Target Test Series for NEET-2021

Time: 3 Hr. **PART TEST : 01** **Max. Marks: 720**

INSTRUCTIONS :

- There are three sections in this paper, consisting Physics, Chemistry & Biology. Physics 45,Chemistry 45 and Biology 90 questions. Total 180 Questions and 720 Marks.
- For each correct answer 4 marks awarded and for each incorrect answer, one mark will be deducted.
- Mark only one correct answer out of four alternatives.
- Use Blue/Black Ball Point Pen only for writing particulars/marking.
- Use of Calculator is not allowed.
- Dark the circle in the space provided only.
- Use of white fluid or any other material which damage the answer sheet, is not permissible on the Answer Sheet.

USEFUL CONSTANTS

Boltzmann constant (k)	=	1.38×10^{-23} J K^{-1}	Avogadro's number (N_A)	=	6.02×10^{23} mol^{-1}
Planck's constant (h)	=	6.63×10^{-34} J s	Speed of light in vacuum (c)	=	3×10^{8} m s^{-1}
Rest mass of electron (m_e)	=	9.1×10^{-31} kg	1 unified atomic mass unit (u)	=	1.66×10^{-27} kg
1 eV	=	1.6×10^{-19} J	1 nm	=	10^{-9} m
Charge of Electron (e)	=	1.6×10^{-19} C	Gas constant (R)	=	8.31 J mol^{-1} K^{-1}]

SYLLABUS

Physics : Physical World and Measurement; Kinematics

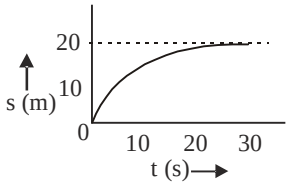
Chemistry : Some Basic Concepts of Chemistry, Structure of Atom, Classification of Elements and Periodicity in Properties, Chemical bonding and Molecular Structure

Biology : Diversity in Living World: What is living? ; Biodiversity; Need for classification; Three domains of life; Taxonomy & Systematics; Concept of species and taxonomical hierarchy; Binomial nomenclature; Tools for study of Taxonomy – Museums, Zoos, Herbaria, Botanical gardens keys, Five kingdom classification; salient features and classification of Monera, Protista and Fungi into major groups; Lichens; Viruses and Viroids,

Salient Features and classification of animals-non chordate up to phyla level and Chordates up to classes level

PHYSICS

1. The dimensions of magnetic intensity are :
   (1) $[M^0LT^0A]$ (2) $[M^0L^2T^0A]$
   (3) $[M^0L^{-1}T^0A]$ (4) $[M^0L^0TA^0]$
2. The velocity of water waves may depend on their wavelength λ, the density of water ρ and the acceleration due to gravity g. The method of dimensions gives the relation between these quantities as :
   (1) $V^2 \propto \lambda\, g^{-1}\, \rho^{-1}$ (2) $V^2 \propto g\,\lambda$
   (3) $V^2 \propto g\,\lambda\,\rho$ (4) $V^2 \propto g^{-1}\,\lambda^3$
3. Time of oscillation of a liquid drop depends upon density 'd', radius 'r' and surface tension 'S'. The correct relation is :
   (1) $T \propto dr^3S$ (2) $T \propto \sqrt{dr^3S}$
   (3) $T \propto \sqrt{dr^3/S}$ (4) $T \propto \sqrt{drS}$
4. A car moving with a speed of 20 m/s when driver applies brakes, if brakes produce constant retardation of 1.25 m/s^2. Find distance covered by the car in the 17th second
   (1) $-\frac{5}{8}$ m (2) $\frac{5}{8}$ m
   (3) $\frac{10}{8}$ (4) None of these
5. A quantity X is given by $\epsilon_0 L \frac{\Delta V}{\Delta t}$ where, ϵ_0 is the permittivity of free space, L is length, ΔV is a potential difference and Δt is time interval. The dimensional formula for X is the same as that of :
   (1) Resistance (2) Charge
   (3) Voltage (4) Current
6. A scientist performs an experiment and takes 100 readings. He repeats same experiment and now takes 400 readings. By doing so :
   (1) the probable error remains the same
   (2) the probable error is halved
   (3) the probable error is doubled
   (4) the probable error is reduced by a factor 1/4
7. A body sliding on a smooth inclined plane requires 4 seconds to reach the bottom, starting from rest at the top. How much time does it take to cover one fourth the distance starting from rest at the top ?
   (1) 1 sec (2) 2 sec
   (3) 4 sec (4) 16 sec
8. The initial velocity of a particle moving along a straight line is 10 m/s and its retardation is 2 m/s^2. The distance covered by the body in the 5th second of its motion is:
   (1) 19 m (2) 50 m
   (3) 75 m (4) 1 m
9. The displacement of a particle as a function of time is shown in figure. The figure indicates :



   (1) The particle starts with a certain velocity, but the motion is retarded and finally the particle stops
   (2) The velocity of the particle is constant throughout
   (3) The acceleration of the particle is constant throughout
   (4) The particle starts with a constant velocity, the motion is accelerated and finally the particle moves with another constant velocity
10. A body is released from a great height and falls freely towards the earth. Another body is released from the same height exactly one second later. Then the separation between the two bodies, two seconds after the release of the second body is :
   (1) 4.9 m (2) 9.8 m
   (3) 19.6 m (4) 24.5 m
11. A ball which is thrown vertically upwards reaches the roof of a house 100 metres high. At the moment this ball is thrown vertically upwards, another ball is dropped from rest vertically downward from the roof of the house. They will pass each other at a height of :
   (1) 50 m (2) 25 m
   (3) 75 m (4) 12.5 m
12. Two boys are standing at points A and B 100 metre apart. They start running towards each other with speeds of 3 m/s and 7 m/s respectively. After how much time and at what distance from point A, they will meet :
   (1) 5 sec, 50 m (2) 3 sec, 50 m
   (3) 10 sec, 30 m (4) 10 sec, 740 m

13. A man in a lift ascending with an acceleration '*a*' throws a ball vertically upwards with a velocity *u* relative to the lift, catches it again after *t* seconds. Then *t* is given by :

(1) $\frac{2u}{g}$ (2) $\frac{2u}{g+a}$

(3) $\frac{2u}{g-a}$ (4) $\frac{2u}{a}$

14. A particle moving in a straight line covers half the distance with speed of 3 m/s. The other half of the distance is covered in two equal time intervals with speed of 4.5 m/s and 7.5 m/s respectively. The average speed of the particle during this motion is :

(1) 4.0 m/s (2) 5.0 m/s

(3) 5.5 m/s (4) 4.8 m/s

15. A particle moving in a straight line with initial velocity *u* and uniform acceleration *f*. If the sum of the distances travelled in *t*th and $(t+1)$th seconds is 100 cm, then its velocity after t seconds in cm/s is :

(1) 20 (2) 30

(3) 50 (4) 80

16. A balloon starts rising from the ground with an acceleration of 1.25 m/s^2. After 8 s, a stone is released from the balloon. The stone will :

(taking g = 10 ms^{-2})

(1) Cover a distance of 40 m in reaching the ground

(2) Will have a displacement of 50 m

(3) Begin to move down after being released

(4) Reach the ground in 4 s

17. A boat which has a speed of 5 km/hr in still water crosses a river of width 1 km along the shortest possible path in 15 minutes. The velocity of river water in km/hr is :

(1) 1 (2) 3

(3) 4 (4) $\sqrt{41}$

18. The vector sum of two vectors $\vec{P}$ and $\vec{Q}$ is $\vec{R}$. If vector $\vec{Q}$ is reversed, the resultant becomes $\vec{S}$, then which of the following relation is valid ?

(1) $R^2+S^2=2(P^2+Q^2)$

(2) $R^2-S^2=2(P^2-Q^2)$

(3) $R^2+S^2=P^2-Q^2$

(4) $R+S=2(P+Q)$

19. If the two vectors

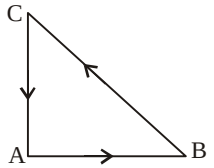
$\vec{A}=5\hat{i}+7\hat{j}-3\hat{k}$ and $\vec{B}=2\hat{i}-m\hat{j}+n\hat{k}$

are parallel them :

(1) $m=-\frac{14}{5}, n=-\frac{6}{5}$ (2) $m=\frac{14}{5}, n=\frac{3}{5}$

(3) $m=\frac{6}{5}, n=\frac{14}{5}$ (4) $m=\frac{7}{5}, n=\frac{6}{5}$

20. Three forces start acting simultaneously on a particle moving with velocity $\vec{v}$. These forces are represented in magnitude and direction by the three sides of a triangle ABC (as shown). The particle will now move with velocity :



(1) |v| in the direction of the largest force BC

(2) $\vec{v}$, remaining unchanged

(3) less than $\vec{v}$

(4) greater than $\vec{v}$

21. A particle is projected at an angle θ with the horizontal. If the horizontal range and maximum height attained are equal then the angle θ is :

(1) $\tan^{-1} 2$ (2) $\tan^{-1} 4$

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

22. A player kicks a ball at an angle of 45° with the horizontal with an initial speed of 20 m/s. A second player on the goal line 60 m away in the direction of kick starts running to receive the ball at the same instant. If he is able to catch the ball before it hits the ground, he should run with a speed :

(1) 5 m/s (2) $5\sqrt{2}$ m/s

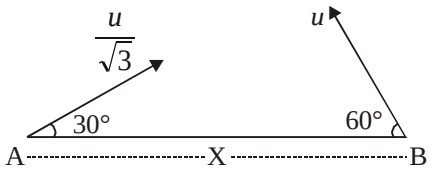
(3) 10 m/s (4) $10\sqrt{2}$ m/s

23. The velocity at the maximum height of a projectile is half its initial velocity of projection '*u*'. Its range on the horizontal plane is :

(1) $\frac{\sqrt{3}}{2}\frac{u^2}{g}$ (2) $\frac{u^2}{3g}$

(3) $\frac{3}{2}\frac{u^2}{g}$ (4) $\frac{3u^2}{g}$

24. Two particles are separated by a horizontal distance 'X' as shown in the adjoining figure. They are projected at the same time with velocities $\frac{u}{\sqrt{3}}$ and *u* respectively. The time after which the horizontal distance between the particles becomes zero, is :



(1) $\frac{u}{2X}$ (2) $\frac{u}{X}$

(3) $\frac{X}{u}$ (4) $\frac{2X}{u}$

25. A particle is moving in a plane with a velocity given by $\vec{u} = a\hat{i} + \cos\omega t\ \hat{j}$, where $\hat{i}$ and $\hat{j}$ are unit vectors along x- and y- axes respectively. If the particle is at the origin at t = 0, then the distance from the origin at time $t = 3\pi/2\omega$, is :

(1) $\frac{3\pi a}{2\omega}$ (2) $\sqrt{\left(\frac{3\pi a}{2\omega}\right)^2 + \omega^2}$

(3) $\sqrt{\left(\frac{3\pi a}{2\omega}\right)^2 + \left(\frac{1}{\omega}\right)^2}$ (4) $\sqrt{\left(\frac{3\pi a}{2\omega}\right)^2 + a^2}$

26. The trajectory of a projectile in a vertical plane is $y = ax - bx^2$, where a and b are constants, and x and y are the horizontal and vertical distances of the projectile from the point of projection. The maximum height attained by the projectile is :

(1) $\frac{a}{2b}$ (2) $\frac{a^2}{4b}$

(3) $\frac{b^2}{2a}$ (4) $\frac{b^2}{4a}$

27. A particle begins to slide down a fixed smooth hemisphere from the topmost point. Its tangential acceleration, when it just leaves the surface of the sphere, is :

(1) g (2) $\frac{\sqrt{5}}{3}g$

(3) $\frac{g}{3}$ (4) $\frac{2g}{3}$

28. Given that $y = a\cos\left(\frac{t}{p} - qx\right)$, where t represents time in second and x represents distance in metre. Which of the following statements is true ?

(1) The unit of x is same as that of q

(2) The unit of x is same as that of p

(3) The unit of t is same as that of q

(4) The unit of t is same as that of p

29. The length of cylinder is measured with a metre rod having least count 0.1 cm. Its diameter is measured with vernier callipers having least count 0.01 cm. Given that length is 5.0 cm and radius is 2.0 cm. The percentage error in the calculated value of the volume will be

(1) 1.5% (2) 2.5%

(3) 32.5% (4) 4%

30. The dimensional representation of specific resistance in terms of charge Q is

(1) $[ML^3T^{-1}Q^{-2}]$ (2) $[ML^2T^{-2}Q^{+2}]$

(3) $[MLT^{-2}Q^{-1}]$ (4) $[ML^2T^{-2}Q^{-1}]$

31. The dimensional formula for molar thermal capacity is same as that of

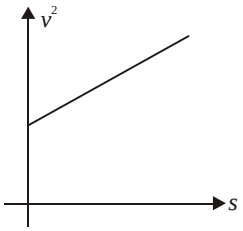
(1) Gas constant

(2) Specific heat

(3) Boltzmann's constant

(4) Stefan's constant

32. v^2 versus s-graph of a particle moving in a straight line is as shown in figure. From the graph some conclusions are drawn. State which statement is wrong



(1) The given graph shows a uniformly accelerated motion

(2) Initial velocity of particle is zero

(3) Corresponding s-t graph will be a parabola

(4) None of the above

33. At $t = 0$, an arrow is fired vertically upwards with a speed of 98 ms^{-1}. A second arrow is fired vertically upwards with the same speed at $t = 5$ s. Then select wrong alternative

(1) the two arrows will be at the same height above the ground at $t = 12.5$ s

(2) the two arrows will reach back their starting points at $t = 20$ s and $t = 25$ s

(3) the ratio of the speeds of the first and the second arrows at $t = 20$ s will be 2 : 1

(4) the maximum height attained by either arrow will be 980 m

34. A particle moves along a straight line such that its displacement at any time t is given by

$$s = 3t^3 + 7t^2 + 14t + 5$$

The acceleration of the particle at $t = 1$ sec is

(1) 18 m/s^2 (2) 32 m/s^2

(3) 29 m/s^2 (4) 24 m/s^2

35. A ball thrown vertically upwards reaches the roof of a house 100 m high. At the moment this ball is thrown vertically upwards, another ball is dropped from rest vertically downwards from the roof of the house. At which height do the ball pass each other and after what time ?

(1) 50 m, $\frac{300}{\sqrt{1960}}$ s (2) 50 m, $\frac{\sqrt{1960}}{100}$ s

(3) 37.5 m, $\frac{200}{\sqrt{1960}}$ s (4) 75 m, $\frac{100}{\sqrt{1960}}$ s

36. The charge in velocity vector of a projectile in air in an interval of 10 seconds is ($g = 10\ m/s^2$)

(1) 100 m/s $\hat{j}$ (2) – 100 m/s $\hat{j}$

(3) – 200 m/s $\hat{j}$ (4) Can't be calculated

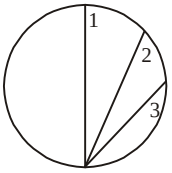
37. A particle moves along a parabolic path $y = 9x^2$ in such a way that the x component of velocity remains constant and has a value $\frac{1}{3}$ ms^{-1}.

The acceleration of the particle is

(1) $\frac{1}{3}\hat{j}\ ms^{-1}$ (2) $3\hat{j}\ ms^{-2}$

(3) $\frac{2}{3}\hat{j}\ ms^{-2}$ (4) $2\hat{j}\ ms^{-2}$

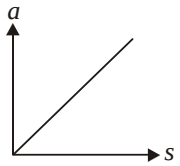
38. Three planes coincide with the chords of the same circle of radius R. A small body slides down each of them without friction and without initial velocity. If t_1, t_2 and t_3 are time taken by the body to reach the bottom of planes denoted by 1, 2 and 3 respectively, then

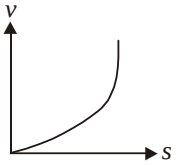


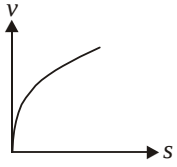
(1) $t_1 > t_2 > t_3$ (2) $t_1 < t_2 < t_3$

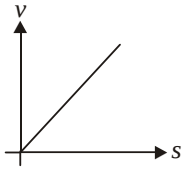
(3) $t_1 = t_2 = t_3$ (4) Cannot be decided

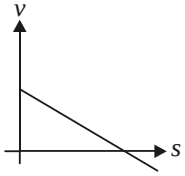
39. Acceleration-displacement (a-s) graph of a particle moving in a straight line is as shown in the figure. The initial velocity of the particle is zero. The velocity-displacement graph of the particle will be



(1) 

(2) 

(3) 

(4) 

40. A ball is thrown upwards from the top of a tower, 40 m high with a velocity of 10 m/s. The time when it strikes the ground is given by ($g = 10\ m/s^2$)

(1) $t = 2$ sec (2) $t = 4$ sec

(3) $t = 8$ sec (4) $t = 12$ sec

41. A particle starts moving from the position of rest under a constant acceleration. If it travels a distance x in t sec, then the distance travelled in the next t sec will be

(1) x (2) $2x$

(3) $3x$ (4) $4x$

42. A projectile is thrown from the ground with an initial velocity vector $\vec{u} = a\hat{i} + b\hat{j}$ m/s its equation of trajectory is

(1) $y = \frac{b}{a}x - \frac{1}{2}g\frac{x^2}{a^2}$ (2) $y = \frac{ax}{b} - \frac{1}{2}g\frac{x^2}{a^2}$

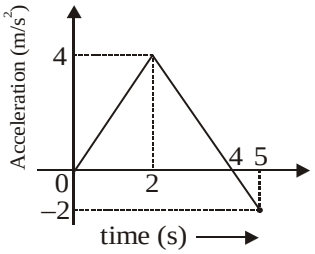
(3) $y = \frac{bx}{a} - \frac{1}{2}g\frac{x^2}{a^2+b^2}$ (4) $y = \frac{ax}{b} - \frac{1}{2}g\frac{x^2}{a^2+b^2}$

43. A racing car moving with constant acceleration covers two successive kilometers in 30 s and 20 s respectively. Then the acceleration and the initial speed of the car are

(1) $\frac{2}{3}\ m/s^2\ ;\ \frac{70}{3}\ m/s$ (2) $\frac{3}{2}\ m/s^2\ ;\ \frac{70}{3}\ m/s$

(3) $\frac{2}{3}\ m/s^2\ ;\ \frac{70}{4}\ m/s$ (4) $\frac{3}{2}\ m/s^2\ ;\ \frac{70}{4}\ m/s$

44. Figure shows the graph of acceleration of particle as a function of time. The maximum speed of the particle is (particle starts from rest)



(1) 7 m/s (2) 8 m/s

(3) 4 m/s (4) 16 m/s

45. Two tall buildings are 30 m apart. The speed with which a ball must be thrown horizontally from a window 150 m above the ground in one building so that it enters a window 27.5 m from the ground in the other building isclose to

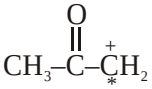
(1) 2 $m\ s^{-1}$ (2) 6 $m\ s^{-1}$

(3) 4 $m\ s^{-1}$ (4) 8 $m\ s^{-1}$

CHEMISTSRY

46. In the structure of ClF_3
(1) Lone pairs occupy axial position
(2) Lone pairs occupy equatorial position
(3) Lone pairs occupy both axial and equatorial position
(4) No lone pairs are there

47. Hybridisation of carbon (*) in the following organic cation is



(1) sp^2 (2) sp
(3) sp^3 (4) sp^3d

48. Which of the following statements is incorrect about Resonance ?
(1) Cannonical form have no real existance
(2) There is as such equilibrium between cannonical forms on in tautomers
(3) Resonance hybrid structure has least energy
(4) More the resonating structures more the stability

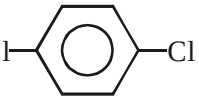
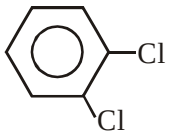
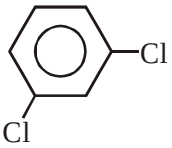
49. Correct order of 2nd ionisation enthalpy will be
(1) Mg < Si < Al < Na (2) Na < Al < Mg < Si
(3) Na < Mg < Al < Si (4) Na < Si < Mg < Al

50. Which of the following order of lattice energy is incorrect ?
(1) KBr < LiF < MgO
(2) FeO > Fe_2O_3
(3) $Ba(OH)_2$ < $Sr(OH)_2$ < $Mg(OH)_2$
(4) BaO < SrO < CaO

51. Which of the following specie is having a coordinate bond ?
(1) NH_4^+ (2) BF_4^-
(3) $[Cu(NH_3)_4]^{2+}$ (4) All of these

52. Which of the following is having maximum number of lone pair on central atom ?
(1) $I_3^{\ominus}$ (2) XeF_4
(3) XeO_2F_2 (4) $XeOF_4$

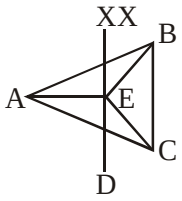
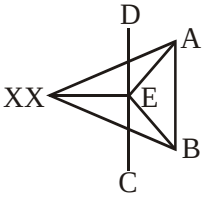
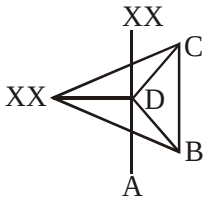
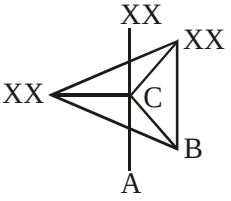
53. Which of the following is having a two-dimensional shape ?
(1) XeF_4 (2) NH_3
(3) $ClO_4^{\ominus}$ (4) $XeOF_4$

54. Which of the following is non-polar ?
(1) 
(2) 
(3) 
(4) 

55. Which of the following is having a dipole-moment ?
(1) XeO_3 (2) CO_3^{2-}
(3) $XeOF_4$ (4) Both (1) and (3)

56. If the central atom of the molecule is having 1 lone pair and 4 bond pair then the shape of molecule will be always
(1) T-shape (2) See-saw
(3) Bent (4) Trigonal planar

57. The number of σ and π bonds present in ethylacetoacetate are
(1) 17 σ & 2 π (2) 18 σ & 2 π
(3) 16 σ & 4 π (4) 20 σ & 3 π

58. In which of the following arrangement, repulsion is least and stability is maximum ?
(1) 
(2) 
(3) 
(4) 

59. In which of the following arrangement of hybrid orbitals, all the bond angles are same?
(1) Trigonal bipyramidal
(2) Penta-gonal bipyramidal
(3) Square bipyramidal
(4) See-saw

60. A element is having atomic number 52. In which group of modern periodic table it will lie ?
(1) 12 (2) 13
(3) 15 (4) 16

61. Which of the following form of iron is most electronegative form ?
(1) Fe^{2+} (2) Fe^{3+}
(3) Fe (4) Can't predicted

62. Shape of IF_5 will be
(1) Trigonal bipyramidal (2) Pentagonal
(3) Square pyramidal (4) Octahedral

63. Which of the following element occupy the peak of Lothar Meyer's atomic volume curve ?
(1) K (2) Be
(3) F (4) Cl

64. Which of the following is the correct sequence of ionisation energy among elements of Boron family ?
(1) In < Tl < Al < Ga < B
(2) In < Al < Ga < Tl < B
(3) Tl < Ga < Al < B
(4) Tl < Ga < In < Al < B

65. Arrange the elements of oxygen family in increasing order of electron gain enthalpy ?
(1) S < Se < Te < O (2) S < Te < Se < O
(3) S < O < Se < Te (4) S < Te < O < Se

66. Electron affinity of chlorine is 349 kJ/mole. Find the amount of energy released when 0.355 gm of chlorine is converted into Cl^- in gaseous state?
(1) 2 kJ (2) 3.50 kJ
(3) 10 kJ (4) 12 kJ

67. In a given shell, order of screening effect is
(1) s > p > d > f (2) f > d > p > s
(3) f > s > d > p (4) d > f > s > p

68. The successive ionisation energy of an element X are given below :
A : IE_I = 410 kJ/mole B : IE_{II} = 820 kJ/mole
C : IE_{III} = 1000 kJ/mole D : IE_{IV} = 1400 kJ/mole
E : IE_V = 3200 kJ/mole
No. of valence electron in the element are
(1) 3 (2) 5
(3) 2 (4) 4

69. Which of the following is having maximum number of atoms?
(1) 10 mole $Na_2SO_4 \cdot 10H_2O$
(2) 20 mole $CuSO_4 \cdot 5H_2O$
(3) 25 mole $FeSO_4 \cdot 7H_2O$
(4) 20 mole $CaSO_4 \cdot 2H_2O$

70. Which of the following sample contains least no. of atoms ?
(1) 636 gm Na_2CO_3 (2) 1500 gm $CaCO_3$
(3) 1680 gm $NaHCO_3$ (4) 585 gm NaCl

71. A solution of $Na_2S_2O_3$ is 10% by wt. and $\rho_{solution}$ = 1.2 gm/ml. Find normality of solution ?
(1) 1.20 N (2) 1.40 N
(3) 1.51 N (4) 1.8 N

72. Equal volumes of 9.8% by vol. H_2SO_4 and 3.65% by vol. HCl are mixed. Find the normality of resultant mixture ?
(1) 1 N (2) 1.5 N
(3) 2 N (4) 2.5 N

73. A 10 gm mixture of Na_2SO_4 and Na_2CO_3 requires 400 ml of $\frac{M}{10}$ H_2SO_4 for complete neutralisation. What is the wt. of Na_2SO_4 in the mixture ?
(1) 2.5 gm (2) 4.24 gm
(3) 5 gm (4) 5.76 gm

74. Find the amount of each product formed in the following reaction ?

$$4NH_3 + 5O_2 \longrightarrow 4NO + 6H_2O$$

136gm 128gm
(1) NO = 20 gm, H_2O = 40 gm
(2) NO = 86 gm, H_2O = 96 gm
(3) NO = 96 gm, H_2O = 86 gm
(4) NO = 100 gm, H_2O = 200 gm

75. Which of the following is a monobasic acid?
(1) H_3BO_3 (2) H_3PO_3
(3) H_2SO_4 (4) $\begin{matrix} COOH \\ | \\ COOH \end{matrix}$

76. A polyvalent metal of weight 0.1 gm and atomic weight 51 gm is having a lower oxidation state of +2. Metal is oxidised with 58.8 ml of $\frac{N}{10}$ solution of an oxidant. Find the higher oxidation state of metal ?
(1) 3 (2) 4
(3) 5 (4) 6

77. When 10 gm of $CaCO_3$ is reacted with 100 ml $\frac{M}{10}$ HCl then find volume of $CO_{2(g)}$ obtained at STP ?
(1) 0.1 lt (2) 0.2 lt
(3) 0.224 lt (4) 0.3 lt

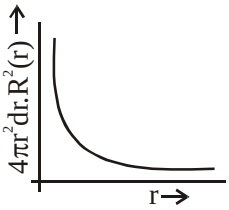
78. One litre of oxygen at NTP weights 1.46 gm. How many litres of oxygen are needed for the combustion of 21 gm of Mg ? [Mg = 24 gm]
(1) 5 lt (2) 8 lt
(3) 9.60 lt (4) 12 lt

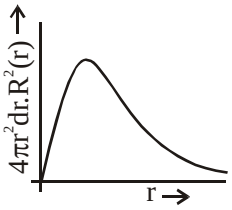
79. Find the ratio of time required to complete one revolution in 3rd excited state of He^+ and 4th orbit of Be^{3+} ?
(1) 1 : 1 (2) 2 : 1
(3) 4 : 1 (4) 5 : 1

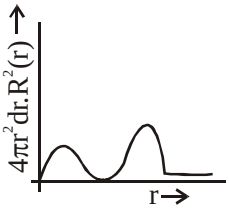
80. 12.75 eV energy is supplied to a hydrogen atom in ground state. Find total number of lines obtained in visible region in emission spectrum ?
(1) 3 (2) 2
(3) 1 (4) 5

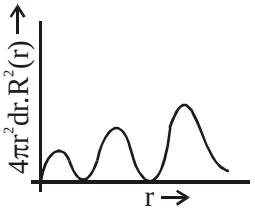
81. Total number of nodes in a 4 p-orbital are
(1) 2 (2) 3
(3) 4 (4) 5

82. Which of the following is the correct graph for 3s-orbital ?

(1) 

(2) 

(3) 

(4) 

83. Which of the following set of quantum number is correct for 5th last electron in a element of atomic no. 75 ?

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

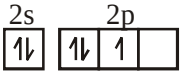
(2) $n = 5, l = 2, m = -2, s = +\frac{1}{2}$

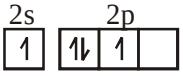
(3) $n = 4, l = 2, m = -2, s = +\frac{1}{2}$

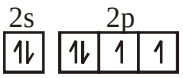
(4) $n = 4, l = 2, m = +2, s = +\frac{1}{2}$

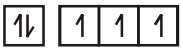
84. Find the total number of electron in a element of atomic number 80 for which $n + l = 6$?
(1) 10 (2) 12
(3) 18 (4) 20

85. In which of the following arrangement, both Aufbau and Hund's Rule are violated ?

(1) 

(2) 

(3) 

(4) 

86. Volume of ammonia gas formed at NTP, when 20 g each of nitrogen and hydrogen are allowed to react, will be
(1) 8 litres (2) 16 litres
(3) 32 litres (4) 64 litres

87. Maximum number of electrons of same spin in an atom having $(n + l) = 4$ will be
(1) 32 (2) 16
(3) 18 (4) 10

88. Kinetic energy of O_2 molecule, having wavelength of 2.5 pm will be
(1) 1.6×10^{-19} J (2) 6.6×10^{-19} J
(3) 6.6×10^{-25} J (4) 1.6×10^{-25} J

89. Which of the following orbitals of hydrogen atom has maximum energy?
(1) 3s (2) 4s
(3) 3d (4) 3p

90. Find the volume of $CO_2(g)$ obtained by very strong heating of 1620 gm $Ca(HCO_3)_2$ at STP ?
(1) 224 lt (2) 2.24 lt
(3) 448 lt (4) 400 lt

BIOLOGY

91. How many of the following statements can be considered as defining feature of all life forms?
A. Increase in mass of body from inside due to synthesis of living substances only.
B. Growth and reproduction are mutually inclusive events for bacteria, protists and algae.
C. Intrinsic growth due to deposition of apoplasmic and symplasmic substances.
D. Awareness in organisms for their surroundings.
(1) Four (2) Three
(3) Two (4) One

92. Scientific name of edible mushroom is based on agreed principles and criteria which are mentioned in
(1) ICBN (2) ICNCP
(3) ICNB (4) ICZN

93. Which of the following statements justify that living organisms are self-regulating, interactive systems and it results in emergent properties at higher level of organisation?
A. Properties of tissues arise as a result of interaction in their constituent cells.
B. Properties of cell organelles are present in their molecular constituents.
C. They are capable of responding to external stimuli.
(1) All are correct (2) A & C are correct
(3) B & C are incorrect (4) A & B are incorrect

94. Select the taxa of same category level from the given options
(1) Man, Cat, Animals and Insect
(2) Potato, Sweet potato, Mango and Dicots
(3) Felidae, Carnivora, Primata
(4) Moss, Green algae, Dicots and Mammals

95. Which of the following pair is **incorrectly** matched?
(1) *Mangifera indica* -Species
(2) Hominidae - Family
(3) Diptera - Class
(4) Gymnospermae - Division

96. The aggregates of potato and sweet potato families into next higher category is mainly based upon
(1) Vegetative characters
(2) Vegetative and floral characters
(3) Floral characters
(4) Colour, size and number of leaves

97. Which of the following will have more number of common characters?
(1) A group of related genera
(2) A group of related species
(3) A group of related family
(4) A group of related order

98. The most obvious and technically complicated feature is **A** present in **B** .
(1) A - Growth, B - Higher plants and animals
(2) A - Reproduction, B - Eukaryotes
(3) A - Self-consciousness, B - Multicellular organisms
(4) A - Consciousness, B - Prokaryotes and eukaryotes

99. Kinds and diversity of organisms alongwith their relationship are dealt with
(1) Classical taxonomy (2) Classification
(3) Morphotaxonomy (4) Systematics

100. Select correctly matched pair from the given options
(1) Polytypic genus - *Homo sapiens*
(2) Polytypic species - *Solanum melongena*
(3) Polytypic genus - *Panthera*
(4) Biological concept of species - Mule

101. Animals like fishes, amphibians, reptiles and birds constitute the next higher category called
(1) Class
(2) Phylum
(3) Division
(4) More than one option is correct

102. With respect to following taxonomic aids, how many are associated with preservation of plants **[A]** and animals **[B]**?
(i) Zoological parks, (ii) Museum, (iii) Botanical gardens, (iv) Manuals, (v) Herbaria, (vi) Flora
(1) A - (ii), (iii), (v); B - (i), (ii)
(2) A - (ii), (v); B - (ii), (iv)
(3) A - (ii), (v); B - (ii)
(4) A - (v); B - (i), (ii)

103. In taxonomic keys
(1) The pair of contrasting characters is called lead
(2) Statements are analytical in nature

(3) Each character has generally more than two choices
(4) More than one option is correct

104. Select correct choice for the conservation strategies of live specimens where each specimen is labelled indicating its scientific name and family name.
(1) Herbarium (2) Museum
(3) NBRI (4) Zoological park

105. Find correct match.

Column I	Column II
a. Index to the plant species in a particular area	(i) Manuals
b. Alphabetical arrangement of species	(ii) Monographs
c. Information of any one taxon	(iii) Catalogues
d. Information for identification of names of species found in an area	(iv) Flora

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

106. Unicellular prokaryotic and eukaryotic organisms with cell wall are kept together in the same kingdom _____ in _____ classification.
(1) Plantae: Linnaeus (2) Protista; Whittaker's
(3) Protista: Copeland's (4) Plantae; Copeland's

107. Select the organism with loose tissue level body organisation for the box.
(i) *Anabaena*. (ii) *Pseudomonas*, (iii) *Saccharomyces*, (iv) *Agaricus*. (v) *Claviceps*, (vi) *Drosophila* of plant kingdom, (vii) Puffball, (viii) *Physarum*, (ix) *Gymnodinium*
(1) (iv), (v), (vi), (vii) (2) (iii), (iv), (vi), (ix)
(3) (i), (iii), (vii), (viii) (4) (iv), (vii), (ix)

108. The kingdom Monera includes
(1) Unicellular and multicellular microorganisms with simplest metabolism
(2) The most ancient microorganisms which are nutritionally heterotrophs only
(3) Most ancient, the smallest, and most abundant microorganisms.
(4) Only unicellular photosynthetic microorganisms.

109. Purple sulphur bacteria are nutritionally
(1) Chemotrophic autotrophs
(2) Photolithotrophs
(3) Photoorganotrophs
(4) Chemolithotrophs

110. Which of the following is capable of switching over to anaerobic mode to get energy for its survival?
(1) Obligate anaerobe like *Bacillus subtilis*
(2) Facultative aerobes like *Chlorobium*
(3) Facultative anaerobes like *Pseudomonas*
(4) Facultative aerobes like *Clostridium botulinum*

111. Select **incorrect** match w.r.t. given organisms and their features.
(1) *Anabaena* - Specialized vegetative cell with PS I only
(2) *Chlorobium* - Anoxygenic photosynthesis
(3) *Bacillus* - Rod shape chemoautotrophic bacteria
(4) *Methanococcus* - Obligate anaerobe

112. Cyanobacteria are
(1) Oxyphotobacteria having chlorophyll a similar to higher plants
(2) Non-motile/ aflagellate in vegetative stage only
(3) Mostly unicellular terrestrial forms
(4) Gram positive monerans

113. Which of the following statement is correct for the ancient bacteria of saline habitats?
(1) Obligate anaerobes
(2) Heterotrophic mode of nutrition
(3) Are able to produce methane
(4) Muramic acid is present in cell wall

114. Photosynthetic protists that float passively on water surface show/are
(1) Stiff cellulosic plates on cell wall
(2) Thick overlapping silicified shells
(3) Chrysophytes
(4) More than one option is correct

115. Indestructible cell wall is due to _____ and present in _____.
(1) Silica, *Ceratium* and *Gymnodinium*
(2) Cellulose, *Physarum*
(3) Pectin, Diatoms
(4) Silica, *Melosira*

116. A taxon is
(1) a group of related families
(2) a group of related species
(3) a type of living organisms
(4) a taxonomic group of any ranking.

117. "Slime Moulds $\xrightarrow[A]{}$ [B] $\xrightarrow[C]{}$ Fruiting bodies".
In the above mentioned incomplete statement, labelling represents
(1) A- Aggregation, B- Plasmodium, C- Suitable conditions
(2) A- Suitable conditions, B- Plasmodium, C- Aggregation
(3) A- Aggregation, B- Plasmodium, C- Differentiation
(4) A- Suitable conditions, B- Pseudoplasmodium, C- Aggregation

118. Organism which forms red tide also show
(1) Complementary chromatic adaptations
(2) Spinning movement
(3) Reserve food as leucosin
(4) Nitrogen fixation

119. The mode of nutrition in protists group which are known as primitive relative of multicellular animals, is
(1) Predation and chemoautotrophic
(2) Parasitism and commensalism
(3) Predation and parasitic
(4) Predation and holophytic

120. Monerans with smallest living cells
(1) Are pathogens of plants and animals
(2) Lack cell wall and are sensitive to penicillin
(3) Obligate parasites only
(4) Cannot survive without oxygen

121. The unique kingdom of heterotrophic organisms with loose tissue level organisation shows
(i) Diversity in habitat
(ii) Diversity in morphology of mycelium
(iii) NAG polymer in cell wall
(iv) Degeneration of sex organs from lower to higher group
(v) Optimum growth in cool and humid places.
(1) All are correct
(2) (i), (ii), (iii) & (v) are correct
(3) (iii) & (v) are incorrect
(4) Only (v) is incorrect

122. Karyogamy is delayed after plasmogamy in the sexual life cycle of how many members?
Bread mould, Causal organism of white rust disease, Puffball, *Drosophila* of plant kingdom, Mushroom, Wheat rust fungi, Bracket fungi, *Alternaria*
(1) Five (2) Six
(3) Four (4) Three

123. Plasmogamy by fusion of the protoplasm of gametangia can be observed in
(1) *Rhizopus* and *Mucor*
(2) *Pythium* and *Agaricus*
(3) *Trichoderma* and *Puccinia*
(4) *Penicillium* and *Alternaria*

124. Highly resistant spores with ability to survive for many years even under adverse conditions are found in
(1) Protists as whirling whips
(2) Bioluminescent protists
(3) Protists showing plant, animal and fungi characters
(4) Protists having chlorophyll-b

125. Classification given by Bentham and Hooker is
(1) artificial (2) natural
(3) phylogenetic (4) numerical

126. Pathogen of sleeping sickness disease
(1) Possess no motile structure
(2) Is sporozoan
(3) Is flagellated protozoan
(4) Is amoeboid protozoan

127. How many statements are correct for truffles and morels?
(i) They have septate monokaryotic mycelium
(ii) Reproduce asexually by nonmotile endogenous spores
(iii) Produce haploid exogenous sexual spores arranged in an orderly manner
(iv) Their fruiting bodies are edible
(1) Four (2) Three
(3) Two (4) One

128. Consider the statements :
(i) Organisms are known by only vegetative or asexual stage.
(ii) Most of the members are decomposers of litter.
These statements are true for
(1) Phycomycetes (2) Ascomycetes
(3) Basidiomycetes (4) Deuteromycetes

129. Virus and viroids have no position in five kingdom system because they
(1) Are causal organism of several diseases
(2) Don't have the ability to multiply
(3) Are noncellular structure
(4) Are obligate parasites

130. How many statements/ features are correct for T_4,– phage or T even-phage?
(a) They have non-prismatic polygonal head and envelope
(b) Contractile tail
(c) Tail sheath present
(d) Tail fibers are six as locomotory structure
(e) Nucleic acid as double stranded circular DNA
(1) (b) & (c) (2) (a), (b), (c) & (d)
(3) (b), (c), (d) & (e) (4) All correct, except (d)

131. Viruses infecting plants have genetic material usually as
(1) ssDNA (2) dsDNA
(3) ssRNA (4) dsRNA

132. Causal organism of PSTD
(1) Possess free RNA of high molecular weight
(2) Was discovered by T.O. Diener as inert protein crystal
(3) Lacks protein coat
(4) Has double stranded RNA of low molecular weight

133. Dominating mycobiont and phycobiont components in lichens are respectively
(1) Algal and BGA
(2) Sac fungi and BGA
(3) Ascomycetes and Green algae
(4) Basidiomycetes and BGA

134. The fungal partner in lichens body is not concerned with
(1) Absorption of water from wet air, dew and rain
(2) Body structure and covering
(3) Frutification and sex organs formation
(4) Nitrogenase activity

135. Which of the following is **not** associated with ectomycorrhiza?
(1) Wooly covering (2) Hartig net
(3) VAM (4) Basidiomycetes

136. Which one of the following statement is correct?
(1) Bilateral symmetry present in flatworms, roundworms, earthworms, starfish and dogfish
(2) Mesoderm in Platyhelminthes members is hollow
(3) Coelom of earthworm is filled with blood
(4) All are incorrect

137. Metameric segmentation is the characteristic of
(1) Annelida and Arthropoda
(2) Mollusca and Chordata
(3) Platyhelminthes and Arthropoda
(4) Echinodermata and Annelida

138. The precious marriage gift in Japan is:
(1) *Leucosolenia* (2) *Euplectella*
(3) *Hyalonema* (4) *Spongilla*

139. A sponge harmful to pearl industry is:
(1) *Spongilla* (2) *Euspongia*
(3) *Hyalonema* (4) *Cliona*

140. Reproductive cells of sponges are formed from :
(1) pinacocytes (2) Choanocytes
(3) Archaeocytes (4) Trophocytes

141. Which of the following is not a characteristic feature of sponges?
(1) They are primitive multicellular animals and have cellular level of organization
(2) Choanocytes (collar cells) are the characteristic cells
(3) Digestion is intracellular
(4) Fertilisation is generally external and development is indirect

142. In *Hydra*, digestion takes place
(1) Only extracellularly
(2) In a gastrovascular cavity and intracellularly
(3) Only intracellularly
(4) In a digestive tract

143. A mature *Hydra* usually bears:
(1) One testis and several ovaries
(2) One testis and one ovary
(3) Several testes and one ovary
(4) Several testes and several ovaries

144. Which of the following has nerve cells but no brain?
(1) *Hydra* (2) *Sponge*
(3) Cockroach (4) Mosquito

145. Mark the statement that is incorrect for cnidoblasts of Cnidaria.
(1) Cnidoblasts are the unique cells of the phylum, which contain stinging apparatus in them called nematocyst
(2) They are present in both layers of body wall
(3) Cnidoblasts are related with food capture, defence and locomotion
(4) They cannot be reused once discharged

146. Which one is correct match among the following choice ?
(1) *Pennatula* — Sea pen
(2) *Meandrina* — Mushroom coral
(3) *Heliopora* — Black coral
(4) *Gorgonia* — Sea feather

147. Metagenecis is
(1) Found in all coelenterates
(2) Best observed in *Hydra*
(3) Best observed in *Metridium*
(4) Best observed in *Obelia*

148. Which of the following are Cnidarians?
(1) Feather star, sea star, Fungia
(2) Sea pen, *Hydra*, sea anemone
(3) Blue coral, feather star, sea anemone
(4) All of these

149. Which of the following groups of animals reproduces only by sexual means?
(1) Cnidaria (2) Porifera
(3) Protozoa (4) Ctenophora

150. Mark the feature which can't be associated with ctenophores.
(1) The body bears eight external rows of ciliary comb plates
(2) Digestion is both extra and intracellular
(3) Bioluminescence is well marked
(4) Sexes are separate and fertilization is internal with indirect development

151. *Taenia solium* attaches itself to the intestinal wall by means of scolex through its:
(1) Suckers (2) Suckers and hooks
(3) Hooks (4) Adhesive glands.

152. Which of the following helps in osmoregulation and excretion in tape worm?
(1) Nephridia
(2) Flame cell
(3) Rennete cells
(4) Flame cell and body Surface

153. Which of the following can be a differentiating character of *Taenia saginata* and *T solium*?
(1) Presence of rostellum
(2) Presence of hooks
(3) Number of proglottids
(4) All of these

154. Elephantiasis is caused by
(1) *Trichinella* (2) *Ancylostoma*
(3) *Wuchereria* (4) Rhabditis.

155. Musculature of *Ascaris* consists of :
(1) Circular muscles only
(2) Outer longitudinal and inner circular
(3) Outer circular and inner longitudinal
(4) Longitudinal muscles only

156. Female *Ascaris* differs from male *Ascaris* in all the following features except one.
(1) Presence of anus
(2) Absence of pineal spicules
(3) Longer and straight posterior end
(4) Presence of amphids on ventrolateral Lips

157. Neural system in annelida consists of paired ganglia connected by lateral nerves to nerve cord. The nerve cord is/are
(1) Double, ventral and solid
(2) Double, dorsal and hollow
(3) Double, ventral and hollow
(4) Single, ventral and solid

158. Trait common amongst Earthworm, Leech and Centipede is :
(1) Absence of legs (2) Hermaphrodite nature
(3) Ventral nerve cord (4) Malpighian tubules

159. Earthworm shows locomotion by means of :
(1) Muscles
(2) Setae
(3) Parapodia
(4) Setae, muscles and coelomic fluid

160. Given below are some animals in box
Apis, Scorpion, Laccifer, Locusta, Spider, Prawn, Mosquito, Butterfly, Bombyx, Crab, Leech, Earthworm, Ascaris.
How many of them are insects?

(1) Five (2) Six
(3) Eight (4) Ten

161. Which one is mismatched?
(1) *Apis* - Honey bee
(2) *Laccifera*- Lac insect
(3) *Locusta* - Gregarious pest
(4) *Limulus*-Fossil arthropod

162. Which of the following is incorrectly matched w.r.t. mouth part present in given insects?
(1) Sponging type - Housefly
(2) Chewing and lapping type - Honey bees
(3) Siphoning type - Butterflies and moths
(4) Piercing and sucking type - Grasshoppers

163. *Among Pila, Octopus, Sepia, Loligo, Aplysia, Chiton.* How many of them have closed circulatory system?
(1) Two (2) One
(3) Three (4) Five

164. Read the following statement
I. Body is covered by calcareous shell.
II. A soft and spongy layer of skin forms a mantle over visceral hump.
III. Body is triploblastic and bilaterally symmetrical.
Choose the correct statement w.r.t. *Octopus.*
(1) I only (2) l and II only
(3) II only (4) II and III only

165. Aristotle's lantern in *Echinus* is
(1) Photoreceptor
(2) Masticatory apparatus
(3) Bioluminescent structure
(4) Locomotory structure

166. Which of the following is incorrect match w.r.t. scientific name and common name of organisms?

Scientific name	**Common name**
(1) *Echinus*	Sea urchin
(2) *Antedon*	Star fish
(3) *Cucumaria*	Sea cucumber
(4) *Ophiura*	Brittle star

167. Proboscis containing a short stiffening stomochord histologically similar to the notochord of chordates is a characteristic of
(1) Sea squirt (2) Acorn-worm
(3) Lancelet (4) *Neoceratodus*

168. Cephalochordates are those animals in which
1. Notochord extends from head to tail region
II. Notochord persists throughout life
III. Excretion takes place by neural gland
IV. Paired appendages are absent
(1) I, II, III and IV (2) II, III and IV
(3) I, II and IV (4) I, III and IV

169. Select the two correct statements from given below:
I. In urochordates, notochord is present only in tail in larval stage
II. In cephalochordates, notochord present in head region only
III. Notochord persists throughout life in cephalochordates
IV. Cephalochordates are generally called tunicates
(1) I and II (2) II and III
(3) I and III (4) I and IV

170. In which of the following the larvae after metamorphosis will return to the ocean?
(1) *Petromyzon* (2) *Myxine*
(3) *Amphioxus* (4) *Ascidia*

171. Which one of the following pairs of animals are similar to each other pertaining to the feature stated against them?
(1) *Pteropus* and *Ornithorhyncus* - Viviparity
(2) Garden lizard and Crocodile - Three chambered heart
(3) *Ascaris* and *Ancylostoma* - Metameric segmentation.
(4) Sea horse and Flying fish - Cold blooded (poikilothermal)

172. Which of the followings is adaptation for flight habit?
(1) Pneumatic bones
(2) Sternum has a keel to increase surface area for the attachment of flight muscles
(3) Absence of one ovary
(4) All of these

173. Which of the following is not a reptile
(1) *Chameleon* (2) *Sphenodon*
(3) *Draco* (4) *Salamander*

174. Some statements regarding cyclostomes are
I. have a sucking and circular mouth without jaws
II. body is devoid of scales and paired fins
III. circulation is of closed type

IV. show anadromous migration

Selection the correct statements out of these

(1) I and II (2) I, II and III

(3) I, II and IV (4) I, II, III and IV

175. Read the following statements

I. In males pectoral fins bear claspers.

II. Heart is two chambered with one atrium and one ventricle.

III. Mouth is ventral in which teeth are modified placoid scales which are backwardly directed.

IV. Due to the absence of swim/air bladder, they have to swim constantly to avoid sinking.

Select the option which includes correct statement w.r.t. cartilaginous fish?

(1) I, II and III only (2) II, III and IV only

(3) I, II, III and IV (4) II and IV only

176. Consider the given statement

I. Cloaca is present

II. Body is divided into head and neck

III. Eyes are covered by eyelids

IV. Oviparous and indirect development

How many of them are correct w.r.t. amphibian?

(1) One (2) Two

(3) Three (4) Four

177. *Chimaera* (rabbit fish) is connecting link between cartilaginous and bony fishes. Some characters of *Chimaera* are given below, mark the character similar to bony fishes.

I. Claspers II. Placoid scales

III. Operculum IV. Anus

(1) Only III (2) II and III

(3) I, III and IV (4) III and IV

178. Fertilization and development in reptiles are

(1) internal and direct respectively

(2) internal and indirect respectively

(3) external and direct respectively

(4) external and indirect respectively

179. Birds and mammals have many similarities between their blood vascular system but in birds blood circulation can be identified by

I. Four-chambered heart

II. Only left systemic arch persists

III. Small, oval and nucleated RBC

IV. Maximum RBC/cm^3 of blood

(1) Only II (2) II and III

(3) II, III, IV (4) III and IV

180. Which of the following character is common in *Delphinus*, *Rattus* and *Pteropus?*

(1) Functional eyes which help in vision

(2) Muscular diaphragm

(3) Testes are extra abdominal

(4) Presence of external ear

Target Test Series for NEET-2021

Time: 3 Hr.

PART TEST : 01 Key

Max. Marks: 720

1.	(3)	46.	(2)	91.	(3)	136.	(4)
2.	(2)	47.	(1)	92.	(1)	137.	(1)
3.	(3)	48.	(2)	93.	(2)	138.	(2)
4.	(4)	49.	(1)	94.	(4)	139.	(4)
5.	(4)	50.	(2)	95.	(3)	140.	(3)
6.	(4)	51.	(4)	96.	(3)	141.	(4)
7.	(2)	52.	(1)	97.	(2)	142.	(2)
8.	(4)	53.	(1)	98.	(4)	143.	(3)
9.	(1)	54.	(1)	99.	(4)	144.	(1)
10.	(4)	55.	(4)	100.	(3)	145.	(2)
11.	(3)	56.	(2)	101.	(2)	146.	(1)
12.	(3)	57.	(2)	102.	(3)	147.	(4)
13.	(2)	58.	(2)	103.	(2)	148.	(2)
14.	(1)	59.	(3)	104.	(3)	149.	(4)
15.	(3)	60.	(4)	105.	(1)	150.	(4)
16.	(4)	61.	(2)	106.	(1)	151.	(2)
27.	(2)	62.	(3)	107.	(1)	152.	(2)
18.	(1)	63.	(1)	108.	(3)	153.	(4)
19.	(1)	64.	(2)	109.	(2)	154.	(3)
20.	(2)	65.	(1)	110.	(3)	155.	(4)
21.	(2)	66.	(2)	111.	(3)	156.	(4)
22.	(2)	67.	(1)	112.	(1)	157.	(1)
23.	(1)	68.	(4)	113.	(2)	158.	(3)
24.	(3)	69.	(3)	114.	(3)	159.	(4)
25.	(3)	70.	(3)	115.	(4)	160.	(2)
26.	(2)	71.	(3)	116.	(4)	161.	(4)
27.	(2)	72.	(2)	117.	(3)	162.	(4)
28.	(4)	73.	(4)	118.	(2)	163.	(3)
29.	(2)	74.	(3)	119.	(3)	164.	(4)
30.	(1)	75.	(1)	120.	(1)	165.	(2)
31.	(1)	76.	(3)	121.	(4)	166.	(2)
32.	(2)	77.	(3)	122.	(1)	167.	(2)
33.	(4)	78.	(3)	123.	(1)	168.	(1)
34.	(2)	79.	(3)	124.	(3)	169.	(3)
35.	(4)	80.	(2)	125.	(2)	170.	(1)
36.	(2)	81.	(2)	126.	(3)	171.	(4)
37.	(4)	82.	(4)	127.	(3)	172.	(4)
38.	(3)	83.	(2)	128.	(4)	173.	(4)
39.	(3)	84.	(3)	129.	(3)	174.	(4)
40.	(2)	85.	(2)	130.	(1)	175.	(3)
41.	(3)	86.	(3)	131.	(3)	176.	(3)
42.	(1)	87.	(2)	132.	(3)	177.	(1)
43.	(1)	88.	(2)	133.	(3)	178.	(1)
44.	(2)	89.	(2)	134.	(4)	179.	(4)
45.	(2)	90.	(3)	135.	(3)	180.	(2)

Hints and Solutions

Physics

1. Magnetic intensity (H)

$B = \mu_o H$

$H = \dfrac{B}{\mu_0}$

$[H] = \dfrac{[B]}{[\mu_0]} = [M^0 L^{-1} T^0 A]$

2. $[V^2] = [g][\lambda]$

$[L^2 T^{-2}] = [L^2 T^{-2}]$

4. Stopping time (t) = $\dfrac{u}{a} = \dfrac{20}{1.25} = 16\,\text{sec}.$

So particle will stop in 16 sec. distance covered is zero in 17th sec.

6. $\underset{(e)}{\text{Probable error}} \propto \dfrac{1}{\text{no. of reading (n)}}$

$\dfrac{e_1}{e_2} = \dfrac{n_2}{n_1}$

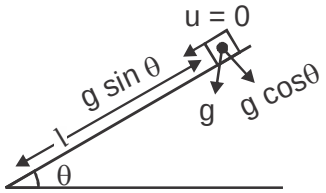
Now, $n_1 = 100$, $n_2 = 400$

$\dfrac{e_1}{e_2} = \dfrac{400}{100}$

$e_1 = 4e_2$

$e_2 = \dfrac{e_1}{4}$

So probable error is reduced by a factor 1/4.

7. 

u = 0, a = g sin θ

Total distance = l

$s = ut + \dfrac{1}{2}at^2$

$l = 0 + 4 + \dfrac{1}{2} \times (g \sin\theta).(4)^2$

$l = 8\, g \sin\theta$

Now let time to cover $l/4$ distance from top be t′ then

$\dfrac{l}{4} = \dfrac{1}{2} \times (g \sin\theta)\, t'^2$

$\dfrac{8\, g \sin\theta}{4} = \dfrac{1}{2}(g \sin\theta)\, t'^2$

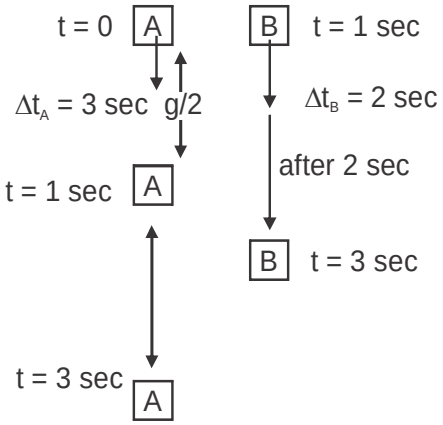
$4g\sin\theta = g\sin\theta\, t'^2$

$t' = 2\,\text{sec}$

8. $S_n = u + \dfrac{1}{2}a(2n-1)$

$S_5 = 10 + \dfrac{1}{2}(-2)(10-1) = 10 - 9 = 1\text{m}.$

9. Slope of S(t) curve is decreasing with time which means; velocity is decreasing with time; that mean particle had some initial velocity and is retarded untill the velocity of particle become zero.

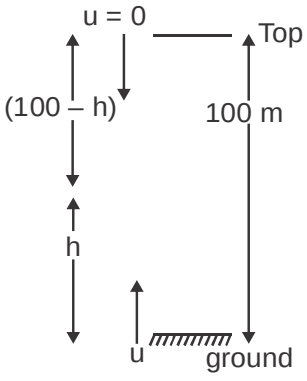
10. 

$S_A(3) = \dfrac{1}{2} \times g \times (3)^2 = \dfrac{9g}{2}$

$S_B(3) = \dfrac{1}{2} \times g \times (2)^2 = 2g$

$\Delta S = S_A(3) - S_B(2)$

$= \dfrac{9}{2}g - 2g = \dfrac{5g}{2} = 5 \times \dfrac{9.8}{2} = 24.5\text{m}.$

11. 

Let two balls meet at height h and time taken by them be t so

$$h = ut - \frac{1}{2}gt^2 \quad \text{(i)}$$

$$(100 - h) = \frac{1}{2} \times g \times t^2 \quad \text{(ii)}$$

Now initial velocity is sufficient to throw the ball at height of 100 m. So

$$v^2 = u^2 - 2gh$$

$$0 = u^2 - 2g \times 100$$

$$u = \sqrt{2000}\, m/s$$

again solving equation (i) and (ii)

$$h = ut - (100 - h)$$

$$h = \sqrt{2g\,100} \times t - 100 + h$$

$$t = \frac{100}{\sqrt{200g}}$$

Putting this value in equation (ii)

$$(100 - h) = \frac{1}{2} \times g \times \frac{100 \times 100}{200 \times 9}$$

h = 100 – 25 = 75 m.

12. A → 3 m/s 7 m/s ← B
←100 m→

$$\vec{v}_{A/B} = 3 - (-7) = 10 \text{ m/s}$$

$$\text{Time (t)} = \frac{100}{10} = 10 \text{sec}$$

$$\text{Distance from A} = 3 \times 10 = 30 \text{m}$$

13. $a_{eff} = g + a$

Now time flight = $\frac{2u}{a_{eff}}$

$$t = \frac{2u}{a_{eff}} = \frac{2u}{(g+a)} \text{sec}$$

15. $S_t = u + \frac{1}{2}f(2t - 1)$

$$S_{t+1} = u + \frac{1}{2}f[2(t+1) - 1]$$

$100 = S_t + S_{(t+1)}$

$$= 2u + \frac{1}{2}f[2t + 2 - 1 + 2t - 1]$$

$$= 2u + \frac{1}{2}f[4t]$$

$100 = 2u + 2ft$

$50 = u + ft$

$50 = v(t)$

16. The moment when stone is released from ballon, it will impart an upward initial velocity to the stone which is

v = u + at

= 0 + 1.25 × 8

= 10 m/s

height from the ground when it was released (h)

$v^2 = u^2 + 2as$

$(0)^2 = 0 + 2 \times 1.25 \times h$

$$h = \frac{100}{2 \times 1.25} = \frac{100}{2.5} = 40\text{m}$$

Now let the time taken to reach the ground is t then

$-40 = 10 \times t - 1/2 \times 10 \times t^2$

$-80 = 20t - 10\,t^2$

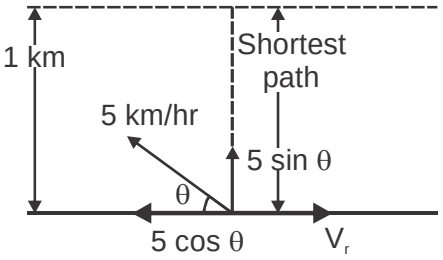
$10t^2 - 20t - 80 - 0$

$t^2 - 2t - 8 = 0$

$(t - 4)(t + 2) = 0$

t = 4 sec

17.



Now v_r = 5 cos θ (for shortest path)

Time taken = 15 min = 0.25 hour

$$\text{So time} = \frac{\text{path length}}{\text{velocity}}$$

$$0.25 = \frac{1}{5\sin\theta}$$

$$\sin\theta = \frac{4}{5}$$

$$\cos\theta = \frac{3}{5}$$

$$\text{So, } v_r = 5 \times \frac{3}{5} = 3\text{km/hr}$$

19. For two parallel vectors

$\vec{A} = A_x\hat{i} + A_y\hat{j} + A_z\hat{k}$

$\vec{B} = B_x\hat{i} + B_y\hat{j} + B_z\hat{k}$

$\frac{5}{2} = \frac{A_x}{B_x} = \frac{A_y}{B_y} = \frac{A_z}{B_z} = \frac{7}{-m} = \frac{-3}{n}$

$m = \frac{-14}{5}$ $n = \frac{-6}{5}$

20. Balanced forces does not change state of inertia.

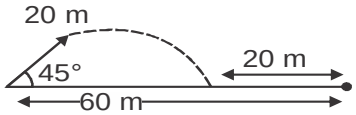
21. For a projectile

$\tan\theta = \frac{4H_{max}}{R_{max}}$

Now if $H_{max} = R_{max}$

Then $\tan\theta = 4$

$\theta = \tan^{-1}(4)$

22. 

$R = \frac{400 + \sin 90°}{g} = 40m$

$T = \frac{2u\sin\theta}{g} = \frac{2\times 20\times \sin 45°}{10} = 2\sqrt{2}\sec$

Now speed of second player.

$= \frac{\text{distance}}{\text{time}} = \frac{20}{2\sqrt{2}} = 5\sqrt{2}m/s$

24. Let the time be t then $\frac{u}{\sqrt{3}\cos 30°}\times t + u\cos 60°t = x$

$\frac{ut}{2} + \frac{ut}{2} = x$

$t = \frac{x}{u}$

25. $u_x = am/s$

$u_y(t) = \cos\omega t$

$\frac{dy}{dt} = \cos\omega t$

$\int_0^y dy = \int_0^{t=\frac{2\pi}{2\omega}} \cos\omega t.\, dt$

$y = \left[\frac{\sin\omega t}{w}\right]_0^{\frac{3\pi}{2\omega}}$

$= \frac{1}{w}\left[\sin\omega\times\frac{2\pi}{2\omega} - 0\right]$

$y = \frac{1}{\omega}[-1]$

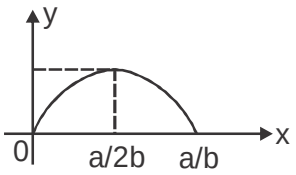
$x = u_x \times t = at = a\times\frac{3\pi}{2\omega}$

Now distance from origin

$r = \sqrt{x^2 + y^2}$

$= \sqrt{\left(\frac{3\pi a}{2\omega}\right)^2 + \left(\frac{-1}{\omega}\right)^2}$

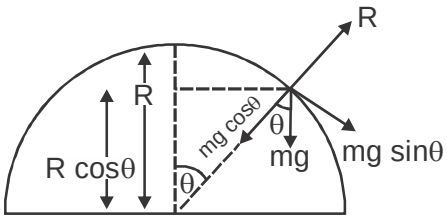
$r = \sqrt{\left(\frac{3\pi a}{2\omega}\right)^2 + \left(\frac{-1}{\omega}\right)^2}$

26. 

$H_{max} = y\left(\frac{a}{2b}\right)$

$= a\times\frac{a}{2b} - b\times\frac{a^2}{4b^2}$

$H_{max} = \frac{a^2}{2b} - \frac{a^2}{4b} = \frac{a^2}{4b}$

27. 

Particle will leave the hemisphere when mg cosθ won't be sufficient to provide centripetal force.

At critical point

$mg\cos\theta = \frac{mv^2}{R}$

Where v is tangential speed and r is radius of hemisphere

$\frac{v^2}{R} = g\cos\theta$ (i)

Now change in potential energy will convert into kinetic energy

So $\frac{1}{2}mv^2 = mg(R - R\cos\theta)$

$\frac{v^2}{R} = 2g(1-\cos\theta)$ (ii)

From equation (i) and (ii)

$2g(1-\cos\theta) = g\cos\theta$

$2 - 2\cos\theta = \cos\theta$

$3\cos\theta = 2$

$\cos\theta = \frac{2}{3}$

and $\sin\theta = \frac{\sqrt{9-4}}{3} = \frac{\sqrt{5}}{3}$

So tangential acceleraiton = $g\sin\theta = \frac{\sqrt{5}}{3}g$

29. l = 5.0 cm , Δl = 0.1 cm

(diameter) d = 4.0 cm Δ d = 0.01 cm

now volume $v = \frac{\pi D^2}{4}h$

so $\frac{\Delta V}{v}\times 100 = 2\times\left(\frac{\Delta D}{D}\times 100\right) + \left(\frac{\Delta h}{h}\times 100\right)$

$= 2\times\left(\frac{0.01}{4}\times 25\right) + \left(\frac{0.1}{5}\times 100\right)$

$= 2\times(0.25) + (2) = 0.5 + 2 = 2.5\%$

31. Gas constant

32. From the graph we can write

$v^2 = kS + C$

comparing above equation with

$v^2 = u^2 + 2as$

$u^2 = c \quad 2a = k$

which mean. It has some initial velocity as well as constant acceleration.

So statement (2) is wrong.

36. $v_2(t) = u_x$

$v_2(t) = u_y - gt$

Now initial velocity

$\vec{u} = u_x\hat{i} + u_y\hat{j}$

$\vec{v}(t) = v_x\hat{i} + v_y\hat{j}$

change in velocity in time t

$\Delta\vec{v}(t) = \vec{v}(t) - \vec{u}$

$= (v_x\hat{i} + v_y\hat{j}) - (u_x\hat{i} + u_y\hat{j})$

$= (v_x - u_x)\hat{i} + (v_y - u_y)\hat{j}$

$= (u_x - u_x)\hat{i} + (u_y - gt - u_y)\hat{j}$

$\Delta\vec{v} = -gt\hat{j}$

In 10 sec

$\Delta\vec{v} = -10\times 10\hat{j} = -100\hat{j}\ m/s$

$\Delta\vec{v} = -100\hat{j}\ m/s$

37. $y = 9x^2$

$v_x = \frac{1}{3}m/s$

$x = v_x t = \frac{t}{3}$

Now $y = 9\times\left(\frac{t}{3}\right)^2$

$= 9\times\frac{t^2}{3} = t^2$

Now comparing

$y = t^2$ with $y = u_y t + 1/2 a_y t^2$

we can conclude that

$u_y = 0$ & $\frac{1}{2}a_y = 1$

$a_y = 2m/s^2$

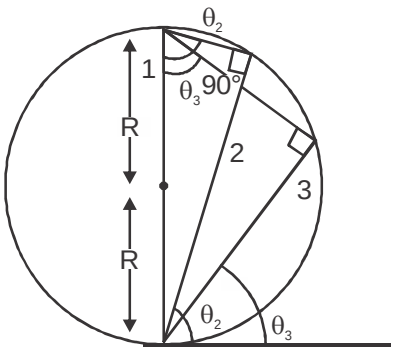
So acceleration of particle can be written as

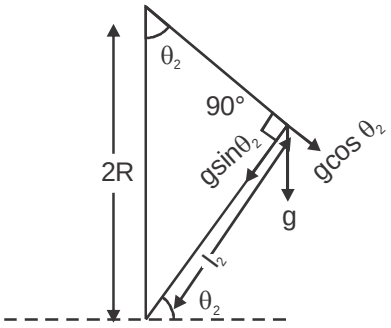
$\vec{a} = a_x\hat{i} + a_y\hat{j}$

$= 0\hat{i} + 2\hat{j}$

$\vec{a} = 2\hat{j}\ m/s^2$

38. For path 2





Path length $l_2 = 2R \sin\theta_2$
and acceleration along the path
$a_2 = g \sin \theta_2$
similarly for path 3
$l_3 = 2R \sin \theta_3$
$a_3 = g \sin \theta_3$
and for path 1
$l_1 = 2R$
$a_1 = g$
now time taken by each particle can be find by formula
$s = 1/2\ at^2$ [u = 0]

$$t = \sqrt{\frac{2s}{a}}$$

sor for particle 1

$$t_1 = \sqrt{\frac{2l_1}{a_2}} \ \& \ t_2 = \sqrt{\frac{2l_2}{a_2}}$$

$$t_3 = \sqrt{\frac{2l_3}{a_3}}$$

Now $\frac{l_1}{a_1} = \frac{l_2}{a_2} = \frac{l_3}{a_3} = \frac{2R}{g}$

so $t_1 = t_2 = t_3 = \sqrt{\frac{4R}{g}}$

44. Area will be maximum for t = 4 sec.

So change in speed and maximum speed will be obtained at t = 4 sec.

$(\Delta V)_{max}$ = Area under a(t) curve upto t = 4 sec

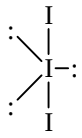
$$= \frac{1}{2} \times 4 \times 4$$

$V_{max} - 0 = 8$

$V_{max} = 8\ m/s$

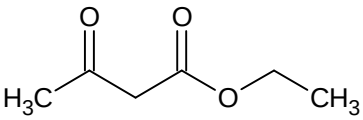
Chemistry

46. To minimise repulsion between lp and bp
47. BP = 3
LP = O
H = 3 $\rightarrow sp^2$ - hybridisation
48. Conceptual
49. $Na^{+1} \rightarrow$ has completely filled electronic configuration
$1s^2\ 2s^2\ 2p^6$
$Mg^{+1} \rightarrow 1s^2\ 2s^2\ 2p^6\ 3s^1$
more easier to remove one electron from Mg.
50. Conceptual
51. Conceptual
52.
I^{3-} has 3 - lone pair
XeF_4 has 2 - lone pair
XeO_2F_2 has 1 - lone pair
$XeOF_4$ has 1 - lone pair

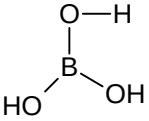


53. Square planar shape.
54. has zero dipole moment.
55. Because CO_3^{2-} has zero dipole moment
56.
BP = 4
LP = 1
5
due to lp - bp repulsion.

57.



58. Conceptual
59. all have $\theta = 90°$
60. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^{10}\ 4p^6\ 5s^2\ 4d^{10}\ 5p4$
$5p^4$
period no = 5
group = 16
61. high charge
62. BP = 5
LP = 1
H = 6 $\rightarrow sp^3d^2$ Geometry = Octahedral
shape = pentagonal
63. Conceptual
64. Due to shielding effect of f - orbital.
65. Conceptual

66. $n = \frac{0.355}{35.5} \times \frac{10}{1000} = 0.01$ moles
for 1 mole = 349 kJ
0.01 mole = 0.01 × 349 kJ
= 3.49 ≈ 3.50 kJ
67. Conceptual
68. Conceptual
69. $n = \frac{W}{M}$
no. of atoms $= n \times N_A$
70. Mole concept. $n = \frac{W}{M}$
No. of atoms = $n \times N_A$
71. $n = \frac{W}{M}$
no. of atom = $n \times N_A$
10 g of $Na_2S_2O_3$ in 100 g.
$E = \frac{\text{mass}}{\text{volume}}$
$1.2 \text{ g ml}^{-1} = \frac{100 \text{ g}}{\text{volume}}$
$\text{volume} = \frac{100}{1.2} \text{ nk}$
$N = \frac{\text{Eq.wt.}}{\text{vol. of solution}}$
72. $N_1V_1 + N_2V_2 = N_3V_3$
73. $N_1V_1 + N_2V_2 = N_3V_3$
74. Limiting reagent concept.
75. 
It takes OH^- ion from the solution
76. Conceptual
77. $CaCO_3 + HCl \longrightarrow CaCl_2 + CO_2 + H_2O$
moles of $Ca(HCO_3)_2$ =
moles of $CO_2 = \frac{1620}{160} = 10$ mole
At STP, 1 mole = 22.4 *l*
78. $Mg + \frac{1}{2}O_2 \longrightarrow Mg\theta$
79. $\text{Speed} = \frac{\text{distance}}{\text{time}}$
$\text{Time} = \frac{\text{speed}}{\text{distance}} = \frac{\text{speed}}{2\pi r}$
r = radius
80. Visible region : Balmer Region ($n_f = 2$)
81. Total nodes : $(n - l)$
82. No of radial nodes : $(n - l - 1) : 3 - 0 - 1 = 2$
83. Conceptual
84. Atomic no = 80
$4d^{10}\ 5p^6\ 6s^2$
18 electrons of atoms
85. Conceptual
86. Use concept of limiting reagent.
At STP 1 mole = 22.4 L
87. for (n + l) = 4
4s is more appropriate answer.
$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2$
88. $\lambda = \frac{h}{\sqrt{2KEm}}$
89. more value of (n + l) more is energy
90. $Ca(HCO_3)_2 \xrightarrow{\text{Heat}} CaCO_3 + CO_2 + H_2O$
moles of $Ca(HCO_3)_2$ =
mole of $CO_2 = \frac{1620}{160} = 10$ mole
At STP, 1 mole = 22.4 lt