing ?
- 0.5/
 - 1.5/
 - 3.5/
 - 4.5/
98. What is incorrect about oxygen binding with haemoglobin ?
- The bond between oxygen and Hb is a very loose bond
 - Oxygen becomes ionic when it binds to Hb
 - Hb and oxygen is readily reversible combination
 - None of the above
99. Foetal haemoglobin has x affinity for oxygen than that of mother's haemoglobin during gestation. X is
- same
 - higher
 - lower
 - lower affinity earlier but higher later
100. During normal respiration, without any effort, the volume of air inspired or expired is called
- Tidal volume
 - Reserve volume
 - Residual volume
 - None of these
101. Match Column-I with Column-II and select the correct option from the codes given below.
- | Column-I | Column-II |
|-------------------------------|--------------------------|
| A. Tidal volume | (i) 2500-3000 mL of air |
| B. Inspiratory reserve volume | (ii) 1000 mL of air |
| C. Expiratory reserve volume | (iii) 500 mL of air |
| D. Residual volume | (iv) 3400-4800 mL of air |
| E. Vital capacity | (v) 1200 mL of air |
- A-(iii), B-(iv), C-(ii), D-(i), E-(v)
 - A-(iii), B-(i), C-(ii), D-(v), E-(iv)
 - A-(iii), B-(i), C-(iv), D-(v), E-(ii)
 - A-(v), B-(i), C-(ii), D-(iii), E-(iv)
102. When the oxygen supply to the tissue is inadequate, the condition is
- Hypoxia
 - Asphyxia
 - Pleurisy
 - Anoxia
103. The serous membrane in contact with the lungs is the
- Parietal pleura
 - Pulmonary mesentery
 - Pulmonary peritoneum
 - Visceral pleura
104. Expiratory muscles contract at the time of
- Deep inspiration
 - Normal inspiration and expiration
 - Forceful expiration
 - Normal expiration
105. Neither the trachea nor the bronchi contain
- Hyaline cartilage
 - Ciliated columnar epithelium
 - Goblet cells
 - simple squamous epithelium
106. The narrowest and most numerous tubes of lungs are termed as
- Hilum
 - Bronchus
 - Alveoli
 - Bronchioles

Space for Rough Work

107. Division of mammalian lungs into a very large number of tiny alveoli around alveolar ducts opening into bronchioles, is
- (A) An inefficient system of ventilation of alveoli with very little residual air
 (B) An inefficient system of ventilation of alveoli resulting in a very high percentage of residual air in the lungs
 (C) A very efficient system of ventilation of alveoli with no residual air
 (D) An efficient system of ventilation of alveoli with little or no residual air
108. In man and mammals, air passes from outside into the lungs through
- (A) Nasal cavity, larynx, pharynx, trachea, bronchi, alveoli
 (B) Nasal cavity, larynx, pharynx, trachea, bronchioles, alveoli
 (C) Nasal cavity, pharynx, larynx, trachea, bronchioles, bronchi, alveoli
 (D) Nasal cavity, pharynx, larynx, trachea, bronchi bronchioles, alveoli
109. Type of cartilage seen in tracheal wall is
- (A) Hyaline cartilage (B) Fibro-cartilage
 (C) Elastic cartilage (D) None of these
110. Cyanosis is
- (A) Lack of oxygen in body fluid
 (B) Difficult or heavy breathing
 (C) Excess of carbon dioxide in the body fluids
 (D) 'Skin turning blue' due to excessive amount of deoxygenated haemoglobin in the blood vessels
111. In which one of the following conditions does the oxygen dissociation curve of haemoglobin shift to the right side ?
- (A) Decrease in pH
 (B) Decrease in CO₂ concentration
 (C) Decrease in acidity
 (D) Decrease in temperature

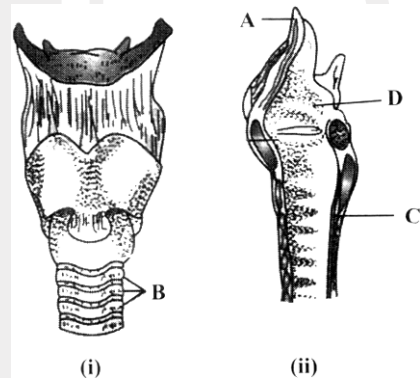
112. The diagram shows organs associated with breathing in humans.



What are the numbered structures ?

- | | a | b | c | d |
|-----|------------|------------|------------|------------|
| (A) | Bronchus | Bronchiole | Larynx | Trachea |
| (B) | Bronchiole | Bronchus | Larynx | Trachea |
| (C) | Larynx | Trachea | Bronchus | Bronchiole |
| (D) | Trachea | Bronchus | Bronchiole | Larynx |

113. The given figures are of human larynx, front view (i) and vertical section (ii).

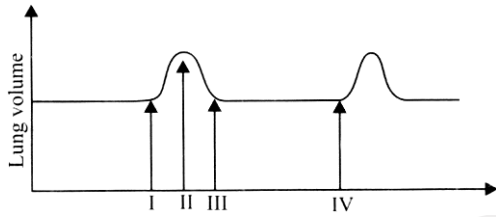


Identify the labelled parts A to D.

- | | A | B | C | D |
|-----|------------|--------------------------------|------------|--------------------------------|
| (A) | Glottis | Larynx | Vocal cord | Cartilaginous rings of trachea |
| (B) | Epiglottis | Cartilaginous rings of trachea | Trachea | Larynx |
| (C) | Glottis | Cartilaginous rings of trachea | Larynx | Trachea |
| (D) | Epiglottis | Bony rings of trachea | Larynx | Trachea |

Space for Rough Work

114. The given figure illustrates the changes in lung volume during the process of breathing.



The change from II to III indicates the

- (A) movement of diaphragm away from the lungs
 - (B) expansion of the thoracic cavity
 - (C) movement of air out of the lungs
 - (D) expansion of ribs
115. Chemosensitive area of respiratory centre in medulla is affected by
- (A) less CO_2 and H^+ ions
 - (B) less O_2 and H^+ ions
 - (C) excess CO_2 and H^+ ions
 - (D) excess O_2 and H^+ ions

116. The correct match for kind of respiration

	Example	Respiration
A.	Earthworm	1. Pulmonary
B.	Human	2. Bronchial
C.	Prawn	3. Tracheal
D.	Insects	4. Cutaneous

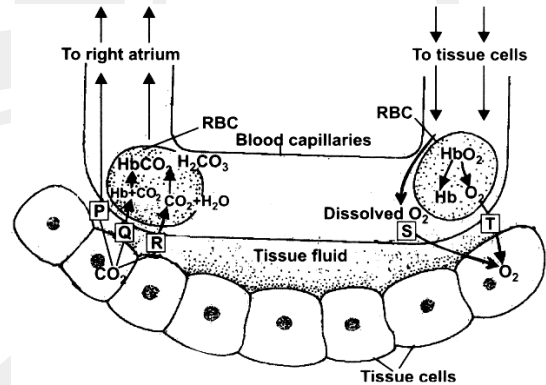
	A	B	C	D		A	B	C	D
(A)	1	2	3	4	(B)	4	2	1	3
(C)	4	1	2	3	(D)	3	2	4	1

117. The air that enters our lungs is characterised such that

- I. It is warm
- II. It is filtered
- III. Some oxygen is extracted from it
- IV. Some carbon dioxide is added to it

The correct answers are

- (A) I, II, III and IV
 - (B) I and II
 - (C) II and IV
 - (D) III and IV
118. Emphysema is a condition resulting from
- (A) cigarette smoking
 - (B) liquor consumption
 - (C) drug addiction
 - (D) reduced oxygen carrying capacity of blood.
119. Arrange the following in the order of increasing volume.
- I. Tidal volume
 - II. Residual volume
 - III. Expiratory reserve volume
 - IV. Vital capacity
- (A) $\text{I} < \text{II} < \text{III} < \text{IV}$
 - (B) $\text{I} < \text{III} < \text{II} < \text{IV}$
 - (C) $\text{I} < \text{IV} < \text{III} < \text{II}$
 - (D) $\text{I} < \text{IV} < \text{II} < \text{III}$
120. Refer the given diagrammatic representation of the transportation of oxygen and carbon dioxide in the blood. P, Q, R, S and T represent percentage of both gases in different forms. Select the correct option for P to T



	P	Q	R	S	T
(A)	23%	70%	7%	93%	7%
(B)	7%	23%	70%	3%	97%
(C)	7%	23%	70%	97%	3%
(D)	70%	7%	23%	97%	3%

Space for Rough Work

Direction : In the following questions (121-124), more than one of the answers given may be correct. Select the correct answers and mark them according to the codes given below.

Codes:

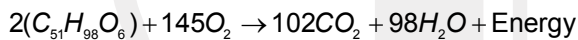
- (A) 1, 2 and 3 are correct
 (B) 1 and 2 are correct
 (C) 2 and 4 are correct
 (D) 1 and 3 are correct
121. The diffusion of bicarbonate ions from RBC into plasma is known as
 (1) Henry's law
 (2) Chloride shift
 (3) Charle's law
 (4) Hamburger's phenomenon
122. The mucus produced by the goblet cells
 (1) Moistens the incoming air
 (2) Traps the finest dust particles
 (3) Filters out largest dust particles
 (4) Warms the incoming air
123. When blood is mixed with cyanide (to stop carbonic anhydrase activity) the rate of and will show
 (1) Absorption
 (2) Adsorption
 (3) Dissociation of CO_2
 (4) Association of CO_2
124. Certain bacteria that cause bronchitis are
 (1) Streptococcus pneumoniae
 (2) Haemophilus influenzae
 (3) Yersinia pestis
 (4) Clostridium tetani
125. The shape of a mature human RBC resembles:
 (A) A sphere (B) A dumble
 (C) A biconcave disc (D) A pavement tile
126. Adult males normally have more RBC per cc than adult females loose because :
 (A) Females lose blood during menstrual flow
 (B) Males work much harder than females
 (C) Testosterone has a favourable effect on RBC production
 (D) The statement is incorrect; both males and females have equal number of RBC per cc
127. The percentage of blood that is cells is called as _____ and it is about _____ %
 (A) Hematocrit; 40 – 45
 (B) ESR; 9 – 15
 (C) Mean corpuscular volume; 80 – 90
 (D) MCHC; 10 – 15
128. The earliest site for the production of RBCs in the human foetus is :
 (A) Bone marrow (B) Liver
 (C) Spleen (D) Yolk sac
129. Consider the following leucocytes:
 I. Basophils
 II. Neutrophils
 III. Monocytes
 IV. Eosinophils
 Phagocytic property is present in :
 (A) I, II, III, IV (B) I, II, III
 (C) II and III (D) II, III, IV
130. Blood monocytes migrate into the tissues of the body and there differentiate (evolve) into :
 (A) Plasma cells (B) Macrophages
 (C) Granulocytes (D) Mast cells
131. The blood cells that release histamine and heparin are:
 (A) Basophils (B) Neutrophils
 (C) Eosinophils (D) Lymphocytes
132. Which of the following is a polymorphonuclear granulocyte that has 2 to 7 lobed nucleus ?
 (A) Basophils (B) Neutrophils
 (C) Eosinophils (D) Lymphocyte
133. Regarding eosinophils :
 I. They are granulocytes
 II. They have bilobed nucleus
 III. They are increased in parasitic infestations
 (A) I and II are correct
 (B) Only I is correct
 (C) I, II, III are correct
 (D) All are incorrect

Space for Rough Work

134. An increase of which of the following is the hallmark of acute inflammation ?
 (A) Basophils (B) Neutrophils
 (C) Eosinophils (D) Lymphocytes
135. The antibodies associated with the ABO system are usually of the class
 (A) I_gE (B) I_gM
 (C) I_gG (D) I_gA

[BOTANY]

136. Respiratory substrates are the organic substances which are _____ during respiration to liberate energy.
 (A) oxidized (B) reduced
 (C) synthesized (D) both (A) and (B)
137. If volume of CO₂ liberated during respiration is more than the volume of O₂ used, the respiratory substrate will be :
 (A) Carbohydrate (B) Fats
 (C) Proteins (D) Organic acid
138. Value of RQ in succulents is
 (A) unity (B) infinite
 (C) less than unity (D) zero
139. Instantaneous source of energy is
 (A) proteins (B) fats
 (C) nucleic acids (D) glucose
140. Refer the given equation

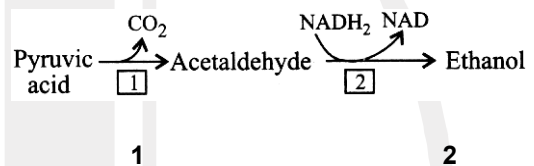


The RQ in this case is

- (A) 1 (B) 0.7
 (C) 1.45 (D) 1.62
141. Match Column-I with Column-II and select the correct option from the codes given below.
- | Column-I | Column-II |
|----------|----------------|
| A. Wine | (i) Apples |
| B. Cider | (ii) Grapes |
| C. Beer | (iii) Molasses |
| D. Rum | (iv) Cereals |

- (A) A-(ii), B-(iv), C-(iii), D-(i)
 (B) A-(ii), B-(i), C-(iv), D-(iii)
 (C) A-(iv), B-(iii), C-(ii), D-(i)
 (D) A-(iv), B-(ii), C-(iii), D-(i)
142. R.Q. of proteins, carbohydrates, fats and organic acids are in order
 (A) <1, 1, <1, >1 (B) >1, <1, 1, 1
 (C) 1, 1, 0, -1 (D) 0, <1, 1, >1

143. _____ is a facultative anaerobe
 (A) Clostridium tetani
 (B) Saccharomyces cerevisiae
 (C) Azotobacter
 (D) Beijerinckia
144. Identify the enzymes 1 and 2 in the given reaction and select the correct option.



- (A) Ethanol dehydrogenase Pyruvate decarboxylase
 (B) Ethanol decarboxylase Pyruvate dehydrogenase
 (C) Pyruvate decarboxylase Ethanol dehydrogenase
 (D) Pyruvate dehydrogenase Ethanol dehydrogenase

145. Select the incorrectly matched pair.
 (A) End product of alcoholic fermentation – Ethanol + CO₂
 (B) End products of lactic acid fermentation – Lactic acid + CO₂
 (C) Obligate anaerobe – Clostridium tetani
 (D) RQ of carbohydrates – One

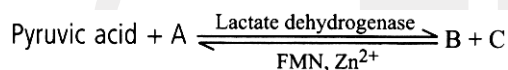
Space for Rough Work

146. Which of the following describes significance of fermentation ?

- (i) Production of alcohol in brewing industry.
- (ii) Making of dough in baking industry.
- (iii) Curing of tea and tobacco.
- (iv) Production of vinegar by acetic acid bacteria.

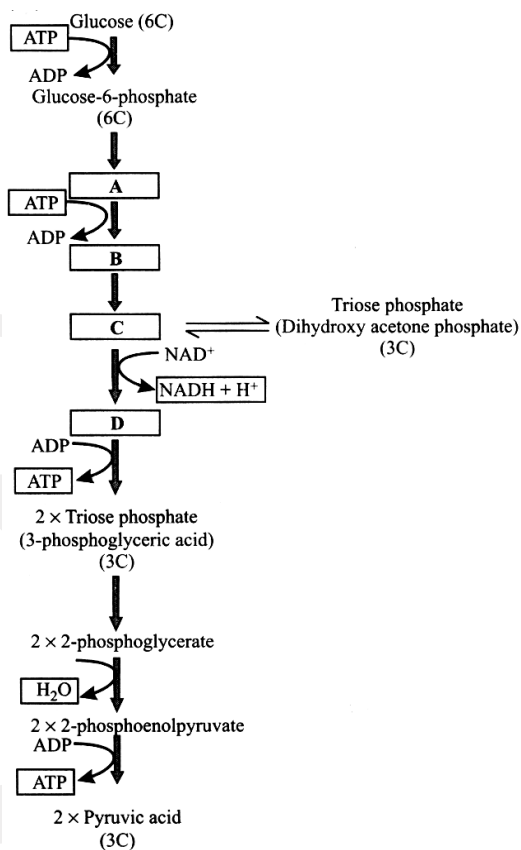
- (A) (i),(ii) and (iii) (B) (i),(ii) and (iv)
 (C) (ii),(iii) and (iv) (D) (i),(ii),(iii) and (iv)

147. Identify A, B and C in the given reaction and select the correct option.



- | A | B | C |
|----------------------|-----------------------------|------------------|
| (A) NADH | Lactic acid+CO ₂ | NAD ⁺ |
| (B) NADH | Lactic acid | NAD ⁺ |
| (C) NAD ⁺ | Lactic acid | NADH |
| (D) NAD ⁺ | Lactic acid+CO ₂ | NADH |

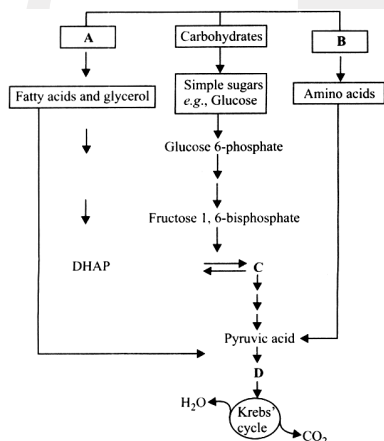
148. The flowchart given below shows the steps in glycolysis. Select the option that correctly fills in the missing steps A, B, C and D.



- | | A | B | C | D |
|-----|---------------------------|------------------------------|------------------------------|-----------------------------|
| (A) | Fructose-6-phosphate | Fructose -1, 6-biphosphate | 3-PGAL | 1,3-biphospho-glyceric acid |
| (B) | Fructose-1, 6-biphosphate | 3-PGAL | 1, 3-biphospho-glyceric acid | 3 PGA |
| (C) | 3-PGA | 1, 3-biphospho-glyceric acid | 3-PGAL | Fructose-1, 6-biphosphate |
| (D) | Fructose-1, 6-biphosphate | Fructose -6-phosphate | 3-PGAL | 1,3-biphospho-glyceric acid |

Space for Rough Work

149. 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
150. The first 5-C dicarboxylic acid in Krebs' cycle which is used in nitrogen metabolism is
 (A) OAA
 (B) citric acid
 (C) α -ketoglutaric acid
 (D) acetyl coenzyme A
151. Seeds respire in
 (A) presence of O₂ (B) presence of CO₂
 (C) absence of O₂ (D) both (A) and (C)
152. Which of the following are isomers ?
 (A) 3PGA and 2PGA
 (B) PGAL and DHAP
 (C) Glucose and Fructose
 (D) All of these
153. Alternate name of Krebs' cycle is
 (A) TCA cycle (B) citric acid cycle
 (C) both (A) and (B) (D) none of these
154. Select the correct option for A, B, C and D



- | A | B | C | D |
|--------------|----------|------------|-----------------|
| (A) Fats | Proteins | 3-PGAL | Acetyl CoA |
| (B) Fats | Proteins | 3-PGAL | CO ₂ |
| (C) Proteins | Fats | Acetyl CoA | PEP |
| (D) Proteins | Fats | PEP | Acetyl CoA |

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

Column-I	Column-II
A. Fats made of three fatty-acid chains attached to glycerol	(i) Glycogen
B. Glycolysis metabolite made from glycerol	(ii) Glyceraldehyde
C. Storage form of glucose	(iii) Triglycerides
D. Result of running reactions of glycolysis in reverse	(iv) Glucose

- (A) A-(iv), B-(ii), C-(i), D-(iii)
 (B) A-(iii), B-(ii), C-(i), D-(iv)
 (C) A-(iv), B-(iii), C-(i), D-(ii)
 (D) A-(i), B-(ii), C-(iii), D-(iv)

156. In Krebs' cycle, OAA accepts acetyl CoA to form

- (A) citric acid (B) oxalosuccinate
 (C) fumarate (D) succinyl CoA

157. All enzymes of TCA cycle are located in the mitochondrial matrix except one which is located in inner mitochondrial membranes in eukaryotes and in cytosol in prokaryotes. This enzyme is

- (A) isocitrate dehydrogenase
 (B) ketoglutarate dehydrogenase
 (C) succinate dehydrogenase
 (D) lactate dehydrogenase

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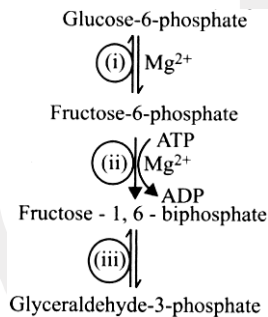
158. At the end of glycolysis, X is the net energy gain from one molecule of glucose via Y, but there is also energy stored in the form of Z. Identify X, Y and Z.

	X	Y	Z
(A)	1 ATP	Oxidative phosphorylation	NADH+H ⁺
(B)	2 ATPs	Oxidative phosphorylation	NADH+H ⁺
(C)	1 ATP	Substrate level phosphorylation	FADH ₂
(D)	2 ATPs	Substrate level phosphorylation	NADH+H ⁺

159. Select the correct sequence of formation of given intermediates of Krebs' cycle.

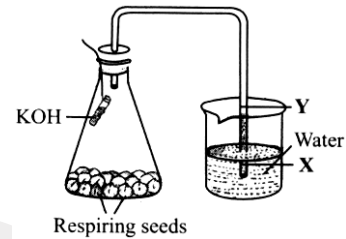
- (A) Succinate → Malate → Fumarate → OAA
- (B) Fumarate → Succinate → Malate → OAA
- (C) Succinate → Fumarate → Malate → OAA
- (D) Malate → Fumarate → Succinate → OAA

160. Study the given steps of glycolysis and identify the enzymes (i), (ii) and (iii) responsible for carrying out these steps.



	(i)	(ii)	(iii)
(A)	Phosphohexose isomerase	Phospho-fructokinase	Aldolase
(B)	Hexokinase	Phospho-fructokinase	Aldolase
(C)	Phosphohexose isomerase	Hexokinase	Phosphofructokinase
(D)	Aldolase	Phospho-fructokinase	Phosphohexose isomerase

161. Rise in the water level from X to Y in the given experimental set-up demonstrates



- (A) aerobic respiration
 - (B) anaerobic respiration
 - (C) photosynthesis
 - (D) transpiration pull
162. Identify the correct terms for the given statements and select the correct answer.

- (i) Sudden increase in the rate of respiration during ripening of fruits.
- (ii) Reduction in the consumption of respiratory substrate when mode of respiration is changed from anaerobic to aerobic.
- (iii) Respiratory oxidation of carbohydrate and fats.

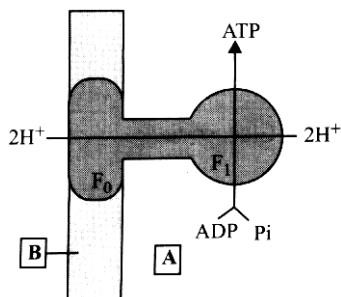
	Pasteur effect	Floating respiration	Climacteric respiration
(A)	(i)	(ii)	(iii)
(B)	(ii)	(iii)	(i)
(C)	(iii)	(ii)	(i)
(D)	(ii)	(i)	(iii)

163. Select the wrong statement.

- (A) Oxidative decarboxylation of pyruvic acid requires the presence of enzyme pyruvate dehydrogenase.
- (B) All living cells whether aerobic or anaerobic, perform glycolysis.
- (C) Cyanide does not stop chemiosmosis.
- (D) Respiratory chain uses O₂ as final hydrogen acceptor.

Space for Rough Work

164. Identify A and B in the given diagram showing ATP synthesis in oxysomes.



- (A) A = Mitochondrial matrix
B = Outer mitochondrial membrane
- (B) A = Mitochondrial matrix
B = Inner mitochondrial membrane
- (C) A = Cell cytoplasm
B = Inner mitochondrial membrane
- (D) A = Cell cytoplasm
B = Outer mitochondrial membrane

165. Study the following statements regarding chemiosmotic hypothesis in mitochondria and select the correct ones.

- (i) F_1 headpiece contains the site for the synthesis of ATP from ADP + P_i .
- (ii) F_0 part forms the channel through which protons cross the inner membrane.

(iii) For each ATP produced, $2H^+$ pass through F_0 from the intermembrane space to the matrix down the electrochemical proton gradient.

- (A) (i) and (ii) (B) (ii) and (iii)
(C) (i) and (iii) (D) (i), (ii) and (iii)

166. Oxidation of one $NADH_2$ and one $FADH_2$ respectively gives rise to ___ and ___ ATP molecules.

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

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

Statement 1 : During photophosphorylation (of photosynthesis), light energy is utilized for the production of proton gradient during ATP synthesis.

Statement 2 : In respiration, energy of oxidation reduction is utilized for the phosphorylation and thus the process is called oxidative phosphorylation.

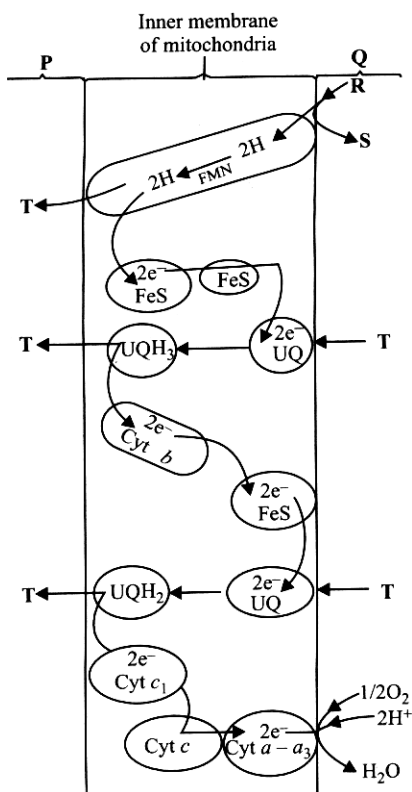
- (A) Both statements 1 and 2 are correct and statement 2 is the correct explanation of statement 1.
- (B) Both statements 1 and 2 are correct but statement 2 is not the correct explanation of statement 1.
- (C) Statement 1 is correct and statement 2 is incorrect.
- (D) Both statements 1 and 2 are incorrect.

168. Electron transport chain (ETC) is a set of ___ electron carriers present in a specific sequence along ___ mitochondrial membrane.

- (A) seven, inner (B) six, inner
(C) seven, outer (D) six, outer

Space for Rough Work

169. Identify P, Q, R, S and T in the given diagram of mitochondrial electron transport chain.



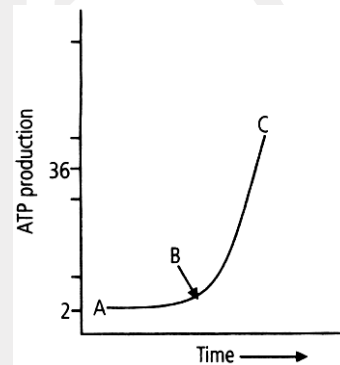
	P	Q	R	S	T
(A)	Matrix	Outer chamber	FMNH ₂	NADH ₂	2H ⁺
(B)	Outer chamber	Matrix	NADH+H ⁺	NAD ⁺	2H ⁺
(C)	Outer chamber	Cristae	NAD ⁺	NADH+H ⁺	H ₂
(D)	Cristae	Outer chamber	NADH+H ⁺	NAD ⁺	2H ⁺

170. Last e⁻ acceptor during ETS is
 (A) O₂ (B) cyt a
 (C) cyt a₂ (D) cyt a₃
171. Amount of energy released during hydrolysis of a high energy bond of ATP is
 (A) 73 kcal mol⁻¹ (B) 0.73 kcal mol⁻¹
 (C) 3.4 kcal mol⁻¹ (D) 7.3 kcal mol⁻¹
172. Match Column-I with Column-II and select the correct option from the codes given below.
- | Column-I | Column-II |
|----------------|------------------------------------|
| A. R.Q | (i) Chemiosmotic ATP synthesis |
| B. Mitchel | (ii) Muscle fatigue |
| C. Cytochromes | (iii) Inner mitochondrial membrane |
| D. Lactic acid | (iv) Alcoholic fermentation |
| E. Yeast | (v) Respirometer |
- (A) A-(v), B-(i), C-(iii), D-(ii), E-(iv)
 (B) A-(v), B-(i), C-(iii), D-(iv), E-(ii)
 (C) A-(i), B-(v), C-(ii), D-(iii), E-(iv)
 (D) A-(v), B-(ii), C-(iv), D-(iii), E-(i)
173. How many ATP molecules will be generated in a plant system during complete oxidation of 40 molecules of glucose ?
 (A) 180 (B) 360
 (C) 1440 (D) 3040

174. Select the wrong statement.
 (A) When tripalmitin is used as a substrate in respiration, the R.Q. is 0.7.
 (B) The intermediate compound which links glycolysis with Krebs' cycle is malic acid.
 (C) One glucose molecule yields a net gain of 36 ATP molecule during aerobic respiration
 (D) One glucose molecule yields a net gain of 2 ATP molecules during glycolysis.

Space for Rough Work

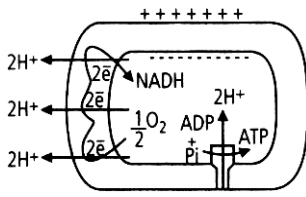
175. In the electron transport system present in the inner mitochondrial membrane, complexes I and IV are respectively
- NADH dehydrogenase and FADH_2
 - FADH_2 and NADH dehydrogenase
 - NADH dehydrogenase and cytochrome oxidase complex
 - NADH dehydrogenase and ATP synthase
176. Which out of the following statements is incorrect ?
- The breakdown product of glucose which enters into mitochondrion during aerobic respiration is pyruvic acid generated in the cytosol.
 - When the electrons pass from one carrier to another *via* complex I to IV in the electron transport chain, they are coupled to ATP synthase (complex V) for the production of ATP from ADP and P_i .
 - The ratio of volume of O_2 consumed in respiration to the volume of CO_2 evolved is called as the respiratory quotient (RQ).
 - Compensation point is the point reached in a plant when the rate of photosynthesis is equal to the rate of respiration.
177. Which of the following statements is correct with respect to the effect of temperature on rate of respiration ?
- Rate of respiration increases with an increase in temperature from 0°C to 30°C .
 - Rate of respiration doubles for every 10°C rise in temperature, thus temperature co-efficient (Q_{10}) for respiration is 2.
 - At very high temperatures such as 50°C or more, rate of respiration decreases due to enzymatic degradation.
 - All of these.
178. During electron transport system (ETS), electron transport proceeds from carriers that have ____ redox potential to those having _____ redox potential. This electron transport down to the energy gradient leads to the formation of ATP from ADP and P_i , which is referred to as _____.
- Low, high, oxidative phosphorylation
 - Low, high, oxidative decarboxylation
 - High, low, oxidative phosphorylation
 - High, low, oxidative decarboxylation
179. Animal cells are suspended in a culture medium that contains excess glucose. The graph below shows glucose utilization under different growth conditions. (A), (B), and (C) in the graph indicate



- A - Anaerobic respiration
B - Introduction of O_2 to culture medium
C - Aerobic respiration
- A - Aerobic respiration
B - Introduction of CO_2 to culture medium
C - Anaerobic respiration
- A - Aerobic respiration
B - Supply of organic triphosphate
C - Aerobic respiration
- A - Aerobic respiration
B - Introduction of CO to culture medium
C - Anaerobic respiration

Space for Rough Work

180. Mechanism of phosphorylation is depicted in the diagram below. Study it carefully and mark the correct option.



(A) The diagram depicts photosynthetic phosphorylation taking place in the chloroplast. The incident light should be shown in the diagram.

- (B) The diagram depicts oxidative phosphorylation taking place in mitochondria. However, the flow of electrons should be shown in reverse direction.
- (C) Diagram depicts the basic process of both oxidative as well as photosynthetic phosphorylation. However, the proton concentration should be high, inside and low outside.
- (D) The diagram correctly depicts the oxidative phosphorylation occurring in all heterotrophic organisms.

Space for Rough Work