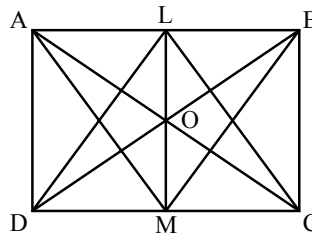


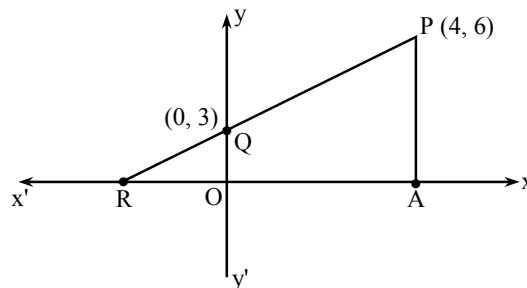
MATHEMATICS

1. Consider the given figure in which ABCD is a rectangle and $LM \parallel AD$ and L is mid-point of AB.



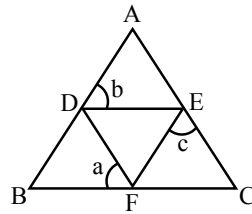
If the areas of the triangles LDC, BMC and AMC are denoted by x , y and z respectively, then

- (A) $x = y = z$ (B) $x = 2y = 2z$ (C) $y = 2x = 2z$ (D) $z = 2x = 2y$
2. If a, b, c are sides of a triangle and $a^2 + b^2 + c^2 = ab + bc + ca$ then the triangle is
 (A) isosceles (B) right angled (C) obtuse (D) equilateral
3. If $pqr = 1$, the value of $\frac{1}{[1+p+q^{-1}]} + \frac{1}{[1+q+r^{-1}]} + \frac{1}{[1+r+p^{-1}]}$ will be equal to
 (A) 1 (B) 0 (C) -1 (D) -2
4. If $x^2 = y + z$, $y^2 = z + x$, $z^2 = x + y$, then what is the value of $\frac{1}{x+1} + \frac{1}{y+1} + \frac{1}{z+1}$?
 (A) 1 (B) 0 (C) -1 (D) 2
5. If $a + b + c = 0$, then $a^2 + ab + b^2$ is equal to
 (A) $b^2 - bc + c^2$ (B) $c^2 - ab$ (C) $b^2 + bc + c^2$ (D) 0
6. In the adjoining figure, P and Q have coordinates (4, 6) and (0, 3) respectively. Find the area of quadrilateral OAPQ.

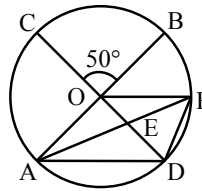


- (A) 16 sq. units (B) 18 sq. units (C) 9 sq. units (D) 24 sq. units
7. ABC is a triangle in which $\angle B = 2\angle C$ and D is a point on BC such that AD bisects $\angle BAC$ and $AB = CD$. Then $\angle BAC$ is equal to
 (A) 27° (B) 72° (C) 36° (D) 70°

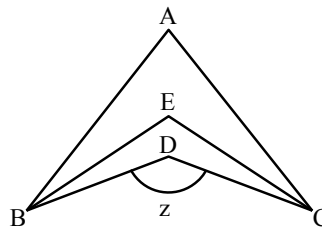
8. In the diagram AB and AC are the equal sides of an isosceles triangle ABC, triangle DEF is an equilateral triangle and $\angle BFD = a$, $\angle ADE = b$, $\angle FEC = c$ then the value of a is



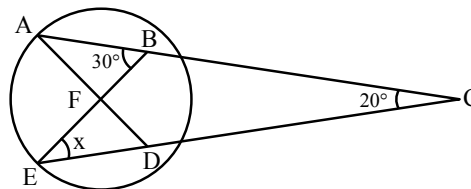
- (A) $\frac{b-c}{2}$ (B) $\frac{2b+c}{2}$ (C) $\frac{b+c}{2}$ (D) $\frac{2b-c}{2}$
9. In the figure, O is the centre, AB and CD are diameters. $\angle COB = 50^\circ$. If E is the mid-point of AF, then $\angle ADF$ is



- (A) 130° (B) 100° (C) 110° (D) 120°
10. In the figure (not to scale) $\angle ABE = \angle ECD$ and $\angle EBD = \angle ACE$. If $\angle BAC = 80^\circ$ and $\angle BEC = 100^\circ$, $\angle BDC = z$. Then the value of z is



- (A) 80° (B) 100° (C) 110° (D) 120°
11. The value of x in the given figure is



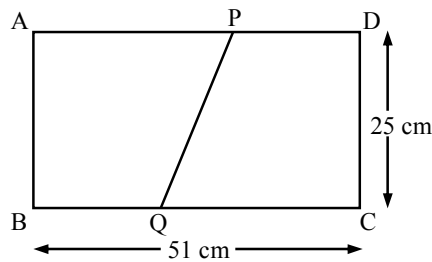
- (A) 30° (B) 20° (C) 10° (D) 40°
12. If $y^2 = 3 + 2\sqrt{2}$, then the value of $y + \frac{1}{y}$ is

- (A) $\sqrt{\frac{3}{2}}$ (B) $\frac{\sqrt{3}}{2}$ (C) $\frac{\sqrt{2}}{2}$ (D) $\frac{4}{\sqrt{2}}$

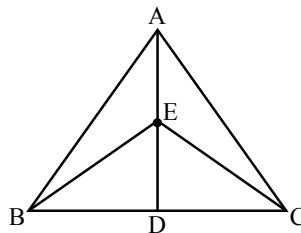
13. The value of $\frac{(0.137)^3 + (0.113)^3}{(0.137)^2 - (0.137)(0.113) + (0.113)^2}$ is

- (A) $\frac{1}{3}$ (B) $\frac{1}{2}$ (C) $\frac{1}{4}$ (D) $\frac{3}{2}$

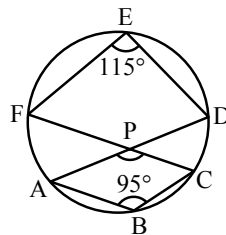
14. The dimensions of a rectangle ABCD are 51 cm \times 25 cm. A trapezium PQCD with its parallel sides QC and PD in the ratio 9 : 8, is cut off from the rectangle as shown in the figure. If the area of the trapezium PQCD is $\frac{5}{6}$ th part of the area of the rectangle ABCD, then the length of QC is



- (A) 45 cm (B) 40 cm (C) 35 cm (D) 50 cm
15. From a point in the interior of an equilateral triangle, perpendiculars are drawn on the three sides. The length of the perpendiculars are 14 cm, 10 cm and 6 cm. Then the area of the equilateral triangle is
- (A) $330\sqrt{3}$ (B) $200\sqrt{3}$ (C) $300\sqrt{3}$ (D) $230\sqrt{3}$
16. The distance of the point (5, -4) from the x axis is
- (A) - 5 units (B) - 4 units (C) 1 unit (D) 4 units
17. ABC is a right angled triangle with $\angle BAC = 90^\circ$. AH is drawn perpendicular to BC. If AB = 60 cm and AC = 80 cm, then BH is equal to
- (A) 36 cm (B) 32 cm (C) 24 cm (D) 30 cm
18. In a triangle ABC, E is the mid-point of median AD. If area of $\triangle ABC$ is $40\sqrt{3}$ square units then the area of $\triangle BED$ is

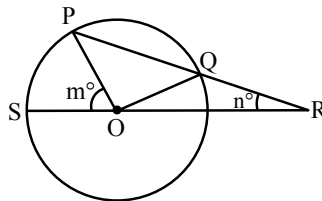


- (A) $20\sqrt{3}$ sq. units (B) $10\sqrt{3}$ sq. units (C) $30\sqrt{3}$ sq. units (D) $15\sqrt{3}$ sq. units
19. In the following figure, if $\angle ABC = 95^\circ$, $\angle FED = 115^\circ$. Then the $\angle APC$ is equal to

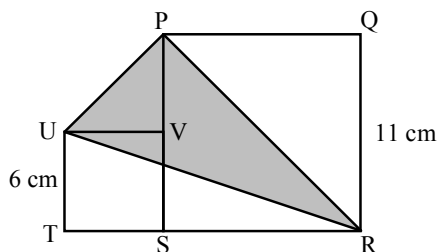


- (A) 120° (B) 150° (C) 135° (D) 155°

20. In the given figure O is the centre of the circle. If $OQ = QR$, then the value of m° is



- (A) $3n^\circ$ (B) n° (C) $2n^\circ$ (D) $4n^\circ$
21. In the figure UVST and PQRS are squares. The length of the smaller square is 6 cm and the length of the larger square is 11 cm. The area of the shaded part is

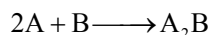


- (A) 363.5 cm^2 (B) 60.5 cm^2 (C) 121 cm^2 (D) 66 cm^2
22. Three circles of radius a, b, c touch each other externally. The area of the triangle formed by joining their centres is
- (A) $\sqrt{(a+b+c)(abc)}$ (B) $(a+b+c)\sqrt{ab+bc+ca}$
 (C) $\sqrt{ab+bc+ca}$ (D) $ab+bc+ca\sqrt{abc}$
23. $(2x-3y)^3 + (3y-4z)^3 + (4z-2x)^3$ can be factorised into which one of the following?
- (A) $(2x+3y+4z)(2x-3y-4z)$ (B) $3(2x-3y)(3y-4z)(2z-x)$
 (C) $(2x-3y)(3y-4z)(4z-2x)$ (D) $6(2x-3y)(3y-4z)(2z-x)$
24. If $x + \frac{1}{x} = -2$ then $x^5 + \frac{1}{x^5}$ equals to
- (A) -1 (B) 2 (C) -2 (D) 1
25. The value of $\frac{1}{1-\sqrt{2}} - \frac{1}{\sqrt{2}-\sqrt{3}} + \frac{1}{\sqrt{3}-\sqrt{4}} - \frac{1}{\sqrt{4}-\sqrt{5}} + \frac{1}{\sqrt{5}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{9}}$ is
- (A) 2 (B) -2 (C) 3 (D) -3

CHEMISTRY

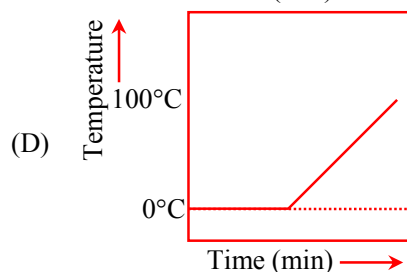
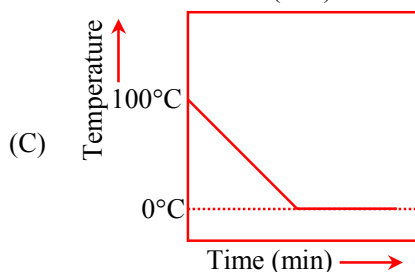
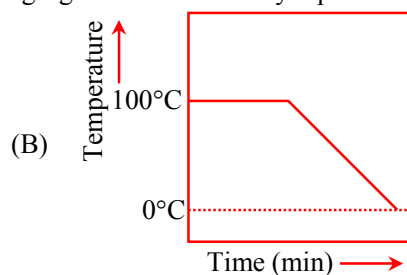
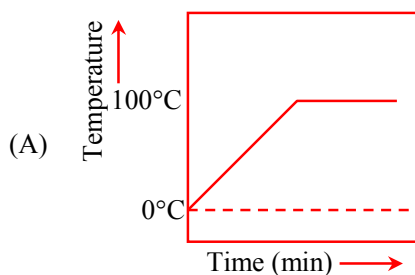
26. Which of the following correctly represents 360 g of water?
- (i) 2 moles of H_2O (ii) 20 moles of water
 (iii) 6.022×10^{23} molecules of water (iv) 1.2044×10^{25} molecules of water
- (A) (i) (B) (i) and (iv) (C) (ii) and (iii) (D) (ii) and (iv)

27. Two substances, A and B were made to react to form a third substance, A_2B according to the following reaction:



Which of the following statements concerning this reaction are **incorrect**?

- (i) The product A_2B shows the properties of substances A and B.
 (ii) The product will always have a fixed composition.
 (iii) The product so formed cannot be classified as a compound.
 (iv) The product so formed is an element.
- (A) (i), (ii) and (iii) (B) (ii), (iii) and (iv) (C) (i), (iii) and (iv) (D) (ii), (iii) and (iv)
28. A solution contains 40 g of common salt in 320 g of water. Calculate the concentration in terms of mass by mass percentage of the solution.
 (A) 12.5% (B) 8% (C) 10% (D) 11.1%
29. A mixture of sulphur and carbon disulphide is :
 (A) heterogeneous and shows Tyndall effect
 (B) homogeneous and shows Tyndall effect
 (C) heterogeneous and does not show Tyndall effect
 (D) homogeneous and does not show Tyndall effect
30. In which of the following conditions, the distance between the molecules of hydrogen gas would increase?
 (i) Increasing pressure on hydrogen gas contained in a closed container.
 (ii) Some hydrogen gas leaking out of the container.
 (iii) Increasing the volume of the container of hydrogen gas.
 (iv) Adding more hydrogen gas to the container without increasing the volume of the container.
 (A) (i) and (iii) (B) (i) and (iv) (C) (ii) and (iii) (D) (ii) and (iv)
31. Which one of the following would increase on raising the temperature?
 (A) Rate of diffusion, rate of evaporation, and rate of condensation
 (B) Rate of evaporation, rate of condensation and solubility of gas in liquid
 (C) Rate of evaporation, rate of diffusion and solubility of solid in liquid
 (D) Rate of evaporation, rate of diffusion and solubility of gas in liquid
32. A student heats a beaker containing ice and water. He measures the temperature of the content of the beaker as a function of time. Which of the following figure would correctly represent the result?



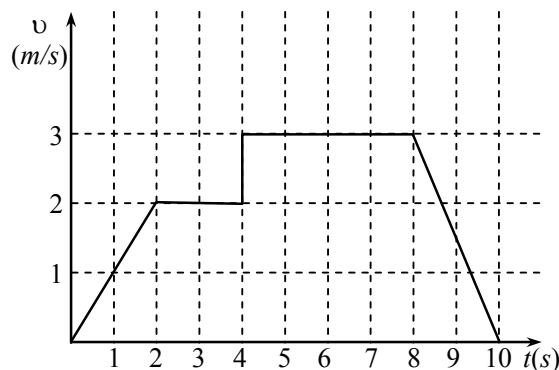
33. If the formula of the compound is $X_2(SO_4)_3$. Which possible metal is X?
 (A) Na (B) Mg (C) Al (D) Pb

PHYSICS

34. A parachutist after bailing out falls 50 m without friction. When parachute opens, it decelerates at 2 m/s^2 . He reaches the ground with a speed of 3 m/s . At what height, did he bail out

(A) 293 m (B) 111 m (C) 91 m (D) 182 m

35. A particle starts from the origin at time $t = 0$ and moves along the positive x -axis. The graph of velocity with respect to time is shown in figure. What is the position of the particle at time $t = 5 \text{ s}$



(A) 6 m (B) 9 m (C) 3 m (D) 10 m

36. The mass of ship is $2 \times 10^7 \text{ kg}$. On applying a force of $25 \times 10^5 \text{ N}$, it is displaced through 25 m. After the displacement, the velocity acquired by the ship will be

(A) 12.5 m/s (B) 5 m/s (C) 3.7 m/s (D) 2.5 m/s

37. A gun fires a bullet of mass 50 g with a velocity of 30 m sec^{-1} . Because of this the gun is pushed back with a velocity of 1 m sec^{-1} . The mass of the gun is

(A) 15 kg (B) 30 kg (C) 1.5 kg (D) 20 kg

38. A man getting down a running bus falls forward because

(A) Due to inertia of rest, road is left behind and man reaches forward
 (B) Due to inertia of motion upper part of body continues to be in motion in forward direction while feet come to rest as soon as they touch the road
 (C) He leans forward as a matter of habit
 (D) Of the combined effect of all the three factors stated in (a), (b) and (c)

39. A man pushes a wall and fails to displace it. He does

(A) Negative work (B) Positive but not maximum work
 (C) No work at all (D) Maximum work

40. A rifle bullet loses $1/20^{\text{th}}$ of its velocity in passing through a plank. The least number of such planks required just to stop the bullet is

(A) 5 (B) 10 (C) 11 (D) 20

41. A particle is acted upon by a constant power. Then, which of the following physical quantity remains constant

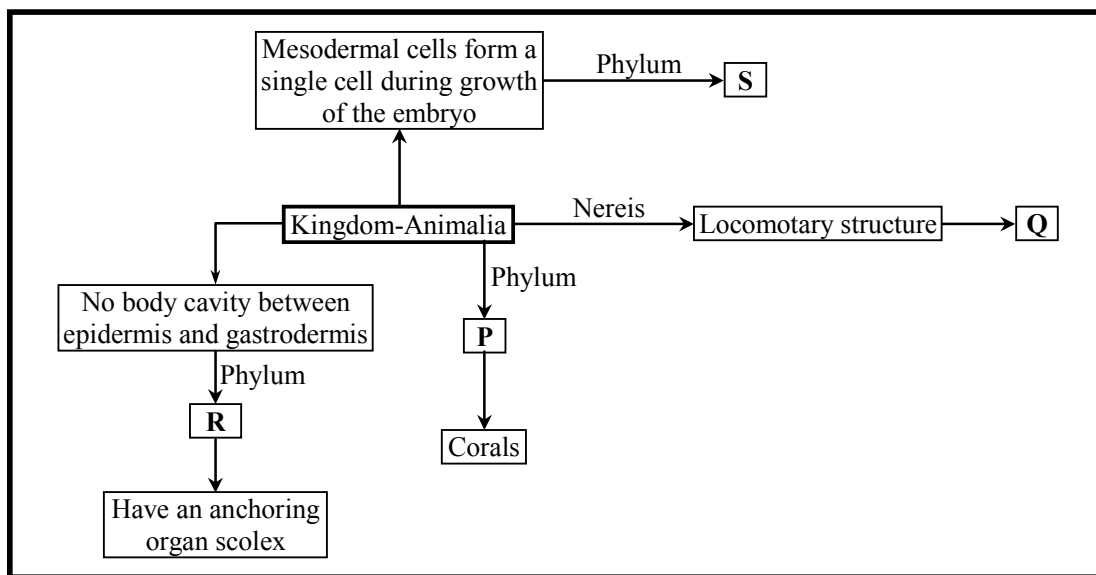
(A) Speed (B) Rate of change of acceleration
 (C) Kinetic energy (D) Rate of change of kinetic energy

42. If mass of a body is M on the earth surface, then the mass of the same body on the moon surface is

(A) $M/6$ (B) Zero (C) M (D) None of these

BIOLOGY

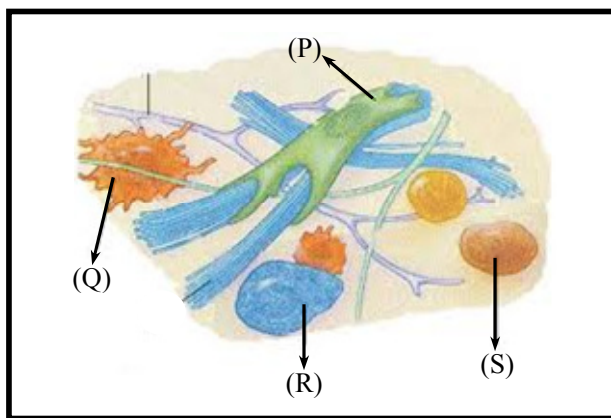
43. The flow chart given below shows some characteristics and examples of animals of kingdom-Animalia.



Identify the phylum (P), (R), (S) and also identify the structure (Q).

	(P)	(Q)	(R)	(S)
(A)	Porifera	Parapodia	Coelenterata	Annelida
(B)	Coelenterata	Palamnaeus	Nematoda	Porifera
(C)	Coelenterata	Parapodia	Platyhelminthes	Mollusca
(D)	Mollusca	Parapodia	Platyhelminthes	Mollusca

44. Given below is the diagrammatic sketch of a certain type of connective tissue. Identify the parts labelled P, Q, R, and S and select the right option about them.

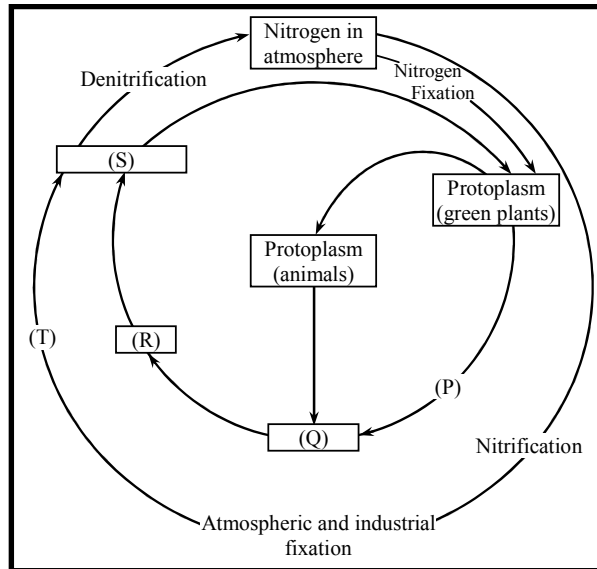


	(P)	(Q)	(R)	(S)
(A)	Fibroblast	Mast Cell	Macrophage	Plasma Cell
(B)	Fibroblast	Plasma Cell	Mast Cell	Macrophage
(C)	Fibroblast	Macrophage	Plasma Cell	Mast Cell
(D)	Fibroblast	Macrophage	Mast Cell	Plasma Cell

45. How many mitotic divisions must occur in a cell to form 1024 cells?

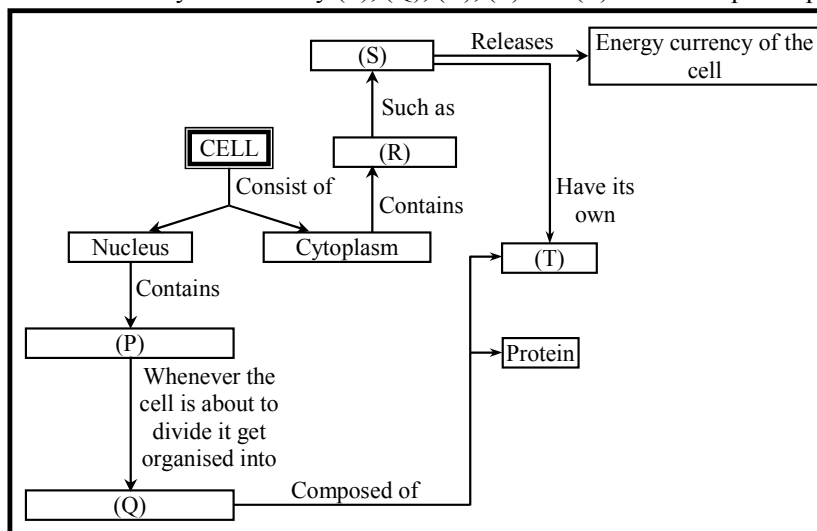
- (A) 10 (B) 512 (C) 256 (D) 20

46. Which of the following statement is not correct?
 (A) Lysosomes are filled with digestive enzymes.
 (B) Lysosomes are membrane bound structures.
 (C) Enzymes filled in lysosome are made by RER.
 (D) Lysosomes are formed by the process of packaging in the endoplasmic reticulum.
47. Given below is nitrogen cycle in nature. Carefully observe the cycle and fill in the blanks (P), (Q), (R), (S) and (T).



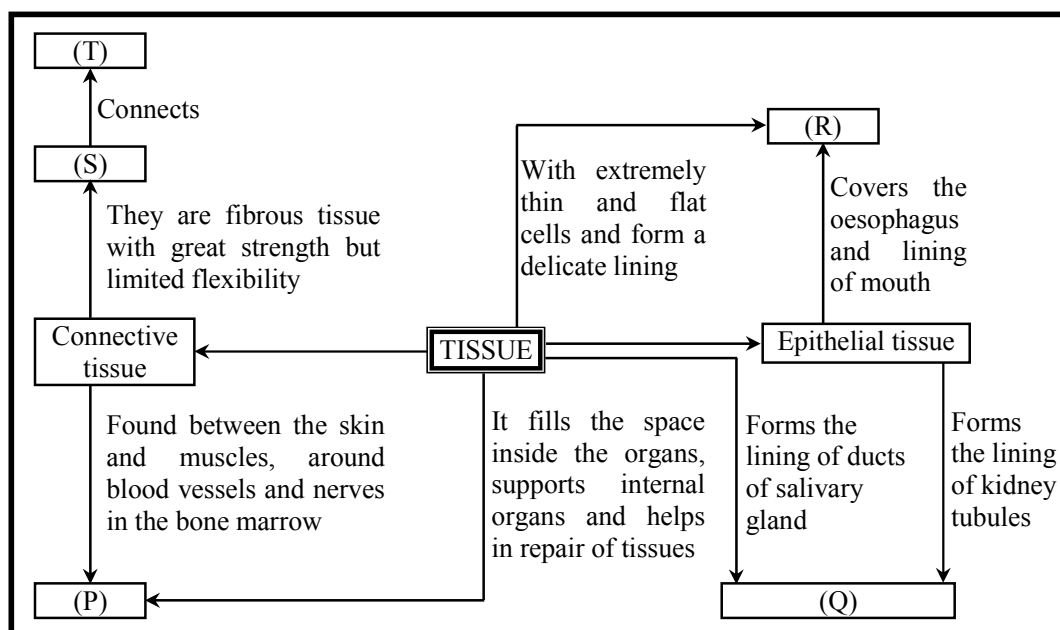
	(P)	(Q)	(R)	(S)	(T)
(A)	Ammonia	Ammonification	Nitrates	Nitrites	Denitrification
(B)	Ammonification	Ammonia	Nitrates	Nitrites	Nitrification
(C)	Ammonification	Ammonia	Nitrites	Nitrates	Nitrification
(D)	Ammonification	Ammonia	Nitrites	Nitrates	Denitrification

48. Observe the flow chart carefully and identify (P), (Q), (R), (S) and (T) from the options provided.



	(P)	(Q)	(R)	(S)	(T)
(A)	DNA	Chromosomes	Lysosome	Ribosome	Enzyme
(B)	Nuclear membrane	Nucleolus	Vacuole	Food vacuole	RNA
(C)	Chromatin threads	Chromosomes	Cell Organelles	Mitochondria	DNA
(D)	Chromosomes	Chromatin threads	Cell Organelles	Mitochondria	DNA

49. Which among the following statement is true in case of Japanese encephalitis?
- (A) The virus causing Japanese encephalitis enters into the body through air and it goes on to infect the liver resulting in jaundice.
 - (B) The virus causing Japanese encephalitis enters into the body through air and it goes on to infect the lungs resulting in cough and breathlessness.
 - (C) The bacteria causing Japanese encephalitis enters into the body through a mosquito bite and it goes on to infect the brain resulting in headaches, vomiting, fits or unconsciousness.
 - (D) The virus causing Japanese encephalitis enters into the body through a mosquito bite and it goes on to infect the brain resulting in headaches, vomiting, fits or unconsciousness.
50. Observe the flow chart carefully and identify (P), (Q), (R), (S) and (T) from the options provided.



	(P)	(Q)	(R)	(S)	(T)
(A)	Areolar tissue	Squamous epithelium	Cuboidal epithelium	Ligament	Bone to Bone
(B)	Areolar tissue	Cuboidal epithelium	Squamous epithelium	Tendon	Muscle to Bone
(C)	Blood	Stratified epithelium	Reticular epithelium	Ligament	Bone to Bone
(D)	Areolar tissue	Cuboidal epithelium	Squamous epithelium	Tendon	Bone to Bone

* * * * *