

23/07/2025

Code-B_(Phase-2)


Aakash
 Medical | IIT-JEE | Foundations

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 Udyog Vihar, Gurugram, Haryana - 122015, Ph.+91-1244168300

Time : 180 Min.

Fortnightly Test for NEET-2026_RM(P2)_FT-02B

MM : 720

Topics Covered:**Physics:** Motion in a Plane, Laws of Motion**Chemistry:** Structure of Atom, Classification of Elements and Periodicity in Properties**Botany:** Cell Cycle & Cell Division, The Living World**Zoology:** Biomolecules-II: (Proteins, types & functions, Lipids, Nucleic acids, Enzymes, Cofactors), Breathing & Exchange of Gases-I: (Upto mechanism of breathing)**General Instructions :**

Duration of Test is 3 hrs.

The Test consists of 180 questions. The maximum marks are 720.

There are four parts in the question paper consisting of Physics, Chemistry, Botany and Zoology having 45 questions in each part of equal weightage.

Each question carries +4 marks. For every wrong response, -1 mark shall be deducted from the total score. Unanswered/unattempted questions will be given no marks.

Use blue/black ballpoint pen only to darken the appropriate circle.

Mark should be dark and completely fill the circle.

Dark only one circle for each entry.

Dark the circle in the space provided only.

Rough work must not be done on the Answer sheet and do not use white fluid or any other rubbing material on the Answer sheet.

PHYSICS

Equation of trajectory of a projectile is $y = \sqrt{3}x - 5x^2$. Then angle of projection with vertical is (Assume x-axis as horizontal and y-axis as vertical)

- (1) 45°
 (2) 30°
 (3) 60°
 (4) 53°

$y = 2x - 8x^2$ represents equation of motion of an oblique projectile in X-Y plane. The range of the projectile is

- (1) 2 m
 (2) 4 m
 (3) 8 m
 (4) $\frac{1}{4}$ m

3. A body starts its motion from rest from origin with an acceleration of 3 m/s^2 along x-axis and 4 m/s^2 along y-axis. The magnitude of displacement of body from origin after 2 s will be

- (1) 10 m
 (2) 5 m
 (3) 20 m
 (4) 25 m

4. When two particles are projected with same speed at angles 30° and 60° with vertical, the maximum heights by the projectiles are in ratio

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

$$2 - 16x$$

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

$$\frac{4^2}{2 \times 9} =$$

$$\sqrt{3^2 + 4^2}$$

$$\sqrt{9 + 16}$$

$$= \sqrt{25}$$

5. A particle is projected with initial velocity $(16\hat{i} + 17\hat{j})$ m/s from the ground. Its speed v (in m/s) when velocity vector becomes horizontal (along x-axis), is (assume y-axis is along vertical direction)

(1) 16
(2) 17
(3) $16 < v < 17$
(4) $v > 17$

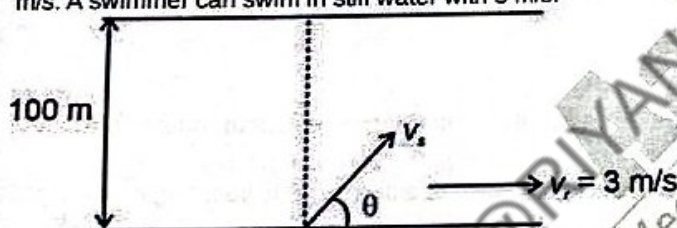
6. A body is projected from ground with velocity $(6\hat{i} + 8\hat{j})$ m/s. The time of flight of projectile is

(1) 1.6 s
(2) 1 s
(3) 2 s
(4) 2.6 s

7. An oblique projectile is projected with a velocity (in m/s) of $3\hat{i} + 2\hat{j}$. Its velocity (in m/s) when it reaches the ground is

(1) $3\hat{i} - 2\hat{j}$
(2) $2\hat{i} + 3\hat{j}$
(3) $3\hat{i} + 2\hat{j}$
(4) $2\hat{i} - 3\hat{j}$

8. A river has a width of 100 m and it is flowing with speed 3 m/s. A swimmer can swim in still water with 5 m/s.



As shown in the figure, θ is the angle at which swimmer swims with respect to the river flow. Match the columns and tick the correct option.

Column I

- a. Value of θ (in degrees) for zero drift
b. Value of θ (in degrees) for minimum time to cross the river
c. Value of drift (in m) in case of minimum time
d. Value of time (in s) in case of zero drift

Column II

- (i) 60
(ii) 25
(iii) 127
(iv) 90
(v) 45

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

9. The position vector of a particle is given by $\vec{r} = 8t\hat{i} + t^2\hat{j} + 3t\hat{k}$, where t is in second and r in metre. The angle (θ) of velocity vector at $t = 2$ second with x axis is

(1) $\theta = \tan^{-1}(\frac{1}{2})$
(2) $\theta = \tan^{-1}(2)$
(3) $\theta = \tan^{-1}(\frac{1}{\sqrt{2}})$
(4) $\theta = \tan^{-1}(\sqrt{2})$

10. A particle starts from origin and moves with a constant acceleration of $(7\hat{i} + 3\hat{j})$ m/s². The position vector of the particle at $t = 2$ s will be

(1) $(14\hat{i} - 3\hat{j})$ m
(2) $(-14\hat{i} - 3\hat{j})$ m
(3) $(7\hat{i} + 6\hat{j})$ m
(4) $(14\hat{i} + 6\hat{j})$ m

11. A particle is projected with velocity $(20\hat{i} + 40\hat{j})$ m/s from ground. The horizontal distance travelled by the particle in time interval of 2 s, will be

(1) 40 m
(2) 10 m
(3) 80 m
(4) 20 m

12. The height y and horizontal distance x covered by a projectile in time t are given by the equation $y = 4t - 5t^2$ and $x = 3t$, the angle of projection with the horizontal will be

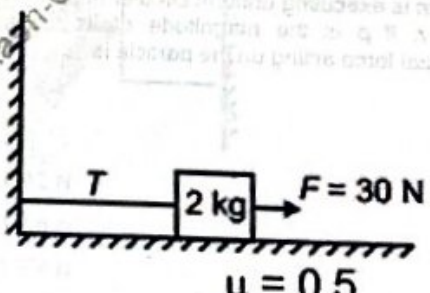
(1) 53°
(2) 37°
(3) 30°
(4) 60°

13. A particle is projected from ground with velocity 20 m/s at an angle 45° with horizontal. The equation of projectile is (where symbols have their usual meaning)

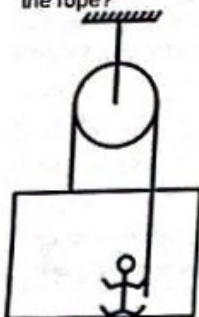
(1) $y = \frac{x}{\sqrt{3}} - \frac{x^2}{20\sqrt{3}}$
(2) $y = x - \frac{x^2}{20}$
(3) $y = \frac{x}{\sqrt{3}} - \frac{x^2}{40\sqrt{3}}$
(4) $y = x - \frac{x^2}{40}$

$$\sqrt{20^2 + 40^2}$$

$$\sqrt{9 + 49}$$

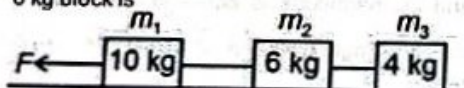
14. A particle moving with uniform speed in a circular path maintains:
- Constant velocity
 - Constant acceleration
 - Constant velocity but varying acceleration
 - Varying velocity and varying acceleration
15. A man running at speed of 5 km/h, finds the rain hitting his head vertically but he has to hold the umbrella at 30° with vertical while at rest. The speed of rain w.r.t. ground is
- $5\sqrt{3}$ km/h
 - 10 km/h
 - 5 km/h
 - $10\sqrt{3}$ km/h
16. The angle between velocity vector and acceleration of oblique projectile at its maximum height is
- 30°
 - 60°
 - 90°
 - 180°
17. $\vec{P} = \hat{i} + 2\hat{j} - 3\hat{k}$, when a vector \vec{Q} is added to \vec{P} , we get a unit vector along positive x-axis. The magnitude of vector \vec{Q} is
- $\sqrt{3}$ units
 - $\sqrt{5}$ units
 - $\sqrt{13}$ units
 - $\sqrt{15}$ units
18. The ratio of ranges of projectile motions with angle of projections 30° and 60° is [assume same speeds of projections]
- 2 : 1
 - 1 : 4
 - 1 : 1
 - 1 : 6
19. Consider the following statements and choose the correct option.
Statement A: For an object moving in uniform circular motion its speed and acceleration, both remain constant.
Statement B: Acceleration and speed, both are vector quantities.
- Statement A is correct while statement B is incorrect.
 - Statement B is correct while statement A is incorrect.
 - Both statement A and statement B are correct.
 - Both statement A and statement B are incorrect.
20. A projectile is given an initial velocity $\vec{u} = \hat{i} + \hat{j}$ ms⁻¹. The equation of its trajectory is (Take $g = 10$ m s⁻²)
- $y = x - 10x^2$
 - $y = 2x - 5x^2$
 - $y = x - 5x^2$
 - $y = 2x - 10x^2$
21. A particle is projected at angle 60° with horizontal with an initial speed $20\sqrt{2}$ m s⁻¹. When it makes an angle 45° with horizontal, its speed v is
- 10 m s⁻¹
 - 20 m s⁻¹
 - $10\sqrt{2}$ m s⁻¹
 - $10\sqrt{3}$ m s⁻¹
22. The resultant of two vectors \vec{P} and \vec{Q} is perpendicular to the vector \vec{P} and its magnitude is equal to half of the magnitude of vector \vec{Q} . Angle between \vec{P} and \vec{Q} is
- $\theta = 120^\circ$
 - $\theta = 90^\circ$
 - $\theta = 180^\circ$
 - $\theta = 150^\circ$
23. The tension (T) in the given diagram is (Take $g = 10$ m/s²)
- 
- 20 N
 - 10 N
 - 5 N
 - Zero
24. A shell of mass 200 g is fired by a gun of mass 100 kg. If speed of the shell is 80 m/s then the recoil speed of the gun will be
- 16 cm/s
 - 8 cm/s
 - 8 m/s
 - 16 m/s

25. A man of mass 50 kg stands on a box of mass 30 kg. For the system to be in equilibrium, what force man must exert on the rope?



- (1) 400 N
(2) 600 N
(3) 300 N
(4) 1000 N

26. Three blocks of masses m_1 , m_2 and m_3 are placed on a horizontal frictionless surface. If a force (F) of 40 N pulls the system, then the tension in the string connecting 10 kg and 6 kg block is



- (1) 30 N
(2) 20 N
(3) 2 N
(4) 5 N

27. A particle of mass m is executing uniform circular motion on a path of radius r . If p is the magnitude of its linear momentum, the radial force acting on the particle is

- (1) $\frac{p^2}{rm}$
(2) $\frac{rm}{p}$
(3) $\frac{mp^2}{r}$
(4) pmr

28. If the radius of bend is 13 m and coefficient of friction between the road and the tyres is 0.5 Maximum speed with which a car can turn on a bend without skidding is ($g = 10 \text{ m/s}^2$)

- (1) 8 m/s
(2) 7 m/s
(3) 10 m/s
(4) 5 m/s

29. Consider the given statements and choose the correct option.

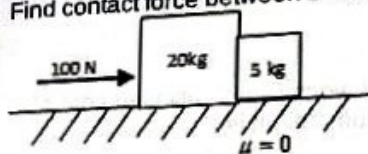
Statement A: The magnitude of the net force acting on a drop of rain falling down with constant speed is zero.

Statement B: The initial thrust (force) of the blast when a rocket with a lift-off mass 20,000 kg is blasted upwards with initial acceleration of 5 m/s^2 is $3 \times 10^5 \text{ N}$.

Statement C: The vector sum of internal action and reaction forces between different parts of a body, is infinity.

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

30. Find contact force between blocks



- (1) 20 N
(2) 40 N
(3) 60 N
(4) 50 N

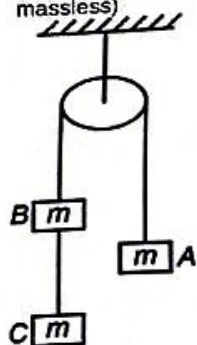
31. Assertion (A): Projectile motion is a 2-D motion and it can be dealt with by breaking it in two 1-D motions.

Reason (R): Motion in mutually perpendicular directions are independent of each other.

In the light of above statements, select the most appropriate option.

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

32. Three identical masses A, B and C are connected with two strings one of which passes over a pulley as shown in figure. If system is released from rest, then tension in string connected with blocks B and C is (if strings and pulley are massless)

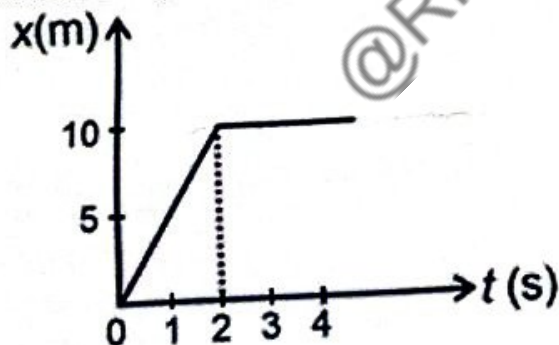


- (1) $\frac{mg}{3}$
 (2) $\frac{3mg}{2}$
 (3) mg
 (4) $\frac{2mg}{3}$

33. In the situation shown, reading of the spring balance will be $F_2 = 15\text{ N}$
-

- (1) 30 N
 (2) 33 N
 (3) 36 N
 (4) 40 N

34. The position-time ($x-t$) graph of a body of mass 1 kg is as shown in the figure. The impulse on the body at $t = 2\text{ s}$ is



- (1) 4 kg m/s
 (2) -5 kg m/s
 (3) -3 kg m/s
 (4) Zero

$$F \times t = 2$$

$$m \times 2$$

$$1 \times 2 \times 10$$

$$2 \times 10 \times 2 = 10$$

35. Given below are two statements:

Statement-I: A person standing freely in a bus experiences backward push when bus starts suddenly.

Statement-II: An inertial frame must always remain at rest. In the light of the above statements, choose the most appropriate answer from the options given below.

- (1) Both Statement I and Statement II are correct
 (2) Both Statement I and Statement II are incorrect
 (3) Statement I is correct but Statement II is incorrect
 (4) Statement I is incorrect but Statement II is correct

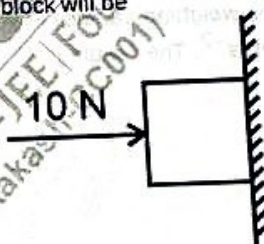
36. Given below are two statements labelled as Assertion (A) and Reason (R)

Assertion (A): If a body is in equilibrium while suspended vertically with the help of a string then tension in the string balances the weight of the body.

Reason (R): Static friction force is a self adjusting force. Select the most appropriate answer from the options given below.

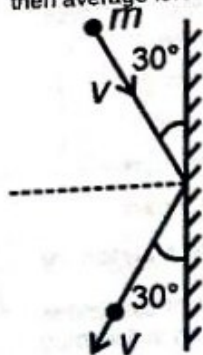
- (1) Both (A) and (R) are true and (R) is the correct explanation of (A).
 (2) Both (A) and (R) are true but (R) is not the correct explanation of (A).
 (3) (A) is true but (R) is false.
 (4) (A) is false and (R) is also false.

37. A horizontal force of 10 N is just sufficient to hold a block stationary against a vertical wall. If coefficient of friction between the block and wall is 0.25 then the weight of the block will be



- (1) 5.2 N
 (2) 2.5 N
 (3) 6.8 N
 (4) 4.5 N

38. A ball of mass 0.5 kg moving with speed $v = 20 \text{ m s}^{-1}$ strikes a hard wall at an angle of 30° with the wall as shown. If the ball is in contact with the wall for 0.05 seconds , then average force acting on the ball is



- (1) 173.2 N
- (2) 346.2 N
- (3) 200 N
- (4) 100 N

39. The coefficient of static friction between a block and an inclined plane is $\sqrt{3}$. The angle of repose is

- (1) 30°
- (2) 60°
- (3) 45°
- (4) 53°

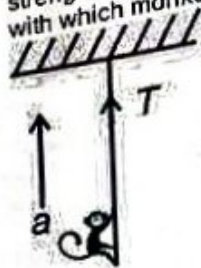
40. A boy with mass 50 kg is standing on a weighing balance in a lift ascending with acceleration 2 m s^{-2} . The reading of the balance is ($g = 10 \text{ m s}^{-2}$)

- (1) 400 N
- (2) 600 N
- (3) 500 N
- (4) 700 N

41. A body of mass 1 kg at rest experiences a force of 10 N . The speed of the body after 5 s will be

- (1) 30 m s^{-1}
- (2) 35 m s^{-1}
- (3) 40 m s^{-1}
- (4) 50 m s^{-1}

42. A monkey of mass 20 kg is climbing on a rope. If breaking strength of the rope is 250 N , then maximum acceleration with which monkey can climb on rope safely, will be



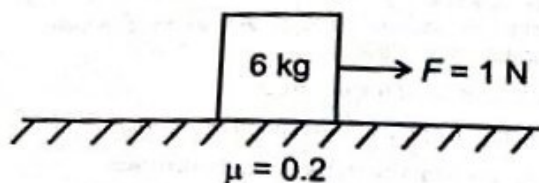
- (1) 7 m/s^2
- (2) 2.5 m/s^2
- (3) 3.5 m/s^2
- (4) 1 m/s^2

43. Three blocks with masses m , $3m$ and $5m$ are connected by strings as shown in figure. An upward force F is applied on block of mass m , the masses move upwards with constant speed v . Then the net force acting on mass $3m$ (acceleration due to gravity is g)




- (1) $2mg$
- (2) $3mg$
- (3) $5mg$
- (4) Zero

44. A block of mass 6 kg is kept on a rough horizontal surface of coefficient of friction 0.2 as shown in the figure. The horizontal force F applied to the block has magnitude 1 N. The acceleration of the block is ($g = 10 \text{ m/s}^2$)



- (1) 0.167 m/s^2
 (2) 1.83 m/s^2
 (3) 2 m/s^2
 (4) Zero
45. A machine gun fires n bullets per second with speed u , mass of each bullet is m . If bullets hit the wall and get embedded in it, then force acting on the wall is

- (1) mnu
 (2) $2mnu$
 (3) $\frac{mnu}{2}$
 (4) $4mnu$


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CHEMISTRY

46. For multielectronic species, the correct order of energy of the given orbitals is

- (1) $3d > 4p > 5s > 5p$
 (2) $4p > 3d > 5p > 5s$
 (3) $5p > 5s > 4p > 3d$
 (4) $5s > 4p > 3d > 5p$

47. The energies E_1 and E_2 of two radiations are 25 eV and 100 eV respectively. The relation between their wavelength i.e. λ_1 and λ_2 will be

- (1) $\lambda_1 = 4\lambda_2$
 (2) $\lambda_2 = 4\lambda_1$
 (3) $\lambda_1 = 2\lambda_2$
 (4) $\lambda_2 = 2\lambda_1$

Handwritten notes on the right side of the page:

1s		
2s	2p	
3s	3p	3d
4s	4p	4d
5s	5p	5d
6s	6p	6d
7s	7p	7d

48. Which of the following is not permissible arrangement of electrons in an atom?

- (1) $n = 4, l = 1, m = 0, s = +\frac{1}{2}$
- (2) $n = 5, l = 2, m = 2, s = -\frac{1}{2}$
- (3) $n = 5, l = 5, m = 1, s = -\frac{1}{2}$
- (4) $n = 4, l = 3, m = 2, s = +\frac{1}{2}$

49. The number of angular nodes and radial nodes respectively in $4d_{xy}$ orbital are

- (1) 1 and 2
- (2) 2 and 1
- (3) 2 and 0
- (4) 1 and 0

50. 0.66 kg ball is moving with a speed of 1000 m/s. The associated wavelength of the moving ball is ($h = 6.6 \times 10^{-34}$ Js)

- (1) 6.6×10^{-36} m
- (2) 6.6×10^{-35} m
- (3) 1×10^{-35} m
- (4) 1×10^{-36} m

51. Wavelength of electron in the fourth orbit of Be^{3+} ion is

- (1) 105.8π pm
- (2) 211.6π pm
- (3) 92.3π pm
- (4) 52.9π pm

52. A 100 watt bulb emits monochromatic light of wavelength 6626 pm. The number of photons emitted per second by the bulb is ($h = 6.626 \times 10^{-34}$ Js)

- (1) $3.33 \times 10^{17} \text{ s}^{-1}$
- (2) $3.33 \times 10^{18} \text{ s}^{-1}$
- (3) $3.33 \times 10^{19} \text{ s}^{-1}$
- (4) $3.33 \times 10^{20} \text{ s}^{-1}$

53. Given below are two statements:
Statement-I: For hydrogen atom $n = 1$, the electron has a more negative energy than $n = 5$, which means that the electron is more loosely bound in $n = 1$ orbit
Statement-II: Maximum number of electrons that a subshell can accommodate is $4l + 2$.
 In the light of above statements, choose the correct answer from the options given below.

- (1) Both statements I and II are correct
- (2) Statement I is incorrect but statement II is correct
- (3) Statement I is correct but statement II is incorrect
- (4) Both statements I and II are incorrect

54. According to the Bohr Theory, which of the following transitions in the hydrogen atom will give rise to the least energetic photon?

- (1) $n = 6$ to $n = 5$
- (2) $n = 5$ to $n = 3$
- (3) $n = 6$ to $n = 1$
- (4) $n = 5$ to $n = 4$

55. Maximum kinetic energy of photoelectrons emitted when a light of frequency 1.1×10^{12} Hz is irradiated on a metal surface whose threshold frequency is equal to 1.0×10^{11} Hz, is ($h = 6.6 \times 10^{-34}$ Js)

- (1) 6.6×10^{-25} J
- (2) 1.8×10^{-21} J
- (3) 5.1×10^{-20} J
- (4) 6.6×10^{-22} J

56. The orbital diagram in which both the Pauli's exclusion principle and Hund's rule are violated is

- (1)

2s	2p
$\uparrow\downarrow$	$\uparrow\uparrow\uparrow\uparrow$
- (2)

2s	2p
$\uparrow\downarrow$	$\uparrow\uparrow\uparrow$
- (3)

2s	2p
\uparrow	$\uparrow\uparrow\uparrow$
- (4)

2s	2p
$\uparrow\downarrow$	$\uparrow\downarrow\uparrow$

57. Choose the incorrect statement among the following

- (1) Cathode rays consist of negatively charged particles, called electrons.
- (2) Characteristics of cathode rays do not depend upon the material of electrodes.
- (3) The cathode rays start from anode and move towards cathode
- (4) In the absence of electrical or magnetic field, cathode rays travel in straight lines

58. What will be the ratio of d-electrons present in Mn^{2+} to Cu^+ in their ground atomic states?

- (1) 2 : 1
- (2) 5 : 9
- (3) 9 : 5
- (4) 1 : 2

59. An ion with a mass number of 56 contains 3 units of positive charge and 30.4% more neutrons than electrons. The symbol of the ion is

- (1) $^{56}_{26}Fe^{3+}$
- (2) $^{57}_{26}Fe^{3+}$
- (3) $^{58}_{27}Fe^{3+}$
- (4) $^{56}_{25}Fe^{3+}$

60. Consider the following experimental phenomena

- (a) Black-body radiation
- (b) Interference
- (c) Photoelectric effect

The phenomenon which could not be explained by the wave nature of electromagnetic radiation are

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

1. Consider the following two statements

Statement I : Bohr's theory was able to explain the splitting of spectral lines in the presence of magnetic field or an electric field.

Statement II : Bohr's theory could not explain the ability of atoms to form molecules by chemical bonds.

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

- (1) Both statement I and statement II are correct
- (2) Statement I is correct and statement II is incorrect
- (3) Statement I is incorrect and statement II is correct
- (4) Both statement I and statement II are incorrect

62. The wavenumber for the longest wavelength in the Lyman series of atomic hydrogen spectrum is

- (1) $3 R_H$
- (2) $\frac{8}{3} R_H$
- (3) $\frac{1}{4} R_H$
- (4) $\frac{3}{4} R_H$

63. Orbital angular momentum of electron present in 3d orbital is

- (1) $\sqrt{2} \hbar$
- (2) $2\sqrt{3} \hbar$
- (3) $\sqrt{6} \hbar$
- (4) $\sqrt{3} \hbar$

64. Match the atomic numbers given in column I with their IUPAC official names given in column II.

Column I	Column II
a. 101	(i) Rutherfordium
b. 103	(ii) Mendelevium
c. 104	(iii) Lawrencium
d. 108	(iv) Hassium

Choose the correct match from the options given below.

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

65. Identify the amphoteric oxide among the following.

- (1) Na_2O
- (2) Cl_2O_7
- (3) Al_2O_3
- (4) N_2O

66. The incorrect statement among the following is

- (1) Atomic radius of silicon is larger than phosphorus.
- (2) The behaviour of lithium and beryllium is more similar with magnesium and aluminium respectively
- (3) Boron can show a maximum covalency of four
- (4) Ionisation enthalpy of potassium is higher than sodium

$$\frac{\hbar(2+1)}{2\pi}$$

$$\frac{9(2+1)\hbar}{2\pi}$$

$$\sqrt{8\hbar} \quad \sqrt{3\hbar}$$

67. Consider the following statements
 (a) Bi and Rb are representative elements ✓
 (b) Ge and Sb are semi-metals
 (c) Ti and Ce are d-block elements
 The correct statements are
 (1) (a) and (c) only
 (2) (b) and (c) only
 (3) (a) and (b) only
 (4) (a), (b) and (c)
68. The correct order of negative electron gain enthalpy for given group 16 elements is
 (1) $O < Te < Se < S$
 (2) $S < Se < Te < O$
 (3) $S < O < Te < Se$
 (4) $S < Te < O < Se$
69. Which among the following electronic configuration represents element with least first ionization enthalpy?
 (1) $1s^2 2s^2 2p^3$
 (2) $1s^2 2s^2 2p^1$
 (3) $1s^2 2s^2 2p^6$
 (4) $1s^2 2s^2 2p^5$
70. The first ionisation enthalpy of Na is 5.1 eV. The value of electron gain enthalpy of Na^+ is
 (1) +1.25 eV
 (2) -5.1 eV
 (3) -2.55 eV
 (4) +10.2 eV
71. Which among the following is the correct order of metallic character of the given elements?
 (1) $K > Al > Mg > B$
 (2) $B > Al > Mg > K$
 (3) $K > Mg > Al > B$
 (4) $Mg > K > Al > B$
- Consider the following statements
 (a) Gallium is called Eka-aluminium
 (b) Sodium is more electropositive than potassium
 (c) Electron gain enthalpy of helium is positive
 The correct statements are
 (1) (a) and (b) only
 (2) (a) and (c) only
 (3) (b) and (c) only
 (4) (a), (b) and (c)
73. Identify the group and period respectively, for an element with atomic number 113.
 (1) 13 and 6
 (2) 13 and 7
 (3) 12 and 7
 (4) 14 and 6
74. Consider the following statements
Statement I: The elements after uranium are called Trans uranium elements.
Statement II: Samarium and neptunium are Trans uranium elements.
 In light of above statements, choose the correct answer.
 (1) Statement I is correct but statement II is incorrect
 (2) Statement I is incorrect but statement II is correct
 (3) Both statement I and statement II are correct
 (4) Both statement I and statement II are incorrect
75. Given below are two statements
Statement I: In Cl_2 molecule the covalent radius of atom is double of the atomic radius of chlorine.
Statement II: Radius of anionic species are always greater than their parent atomic radius.
 In the light of above statements, choose the most appropriate answer from the option given below.
 (1) Statement I is correct but statement II is incorrect
 (2) Statement I is incorrect but statement II is correct
 (3) Both statement I and statement II are correct
 (4) Both statement I and statement II are incorrect
76. Match list-I with list-II
- | | List-I
(atomic number) | | List-II
(Block of periodic table) |
|----|---------------------------|-------|--------------------------------------|
| a. | 37 | (i) | p-block |
| b. | 78 | (ii) | d-block |
| c. | 52 | (iii) | f-block |
| d. | 65 | (iv) | s-block |
- Choose the correct answer from the options given below.
 (1) a(ii), b(iv), c(i), d(iii)
 (2) a(i), b(iii), c(iv), d(ii)
 (3) a(iv), b(iii), c(ii), d(i)
 (4) a(iv), b(ii), c(i), d(iii)
77. The correct order of first ionization enthalpy for the given four elements is
 (1) $N < O < F < Ne$
 (2) $F < O < N < Ne$
 (3) $O < N < F < Ne$
 (4) $F < N < O < Ne$

IE ↓ 4 5 6 ↓ size ↑
 N ↑ M ↓

IE ↑

N O F N

78. Within each pair of elements F and Cl, S and Se, and Li and Na respectively, the elements that release more energy upon an electron gain are

- (1) F, Se and Na
- (2) F, S and Li
- (3) Cl, Se and Na
- (4) Cl, S and Li

79. Which of the following processes is endothermic in nature?

- A. $\text{Al}^{+2} \rightarrow \text{Al}^{+3}$
- B. $\text{Cl} \rightarrow \text{Cl}^-$
- C. $\text{O}^- \rightarrow \text{O}^{2-}$
- D. $\text{H} \rightarrow \text{H}^+$

Choose the correct option.

- (1) A, D only
- (2) B, C, D only
- (3) A, C, D only
- (4) A, B, C, D

80. On the basis of Pauling scale, the electronegativity value of nitrogen is equal to

- (1) F
- (2) O
- (3) C
- (4) Cl

81. Consider the following set of elements

- (a) Li, Na and K
- (b) Cu, Ag and Au
- (c) Ca, Sr and Ba
- (d) Cl, Br and I

The sets which represents Dobereiner's Triads is

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

82. The noble gas having highest value of electron gain enthalpy is

- (1) He
- (2) Ne
- (3) Ar
- (4) Kr

83. If IE_1 , IE_2 , IE_3 and IE_4 values of a metal 'M' are 11 eV, 23 eV, 45 eV and 223 eV respectively, then the formula of the corresponding metal phosphate is

- (1) MPO_4
- (2) M_2PO_4
- (3) $\text{M}_3(\text{PO}_4)_2$
- (4) M_3PO_4

84. The electronic configuration of an element is $1s^2 2s^2 2p^6 3s^2 3p^5$. Atomic number of the element present just below this element in the periodic table is

- (1) 36
- (2) 35
- (3) 33
- (4) 34

85. Consider the following statements about photoelectric effect
(a) There is no time lag between the striking of light beam and the ejection of electrons from metal surface.
(b) The number of electrons ejected is directly proportional to the frequency of light.
(c) The kinetic energy of electrons increases with the increase of intensity of light.
The correct statement(s) is/are

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

86. Out of the following, radiation with minimum wavelength is

- (1) UV
- (2) Radio waves
- (3) X-ray
- (4) IR

87. Which of the following set of orbitals may have electron density along the axes?

- (1) $p_z, d_{z^2}, d_{x^2-y^2}$
- (2) $d_{xy}, d_{x^2-y^2}, d_{z^2}$
- (3) $p_y, d_{x^2-y^2}, d_{yz}$
- (4) d_{xy}, d_{yz}, d_{zx}

88. If uncertainty in the momentum of a microscopic particle is two times to its uncertainty in position, then uncertainty in velocity is

- (1) $\frac{1}{m} \sqrt{\frac{h}{2\pi}}$
- (2) $\frac{4}{m} \sqrt{\frac{h}{\pi}}$
- (3) $\frac{1}{m} \sqrt{\frac{2h}{\pi}}$
- (4) $\frac{1}{m} \sqrt{\frac{h}{\pi}}$

89. For hydrogen atom, correct order of energy of orbital is

- (1) $2s < 2p < 3s < 3p < 3d$
- (2) $2s = 2p < 3s = 3p < 3d$
- (3) $2s = 2p < 3s = 3p = 3d$
- (4) $2s < 2p = 3s < 3p < 3d$

90. Number of proton, electron and neutron in $^{104}_{104}\text{Rf}$ respectively are

- (1) 104, 104, 157
- (2) 157, 104, 104
- (3) 104, 157, 104
- (4) 104, 104, 104

$$p = e \quad n = ?$$

$$\begin{array}{r} 261 \\ 104 \\ \hline 157 \end{array}$$

BOTANY

91. The best stage to study the different shapes of the chromosomes is

- (1) Anaphase
- (2) Metaphase
- (3) Telophase
- (4) Prophase

92. Which of the following does not qualify as the universal rule of binomial nomenclature?

- (1) Biological names are generally in Latin.
- (2) First letter of the second word of biological name is capital.
- (3) First word in a biological name represents the genus.
- (4) Both the words in a biological name, when handwritten, are separately underlined.

93. All of the following are significances of mitosis, except

- (1) Maintenance of cell size
- (2) Healing and regeneration
- (3) Growth of multicellular organisms
- (4) Introduction of variations

94. The DNA replication during cell cycle occurs in

- (1) S-phase
- (2) G_1 -phase
- (3) M-phase
- (4) Interkinesis

95. All are specific epithets of *Panthera*, except

- (1) *leo*
- (2) *tigris*
- (3) *sapiens*
- (4) *pardus*

96. Select the incorrect match from the following w.r.t. different phases of cells.

- (1) S phase – Duplication of centriole
- (2) G_0 phase – Cell can never return to the cell cycle
- (3) G_2 phase – DNA synthesis stops
- (4) G_1 phase – Interval between mitosis and DNA synthesis phase

97. How many generations are required by a cell of meristem to produce 256 cells?

- (1) 255
- (2) 128
- (3) 64
- (4) 8

$$\begin{array}{r} 64 \\ 2 \\ \hline 512 \end{array}$$

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- (1) $2s < 2p < 3s < 3p < 3d$
- (2) $2s = 2p < 3s = 3p < 3d$
- (3) $2s = 2p < 3s = 3p = 3d$
- (4) $2s < 2p = 3s < 3p < 3d$

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- (1) 104, 104, 157
- (2) 157, 104, 104
- (3) 104, 157, 104
- (4) 104, 104, 104

$$p = e \quad n = ?$$

$$\begin{array}{r} 261 \\ 104 \\ \hline 157 \end{array}$$

BOTANY

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- (3) sapiens
- (4) pardus

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- (1) S phase – Duplication of centriole
- (2) G₀ phase – Cell can never return to the cell cycle
- (3) G₂ phase – DNA synthesis stops
- (4) G₁ phase – Interval between mitosis and DNA synthesis phase

97. How many generations are required by a cell of meristem to produce 256 cells?

- (1) 255
- (2) 128
- (3) 64
- (4) 8

$$\begin{array}{r} 64 \\ 2 \\ \hline 512 \end{array}$$

98. Homologous chromosomes separate from each other during
- (1) Metaphase I
 - (2) Metaphase II
 - (3) Anaphase I
 - (4) Prophase I

99. Quiescent stage of cell cycle is

- (1) G₂
- (2) G₀ phase
- (3) M phase
- (4) S phase

100. Match the following columns and select the correct option.

Column-I Column-II

- | | |
|--------------|---|
| a. Zygotene | (i) First stage of prophase I |
| b. Diplotene | (ii) Formation of synaptonemal complex |
| c. Pachytene | (iii) Exchange of genetic material between homologous chromosomes |
| d. Leptotene | (iv) Dissolution of synaptonemal complex |

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

101. Prophase of mitosis is similar to prophase I of meiosis in/as

- a. Being short and without substages.
- b. Being the phase where splitting of centromere takes place.
- c. Both lack crossing over.
- d. Nucleolus and nuclear membrane disappear at the end of both the phases.

- (1) Only d is true
- (2) Only c & d are true
- (3) Only a & d are true
- (4) b, c & d are true

102. How many asters together with spindle fibres forms mitotic apparatus?

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

103. All of the following are features of M-phase, except

- (1) Assembly of mitotic apparatus
- (2) Synthesis of DNA
- (3) Reformation of nucleolus
- (4) Dissolution of nuclear envelope

104. During G₁ Phase

- (1) Cell is metabolically inactive
- (2) Cell grows continuously
- (3) Cell replicates its DNA
- (4) Golgi bodies duplicate

105. In an animal cell, cytokinesis is achieved by the formation of

- (1) Cell plate
- (2) Furrow
- (3) Phragmoplast
- (4) Metaphase plate

106. The interphase includes all of the following phases, except

- (1) M-phase
- (2) S-phase
- (3) G₁-phase
- (4) G₂-phase

107. Wheat and mango are placed in the same

- (1) Order
- (2) Class
- (3) Family
- (4) Division

108. Read the following statements and select the correct option.

Statement A: Meiosis involves two sequential cycles of nuclear and DNA replication but only a single cycle of cell division.

Statement B: Meiosis I is initiated, after the parental chromosomes have replicated to produce identical sister chromatids at the S phase.

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

109. Which of the following taxonomic categories occupy the same rank or level?

- (1) Poales and Sapindales
- (2) Muscidae and Insecta
- (3) Poaceae and Diptera
- (4) Primata and Mammalia

110. Select the sequence of events that take place during mitosis in correct chronological order.

- (a) Splitting of centromeres.
- (b) Attachment of spindle fibres to kinetochores of chromosomes.
- (c) Reformation of Golgi complex and ER.
- (d) Condensation of chromosomal material.

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

111. Monkey, gorilla and gibbon is placed under the order, named

- (1) Animalia
- (2) Mammalia
- (3) Primata
- (4) Chordata

112. The end stage of karyokinesis is

- (1) Telophase
- (2) Prophase
- (3) Metaphase
- (4) Anaphase

113. In oocytes of some vertebrates, _____ lasts for months or years. Select the correct option to fill in the blank.

- (1) Leptotene
- (2) Pachytene
- (3) Diplotene
- (4) Diakinesis

114. Metaphase I differs from metaphase II as in the metaphase

- (1) Microtubules attach to the kinetochores
- (2) Bivalents arrange on the equatorial plate
- (3) Each chromosome has two chromatids
- (4) There is half number of chromosomes as compared to metaphase II

115. Which among the following events does not take place in prophase of mitosis?

- (1) Condensation of chromosomal material
- (2) Attachment of spindle fibres to kinetochores of chromosomes
- (3) Movement of centrosome towards opposite pole
- (4) Formation of mitotic apparatus

116. Mitosis is called equational division because

- (1) The parent cell is divided into two daughter cells
- (2) Daughter cells have the same number of chromosomes as that present in parent cell
- (3) Two daughter cells so formed are identical in shape and size
- (4) All the cell organelles are equally distributed to two daughter cells

117. Semi-autonomous double membrane bound cell organelles duplicate during

- (1) G₁ phase
- (2) S phase
- (3) G₂ phase
- (4) M phase

118. Read the following statements and select the correct option:
Assertion(A): Cell division occurs in order to restore the nucleo-cytoplasmic ratio.

Reason(R): Cell growth results in disturbing the ratio between nucleus and the cytoplasm.

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (2) Both (A) and (R) are true but (R) is not correct explanation (A)
- (3) (A) is true but (R) is false
- (4) (A) is false but (R) is true

119. In which among the following stages, congression of chromosomes can be observed?

- (1) Prophase
- (2) Metaphase
- (3) Anaphase
- (4) Telophase

120. The word systematics is derived from a _____ word 'systema'.

- (1) Greek
- (2) English
- (3) Roman
- (4) Latin

121. Reproduction is synonymous with growth in

- (1) Amoeba
- (2) Hydra
- (3) Planaria
- (4) Higher plants

122. In taxonomic hierarchy there can be many intermediate categories but there are only _____ obligate categories.

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

123. A tetrad

- (a) Is a pair of two homologous chromosomes
- (b) Is clearly visible in zygotene stage
- (c) Consists of four chromatids

The correct one(s) is/are

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

124. The cell cycle is divided into how many basic phases?

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

125. Which of the following is not common to both processes mitosis and meiosis?

- (1) Spindle fibres attachment to kinetochores
- (2) Arrangement of chromosomes at metaphase plate
- (3) Bivalent formation
- (4) Asters formation

126. Select the correct option w.r.t. event that leads to formation of syncytium.

- (1) Karyokinesis not followed by disappearance of nuclear membrane
- (2) Karyokinesis not followed by cytokinesis
- (3) Cytoplasm division without DNA replication
- (4) Cytokinesis followed by karyokinesis

7. State True (T) or False (F) to the given statements

- (a) Cell plate represents the middle lamella between the walls of two adjacent cells T
- (b) Meiosis ensures the production of haploid phase in the life cycle of sexually reproducing organisms
- (c) During interkinesis, replication of DNA occurs F
- (d) The interphase lasts more than 95% of the duration of cell cycle T
- (e) In animals, mitotic cell division is only seen in the diploid somatic cells without any exception

(1) a-(T), b-(F), c-(F), d-(F), e-(T)

(2) a-(F), b-(F), c-(T), d-(F), e-(T)

(3) a-(T), b-(T), c-(F), d-(T), e-(F)

(4) a-(F), b-(T), c-(T), d-(T), e-(F)

128. ICBN stands for

- (1) International Code for Biological Nomenclature
- (2) International Code for Botanical Nomenclature
- (3) Indian Code of Biological Nomenclature
- (4) Indian Code of Botanical Nomenclature

129. Read the given statements and choose the correct option.
Statement A: Self consciousness is the defining feature of all living organisms.
Statement B: Growth is not considered as defining feature as some unicellular organisms do not grow.

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

130. Choose the correct match.

- (1) Division - Dicotyledonae
- (2) Class - Insecta
- (3) Order - Mammalia
- (4) Family - Diptera

131. Systematics differs from taxonomy as it includes

- (1) Classification
- (2) Nomenclature
- (3) Identification
- (4) Phylogeny

132. The properties of tissues are

- (1) Similar to the properties of the cell organelles of the constituent cells
- (2) The result of interactions among the molecular components comprising the organelle
- (3) Present in the constituent cells
- (4) The result of interactions among the constituent cells

133. Select the organisms which show metabolism.

- a. Plants
- b. Fungi
- c. Animals
- d. Microbes

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

134. Difficulty in determining the relationship to other taxa at the same level is very high in

- (1) Primata and Diptera
- (2) Mammalia and Insecta
- (3) *Mangifera* and *Triticum*
- (4) Anacardiaceae and Poaceae

135. Biodiversity is referred as

- (1) Diverse environment of a particular species
- (2) The number and types of organisms on earth
- (3) Availability of different food resources for a specific organism
- (4) Variation among the offspring of an organism

ZOOLOGY

136. Amino acids are considered as substituted methanes. The four substituent groups attached to the four valent positions on α -carbon in an amino acid are

- (1) Hydrogen, carboxyl group, amino group and a variable 'R' group
- (2) Two carboxyl groups, amino group and OH
- (3) Hydrogen, hydroxyl group, amino acid and methyl group
- (4) Two amino acids, one hydrogen and one carboxyl group

137. Choose the correct option to complete the analogy.

Acidic amino acid : Aspartic acid ::
Basic amino acid : _____

- (1) Tyrosine
- (2) Tryptophan
- (3) Phenylalanine
- (4) Lysine

138. If a protein is imagined as a line, the left end is represented by the first amino acid and the right end is represented by the last amino acid. The first and last amino acids are represented respectively by

- (1) C-terminal amino acid; N-terminal amino acid
- (2) N-terminal amino acid; C-terminal amino acid
- (3) C-terminal amino acid; C-terminal amino acid
- (4) N-terminal amino acid; N-terminal amino acid

139. Read the following statements and choose the correct option.

Statement I : In solutions of different pH, the structure of amino acids changes.

Statement II : An amino acid may exist as zwitterionic form, anionic form or cationic form depending on the pH of the solution.

- (1) Only statement I is correct
- (2) Only statement II is correct
- (3) Both the statements I and II are correct
- (4) Both the statements I and II are incorrect

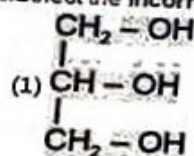
140. All of the following are linear chains of amino acids linked by peptide bonds except

- (1) Antibodies
- (2) Insulin
- (3) Receptors
- (4) Cellulose

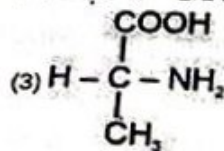
141. α -amino acids are substituted methanes. There are types of amino acids present in proteins and all of them contain a single asymmetric carbon, except

- (1) Glycine
- (2) Proline
- (3) Lysine
- (4) Cysteine

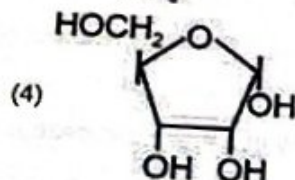
142. Select the incorrect match.



- Trihydroxypropane



- Simplest amino acid



- Pentose sugar of RNA

(1) (1)

(2) (2)

(3) (3)

(4) (4)

143. Lysine can be differentiated from valine as

(1) Former possesses more number of carboxyl group

(2) Latter possesses equal number of amino and carboxyl groups

(3) Latter possesses a cyclic ring in its structure

(4) Former is acidic and latter is basic in chemical nature

144. On comparison of insulin with inulin, it was concluded that

(1) Former is a complex structural homopolymer of glucose

(2) The first amino acid present in the chain of latter, is called the N-terminal amino acid

(3) Former is a heteropolymer which acts as an intercellular messenger

(4) Right end of latter contains the C-terminal amino acid

145. A student was analysing the structure of the respiratory pigment 'X' which is responsible for carrying O_2 in healthy adult humans. He found that 'X'

(1) Possesses two subunits of α -type and two subunits of β -type

(2) Exhibits only tertiary structure in which the protein thread is folded in the form of a helix

(3) Consists of covalent, hydrogen, disulphide as well as phosphodiester bonds

(4) Possesses only one subunit of α -type

146. Read the following statements on lipids and find out correct set of statements:

- (a) Lecithin found in the plasma membrane is a glycolipid.
- (b) Saturated fatty acids possess one or more $\text{C}=\text{C}$ bonds.
- (c) Gingelly oil has lower melting point, hence remains as oil in winter.
- (d) Lipids are generally insoluble in water but soluble in some organic solvents.
- (e) When a fatty acid is esterified with glycerol, monoglycerides are formed.

Choose the correct answer from the options given below:

(1) (c), (d) and (e) only

(2) (a), (b) and (d) only

(3) (a), (b) and (c) only

(4) (a), (d) and (e) only

147. Consider the following:

- (a) Non-polymeric in nature
 - (b) Has 16 carbons including the carboxyl carbon
 - (c) Belongs to the category of saturated fatty acid
- The above given features hold true for which of the following molecules?

(1) Arachidonic acid

(2) Glutamic acid

(3) Cytidylic acid

(4) Palmitic acid

148. The total number of fatty acids present in a molecule of lecithin is equal to the total number of heterocyclic rings present in

(1) Glycerol

(2) Uracil

(3) Adenine

(4) Serine

149.

Triglyceride \xrightarrow{A} 1 molecule of 'B' + 3 molecules of 'C'.

Select the correct option w.r.t. the above given reaction.

(1) 'A' represents the enzyme whose EC number begins with 4

(2) 'B' represents fatty acid

(3) 'C' represents glycerol

(4) 'A' represents the enzyme which breaks the ester bond and its EC number begins with 3

150. Select the option which represents the substituted pyrimidine, present in RNA but not in DNA.

(1) Adenine

(2) Thymine

(3) Guanine

(4) Uracil

151. Choose an incorrect statement w.r.t. Watson-Crick model.

- (1) Backbone of double stranded helical DNA is formed by sugar-phosphate-sugar chain.
- (2) Nitrogen bases are projected more or less perpendicular to the backbone.
- (3) Nitrogen bases in a DNA helix face outside and are complementary.
- (4) The two strands of polynucleotides are antiparallel.

152. If the total amount of adenine in a double stranded DNA molecule is 30%, what will be the amount of pyrimidines in the at DNA molecule?

- (1) 50%
- (2) 30%
- (3) 40%
- (4) 60%

153. Choose the correct option to complete the analogy.
Nitrogenous base : Adenine :: Nucleoside : _____

- (1) Adenosine
- (2) Adenylic acid
- (3) Deoxyadenylic acid
- (4) Guanine

154. A segment of ds DNA has 100 adenine and 100 cytosine residues. The total number of nucleotides and hydrogen bonds present in it respectively are

- (1) 400, 500
- (2) 99, 500
- (3) 400, 198
- (4) 500, 400

155. With the increase in substrate concentration, the velocity of the enzymatic reaction rises and ultimately reaches a maximum velocity. What happens to the enzymatic activity when further more substrate is added in this condition?

- (1) It will decrease
- (2) It will increase
- (3) It will remain unchanged
- (4) It will first increase then it will decrease

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

Statement A: The type of co-factor found in peroxidase is actually an organic compound which is tightly bound to apoenzyme.

Statement B: Catalase and carboxypeptidase possess same type of co-factor.

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

157. The activity of an enzyme is sensitive to all of the following, except

- (1) Presence of inhibitors
- (2) Deviation of temperature from its optimum range
- (3) Decrease in pH from its optimum value
- (4) Activation energy of a chemical reaction

158. Coenzyme nicotinamide adenine dinucleotide (NAD) and NADP contain the vitamin

- (1) Thiamine
- (2) Niacin
- (3) Pyridoxine
- (4) Tocopherol

159. All of the following are steps involved in the catalytic cycle of an enzyme action, except

- (1) Substrate binds to the active site of enzyme
- (2) The binding of substrate induces the enzyme to alter its shape, fitting more tightly around substrate.
- (3) Enzyme-substrate complex is not formed in enzymatic reaction.
- (4) The enzyme releases the products and free enzyme is ready to bind to another molecule of the substrate.

160. Assertion (A): An enzyme like any other protein has a secondary structure which imparts the enzyme its catalytic activity.

Reason (R): The primary structure of an enzyme has many crevices or pockets into which the substrate fits.
In the light of above given statements, choose the correct option.

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

161. During an enzymatic reaction, a transition state structure of the substrate is formed which is

- (1) Stable and transient
- (2) Unstable and transient
- (3) Stable and permanent
- (4) Unstable and permanent

$$\frac{34}{121}$$

$$\begin{array}{r} A = 30 \\ T = 30 \\ \hline 60 \\ 40 \end{array}$$

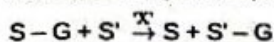
162. Assertion (A): In competitive inhibition, both substrate and inhibitor simultaneously bind to the same active site of the enzyme.

Reason (R): Competitive inhibitors change both the K_m and V_{max} values of the catalysed reaction.

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

- (1) Both (A) and (R) are true and (R) is correct explanation of the (A).
- (2) Both (A) and (R) are true but (R) is not correct explanation of the (A).
- (3) (A) is true but (R) is false.
- (4) Both (A) and (R) are false.

163. Consider the given equation.



'X' is the enzyme in the above given equation. X' belongs to which of the following classes?

- (1) Dehydrogenases
- (2) Hydrolases
- (3) Lyases
- (4) Transferases

164. How many of the given statement(s) are correct?

- a. Prosthetic groups are organic compounds and are distinguished from other co-factors as they are tightly bound to apoenzyme.
 - b. Association of co-enzyme with apoenzyme is permanent.
 - c. Apoenzyme is the non-protein constituent of a holoenzyme.
 - d. Rate of physical or chemical process refers to the amount of product formed per unit time.
- Choose the correct option.

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

165. A non-proteinaceous enzyme is

- (1) Deoxyribonuclease
- (2) Ligase
- (3) Lysozyme
- (4) Ribozyme

166. Assertion (A): Any change in the volume of the thoracic cavity, can affect breathing.

Reason (R): We can directly alter the pulmonary volume and any change in the volume of the thoracic cavity will be reflected in the pulmonary cavity.

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

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

167. During swallowing, glottis can be covered by a flap called epiglottis. Fill in the blank by selecting the correct option.

- (1) Thick muscular
- (2) Thin elastic cartilaginous
- (3) Thin muscular
- (4) Thick fibro-cartilaginous

168. Match column I with column II w.r.t organisms and the structure used by them for exchange of O_2 and CO_2 .

Column I	Column II
a. <i>Aplysia</i>	(i) Moist cuticle
b. <i>Pheretima</i>	(ii) Tracheal tubes
c. <i>Periplaneta</i>	(iii) Lungs
d. <i>Aptenodytes</i>	(iv) Feather-like gills

Select the correct option.

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

169. Select the correct set of structures that are not supported by incomplete cartilaginous rings.

- (1) Initial bronchioles, trachea
- (2) Primary bronchi, secondary bronchi
- (3) Terminal bronchioles, alveoli
- (4) Initial bronchioles, alveoli

170. Comprehend the given statements w.r.t human lungs.
Statement A: Pleural fluid between the double layered pleura reduces friction on the lung surface.
Statement B: The parietal pleura and the visceral pleura respectively are in direct contact with the lung surface and thoracic lining.
Choose the correct option.

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

171. The thoracic chamber of humans is formed dorsally by the A, ventrally by the B, laterally by the C and on the lower side by the D.
Identify A, B, C & D and select the correct option.

A	B	C	D
(1) Ribs	Diaphragm	Sternum	Vertebral column
(2) Vertebral column	Sternum	Ribs	Diaphragm
(3) Sternum	Vertebral column	Ribs	Diaphragm
(4) Sternum	Vertebral column	Diaphragm	Ribs

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

172. Select the option that correctly represents the volume of air that will remain in the lungs after a normal expiration in a healthy adult man.

- (1) $RV + ERV + TV + IRV$
(2) $ERV + RV$
(3) $ERV + TV + IRV$
(4) $VC + RV$

173. Assertion (A): In lower invertebrates like sponges, coelenterates and flatworms, diffusion of gases occurs through their body surfaces.

Reason (R): Mechanism of breathing varies among different groups of animals depending mainly on their habitats and levels of organisation.

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

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(3) (A) is true statement but (R) is false
(4) Both (A) and (R) are false statements

174. A portion of which among the following acts as a common passage for air and food in case of humans?

- (1) Larynx
(2) Pharynx
(3) Trachea
(4) Bronchi

175. Following are the steps involved in respiration in humans:
a. Diffusion of gases between blood and tissues
b. Pulmonary ventilation
c. Diffusion of gases across alveolar membrane
d. Cellular respiration
e. Transport of gases by the blood

Select the option that represents the correct sequence of events for a healthy man.

- (1) $b \rightarrow c \rightarrow d \rightarrow a \rightarrow e$
(2) $b \rightarrow c \rightarrow e \rightarrow a \rightarrow d$
(3) $b \rightarrow a \rightarrow c \rightarrow d \rightarrow e$
(4) $a \rightarrow b \rightarrow c \rightarrow e \rightarrow d$

176. During normal inspiration in humans

- (1) External inter-costal muscles contract
(2) Volume of pulmonary cavity decreases
(3) Ribs and sternum move inwards causing an increase in the intra-pulmonary pressure
(4) Positive pressure is created in the lungs for suction of atmospheric air

177. On an average, a healthy human breathes _____ times/minute. Choose the option that fills the blank correctly.

- (1) 15-20
(2) 12-16
(3) 10-12
(4) 20-25

178. Which of the following helps in clinical assessment of pulmonary functions?

- (1) ECG
(2) Angiograph
(3) Sphygmomanometer
(4) Spirometer

179. A healthy, adult man is quietly respiring while reading a newspaper. Now, which of the following muscles are being involved in this?

- (1) Only external intercostal muscles
(2) Only internal intercostal muscles
(3) Diaphragm and external intercostal muscles
(4) Diaphragm and abdominal muscles

180. Complete the analogy by selecting the correct option w.r. contraction of muscles and change in the volume of thoracic cavity during normal breathing.
Contraction of diaphragm : Antero-posterior axis
Contraction of external inter-costal muscles : _____

- (1) Antero-posterior axis
(2) Dorso-lateral axis
(3) Dorso-ventral axis
(4) Vento-lateral axis

$$\begin{array}{r} 103 \\ \times 412 \\ \hline \end{array}$$

$$\begin{array}{r} 163 \\ \times 652 \\ \hline \end{array}$$