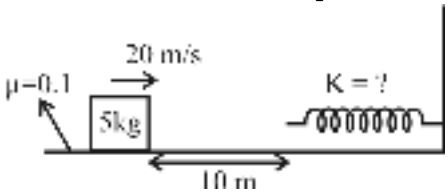
PHYSICS

1) If the maximum compression in the spring is 50 cm then find the value of K($g = 10\ m/s^2$) :-



(1) $7580\frac{N}{m}$

(2) $7600\frac{N}{m}$

(3) $8420\frac{N}{m}$

(4) None of these

2) A small block of mass m is kept on a rough inclined surface of inclination θ fixed in a elevator. The elevator goes down with a uniform velocity v and the block does not slide on the wedge. The work done by the force of friction on the block in time t will be :-

(1) zero

(2) $-mgvt\cos^2\theta$

(3) $-mgvt\sin^2\theta$

(4) $mgvt\sin^2\theta$

3) If momentum of a body is increased by 300% then percentage change in kinetic energy will be

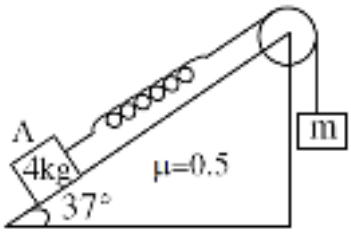
(1) 1500%

(2) 150%

(3) 265%

(4) None

4)



Find the minimum value of m so that block A starts to move up to inclined surface.

(1) 2 kg

(2) 1 kg

(3) 4 kg

(4) 6 kg

5) A spring of force constant K is first stretched by distance a from its natural length and then further by distance b. The work done in stretching the part b is :

(1) $\frac{1}{2}Ka(a-b)$

(2) $\frac{1}{2}Ka(a+b)$

(3) $\frac{1}{2}Kb(a-b)$

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

6) If it is observed for any system that increase in kinetic energy is equal to decrease in potential energy, then choose the correct.

(1) Non conservative force must be absent.

(2) Work done by conservative force cannot increase kinetic energy.

(3) Non conservative force may be present, but its work done must be zero.

(4) Decrease in potential energy indicates work done by conservative force is negative.

7) The potential energy of a particle of mass 5 kg moving in the x-y plane is given by U = (–7x + 24y)J where x and y being in meter. If particle starts from rest from origin then speed of particle at t = 2 sec is :

(1) 14 m/s

(2) 10 m/s

(3) 15 m/s

(4) 20 m/s

8) The work done by the frictional force on a surface in drawing a complete circle of radius r = 1/π metre on the surface by a pencil of negligible mass with a normal pressing force N = 5 N (μ = 0.5) is :

(1) +4 J

(2) –3 J

(3) –2 J

(4) –5 J

9) **Assertion :** Power of a force is frame dependent.
Reason : Work done by a force is frame dependent quantity.

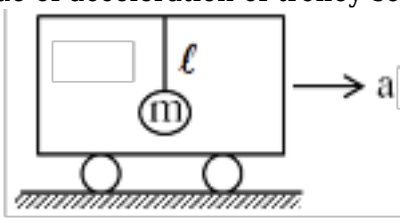
(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

10) Find the minimum value of acceleration of trolley so that bob just reaches the roof of trolley.

(Initially trolley is at rest) 

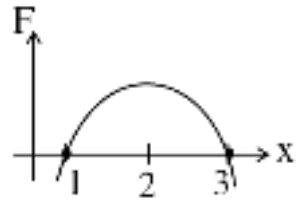
(1) $a_{min} = 2g$

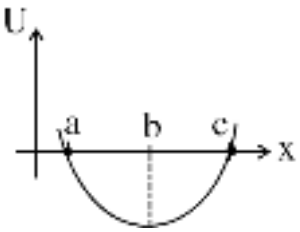
(2) $a_{min} = g$

(3) $a_{min} = 0$

(4) $a_{min} = \sqrt{2g}$

11) A particle is subjected to a conservative force as seen in the graphs, which of the following options is incorrect.





(1) Particle is in stable equilibrium at point 3 and b.

(2) Particle is in neutral equilibrium at point b and 2.

(3) No power is delivered by the force to the particle at 1,3, and b.

(4) Particle has maximum kinetic energy at position b.

12) Which of the following force can never does work under any circumtances ?

(1) Static Friction

(2) Tension

(3) Normal

(4) None of these

13) Power on a mass is $P = (3t^2 - 2t + 1)$ watt change in kinetic energy is t = 2 sec to t = 4 sec is :-

(1) 46 J

(2) 92 J

(3) 23 J

(4) 62 J

14) The potential energy of a system increases, if work is done –

(1) by the system against a conservative force

(2) by the system against a non-conservative force

(3) upon the system by a conservative force

(4) upon the system by a non-conservative force

15) An engine pumps water through a hose pipe. Water passes through the pipe and leaves it with a velocity of 1 m/s. The mass per unit length of water in the pipe is 200 kg/m. What is the power of the engine?

(1) 800 W

(2) 400 W

(3) 200 W

(4) 100 W

16) A man walks 30 m towards north, then 20 m towards east and in the last $10\sqrt{2}$ m towards north-east. The displacement from origin is :-

(1) $30\hat{i} + 40\hat{j}$

(2) $40\hat{i} + 30\hat{j}$

(3) $30\hat{i} - 40\hat{j}$

(4) $-30\hat{i} + 40\hat{j}$

17) A man completes one revolution of circle in 1 minute 10 second. Find distance travelled and |displacement| of man in 4 minutes 5 seconds ? (Radius of circle is 14m)

(1) 28m, 154m

(2) 308m, 44m

(3) 308m, 28m

(4) 88m, 308m

18) The hour hand of a clock is 8 cm long. The magnitude of the displacement of the tip of hour hand between 1:00 pm to 9:00 pm is :-

(1) 8 cm

(2) $8\sqrt{3}$ cm

(3) 16 cm

(4) $8\sqrt{2}$ cm

19) A drunkard is walking along a straight road. He takes 5 steps forward and 3 steps backward, followed by 5 steps forward and 3 steps backward and so on. Each step is one meter long and takes one second. There is a pit on the road 13 meters away from the starting point. The drunkard will fall into the pit after :

(1) 29 s

(2) 21 s

(3) 37s

(4) 31 s

20) A person walks a distance of 30 m towards west with a speed of 2 ms^{-1} and 40 m towards north with a speed of 1.5 ms^{-1}. Then average speed and average velocity of his journey are :-

(1) $\frac{7}{2}ms^{-1}$, $\frac{6}{5}ms^{-1}$

(2) $\frac{6}{5}ms^{-1}$, $\frac{42}{25}ms^{-1}$

(3) $\frac{42}{25}ms^{-1}$, $\frac{6}{5}ms^{-1}$

(4) $\frac{6}{5}ms^{-1}$, $\frac{7}{5}ms^{-1}$

21) If a car covers $2/5^{th}$ of the total distance with v_1 speed and $3/5^{th}$ distance with v_2 then average speed is :-

(1) $\frac{1}{2}\sqrt{v_1v_2}$

(2) $\frac{v_1+v_2}{2}$

(3) $\frac{2v_1v_2}{v_1+v_2}$

(4) $\frac{5v_1v_2}{3v_1+2v_2}$

22) A particle moves along a straight line and its position as function of time is given by $x = t^3 - 3t^2 + 3t + 3$, then particle :-

(1) stops at t = 1s and reverses its direction of motion

(2) stops at t = 1s and continues further without change of direction

(3) stops at t = 2s and reverses its direction of motion

(4) stops at t = 2s and continues further without change of direction

23) Velocity of a particle varies with time as $v = t^2 - t - 2$. Average speed of the particle in time interval from t = 0 to t = 4 sec is :

(1) $\frac{4}{3}$ m/s

(2) 2 m/s

(3) 3 m/s

(4) 5 m/s

24) **Statement-I :-** A particle having zero acceleration must have constant speed.
Statement-II :- particle having constant speed must have zero acceleration.

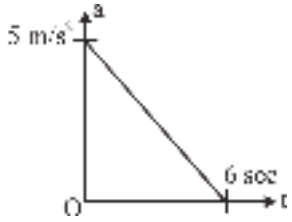
(1) Both **Statement I** and **Statement II** are incorrect.

(2) **Statement I** is correct but **Statement II** is incorrect.

(3) **Statement I** is incorrect but **Statement II** is correct.

(4) Both **Statement I** and **Statement II** are correct.

25) A particle have initial speed 10 m/s. Its acceleration at t = 0 is 5 m/s^2 which varies with time as shown. The maximum speed of the particle will be :-



(1) 15 m/s

(2) 25 m/s

(3) 30 m/s

(4) 7.5 m/s

26) If a particle moves in a straight line according to the equation x= $t^3 - 6t^2 - 15t$, the time interval during which particle is slowing down is :

(1) t < 2 and t > 5

(2) 2 < t < 5

(3) –1 < t < 5

(4) –1 < t < 2

27) The relation between time t and distance x is:

$t = \alpha x^2 + \beta x$

where α and β are constants. The retardation is :-

(1) $2\alpha v^3$

(2) $2\beta v^3$

(3) $2\alpha b v^3$

(4) $2\beta 2v^3$

28) The displacement 'x' and time of travel 't' for a particle moving an a straight line are related as $t^2 = x^2 - 1$, then its acceleration at a time t is :-

(1) $\frac{1}{x} - \frac{1}{x^2}$

(2) $\frac{1}{x^3}$

(3) $\frac{-t^2}{x^3}$

(4) $\frac{-t}{x^2}$

29) A particle moving with a uniform acceleration travels 24m and 64m in the first two consecutive interval of 4s each. Its initial velocity will be :-

(1) 5 m/s

(2) 3 m/s

(3) 1 m/s

(4) 4 m/s

30) A body travelling with uniform acceleration crosses two points A and B with velocities 40 m/s and 60 m/s respectively. The speed of the body at mid-point of A and B is

(1) 50 m/s

(2) 51 m/s

(3) 48 m/s

(4) $20\sqrt{6}$ m/s

31) The initial speed of a body moving with uniform acceleration is u. This speed becomes double after covering a distance S. When it covers an additional distance S, its speed would become :-

(1) 4 u

(2) 3 u

(3) $\sqrt{7}$ u

(4) $\sqrt{5}$ u

32) A car accelerates from rest at a constant rate of 2 m/s^2 for some time. Then, it retards at a constant rate of 4 m/s^2 and comes to rest. If it remains in motion for 3 second, then the maximum speed attained by the car is :

(1) 2 m/s

(2) 3 m/s

(3) 4 m/s

(4) 6 m/s

33) A body starts from rest from the origin with an acceleration of 6 m/s^2 along the x-axis and 8 m/s^2 along the y-axis. Its distance from the origin after 4 seconds will be

(1) 56 m

(2) 64 m

(3) 80 m

(4) 128 m

34) A particle is thrown upward from ground. It experiences a constant resistance force due to air which can produce retardation 2 m/s^2. The ratio of time of ascent to the time of descent is (g = 10 m/s^2) :-

(1) 1 : 1

(2) $\sqrt{\frac{2}{3}}$

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

(4) $\sqrt{\frac{10}{12}}$

35) Water drops fall from a tap on the floor 5 m below at regular intervals of time. The first drop strikes the floor when the fifth drop begins to fall. The height at which the third drop will be, from ground, at the instant when the first drop strikes the ground, will be: ($g = 10\ ms^{-2}$)

(1) 1.25 m

(2) 2.15 m

(3) 2.75 m

(4) 3.75 m

36) ***Assertion :*** The distance traversed, during equal intervals of time, by a body falling from rest are in ratio 1 : 3 : 5 : 7.....[Galileo's law of odd numbers] ***Reason :*** A particle in one-dimensional motion with zero speed may have non-zero velocity.

(1) Both Assertion and Reason are true but Reason is NOT the correct explanation of Assertion.

(2) Assertion is true but Reason is false.

(3) Assertion is false but Reason is true.

(4) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

37)

In ground to ground projection, if at any instant velocity of projectile becomes perpendicular to initial velocity; then what can you say about projection angle with horizontal ?

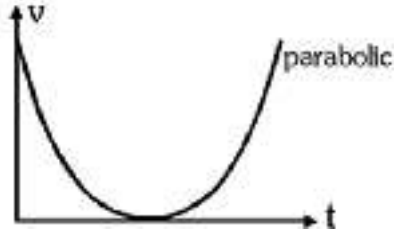
(1) $\theta = 45°$

(2) $\theta \geq 45°$

(3) $\theta \leq 45°$

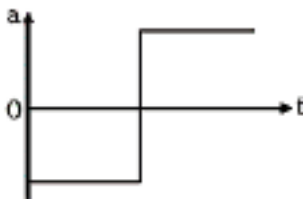
(4) for any value of θ it is possible

38) The graph shows the variation of the velocity v of an object with time t :

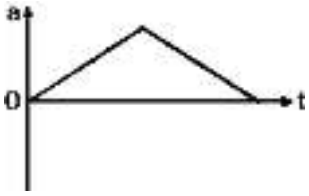


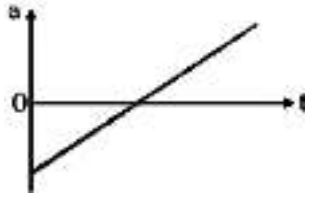
Which one of the following graphs best represents the variation of acceleration 'a' of the object with time t ?

(1)

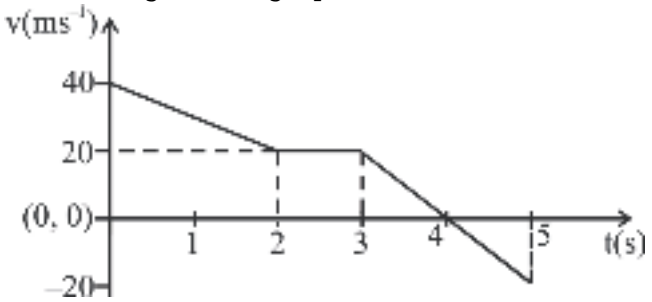


(2) 

(3) 

(4) 

39) In the given v-t graph, the distance travelled by the body in 5 seconds will be



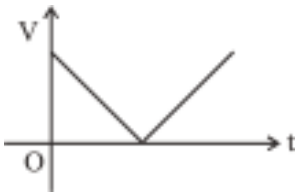
(1) 100 m

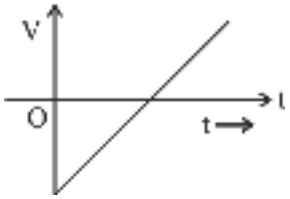
(2) 80 m

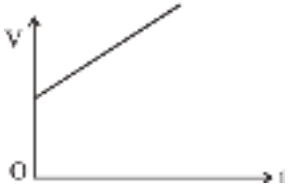
(3) 40 m

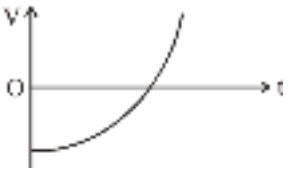
(4) 20 m

40) A particle moves along x-axis in such a way that its x-coordinates varies with time t according to equation $x = 4 - 2t + t^2$. The speed of the particle will vary with time as:

(1) 

(2) 

(3) 

(4) 

41) A projectile is given an initial velocity of $(\hat{i} + 2\hat{j})$. The equation of path of projectile will be (g = 10 m/s^2) :-

(1) $y = 2x - 5x^2$

(2) $y = x - 5x^2$

(3) $4y = 2x - 5x^2$

(4) $y = 2x - 25x^2$

42) If time of flight of a projectile is 10 seconds and range is 500 meters, the maximum height attained by it will be (g = 10 m/s^2) :-

(1) 125 m

(2) 50 m

(3) 100 m

(4) 150 m

43) Two particles A and B are projected as shown in figure. Maximum height is same for both the particles. u_A and u_B are initial speeds of A and B respectively, then :-

(1) $u_A < u_B$

(2) $u_A > u_B$

(3) $u_A = u_B$

(4) $T_B > T_A$

44) The ceiling of a hall is 40m high. For maximum horizontal distance, the angle at which the ball can be thrown with a speed of 56 m/s without hitting the ceiling of the hall is (take, g = 9.8 m/s^2) :

(1) 25°

(2) 30°

(3) 45°

(4) 60°

45) A ball is thrown from the ground to clear a wall 3 m height at a distance of 6 m and falls 18 m away from the wall. The angle of projection of ball is–

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

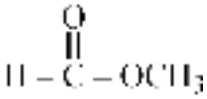
(2) $\tan^{-1}\frac{2}{3}$

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

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

CHEMISTRY

1) Which is incorrect IUPAC name :-

(1)  methyl methanoate

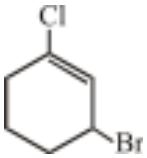
(2)  methoxy propanone

(3)  1-chloro prop-2-ene

(4)  3-methyl hex-1-ene-5-yne

2)

IUPAC name of the compound is :-



(1) 6-Bromo-2-chlorocyclohex-1-ene

(2) 3-Bromo-1-chloro cyclohex-1-ene

(3) 1-Bromo-3-chloro cyclohex-2-ene

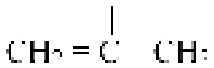
(4) 2-Bromo-6-chloro cyclohex-1-ene

3) Identify the allyl radical :-

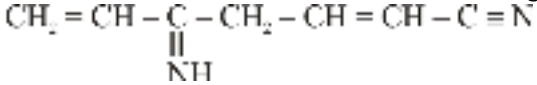
(1) CH_2=CH–

(2) HC≡C–C–

(3) CH_2=CH–CH_2–

(4) 

4) The number of olefinic bonds in the given compound is/are :-



(1) 3

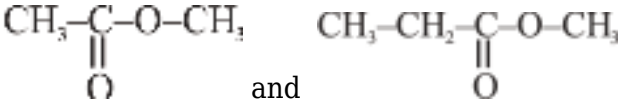
(2) 1

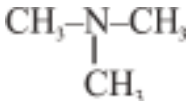
(3) 2

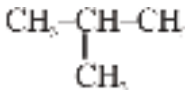
(4) 4

5) Which of the following pair of compounds are homologue :-

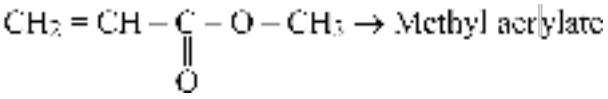
(1) $CH_3–O–CH_2–CH_3$ and $CH_3–CH_2–CH_2$ – OH

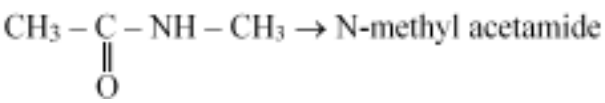
(2)  and

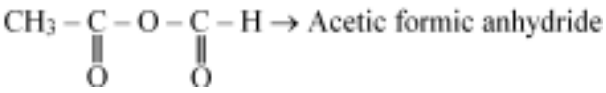
(3) 
$CH_3–NH–CH_3$ and

(4) 
$CH_3–CH_2–CH_2–CH_3$ and

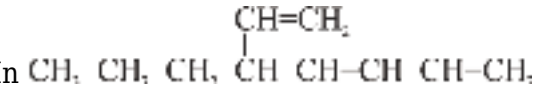
6) Identify incorrect common name of given compound

(1) 

(2) 

(3) 

(4) 

7) In 
the number of carbon atoms in parent carbon chain is :

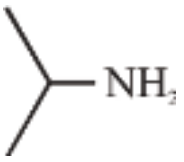
(1) 6

(2) 7

(3) 8

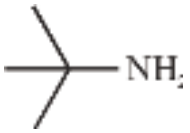
(4) 10

8) Tert butyl amine is :

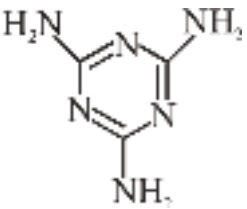
(1) 

(2) 

(3) 

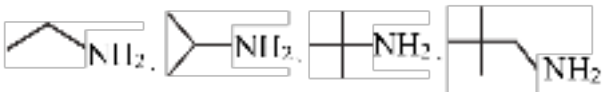
(4) 

9) How many hetero atoms are present in following ?

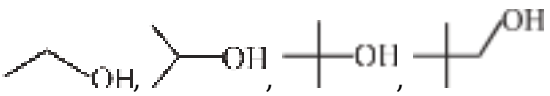
 Melamine

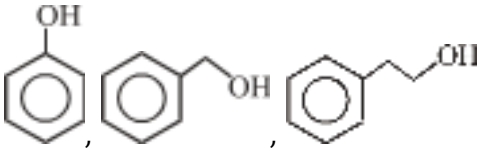
(1) 2
(2) 3
(3) 4
(4) 6

10) Which are not a set of homologous series ?

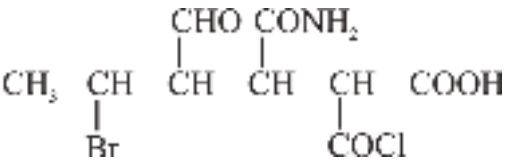
(1) 

(2) 

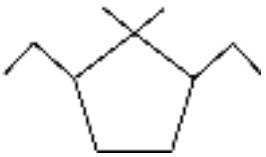
(3) 

(4) 

11) IUPAC name of following compound :-

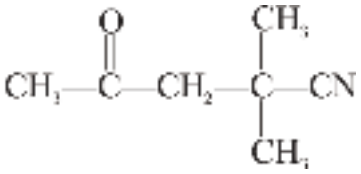


(1) 2-Bromo-4-carbamoyl-5-chlorocarbonyl 3-formyl hexananoic acid
(2) 5-Bromo-3-carbamoyl-2-chlorocarbonyl-4-formyl hexanoic acid
(3) 4-Formyl-2-chlorocarbonyl-3-carbamoyl-5-bromo hexanoic acid
(4) 2-Chlorocarbonyl-3-carbamoyl-4-formyl-5-bromohexanoic acid

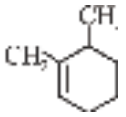
12) IUPAC name of 

(1) 1,3-Diethyl-2,2-dimethylcyclopentane.
(2) 2,5-Diethyl-1,1-dimethylcyclopentane.
(3) 1,4-Diethyl-5,5-dimethylcyclopentane.
(4) 2,2-Dimethyl-1,3-diethylcyclopentane

13) The IUPAC name of the following compound is:

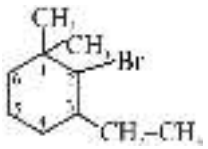


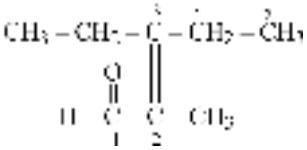
(1) 2,2-Dimethyl-4-oxopentanenitrile
(2) 4-Cyano-4-methyl-2-pentanone
(3) 2-Cyano-2-methyl-4-oxopentane
(4) 4-Cyano-4-methyl-2-oxopentane

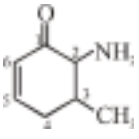
14) IUPAC name of  is :-

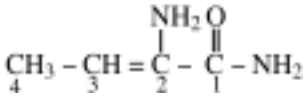
(1) 1,2-Dimethyl cyclohex-1-ene
(2) 1,2-Dimethyl cyclohex-2-ene
(3) 1,6-Dimethyl cyclohex-1-ene
(4) Cyclohexenyl-1,2-dimethane

15) Which of the following compound have incorrect order of numbering :-

(1) 

(2) 

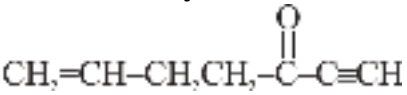
(3) 

(4) 

16) Which of the following common name presents 3° amine :-

(1) Ethyl methyl amine
(2) Tert-butylamine
(3) Ethyl isopropyl methyl amine
(4) Neopentyl amine

17) State of hybridisation for 3rd and 4th carbon in following molecule is respectively : -



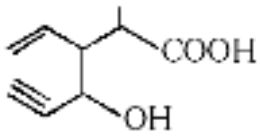
(1) sp^2–sp^3

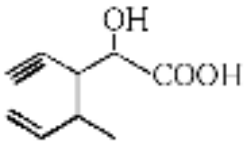
(2) sp^3–sp^2

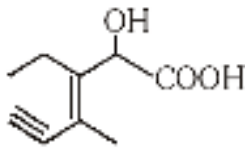
(3) sp^3–sp^3

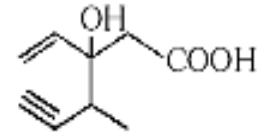
(4) sp–sp^2

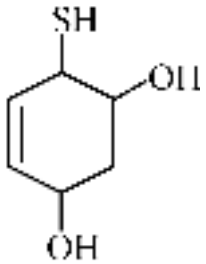
18) Structure of the compound whose IUPAC name is 3–Ethyl–2–hydroxy–4–methylhex–3–en–5–ynoic acid is :-

(1) 

(2) 

(3) 

(4) 

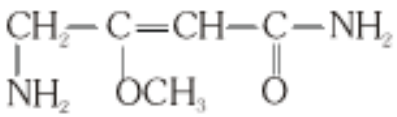
19) Following compound is named as :- 

(1) 6–Mercaptocyclohex–4–ene–1,3–diol

(2) 1–Mercaptocyclohex–2–ene–4,6–diol

(3) 1–Mercaptocyclohex–5–ene–2,4–diol

(4) 4–Mercaptocyclohex–2–ene–1,5–diol

20) The IUPAC name of the compound is :- 

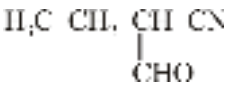
(1) 4–Amino-2–methoxy–1–amino but–2–ene

(2) 4–Amino–3–methoxy but–2–en–1–amide

(3) 2–Methoxy–1,4–diamino but –2–enal

(4) 1–Amino–2–methoxy–3–amino propene

21)

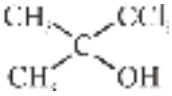
IUPAC Name of  is ?

(1) 2-Formyl propane-1-nitrile

(2) 2-Formyl butane-1-nitrile

(3) 2-Cyanopropanal

(4) 2-Formyl propanecarbonitrile

22) The IUPAC name of  is :-

(1) Trichloromethylpropan-2-ol

(2) 2-hydroxy-2-trichloromethyl propane

(3) 1, 1, 1-trichloro-2-methylpropan-2-ol

(4) 3,3,3-trichloro-2-methyl propan-2-ol

23) Two Bottles A and B contain 2M and 2m aqueous solutions of sulphuric acid respectively, then (d = 1g/ml) :-

(1) A is more concentrated than B

(2) B is more concentrated than A

(3) Concentration of A and B are equal

(4) It is impossible to compare the concentration.

24) The normality of 10 lit. volume hydrogen peroxide is

(1) 0.176

(2) 3.52

(3) 1.78

(4) 0.88

25) 1M HCl and 2M HCl are mixed in volume ratio of 4 : 1. What is the final molarity of HCl solution ?

(1) 1.5

(2) 1

(3) 1.2

(4) 1.8

26) Find molality of an aqueous solution of CH_3OH, in which mole fraction of CH_3OH is 0.2 :-

(1) 1.3

(2) 13.9

(3) 3.9

(4) 21.2

27) Higher the value of K_H at a given pressure, suggests that :-

(1) The higher is the solubility of the gas in the liquid.

(2) The lower is the solubility of the gas in the liquid.

(3) Solubility of gases has no relation with K_H

(4) All gases have same K_H values but different solubilities

28) When a gas is bubbled through water at 298K, a very dilute solution of the gas is obtained. Henry's law constant for the gas at 298 K is 100 kbar. If the gas exerts a partial pressure of 1 bar, the number of millimoles of the gas dissolved in one litre of water is :-

(1) 0.555

(2) 5.55

(3) 55.5

(4) 5.55×10^{-4}

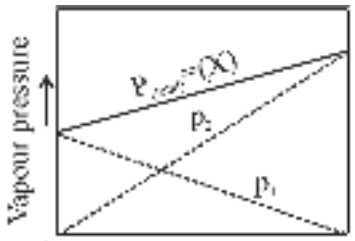
29) An aqueous solution containing 28% by mass of liquid A (molar mass = 70) has a vapour pressure of 160 mm of Hg at 30°C. Find the vapour pressure of pure liquid A (Vapour pressure of H_2O at 30°C is 150 mm Hg):-

(1) 260

(2) 10

(3) 180

(4) 400



30) x=(Y) x=(Z)

X, Y and Z in the above graph are :-

(1) $X = p_1 + p_2$, Y = 1, Z = 1

(2) $X = p_1 + p_2$, Y = 0, Z = 1

(3) $X = p_1 \times p_2$, Y = 0, Z = 1

(4) $X = p_1 - p_2$, Y = 1, Z = 0

31) On mixing 10 mL of carbon tetrachloride with 10mL of benzene, the total volume of solution is:-

(1) > 20 ml

(2) < 20 ml
(3) = 20 ml
(4) Can't say

32) Azeotropic mixture are :

(1) Mixture of two solids
(2) Those which boil at different temperature
(3) Those which can be fractionally distilled
(4) Constant boiling mixtures

33) **Assertion (A)** : Relative lowering in vapour pressure is equal to mole fraction of the solvent.
Reason (R) : Relative lowering in vapour pressure is a colligative property.

(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**
(2) **(A)** is correct but **(R)** is not correct
(3) **(A)** is incorrect but **(R)** is correct
(4) Both **(A)** and **(R)** are correct but **(R)** is the correct explanation of **(A)**

34) The boiling point of a solution is higher than that of pure solvent. This is so because :-

(1) Decrease in vapour pressure of the solution
(2) Increase in vapour pressure of the solution
(3) Change in the vapourisation energy of the solution
(4) Solvation of the solute molecules

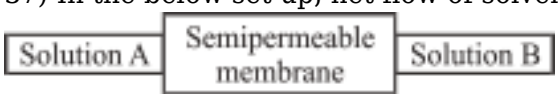
35) A 5% solution (by mass) of cane sugar in water has freezing point of 271 K and freezing point of pure water is 273.15 K. The freezing point of a 5% solution (by mass) of glucose in water is :

(1) 271 K
(2) 273.15 K
(3) 269.07 K
(4) 277.23 K

36) The relationship between osmotic pressures (π_1, π_2 and π_3) at a definite temperature when 1g glucose, 1 g urea and 1 g sucrose are dissolved in 1 litre of water is (assume i = 1 for all) :-

(1) $\pi_1 > \pi_2 > \pi_3$
(2) $\pi_3 > \pi_1 > \pi_2$
(3) $\pi_2 > \pi_1 > \pi_3$
(4) $\pi_2 > \pi_3 > \pi_1$

37) In the below set up, net flow of solvent is from A to B then:-



(1) Solution A will be more concentrated relative to solution B
(2) Solution A will be more dilute relative to solution B
(3) Solution A and solution B will be equally concentrated
(4) Solution A will be at higher temperature relative to solution B

38) Which one of the following aqueous solutions will exhibit highest boiling point :

(1) 0.015 M urea
(2) 0.01 M KNO_3
(3) 0.10 M Na_2SO_4
(4) 0.015 M glucose

39)

Consider the following cases :-
Case I : 2M CH_3COOH solution in benzene at 27°C where there is dimer formation to the extent of 100%.
Case II : 0.5 M KCl aqueous solution at 27°C, which ionises 100%

Which is correct ?
(1) Both are isotonic
(2) I is hypertonic
(3) II is hypertonic
(4) None is correct

40) The value of Λ^∞ for NH_4Cl, NaOH and NaCl are respectively 150, 250 and 130 $ohm^{-1}cm^2eq^{-1}$. The value of Λ^∞ of NH_4OH is :-

(1) 270
(2) 280
(3) 400
(4) 380

41) Value of cell constant depends on :-

(1) Temperature
(2) Nature of solvent
(3) Nature of electrolyte
(4) None of above

42) Resistance of 0.1 M KCl solution in a conductance cell is 300 ohm and conductivity is 0.013 S cm^{-1}. The value of cell constant is –

(1) 3.9 cm^{-1}
(2) 39 m^{-1}
(3) 3.9 m^{-1}

(4) 13 cm^{-1}

43) Value of Λ_m^∞ for $SrCl_2$ in water at 25° from the following data :

Conc. (mol/L)	0.25	1
Λ_m (Ω^{-1} cm^2 mol^{-1})	260	250

(1) 270

(2) 260

(3) 250

(4) 255

44) Which of the following expressions correctly represents the equivalent conductance at infinite dilution of $Al_2(SO_4)_3$. Given that $\Lambda^\circ_{Al^{3+}}$ and $\Lambda^\circ_{SO_4^{2-}}$ are the equivalent conductances at infinite dilution of the respective ions :-

(1) $\Lambda^o_{Al^{3+}} + \Lambda^o_{SO_4^{2-}}$

(2) $\left(\Lambda^o_{Al^{3+}} + \Lambda^o_{SO_4^{2-}}\right) \times 6$

(3) $\frac{1}{3}\Lambda^o_{Al^{3+}} + \frac{1}{2}\Lambda^o_{SO_4^{2-}}$

(4) $2\Lambda^o_{Al^{3+}} + 3\Lambda^o_{SO_4^{2-}}$

45) **Assertion :** Higher the molal depression constant of solvent used, higher the freezing point of solution.
Reason : Depression in freezing point does not depend on the nature of solvent.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.

(2) Assertion & Reason are True but Reason is not a correct explanation of the Assertion.

(3) Assertion is True but the Reason is False.

(4) Both Assertion & Reason are False.

BIOLOGY

1) Which of the following character is not related with chordates ?

(1) Ventral nerve cord

(2) Ventral heart

(3) Dorsal notochord

(4) Post anal tail

2) The characteristic feature of birds which makes them different from reptiles is -

(1) Homoeothermic nature

(2) Post anal tail

(3) Vertebral column

(4) Viviparity

3) Select the correct option :

Animal		Common name
(a)	*Gorgonia*	(1) Bath sponge
(b)	*Ctenoplana*	(2) Sea fan
(c)	*Taenia*	(3) Comb jelly
(d)	*Euspongia*	(4) Tapeworm

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

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

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

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

4) **Statement - I :** In open circulation blood is pumped out of heart and the cell and tissues are directly bathed in it.
Statement - II : In close circulation blood is circulated through series of vessles of varying diameters.

(1) Both statement-I and statement-II are correct.

(2) Both statement-I and statement-II are incorrect.

(3) Statement-I is incorrect and statement-II is correct.

(4) Statement-I is correct and statement-II is incorrect.

5) Which one is correct about Porifera :-

(1) Unisexual

(2) Internal fertilisation with indirect development

(3) External fertilisation with direct development

(4) External fertilisation with indirect development

6) In which phylum the cells performing the same function are arranged into tissues for the first time ?

(1) Porifera

(2) Coelenterata

(3) Platyhelminthes

(4) Aschelminthes

7) On the basis of coelom, Antedon is :-

(1) Acoelomate

(2) Pseudocoelomate

(3) Schizocoelomate

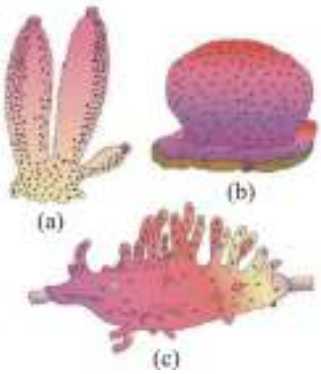
(4) Enterocoelomate

8) Give the correct match in the following :-

Scientific Name		**Common Name**	
(A)	Balenoptera	(I)	Tortoise
(B)	Pteropus	(II)	Angel fish
(C)	Testudo	(III)	Flying fox
(D)	Pterophyllum	(IV)	Blue whale

	A	**B**	**C**	**D**
(1)	II	III	I	IV
(2)	IV	III	I	II
(3)	IV	I	II	III
(4)	I	II	III	IV

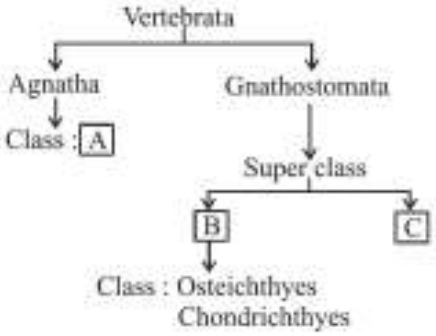
(1) 1
(2) 2
(3) 3
(4) 4



9) Identify the following animal a, b and c :-

	a	**b**	**c**
(1)	*Sycon*	*Spongilla*	*Euspongia*
(2)	*Euspongia*	*Sycon*	*Spongilla*
(3)	*Spongilla*	*Sycon*	*Euspongia*
(4)	*Sycon*	*Euspongia*	*Spongilla*

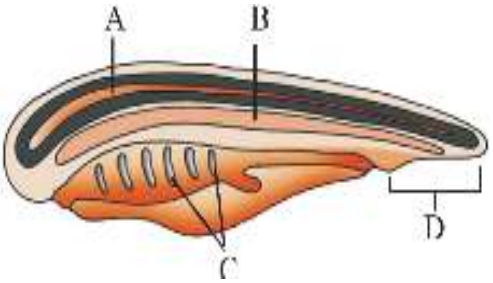
(1) 1
(2) 2
(3) 3
(4) 4



10) Select the correct option to identify A, B and C in given chart :-

(1) A-Pisces, B-Tetrapoda, C-Cyclostomata
(2) A-Cyclostomata, B-Pisces, C-Tetrapoda
(3) A-Tetrapoda, B-Pisces, C-Cyclostomata
(4) A-Pisces, B-Cyclostomata, C-Tetrapoda

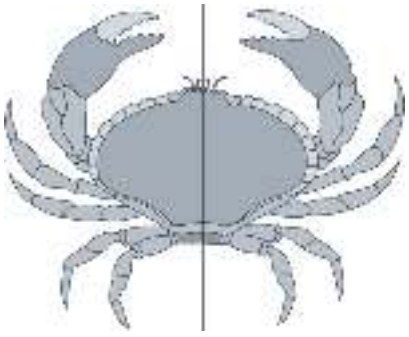
11) Animals belonging to phylum Chordata are fundamentally characterized by the presence of structure noted as A, B, C and D. Identify the names of A, B, C and D :-



(1) A – Nerve cord, B – Gill slits, C – Notochord, D – Post-anal tail
(2) A – Nerve cord, B – Notochord, C – Post-anal tail, D – Gill slits
(3) A – Nerve cord, B – Notochord, C – Gill slits, D – Post-anal tail
(4) A – Notochord, B – Nerve cord, C – Gill slits, D – Post-anal tail

12)

Which of the following is correct option about given diagram?



	Phylum	symmetry
(1)	Coelentrata	Bilateral
(2)	Arthropoda	Bilateral
(3)	Arthropoda	Radial

(4)	Mollusca	Radial

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

13) In which one of the following the genus name, its two character and its class/phylum are correctly matched?

	Genus name		**Two characters**	**Class/ Phylum**
(1)	*Ascaris*	(a)	Body segmented	Annelida
		(b)	Males and females distinct	
(2)	Frog	(a)	A tympanum represents ear	Amphibia
		(b)	Fertilization is external	
(3)	*Pteropus*	(a)	Skin possesses hair	Mammalia
		(b)	Oviparous	
(4)	*Aurelia*	(a)	Cnidoblasts	Coelenterata
		(b)	Organ level of organization	

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

14) { Jointed appendages, Malpighian tubules, Tracheal system, Internal Fertilisation, oviparous, open type of circulatory system }

How many of the above given characters are correct with respect to the given figure?

(1) 6
(2) 5
(3) 3
(4) 1

15) Find out incorrect match from column I, II and III :-

	Column-I	**Column-II**	**Column-III**

(1)		*Petromyzon*	Scales absent
(2)		*Pristis*	Air bladder absent but operculum is present
(3)		*Hippocampus*	Air bladder and operculum both are present
(4)		*Rana*	Skin is scaleless, and tympanum represents the ear

(1) 1

(2) 2

(3) 3

(4) 4

16) Which of the following statement is/are correct regarding phylum coelenterata ? (A) They are aquatic mostly marine, sessile or free swimming, radially symmetrical animals.
(B) They have a central gastro-vascular cavity.
(C) Digestion is extracellular and intracellular.
(D) Examples are Sycon, Spongilla and Euspongia

(1) A and B

(2) A and D

(3) A, B and C

(4) All of these

17) The path of water, in water canal system is :-

(1) Osculum → spongocoel → ostia

(2) Madreporite → ring canal → radial canal

(3) Ostia → spongocoel → osculum

(4) Ampulla → madreporite → radial canal

18) Select the incorrect statement for given diagram :-

(1) Marine animal which show migration.

(2) Cranium and vertebral column both are present

(3) Scales and paired fins present

(4) Elongated body bearing 6-15 pair gill slits for respiration.

19)

Which statement is incorrect for animal belonging to **class chondrichthyes** ?

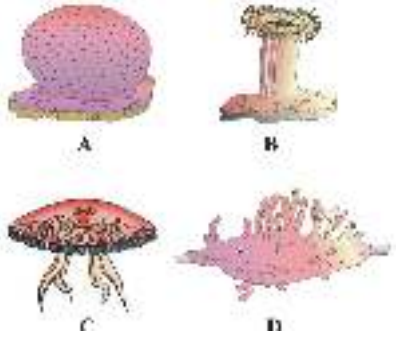
(1) Presence of placoid seates.

(2) Absence of air bladder.

(3) Presence of cartilaginous endoskeleton.

(4) Notochord is present only at larval stage after that it disappears.

20) Identify the following four animals (A, B, C and D) given below. Which one of these is not correctly identified in the option given along with its correct taxonomic group and their common name ?



Options :-

Option	Fig.	Name of animal	Taxonomic group	Common Name
(1)	B	*Adamsia*	Ctenophora	Star coral
(2)	D	*Spongilla*	Porifera	Fresh water sponge
(3)	C	*Aurelia*	Coelenterata	Jelly fish
(4)	A	*Euspongia*	Porifera	Bath sponge

(1) 1

(2) 2

(3) 3

(4) 4

21) Which one is poikilothermic and reptile ?

(1) 

(2) 

(3) 

(4) 

22) Match column-I with column-II

	Column-I		**Column-II**
(A)		(i)	Stomochord
(B)		(ii)	Parapodia
(C)		(iii)	Water vascular system
(D)		(iv)	Water canal system

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

23)

Which one is correct for chondrichthyes?

(1) 4 pair of gills with operculum - Pristis
(2) 4 pair of gills without operculum- Clarias
(3) 5-7 pair of gills without operculum - Trygon
(4) 5-7 pair of gills with operculum - Pterophyllum

24) Identify the incorrect statement regarding the class of given organism

(1) Tympanum represents ear
(2) Fertilisation is internal
(3) Three chambered heart is found in all members
(4) Despite being tetrapods, limbs may not be present in every member of this class

25)

Identify the animals characterized by presence of crop and gizzard in their digestive system?

(1) *Columba, Pila*
(2) *Scoliodon, Labeo*
(3) *Corvus, Periplanata*
(4) *Asterias, Fasciola*

26) Claspers are developed on pelvic fin of :-

(1) Male cartilagenous fish
(2) Male bony fish
(3) Female cartilagenous fish
(4) Female bony fish

27) Gregarious pest is :-

(1) *Anopheles*
(2) *Culex*
(3) *Limulus*
(4) *Locusta*

28) Which class show correct match of examples?

(1) Mammalia- *Corvus, Aptenodytes, Delphinus*
(2) Aves - *Pavo, Columba, Struthio*
(3) Amphibia - *Hyla, Calotes, Rana*
(4) Chondrichthyes - *Carcharodon, Pristis, Betta*

29) Match the following genera with their respective phylum :-

(a)	*Cucumaria*	(i)	Hemichordata
(b)	*Aplysia*	(ii)	Aschelminthes
(c)	*Ancylostoma*	(iii)	Echinodermata
(d)	*Balanoglossus*	(iv)	Mollusca

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

30) Which of the following characteristic is not of phylum annelida ?

(1) Metamerically segmented body
(2) Organ-system level of body organisation and radial symmetry
(3) Closed circulatory system
(4) Presence of nephridia for excretion and osmoregulation

31) Each molecule has four polypeptide chains, two small called light chain and two longer called heavy chains (represented as H_2L_2). Which of the following is not directly related to above described molecule ?

(1) Army of proteins produced by B-lymphocytes
(2) Present in blood
(3) Humoral immunity
(4) Cell mediated immunity (CMI)

32) Which type of immunity is responsible for graft rejection ?

(1) Cell mediated immunity
(2) Antibody mediated immunity
(3) Humoral immunity

(4) Innate immunity

33) Which of the following acts as a physiological barrier to the entry of micro organism in human body ?
(A) Epithelium of Respiratory tract
(B) Monocyte
(C) Tear
(D) Skin
(E) Saliva (F) Acid in stomach
(G) N-K-cell

(1) E, F, G
(2) B, C, E
(3) C, E, F
(4) A, B, D

34) The colostrum is a example of

(1) Artificial active acquired Immunity
(2) Natural active acquired Immunity
(3) Natural passive acquired Immunity
(4) Artificial passive acquired Immunity

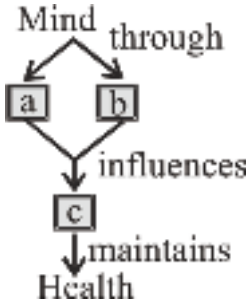
35) Which of the following is largest secondary lymphoid organ :-

(1) Bone marrow
(2) Thymus
(3) Spleen
(4) Lymphnode

36) Non specific immunity includes all of these except

(1) Lymphocyte
(2) Macrophage
(3) Interferons
(4) Neutrophils

37) Fill in the blanks :-



(1) a-neural system, b-endocrine system, c-immune system

(2) b-neural system, c-endocrine system, a-immune system

(3) a- neural system, c-endocrine system, b-immune system

(4) c-neural system, b-endocrine system, a-immune system

38) Vaccination is based on :-

(1) Intensity of pathogen

(2) Memory of person

(3) Memory of immune system

(4) Phagocytosis

39) Injecting the microbes deliberately during immunisation or infectious organisms gaining access into body during natural infection induce:-

(1) Innate immunity

(2) Non-specific immunity

(3) Passive immunity

(4) Active immunity

40) Which barrier of innate immunity first come in contact with pathogen ?

(1) Skin, mucous membrane

(2) Fever

(3) Interferon

(4) Phagocytes

41)

When people are healthy they are ?
(a) More efficient at work
(b) Decreases productivity
(c) Brings economic prosperity
(d) Increases longevity of people
(e) Increases infant and maternal mortality
How many statements are correct about healthy people ?

(1) Two

(2) Three

(3) Four

(4) All are correct

42) Which of the following statement is correct ?
(a) Health is affected by genetic disorders, life style and infections.
(b) Balanced diet, personal hygiene and regular exercise are very important to maintain good health.

(c) Health is "absence of disease" or physical fitness" only.

(1) a, c
(2) b, c
(3) a, b, c
(4) a,b

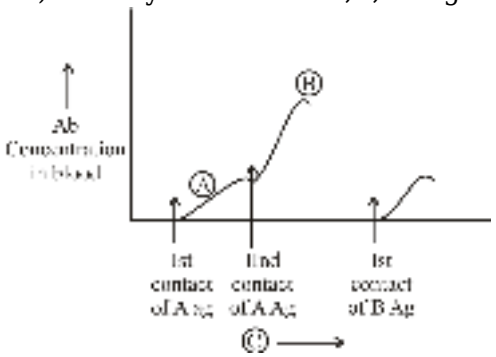
43) The given barrier belongs to the same category to which tears from eyes belongs ?

(1) Skin
(2) Mucosa
(3) Plasma cells
(4) Saliva in mouth

44) Greeks like hippocrates as well as Indian Ayurveda system of medicine Asserted that the person with ____ belong to hot personality and would have fever.

(1) Yellow Bile
(2) Blood
(3) Black Bile
(4) Phlegm

45) Identify the correct A,B,C in given diagramme



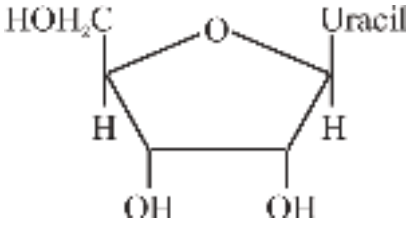
(1) A-Primary IR, B-Secondary IR, C-Ab in Blood
(2) A-Secondary IR, B-Primary IR, C-Time period
(3) A-Primary IR, B-Secondary IR, C-Time period
(4) A-Secondary IR, B-Primary IR, C-Ab in Blood

46) In the following representation A and B is - *Pneumococcus* S Strain → injected into Mice → A
Pneumococcus R Strain → injected into Mice → B

(1) A → Mice die
B → Mice live
(2) A → Mice die
B → Mice die
(3) A → Mice live
B → Mice live

(4) A → Mice live
B → Mice die

47) The molecule represented is ?

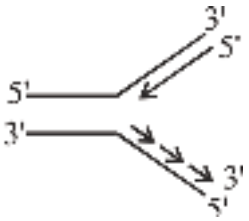


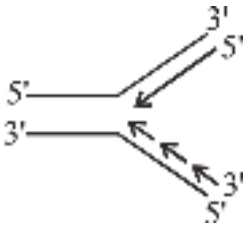
(1) Uridine and it is a pyrimidine
(2) Uridylic acid and it is a nucleoside
(3) Uridine and it is a nucleoside
(4) Uridylic acid and it is a nucleotide

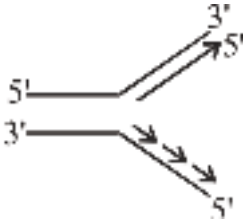
48) In a double stranded DNA molecule each step of ascent is represented by a pair of bases. At each step of ascent, the strand turns :-

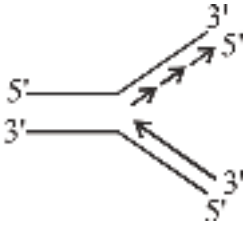
(1) 0.34 nm
(2) 36°
(3) 3.4 nm
(4) 34°

49) Which of the following correctly represent DNA replication ?

(1)


(2)


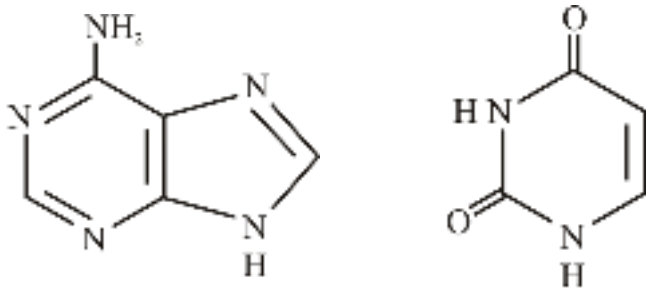
(3)


(4)


50) Which is incorrect for genetic code–

(i) The codon is triplet
(ii) 64 codons code for amino acids
(iii) Genetic code is unambiguous
(iv) Genetic code is nearly universal
(v) AUG has dual functions

(1) only ii
(2) ii & iii
(3) iii, iv and v
(4) All are correct



(A)

(B)

51)
(A) and (B) in the above diagram are :-

	(A)	(B)
(1)	Guanine	Cytosine
(2)	Adenine	Uracil
(3)	Adenosine	Uridine
(4)	Guanine	Uracil

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

52)

	Organism		No. of nucleotides
(i)	$\phi \times 174$ bacteriophage	(A)	4.6×10^6 bp
(ii)	Lambda bacteriophage	(B)	6.6×10^9 bp
(iii)	*E.Coli*	(C)	5386 nucleotides
(iv)	Human	(D)	48502 bp

Following match is correct :-
(1) i = D, ii = C, iii = B, iv = A
(2) i = B, ii = D, iii = A, iv = B

(3) i = A, ii = D, iii = C, iv = B

(4) i = C, ii = D, iii = A, iv = B

53) During replication, lagging strand is formed on one of the DNA template :-
How many option are correct related to this
(A) Formation of okazaki fragments.
(B) Direction of fragment formation 5'→ 3'
(C) It is opposite to helix opening.
(D) Need ligase to join.

(1) One

(2) Two

(3) Three

(4) All

54) In "QB bacteriophage" genetic material is :-

(1) DNA

(2) RNA

(3) Protein

(4) Lipid

55) "The DNA sequence coding for tRNA and rRNA molecule also define a gene" and segment of DNA coding for a polypeptide could be said as

(1) UTR

(2) Cistron

(3) VNTR

(4) Intron

56) A + G = C + T is applicable to :-

(1) rRNA

(2) tRNA

(3) mRNA

(4) dsDNA

57) In which of the following will DNA melt at the lowest temperature ?

(1) 5'–AATAAAGC–3'
3'–TTATTTCG–5'

(2) 5'–AATGCTGC–3'
3'–TTACGACG–5'

(3) 5'–ATGCTGAT–3'
3'–TACGACTA–5'

(4) 5'–GCATAGCT–3'
3'–CGTATCGA–5'

58) Two dimensional shape of tRNA is :-

(1) L-shaped
(2) Clover leaf-like
(3) X-shaped
(4) Y-shaped

59) The salient feature of DNA are :
(i) It is made of two polynucleotide chain
(ii) Back bone is constituted by sugar and nitrogen base
(iii) Two chains have parellel polarity
(iv) Bases in two strands are paired through H-bond
(v) The two chains are coiled in left handed fashion in all types of DNA

(1) i, iv
(2) i, ii, iii, v
(3) i, iii, v
(4) i, ii, iii, iv, v

60) **Assertion (A):** On template 5' – 3' DNA replicate in discontinuous manner.
Reason (R): DNA polymerase catalyse polymerisation only in one direction that is 5' – 3'.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
(3) Assertion is True but the Reason is False.
(4) Both Assertion & Reason are False.

61) **Assertion (A) :** DNA is more stable than RNA.
Reason (R) : In DNA, $2'$–OH is absent and it is double stranded.

(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
(3) Assertion is True but the Reason is False.
(4) Both Assertion & Reason are False.

62) Given below are two statements :-
Statement-I : tRNA has an anticodon loop that has bases complementary to the codon of mRNA.
Statement-II : For initiation of transcription, the ribosome binds to the mRNA at the start codon (AUG).
In the light of above statement choose the correct answer from the options given below :

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

63) The experiment proof for semiconservative replication of DNA was first performed by :

(1) George Gamow

(2) Matthew Meselson and Franklin Stahl

(3) Marshall Nirenbergs

(4) Avery, Mcleod and Mc Carty

64) Match List-I with List-II :

List - I		List - II	
(a)	Double helix model for the structure of DNA.	(i)	Alfred Hershey and Martha Chase
(b)	Biochemical characterisation of 'transforming principle' in Griffith's experiment.	(ii)	Matthew Meselson and Franklin Stahl
(c)	Unequivocal proof that DNA is the genetic material.	(iii)	Oswald Avery, Colin Macleod and Maclyn McCarty
(d)	Experimental proof about semiconservative nature of DNA replication.	(iv)	James Watson and Francis Crick

Choose the correct answer from the options given below.

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

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

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

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

65) Which of the following enzyme did not affect transformation in bacteria ?

(1) DNase and RNase

(2) Only DNase

(3) DNase and Protease

(4) RNase and Protease

66) Which of the following types of RNA polymerase enzyme in eukaryotes transcribes tRNA ?

(1) I

(2) II

(3) III

(4) Any of the above types

67) All of the following are steps of RNA processing in eukaryotes except :-

(1) Capping

(2) Polyadenylation

(3) Blending

(4) RNA splicing

68) The correct order of steps in Herhey-chase experiment -

(1) Infection, Centrifugation, Blending
(2) Infection, Blending, Centrifugation
(3) Blending, Infection, Centrifugation
(4) Blending, Centrifugation, Infection

69) In two stands of DNA a purine always comes opposite to pyrimidine and this generates :

(1) Two strands are antiparallel
(2) Two chains are coiled in right-handed fashion
(3) It provide additional stability
(4) It generates approximately uniform distance between two strands

70) Degeneracy of genetic code refers to-

(1) Each codon codes for only one specific amino acid
(2) Amino acids are always coded by only one specific codon
(3) Some amino acids are coded by more than one codon
(4) Codon of methionine and tryptophan

71) A gene coding for flower colour has 2.8 Kilo base pair. If no. of cytosine molecule in this gene is 1000 then what will be the no. of thymine molecule in this gene ?

(1) 9200
(2) 4600
(3) 3600
(4) 1800

72) A molecule that can act as genetic material must not have following properties -

(1) It should be chemically and structurally highly active
(2) It should be able to generate its replica
(3) It should provide the scope for slow changes
(4) It should be structurally more stable

73) During the process of transcription :-

(1) RNA is synthesised over RNA template
(2) Proteins are synthesised
(3) Adenine forms base pair with uracil
(4) DNA is synthesised over RNA template

74) Which segments of hnRNA are removed during splicing in eukaryotes?

(1) 5′-UTR

(2) 3′-UTR
(3) Introns
(4) Poly–A–tail

75) Consider the following four statements (a-d) and select the option which include all the correct ones only :-
(a) Transcription and translation can be coupled in bacteria.
(b) The split gene arrangements represents the advanced feature of the genome.
(c) The process of splicing represents the dominance of RNA-world.
(d) The presence of introns in split gene is reminiscent of antiquity.

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

76) The UTR is present at which end of m-RNA :-

(1) only at 5' end
(2) only at 3' end
(3) Both 5' & 3' end
(4) After starting codon

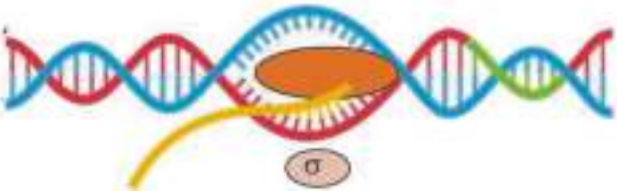
77) If the sequence of coding strand in a transcription unit is -
5'-ATG CAT GCA TGC ATG CAT-3'
What will be sequence of nucleotides in m-RNA?

(1) 5' UAC GUA CGU ACG UAC GUA 3'
(2) 5' AUG CAU GCA UGC AUG CAU 3'
(3) 3' AUG CAU GCA UGC AUG CAU 5'
(4) 3' UAC GUA CGU ACG UAC GUA 5'

78) In prokaryotes, which factor helps RNA polymerase enzyme to recognise the terminator site ?

(1) ρ-factor
(2) σ-factor
(3) α-factor
(4) γ-factor

79) Find out the missing figure with correct option in the given figure.



(1)

(2)

(3)

(4)

80) Peptidyl transferase activity in 80-S and 70-S ribosomes is exhibited respectively by :-

(1) 23-S rRNA and 28-S rRNA
(2) 28-S rRNA and 23-S rRNA
(3) 18-S rRNA and 16-S rRNA
(4) 16-S rRNA and 18-S rRNA

81) The process of copying genetic information from one strand of DNA into ....(Y)..... is termed as .....(Z)..... :-

	Y	Z
(1)	Transcription	RNA
(2)	RNA	Transcription
(3)	DNA	Replication
(4)	Replication	DNA

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

82) In which of the following processes RNA shows enzyme activity?
(A) Prokaryotic DNA replication
(B) Transcription
(C) Translation
(D) Splicing

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

83) Find out the correct match :-

(i)	RNA polymerase-I	(a)	hnRNA
(ii)	RNA polymerase-II	(b)	snRNA
(iii)	RNA polymerase-III	(c)	18s r-RNA

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

84) Which enzyme is helpful in polymersising RNA with defined sequences in a template independent manner ?

(1) DNA dependent RNA polymerase
(2) RNA dependent RNA polymerase
(3) RNA depenent DNA polymerase
(4) Severo ochoa enzyme

85) In bacteria AAA codon codes for lysine amino acid then in human AAA codon codes for :-

(1) Phenyl alanine
(2) Glycine
(3) Lysine
(4) Leusine

86) Back bone in structure of DNA molecule is made up of -

(1) Pentose Sugar and phosphate
(2) Hexose sugar and phosphate
(3) Purine and pyrimidine
(4) Ribose Sugar and phosphate

87) Match the column :-

Column-I		Column-II	
(A)	Triplet	(i)	One codon codes for only one amino acid
(B)	Non-ambiguity	(ii)	One amino acid is coded by more than one codon
(C)	Universality	(iii)	A codon is made up of three N_2 bases.
(D)	Degeneracy or redundancy	(iv)	From bacteria to human beings UUU codes for phenyl alanine

(1) A = (iii), B = (ii), C = (iv), D = (i)

(2) A = (iii), B = (i), C = (iv), D = (ii)

(3) A = (iv), B = (i), C = (ii), D = (iii)

(4) A = (iii), B = (iv), C = (i), D = (ii)

88) Isotopes used for proving that DNA is genetic material :-

(1) N^{14} and P^{31}

(2) N^{14} and N^{15}

(3) N^{14} and C^{14}

(4) S^{35} and P^{32}

89) Incorrect about nucleosome is

(1) Histones are organised to form a unit of eight molecules called as histone octamer.

(2) The negatively charged DNA is wrapped around the positively charged histone octamer.

(3) Nucleosomes constitute the repeating unit of a structure in nucleus called chromatin.

(4) The nucleosomes in chromatin are seen as 'beads-on-string' structure when viewed under light microscope.

90) Match List-I with List-II and select the correct answer using the code given below in the lists.

	List-I	List-II
a	Ligase	Joins short segments of DNA together.
b	DNA polymerase	Cuts protein at specific sequence
c	Helicase	Breaks the hydrogen bonds between complementary pairs during DNA replication.

(1) a, b and c are correct

(2) a and b are correct but c is false

(3) a is correct but b and c are false

(4) a and c are correct but b is false

ANSWER KEYS

PHYSICS

Q.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A.	1	3	1	1	4	3	2	4	1	2	2	4	1	1	3	1	3	2	3	3
Q.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A.	4	2	3	2	2	2	1	2	3	2	3	3	3	2	4	2	2	4	1	1
Q.	41	42	43	44	45															
A.	1	1	1	2	2															

CHEMISTRY

Q.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
A.	3	2	3	3	2	4	2	4	2	4	2	2	1	3	3	3	1	3	1	2
Q.	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
A.	2	3	1	3	3	2	2	1	1	2	1	4	3	1	3	3	2	3	1	1
Q.	86	87	88	89	90															
A.	4	1	1	1	4															

BIOLOGY

Q.	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110
A.	1	1	4	1	2	2	4	2	4	2	3	2	2	1	2	3	3	3	4	1
Q.	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
A.	3	1	3	3	3	1	4	2	2	2	4	1	3	3	3	1	1	3	4	1
Q.	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
A.	2	4	4	3	3	1	3	2	1	1	2	4	4	2	2	4	1	2	1	1
Q.	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170
A.	1	2	2	3	4	3	3	2	4	3	4	1	3	3	3	3	2	1	1	2
Q.	171	172	173	174	175	176	177	178	179	180										
A.	2	2	2	4	3	1	2	4	4	4										

PHYSICS

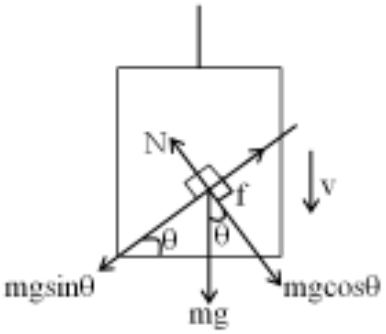
1) $w_{friction} = \Delta KE + \Delta U$

$-\mu mg(\square + x) = -\frac{1}{2}mu^2 + \frac{1}{2}kx^2$

$-0.1 \times 50 \times (10.5) = -\frac{1}{2}(3)(20)^2 + \frac{1}{2}K(0.5)^2$

$\frac{1}{8}K = 1000 - 52.5 = 947.5$

$\boxed{K = 7,580\,N/m}$



2)

Block is at rest so

$f = mg\sin\theta$

$W_f = |f|\,|s|\cos(90 + \theta)$

$W_f = (mg\sin\theta)(vt)(-\sin\theta)$

$W_f = -mg\sin^2\theta\,(vt)$ [$\square$ $s = vt$]

$W_f = -mg\,vt\sin^2\theta$

3) $\frac{K_f - K_i}{K_i} \times 100$

$= \frac{1600 - 100}{100} \times 100 = 1500\ \%$

4) $F_S = \mu mg\cos\theta + mg\sin\theta$

$= \frac{5}{10} \times 40\frac{4}{5} + 4 \times 10\frac{3}{5}$

$= 16 + 24 = 40\ N$

$F_S = 2T = 2mg$

$40 = 2 \times m \times 10$

$m = 2kg$

5) $W = \frac{1}{2}K[X_F^2 - X_i^2] = \frac{1}{2}K\left[(a+b)^2\,(a)^2\right]$

$= \frac{1}{2}K[(2a+b)(b)]$

6) Consider a ball pure rolling on rough incline plane. Here friction is present but the work done by it is zero, so we can apply COME.

7) $U = -7x + 24y$

$\vec{F} = -\Delta U$

$\vec{F} = -\left[-7\hat{i} + 24\hat{j}\right]$

$\left|\vec{F}\right| = 25$

$a = \frac{25}{5} = 5\ m/s^2$

$v = ut + at = 0 + 5 \times 2 = 10\ m/s$

8)

$W = -\frac{5}{10} \times 5 \times 2\pi r$

$= -\frac{25}{10} \times 2\pi\frac{1}{\pi} = -5$

9) As work done is frame dependent so power is also frame dependent

10)

$W_{all} = \Delta K$

$W_p + W_g = 0$

$ma\square - mg\square = 0$

$\boxed{a = g}$

11)

At stable equilibrium

$\frac{dF}{dx} = -ve$

$\frac{dU}{dx} = 0$

At unstable equilibrium

$\frac{dF}{dx} = +ve$

$\frac{dU}{dx} = 0$

12)

Above all forces can do work

13) $\frac{dw}{dt} = \left(3t^2 - 2t + 1\right)$

$\int dw = \int \left(3t^2 - 2t + 1\right) dt$

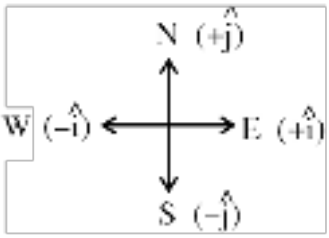
wtotal = $t^3 - t^2 + t$

$\Delta KE = (4^3 - 4^2 + 4) - (2^3 - 2^2 + 2) = 46$ J

14) $\boxed{\Delta U = -w_C}$

15) $P = v^3 \frac{dm}{d\ell} = 1^3 \times 200$

= 200 W

16) 

$\vec{d} = 30\hat{j} + 20\hat{i} + 10\sqrt{2}\left(\frac{\hat{i}+\hat{j}}{\sqrt{2}}\right)$

$\vec{d} = 30\hat{i} + 40\hat{j}$

17) 1 min 10 sec = 70 seconds

4 min 5 sec = 245 seconds

70 seconds → 1 revolution

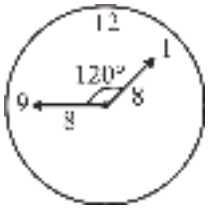
1 second → $\frac{1}{70}$ revolution

245 seconds → $245 \times \frac{1}{70}$ revolution

$= \frac{7}{2}$ revolution

= 3.5 revolution

Distance	Displacement
$= 3.5 \times 2\pi r$	$= 2r$
= 308 m	= 28 m

18) 

 |Displacement| = $2 \times 8 \sin\left(\frac{120°}{2}\right)$

$= 16 \sin 60°$

$= 16 \times \frac{\sqrt{3}}{2} = 8\sqrt{3}$ CM

19) Let 1 cycle = 5 step forward & 3 step backwards,
then,
Net displacement in 1 cycle = (+5) + (–3) = +2m
Net displacement in 4 cycle = 8 m
So he will fall down in the pit after completing
4 cycles & 5 forward steps.
Total time = 4(5 + 3) + 5(1) = 37 sec.

20) Displacement along west = 30m ;
Time taken $t_1 = \frac{30}{2} = 15s$
Displacement along north = 40 m ;
Time taken $t_2 = \frac{40}{1.5} = \frac{80}{3}s$
Total distance travelled = 30 + 40 = 70m
Total displacement = $\sqrt{30^2 + 40^2} = 50m$
 Average speed = $\frac{70}{15 + (80/3)} = \frac{42}{25} ms^{-1}$
Average velocity = $\frac{50}{15 + (80/3)} = \frac{6}{5} ms^{-1}$

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

$= \frac{x}{\frac{2x/5}{v_1} + \frac{3x/5}{v_2}} = \frac{5v_1v_2}{3v_1 + 2v_2}$

22)

$x = t^3 - 3t^2 + 3t + 3$
$V = 3t^2 - 6t + 3 = 0$
at t = 1 sec. V = 0 ...(1)
$a = 6t - 6 = 0$
at t = 1 sec. a = 0 ...(2)
at t = 0, $V_0 = 3$ m/s
$a_0 = -6$ m/s^2
after 1 sec. acceleration becomes positive so particle move in same direction.

$$< \vec{v} >= \frac{\int v dt}{\int dt} = \frac{\int_0^t |(t^2 - t - 2)| dt}{\int_0^t dt}$$

23)

$$= \frac{\left|\int_0^2 (t^2 - t - 2)dt\right| + \int_2^4 (t^2 - t - 2)dt}{\int_0^4 dt} = 3m/s$$

24) **Statement I:** "A particle having zero acceleration must have constant speed."
True. If a particle has zero acceleration, its velocity is not changing. Thus, its speed (the magnitude of velocity) remains constant.
Statement II: "A particle having constant speed must have zero acceleration."
False. A particle can have constant speed but still experience acceleration if its direction of motion is changing. For example, a particle moving in a circular path has constant speed but non-zero acceleration due to the change in direction.
Answer: Statement I is correct, but Statement II is incorrect.

25) Area under a-t graph = change in velocity

$\frac{1}{2} \times 5 \times 6$ = v – u

v = u + 15

u = 10 m/s

Hence,

V_{max} = 10 + 15 = 25 m/s

26) $v = \frac{dx}{dt} = 3t^2 - 12t - 15 = 3\left(t^2 - 4t - 5\right)$
$= 3(t-5)(t+1) < 0 \Rightarrow -1 < t < 5$
$a = \frac{dv}{dt} = 6t - 12 > 0 \Rightarrow t > 2$
⇒ required interval 2 < t < 5

27)

$t = \alpha x^2 + \beta x$
Differentiate w.r.t. 'x'
$\frac{dt}{dx} = 2\alpha x + \beta = \frac{1}{v}$
$v = (2\alpha x + \beta)^{-1}$
$\frac{dv}{dx} = -1(2\alpha x + \beta)^{-2}(2\alpha)$
$a = \frac{vdv}{dx}$

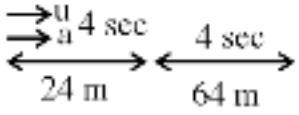
28)

$t^2 = x^2 - 1$
Differentiate w.r.t. 't'
$2t = 2x\frac{dx}{dt} \rightarrow t = xv$
again differentiate w.r.t. time 't'

$1 = xa + v^2$

$$a = \frac{1-v^2}{x} = \frac{1-\frac{t^2}{x^2}}{x}$$

$$a = \frac{x^2-t^2}{x^3} = \frac{1}{x^3}$$

29) 

$s = ut + \frac{1}{2}at^2 \rightarrow 24 = u(4) + \frac{1}{2}a(4)^2$

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

$u + 2a = 6$ ..... (1)

$u + 4a = 11$ ..... (2)

(2) – (1) → $2a = 5$

On solving → $u = 1$ m/s

30) $(60)^2 = (40)^2 + 2a(2s)$ or $4as = 2000$

Now, $v^2 = (40)^2 + 2as = 2600$

$\Rightarrow$ $v = 51$ m/s

31)

$v^2 = u^2 + 2as \Rightarrow (2u)^2 = u^2 + 2as$

$3u^2 = 2as$

$(v')^2 = u^2 + 2as' = u^2 + 2a(2s) = u^2 + 6u^2$

$(v')^2 = 7u^2 \Rightarrow v' = \sqrt{7}u$

32)

$V = 0 + 2 \times t$ ...(1)

$0 = V - 4(3 - t)$ ...(2)

$V = +12 - 4t = 2t$

$t = 2$ sec.

$V = 4$ m/s

33) $S_x = u_x t + \frac{1}{2}a_x t^2 \Rightarrow S_x = \frac{1}{2} \times 6 \times 16 = 48$m

$S_y = u_y t + \frac{1}{2}a_y t^2 \Rightarrow S_y = \frac{1}{2} \times 8 \times 16 = 64$m

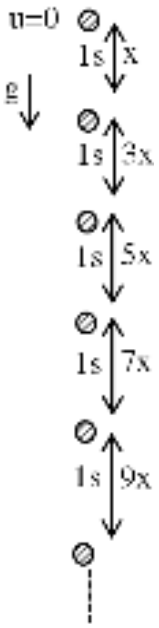
$S = \sqrt{S_x^2 + S_y^2} = 80$ m

34) $t_{ascent} = \sqrt{\frac{24}{g+a}}$, $t_{descent} = \sqrt{\frac{24}{g-a}}$

$$\frac{t_{ascent}}{t_{descent}} = \sqrt{\frac{g-a}{g+a}} = \sqrt{\frac{8}{12}} = \sqrt{\frac{2}{3}}$$

35)

x + 3x + 5x + 7x = 5 m
16x = 5
$x = \frac{5}{16}$ m



36) Ratio of distances traversed in equal time intervals (for a body falling from rest)
= 1 : 3 : 5 : 7 : ....
so, Assertion is correct
For a body having zero speed in one dimensional motion, velocity is also zero. So, Reason is incorrect.

37)

Time when velocity is perpendicular to initial velocity is :
$t = \frac{u}{g\sin\theta}$
so, t ≤ T
$\frac{u}{g\sin\theta} \frac{2u\sin\theta}{g}$
$\sin^2\theta \geqslant \frac{1}{2}$
$\sin\theta \frac{1}{\sqrt{2}}$
θ ≥ 45°

38)

Slope of v-t curve is initially negative and then positive.

39)

Find area of v-t graph.
Area
$= \frac{1}{2} \times 60 \times 2 + 1 \times 20 + \frac{1}{2} \times 1 \times 20 + \frac{1}{2} \times 1 \times 20$
$= 100$ m

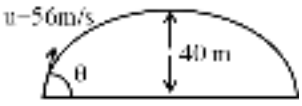
40) $x = 4 - 2t + t^2$
$v = -2 + 2t = 2t - 2$
Speed $= |2t - 2|$

41) $R = \frac{2u_x u_y}{g} = \frac{2 \times 1 \times 2}{10} = \frac{4}{10}$
$\tan\theta = \frac{u_y}{u_x} = 2$
$y = 2x\left[1 - \frac{10x}{4}\right] = 2x - 5x^2$

42) $T = \frac{2u_y}{g} \rightarrow u_y = 50$ m/s
$H_{max} = \frac{u_y^2}{2g} = \frac{(50)^2}{20} = 125$ m

43)

Range of 'B' is greater than 'A', so, speed of particle 'B' is also more than 'A'.

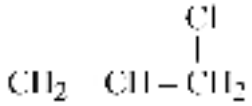
44) 

$H = \frac{u^2 \sin^2\theta}{2g}$
$\sin^2\theta = \frac{2gH}{u^2}$
$\sin^2\theta = \frac{2 \times 9.8 \times 40}{56 \times 56} = \frac{1}{4}$
$\sin\theta = \frac{1}{2} \rightarrow \theta = 30°$

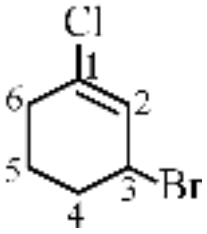
45) $y = \frac{x_1 x_2 \tan\theta}{x_1 + x_2}$
$3 = \frac{6 \times 18\tan\theta}{6 + 18}$

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

CHEMISTRY



46) 3-chloropro-2-ene



47) 3-Bromo-1-chlorocyclohex -1-ene

48) CH_2=CH–CH_2–Allyl radical

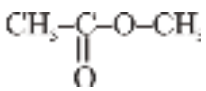
49)

Olefinic bond means >C=C<

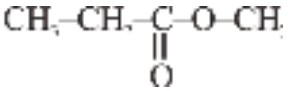
50) **Question Explanatin :**
Pair of compounds which are Homologues.

Concept:
Compounds having same general formula same functional group and successive members differ by -CH_2 group are called.

Solution :
As Homologues and series of members is called as homologous series.



→ and

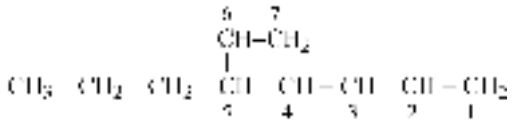


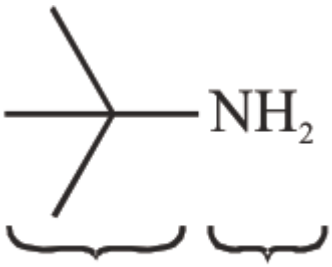
Both belongs to ester series having same general formula $C_nH_{2n}O_2$ and successive member differ by -CH_2 group. Hence are homologs.

Hence,
Option (2) is correct.

51)

CH_3 – CH = CH – CN
Crotononitrile

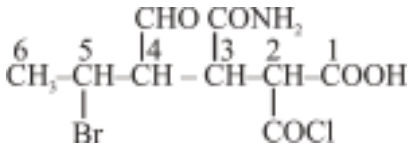
52) 



53) ter.butyl amine

54) Hetro atom from ring part are counted.

55) Phenol and alcohol are different functional group.

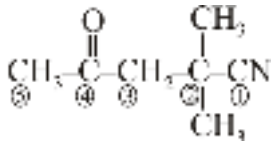


56)

5-Bromo 3 carbamoyl 2-chloroformyl 4-formyl hexanoic acid

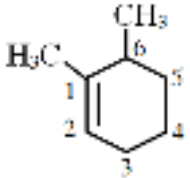
57)

2,5-Diethyl-1,1-dimethyl acyclopentane

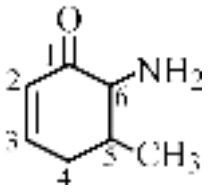


58)

2, 2-dimethyl-4-oxopentanenitrile

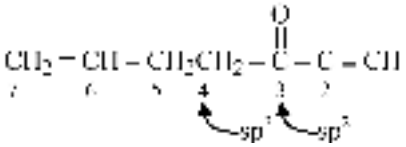


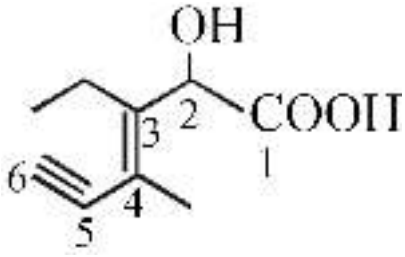
59) 1,6-Dimethyl cyclo hexene

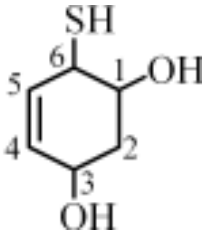
60) 

61)

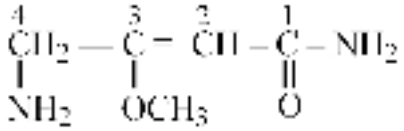
Presence of three alkyl group in name f amine is presents 3° amine.

62) 

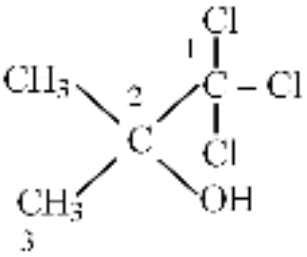
63) 

64) 

6–Mercaptocyclohex–4–ene–1,3–diol

65) 

66) 2-Formyl butanenitrile

67) 

68)

2 M solution will have molality as $m = \frac{2M \times 1000}{1000d - M \times MM_{solute}}$

$m = \frac{2 \times 1000}{1000 - 2 \times 98}$

m > 2

 solution A is more concentrated.

69) **Question explanation:**

We are asked to calculate the normality of a 10-volume hydrogen peroxide (H_2O_2) solution. The term **"10-volume"** refers to the amount of **oxygen gas** (O_2) released by 1 volume of H_2O_2 solution-i.e, **1 mL of H_2O_2 gives 10 mL of O_2 at NTP.**

Given:

A. 10-volume H_2O_2 solution,
B. Volume of O_2 released = 10 mL per mL of solution,
C. Molar volume of gas at NTP = 22.4 L = 22,400 mL
D. Molar mass of H_2O_2 = **34 g/mol,**
E. 1 mole H_2O_2 releases 1 mole O_2, i.e., 22,400 mL O_2.

Concept:

Normality (N) = $\frac{\text{equivalents of solute}}{\text{volume of solution in L}}$

1 equivalent of H_2O_2 = 17 g (since 34 g gives 2 equivalents).

Calculation:

Step 1: 1 mL solution → 10 mL O_2

So, 1 L (1000 mL) → 10 × 1000 = 10,000 mL O_2

Now, from stoichiometry:

22,400 mL O_2 ← from 34 g H_2O_2

 10,000 mL O_2 ← $\frac{34}{22400} \times 10000 = 15.18$ g H_2O_2

Now, equivalents = $\frac{15.18}{17} = 0.892$

Normality = $\frac{0.892}{1} = 0.892N$

But in 2 L, it will be doubled: In 2 L: 0.892 × 2 = 1.78 N

Final answer:

The normality of 10-volume hydrogen peroxide is 1.78 N

Correct answer is Option 3.

70)

HCl HCl

$M_1 = 1$ $M_2 = 2$

$V_1 = 4V$ $V_2 = V$

$M = \frac{M_1V_1 + M_2V_2}{V_1 + V_2}$

$= \frac{1 \times 4 + 2 \times 1}{5}$

= 1.2

71) $\frac{X_B}{1-X_B} = \frac{M \times M_A}{1000}$

$\frac{0.2}{1-0.2} = \frac{m \times 18}{1000}$

$\frac{1}{4} = \frac{m \times 18}{1000}$

$m = \frac{1000}{18 \times 4} = 13.9$

72)

Higher value of K_H represents lower solubility of gas in liquid.

73) $p_{gas} = K_N \times \frac{n}{N}$

$n = \frac{p_{gas} \times N}{K_N} = \frac{1 \times 55.5}{100 \times 10^3}$

No. of millimole = 0.555

74) $P_T = X_A P_A^0 + X_{H_2O} P_{H_2O}^0$

$n_A = \frac{28}{140} = 0.2$

$W_{H_2O} = 100 - 28 = 72, \; n_{H_2O} = \frac{72}{18} = 4$

$n_T = 0.2 + 4 = 4.2$

$P_T = 160 \; P_{H_2O}^0 = 150$

$160 = \frac{0.2}{4.2} \times (P_A^0) + \frac{4}{4.2} (150)$

$\Rightarrow \boxed{P_A^0 = 360 \text{ mm}}$

75)

X represents total pressure
hence $x = p_1 + p_2$
y is origin for mole fraction of liquid 2
 Y = 0 & Z = 1

76) Shows positive deviation

77)

They have fried boiling point

78)

RLVP = X_{solute}
 Assertion is incorrect RLVP is one of the four colligative properties

79)

Addition of non volatile solute decreases the vapour pressure of solvent hence boiling point increases.

80)

Cane sugar 2.15 = $\frac{K_f \times 5}{342} \times \frac{1000}{95}$ ...(1)
glucose $\Delta T_f = \frac{K_f \times 5 \times 1000}{180 \times 95}$ ...(2)
⇒ Divide (1) by (2)
ΔT_f = 4.08

81) π ∝ molarity

82)

During osmosis net flow of solvent occurs from low convent ration to high concentration.

83) **Question Explanation:**
The solution with the highest boiling point will be the one with the greatest number of dissolved particles. Here's how to figure that out:

Concept: Highest boiling point.

Solution:
To determine the solution with the highest boiling point, we need to consider both the molarity and the number of particles each solute produces:

A. **0.015 M urea:** 0.015 moles of particles per liter
B. **0.01 M KNO_3:** 0.01 × 2 = 0.02 moles of particles per liter
C. **0.10 M Na_2SO_4:** 0.10 × 3 = 0.30 moles of particles per liter
D. **0.015 M glucose:** 0.015 moles of particles per liter

Therefore, the 0.10 M Na_2SO_4 solution will have the highest boiling point.

84)

Generated by Allie

Problem Statement: The question is asking to compare two different solutions in terms of their effect on osmotic pressure at the same temperature (27Â°C). One solution is acetic acid in benzene which forms dimers completely, and the other is potassium chloride (KCl) in water

which ionizes fully. It wants to determine which one is isotonic, hypertonic, or if neither classification applies.

Underlying Concept: The core scientific concept involved is colligative properties, specifically osmotic pressure, which depends on the number of solute particles in solution. Dimerization reduces the number of particles, while ionization increases it. Isotonic solutions have the same osmotic pressure because they have the same effective number of solute particles.

Relevant Formulas: Osmotic pressure depends on the effective concentration of solute particles, which can be calculated as: $\text{Effective concentration} = i \times C$ where: - i is the van't Hoff factor (number of particles formed from one solute unit), and - C is the molar concentration.

Step-by-Step Calculation: Case I: For 2 M CHâ‚ƒCOOH in benzene, complete dimerization means 2 molecules form 1 dimer: $\text{Effective concentration} = \frac{2}{2} = 1M$ Case II: For 0.5 M KCl in water, it ionizes completely into 2 ions (Kâº and Clâ»), so $i = 2$: $\text{Effective concentration} = 2 \times 0.5 = 1M$ Since both have an effective solute concentration of 1 M, both solutions exert the same osmotic pressure and are isotonic.

Tips and Tricks: Remember that in non-electrolyte solutions that dimerize, the van't Hoff factor i is less than 1, whereas for ionic compounds that dissociate completely, i equals the total number of ions produced.

Common Mistakes: A common error is to compare just the molarities without considering the effect of dimerization or ionization on the number of particles, leading to wrong osmotic pressure calculations.

Why Other Options Are Incorrect?: 'I is hypertonic' is incorrect because dimerization reduces the effective number of particles. 'II is hypertonic' is incorrect because ionization doubles the number of particles but the initial concentration is lower, making both solutions isotonic. 'None is correct' is wrong because the two solutions actually turn out isotonic when effective particle concentration is considered.

85)

$$\Lambda^{\infty}NH_4OH = \Lambda^{\infty}NH_4Cl + \Lambda^{\infty}NaOH - \Lambda^{\infty}Nacl$$
$$= 150 + 250 - 130$$
$$= 270 \text{ ohm}^{-1}\text{cm}^{-1} \text{ eq}^{-1}$$

86) $\left\{G^* = \frac{\ell}{a}\right\}$

87) $K = \frac{1}{R}\left(\frac{\ell}{A}\right)$

$\left(\frac{\ell}{A}\right) = 0.013 \times 300\ cm^{-1} = 3.9\ cm^{-1}$

88) According to debye huckel onsagar equation

$\Lambda_C = \Lambda_\infty - b\sqrt{C}$

$260 = \Lambda_\infty - b\sqrt{0.25}$ ...(1)

$250 = \Lambda_\infty - b\sqrt{1}$ ...(2)

eq^n (1) – eq^n (2)

than $10 = 0.5\ b$

$b = 20$

on putting value in eq^n(1)

$260 = \Lambda_\infty - 20 \times 0.5$

$\Lambda_\infty = 270$

89)

for an electrolyte $A_x B_y$ the equivalent conductance is given as

$\Lambda^\infty_{eq} A_x By = \lambda^\infty_{eq} A^{+y} + \lambda^\infty_{q} B^{-x}$

$\therefore \Lambda^o_{eq} Al_2(SO_4)_3 = \Lambda^o_{eq} Al^{3+} + \Lambda^o_{eq} SO_4^{2-}$

90)

Tips and Tricks: Keep in mind that a greater Kf means a greater lowering of freezing point, so the solution freezes at a lower temperature, not a higher one.

BIOLOGY

91) Pg. No. 55 NCERT 2022 - 2023 Edition

92) NCERT (XI) Pg# 58 Para: 4.2.11.6

93) NCERT (XIth) Pg. # 50, 51

94)

NCERT (XI) Pg. # 38, 40

95)

NCERT (XI) Pg. # 49

96) NCERT Pg. # 50

97) NCERT Pg. # 40

98)

NCERT page 48 to 51.

99) NCERT Pg. # 40

100) NCERT (XIth) Pg. # 56

101)

Explain Question : Labelling of Diagram

Concept : This question is based on Chordata

Solution :
(A) Nerve cord
(B) Notochord
(C) Gill slits
(D) Post-anal tail

Final Answer : option (3)

102)

Explain Question : The question asks to identify the correct phylum and symmetry of the given crab diagram.
Concept : This question is based on Crabs are arthropods and exhibit bilateral symmetry.
Explanation : The image shows a crab, which belongs to the Phylum Arthropoda and exhibits bilateral symmetry (dividable into two mirror halves along a central plane).

103)

The correct answer is Option 2.
- **Genus Name:** Frog
- **Two Characters:**

A. **(a) A tympanum represents ear:** Frogs have a tympanum, which is an external eardrum.
B. **(b) Fertilization is external:** Most frogs exhibit external fertilization, where the female releases eggs into the water, and the male fertilizes them externally.

- **Class/Phylum: Amphibia:** Frogs belong to the class Amphibia.

104) NCERT (XI) Pg. # 53

105)

NCERT XI Pg. # 47,48

Fig 4.18, 4.19(b), 4.20(b), 4.21(b)

106) NCERT XI, Pg # 41

107) NCERT XIth Pg # 49

108) NCERT-XI - Page No.-56 "Cyclostomata"

109)

NCERT XI Page No. 56

110) NCERT-XI, Pg. # 49,50

111) NCERT Pg. # 48 to 50

112) NCERT XIth Pg.#49,52,54

113)

XI NCERT, Pg. # 56, 57

114) NCERT XI- Pg. no. # 58

115)

XI NCERT, Pg. # 58

116) XI NCERT, Pg. # 57

117) NCERT Pg. # 53, 4.2.7

118) XI NCERT, Pg. # 59, 57, 56

119) NCERT (XIth) Pg. # 52,54

120)

Question Explanation: Which of the following characteristics is not of phylum Annelids?

Concept: This question is based on phylum Annelida.

Solution:
(2) False - They have bilateral, not radial symmetry.

Final Answer: (2)

121) NCERT–XII Pg. # 147, Para-8.1

122) NCERT Pg.# 136

123)

This question focuses on the body's natural defense mechanisms that prevent pathogens from entering and establishing an infection.
Analysis of Each points that acts as physiological barrier
(A) Epithelium of Respiratory Tract: Incorrect.
(B) Monocyte: Incorrect.
(C) Tear: Correct.
(D) Skin: Incorrect.
(E) Saliva: Correct.
(F) Acid in Stomach: Correct.
(G) NK Cell (Natural Killer Cell): Incorrect.
Option 3 correctly includes C, E, and F (Tear, Saliva, and Acid in Stomach).

124) NCERT Pg No. # 152 (Para. 8.2.3)

125) NCERT XII, Pg. # 153,154

126)

Non-specific immunity, also known as innate immunity, is the first line of defense against pathogens. It is a general and immediate response that does not target specific pathogens.

Components of Non-specific Immunity:

A. Macrophages: These are large white blood cells that engulf and destroy pathogens through a process called phagocytosis.

B. Interferons: These are proteins produced by cells in response to viral infections. They help to protect other cells from viral infection.

C. Neutrophils: These are the most abundant type of white blood cell and are also involved

in phagocytosis of pathogens.

Lymphocytes are the key players in specific immunity (also known as adaptive immunity). They are responsible for recognizing specific antigens (foreign substances) and generating a targeted immune response. There are two main types of lymphocytes: B cells and T cells.

Therefore, lymphocytes are not part of non-specific immunity.

127) **Explanation:**
• The diagram suggests that the **mind** influences health through a combination of the **neural system, endocrine system,** and **immune system.** Let's break down why:
a (Neural System): The nervous system plays a crucial role in how our mind (thoughts, emotions) affects our body. Stress, for example, can trigger neural signals that impact various bodily functions.
b (Endocrine System): The endocrine system (hormones) is closely linked to both the nervous system and the immune system. Stress hormones, for example, can affect immune function.
c (Immune System): There's growing evidence of a connection between the mind and the immune system. Psychological factors can influence immune responses, and vice versa.

Correct Answer: 1. a-neural system, b-endocrine system, c-immune system

128) NCERT-12th Pg No. # 152

129) NCERT Pg. # 152 (E)

130) NCERT (XII) Pg. # 150, Para–4

131) NCERT (XII) Pg. # 146, Para–1

132) NCERT (XII) Pg. # 145.146

133) NCERT XII Pg. # 150

134) NCERT Pg. # 145

135) NCERT-XII Pg # 151; Para-8.2.2

136) NCERT-XII, Pg. # 84

137) NCERT-XII, Pg. # 81

138) NCERT XI, pg.#152

139)

NCERT-XII, Pg. No. # 107

140)

NCERT XII Pg # 96

141) NCERT-XI Pg. # 145 Fig. 19.1

142) **Question Explanation:**
Matching organisms with their genome size (number of nucleotides)

Concept:
Understanding the relative sizes of genomes in different organisms, from viruses to bacteria to humans.

Solution:
Let's analyze each organism and its corresponding genome size:

A. ϕX174 bacteriophage (i): This is small, single-stranded DNA virus. Its genome is known to be relatively small. The correct match is (C) 5386 nucleotides.
B. Lambda bacteriophage (ii): This is a more complex bacteriophage with a larger genome than ϕX174. Its genome size is (D) 48502 bp (base pairs).
C. E. coil (iii): This is a bacterium with a significantly larger genome than bacteriophages. Its genome size is (A) 4.6×10^6 bp.
D. Human (iv): Humans have the largest genome among the organisms listed. The human genome size is approximately (B) 6.6×10^9 bp.

Therefore, the correct matching is: (i) – C (ii) – D (iii) – A (iv) – B
Answer: The correct option is 4.

143)

Explanation:
The lagging strand is synthesized discontinuously as Okazaki fragments (A), each formed in the 5' to 3' direction (B), with the overall synthesis occurring opposite to the direction of helix unwinding (C). These fragments are subsequently joined together by DNA ligase (D).

Correct Answer: 4. All

144) NCERT XII Pg. # 103, line 2

145) NCERT Pg # 109

146)

NCERT-XI, Pg # 97

147)

Explanation: DNA with a lower GC content melts at a lower temperature because GC base pairs have three hydrogen bonds, while AT base pairs have only two. Option 1 has the lowest GC content (2 out of 8 base pairs), thus requiring the least energy to separate the strands.

148) **The correct answer is:**
(2) Clover leaf-like.
Explanation: The two-dimensional shape of tRNA (transfer RNA) is often described as cloverleaf-like. This structure consists of several loops, including the anticodon loop, that form a shape resembling a cloverleaf when unfolded. In its three-dimensional form, tRNA adopts an L-shaped configuration.

149) NCERT-XII, Pg. # 81, 82

150)

NCERT Pg. # 91

151) NCERT Pg. # 103 [E]
NCERT Pg. # 103 [H]

152) NCERT-XII Pg # 114,115

153) NCERT-XII Pg. # 89

154) NCERT-XII, Pg. # 81, 85, 88

155)

NCERT-XII Pg. # 85

156) NCERT-XII, Pg. # 95

157) NCERT English XII
Page 94
Figure-5.11

158) NCERT (English) XII

Page-86
Figure-5.5

159) NCERT Pg.# 81

160) NCERT (XII) Pg # 95

161) NCERT-XI Pg. # 152

162) NCERT (XII) Pg. # 103

163)

NCERT-XII, Pg. # 89, 90

164)

During RNA splicing in eukaryotes, the non-coding regions called introns are removed from hnRNA (heterogeneous nuclear RNA). The exons, which are coding regions, are joined together to form the mature mRNA.
The 5' -UTR (untranslated region) and 3' -UTR remain in the mature mRNA, and the poly-A tail is added to the 3' end after splicing.

165) NCERT (XII) Pg. # 111, para 3
a, c, and d

166) NCERT-XII, Pg. # 99

167) NCERT XII Pg.# 108

168) NCERT XII Pg.# 110

169) NCERT XII Pg # 109

170)

NCERT XII, Pg # 99

171) NCERT (XII) Pg. # 107

172)

NCERT XII Pg. # 99

173) NCERT XII pg.#110, 111 (E), 119 (H)

174) NCERT (XII) Pg # 112

175)

NCERT-XII, Pg # 96

176) NCERT Pg. No. 81

177) NCERT XII Pg. 112

178) NCERT-XII Pg. # 85

179) NCERT page # 99

180)

NCERT XII Pg. # 106