

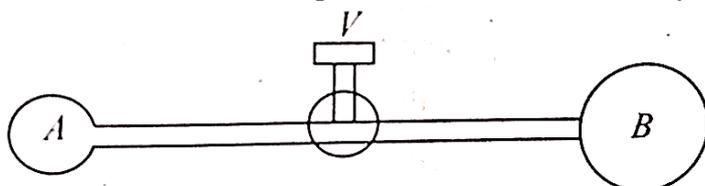
SUBJECTS	XI STD	WT - 16	NEET QP
PHYSICS	MECHANICAL PROPERTIES OF FLUIDS (FULL CHAPTER)		
CHEMISTRY	P-BLOCK ELEMENTS (FULL CHAPTER)		
BIOLOGY	PHOTOSYNTHESIS IN HIGHER PLANTS (FULL CHAPTER)		
TOTAL MARKS – 720		DURATION – 3 HRS	
EACH QUESTION CARRIES 4 MARKS. (-1 MARK) FOR WRONG ANSWER.			

## PHYSICS

1. Water rises up to a height  $h$  in a capillary tube of certain diameter. This capillary tube is replaced by a similar tube of half the diameter. Now, water will rise to the height of

a)  $4h$                                       b)  $3h$                                       c)  $2h$                                       d)  $\frac{h}{2}$

2. Two soap bubbles  $A$  and  $B$  are formed at the two open ends of a tube. The bubble  $A$  is smaller than bubble  $B$ . If valve  $V$  is opened and air can flow freely between the bubbles, then



- a) there is no change in the size of the bubbles  
 b) the two bubbles will become of equal size  
 c)  $A$  will become smaller and  $B$  will become larger  
 d)  $B$  will become smaller and  $A$  will become larger
3. If the surface tension of water is  $0.06 \text{ Nm}^{-1}$ , then the capillary rise in a tube of a diameter  $1 \text{ mm}$  is ( $\theta = 0^\circ$ )  
 a)  $1.22 \text{ cm}$                                       b)  $2.44 \text{ cm}$                                       c)  $3.12 \text{ cm}$                                       d)  $3.86 \text{ cm}$
4. Surface tension of water is  $0.072 \text{ Nm}^{-1}$ . The excess pressure inside a water drop of diameter  $1.2 \text{ mm}$  is  
 a)  $240 \text{ Nm}^{-2}$                                       b)  $120 \text{ Nm}^{-2}$                                       c)  $0.06 \text{ Nm}^{-2}$                                       d)  $72 \text{ Nm}^{-2}$
5. A horizontal pipe of cross-sectional diameter  $5 \text{ cm}$  carries water at a speed of  $4 \text{ ms}^{-1}$ . The pipe is connected to a smaller pipe with a cross-sectional diameter  $4 \text{ cm}$ . The velocity of water through the smaller pipe is  
 a)  $6.25 \text{ ms}^{-1}$                                       b)  $5.0 \text{ ms}^{-1}$                                       c)  $3.2 \text{ ms}^{-1}$                                       d)  $2.56 \text{ ms}^{-1}$
6. The level of water in a tank is  $5 \text{ m}$  high. A hole of area  $10 \text{ cm}^2$  is made in the bottom of the tank. The rate of leakage of water from the hole is (Take  $g = 10 \text{ m s}^{-2}$ )  
 a)  $10^{-2} \text{ m}^3 \text{ s}^{-1}$                                       b)  $10^{-3} \text{ m}^3 \text{ s}^{-1}$   
 c)  $10^{-4} \text{ m}^3 \text{ s}^{-1}$                                       d)  $10^3 \text{ m}^3 \text{ s}^{-1}$
7. The viscous force on a small sphere of radius  $R$  moving in a fluid varies as  
 a)  $\propto R^2$                                       b)  $\propto R$                                       c)  $\propto \left(\frac{1}{R}\right)$                                       d)  $\propto \left(\frac{1}{R}\right)^2$

8. In old age, arteries carrying blood in the human body become narrow resulting in an increase in the blood pressure. This follows from
- Pascal's law
  - Stoke's law
  - Bernoulli's principle
  - Archimede's principle
9. In the case of a sphere falling through a viscous medium, it attains terminal velocity when
- viscous force plus buoyant force becomes equal to force of gravity
  - viscous force is zero
  - viscous force plus force of gravity becomes equal to buoyant force
  - buoyant force becomes equal to force of gravity
10. A horizontal pipe-line carries water in a streamline flow. At a point along the pipe where the cross-sectional area is  $10\text{ cm}^2$ , the water velocity is 1 m/s and the pressure is 2000 Pa. What is the pressure of water at another point when the cross-sectional area is  $5\text{ cm}^2$  ?
- 200 Pa
  - 300 Pa
  - 400 Pa
  - 500 Pa
11. The radii of two columns in a U tube are  $r_1$  and  $r_2$ . When a liquid of density  $\rho$  (angle of contact is  $0^\circ$ ) is filled in it, the level difference of liquid in two arms is  $h$ . The surface tension of liquid is ( $g$  = acceleration due to gravity)
- $\frac{\rho g h r_1 r_2}{2(r_2 - r_1)}$
  - $\frac{\rho g h (r_2 - r_1)}{2r_1 r_2}$
  - $\frac{2(r_2 - r_1)}{\rho g h r_1 r_2}$
  - $\frac{\rho g h}{2(r_2 - r_1)}$
12. A spherical solid ball of volume  $V$  is made of a material of density  $\rho_1$ . It is falling through a liquid of density  $\rho_2$  ( $\rho_2 < \rho_1$ ). Assume that the liquid applies a viscous force on the ball that is proportional to the square of its speed  $v$ , i.e.,  $F_{\text{viscous}} = -kv^2$  ( $k > 0$ ). The terminal speed of the ball is
- $\frac{Vg(\rho_1 - \rho_2)}{k}$
  - $\sqrt{\frac{Vg(\rho_1 - \rho_2)}{k}}$
  - $\frac{Vg\rho_1}{k}$
  - $\sqrt{\frac{Vg\rho_1}{k}}$
13. Water is flowing in a river. If the velocity of a layer at a distance 10 cm from the bottom is 20 cm/s, the velocity of layer at a height of 40 cm from the bottom is
- 10 cm/s
  - 20 cm/s
  - 30 cm/s
  - 80 cm/s
14. A spherical soap bubble of radius 1 cm is formed inside another bubble of radius 3 cm. The radius of a single soap bubble which maintains the same pressure difference as inside the smaller and outside the larger soap bubble is
- 0.75 cm
  - 0.75 m
  - 7.5 cm
  - 7.5 m
15. Angle of contact of a liquid with a solid depends on
- solid only
  - liquid only
  - both on solid and liquid only
  - orientation of the solid surface in liquid
16. When the temperature increases, the viscosity of
- gases decreases and liquid increases
  - gases increases and liquids decreases
  - gases and liquids increases
  - gases and liquids decreases

17. Two capillary tubes of same radius  $r$  but of lengths  $l_1$  and  $l_2$  are fitted in parallel to the bottom of a vessel. The pressure head is  $P$ . What should be the length of a single tube that can replace the two tubes so that the rate of flow is same as before?
- a)  $l_1 + l_2$                       b)  $\frac{1}{l_1} + \frac{1}{l_2}$                       c)  $\frac{l_1 l_2}{l_1 + l_2}$                       d)  $\frac{1}{l_1 + l_2}$
18. What is the excess pressure inside a drop of mercury of radius  $3.0 \text{ mm}$ ? (surface tension of mercury is  $4.65 \times 10^{-1} \text{ Nm}^{-1}$ )
- a) 310 Pa                      b) 410 Pa                      c) 210 Pa                      d) 510 Pa
19. Water rises in a capillary tube to a height of  $2.0 \text{ cm}$ . In another capillary tube whose radius is one-third of it, how much the water will rise?
- a)  $5 \text{ cm}$                       b)  $3 \text{ cm}$                       c)  $6 \text{ cm}$                       d)  $9 \text{ cm}$
20. Two capillaries of radii  $r_1$  and  $r_2$  and lengths  $l_1$  and  $l_2$ , respectively are in series. A liquid of viscosity  $\eta$  is flowing through the combination under a pressure difference  $P$ . What is the rate of volume flow of liquid?
- a)  $\frac{\pi P}{8\eta} \left( \frac{l_1}{r_1^4} + \frac{l_2}{r_2^4} \right)^{-1}$                       b)  $\frac{8\pi P}{\eta} \left( \frac{l_1}{r_1^4} + \frac{l_2}{r_2^4} \right)$
- c)  $\frac{\pi P}{8\eta} \left( \frac{r_1^4}{l_1} + \frac{r_2^4}{l_2} \right)^{-1}$                       d)  $\frac{8\pi P}{\eta} \left( \frac{l_1}{r_1^4} + \frac{l_2}{r_2^4} \right)^{-1}$
21. If  $S$  is the surface tension of a liquid, the energy needed to break a liquid drop of radius  $R$  into 64 drops is
- a)  $6\pi R^2 S$                       b)  $4\pi R^2 S$
- c)  $12\pi R^2 S$                       d)  $8\pi R^2 S$
22. Consider a soap film on a rectangular frame of wire of area  $4 \times 4 \text{ cm}^2$ . If the area of the soap film is increased to  $4 \times 5 \text{ cm}^2$ , the work done in the process will be (The surface tension of the soap film is  $3 \times 10^{-2} \text{ N/m}$ )
- a)  $12 \times 10^{-6} \text{ J}$                       b)  $24 \times 10^{-6} \text{ J}$
- c)  $60 \times 10^{-6} \text{ J}$                       d)  $96 \times 10^{-6} \text{ J}$
23. A drop of water of radius  $0.0015 \text{ mm}$  is falling in air. If the coefficient of viscosity of air is  $2.0 \times 10^{-5} \text{ kg/ms}$ , the terminal velocity of the drop will be (The density of water =  $1.0 \times 10^3 \text{ kg/m}^3$  and  $g = 10 \text{ m/s}^2$ )
- a)  $1.0 \times 10^{-4} \text{ m/s}$                       b)  $2.0 \times 10^{-4} \text{ m/s}$
- c)  $2.5 \times 10^{-4} \text{ m/s}$                       d)  $5.0 \times 10^{-4} \text{ m/s}$
24. A water barrel stands on a table of height  $h$ . If a small hole is punched in the side of the barrel at its base, it is found that the resultant stream of water strikes the ground at a horizontal distance  $R$  from the table. What is the depth of water in the barrel?
- a)  $\frac{R^2}{h}$                       b)  $\frac{R^2}{2h}$                       c)  $\frac{R^2}{4h}$                       d)  $\frac{4R^2}{h}$
25. A drop of liquid of diameter  $2.8 \text{ mm}$  breaks up into 125 identical drops. The change in energy is nearly ( $S = 75 \text{ dyne/cm}$ )
- a) zero                      b) 19 erg                      c) 46 erg                      d) 74 erg





**40. Assertion:** The velocity of flow of a liquid is smaller when pressure is larger and vice versa.

**Reason:** According to Bernoulli's theorem, for the stream-line flow of an ideal liquid, the total energy per unit mass remains constant.

- a) If both assertion and reason are true and the reason is the correct explanation of the assertion
- b) If both assertion and reason are true but reason is not the correct explanation of the assertion
- c) If assertion is true but reason is false
- d) If assertion is false but reason is true

**41. Assertion:** The size of the needle of a syringe controls flow rate better than the thumb pressure exerted by a doctor while administering an injection.

**Reason:** Flow rate is independent of pressure exerted by the thumb of the doctor.

- a) If both assertion and reason are true and the reason is the correct explanation of the assertion
- b) If both assertion and reason are true but reason is not the correct explanation of the assertion
- c) If assertion is true but reason is false
- d) If assertion is false but reason is true

**42. Assertion:** for a floating body to be in stable equilibrium for small angular displacements, its metacentre  $M$ , must be located above the centre of gravity  $G$  (i.e.,  $GM > 0$ ).

**Reason:** When a floating body is given a small tilt, the line of action of buoyant force shifts and passes through the metacentre; if  $M$  is above  $G$ , the buoyant force (upward) and weight (downward at  $G$ ) produce a restoring couple that brings the body back.

- a) If both assertion and reason are true and the reason is the correct explanation of the assertion
- b) If both assertion and reason are true but reason is not the correct explanation of the assertion
- c) If assertion is true but reason is false
- d) If assertion is false but reason is true

**43.** Column I shows the Bernoulli's equation in the different forms. Column II lists certain units each of which pertains to one of the possible forms of the equation.

Column I		Column II	
i)	$\frac{v^2}{2g} + \frac{P}{\rho g} + z = \text{constant}$	(p)	Total energy per unit mass
ii)	$\frac{\rho v^2}{2} + P + \rho gz = \text{constant}$	(q)	Total energy per unit weight
iii)	$\frac{v^2}{2} + \frac{P}{\rho} + gz = \text{constant}$	(r)	Total energy per unit volume

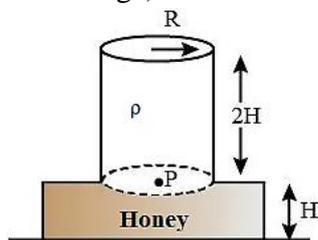
(where  $z$  is the elevation head (height above reference or the ratio of height to volume))

Now match the given columns and select the correct option from the codes given below.

Codes

- a) i – r, ii – p, iii – q
- b) i – p, ii – q, iii – r
- c) i – q, ii – r, iii – p
- d) i – p, ii – r, iii – q

44. A bottle is kept on the ground as shown in the figure. The bottle can be modelled as having two cylindrical zones. The lower zone of the bottle has a cross-sectional radius of  $R\sqrt{2}$  and is filled with honey of density  $2\rho$ . The upper zone of the bottle is filled with the water of density  $\rho$  and has a cross-sectional radius  $R$ . The height of the lower zone is  $H$  while that of the upper zone is  $2H$ . Now the honey and the water parts are mixed together to form a homogenous solution (Assume that total volume does not change).



Column I		Column II	
i)	Net force on bottle in horizontal direction	(p)	Zero
ii)	Pressure at base of bottle before mixing of water and honey	(q)	$\frac{9}{2}\rho gH$
iii)	Pressure at the base after mixing	(r)	$4\rho gH$
iv)	Pressure at point P (figure) after mixing	(s)	$3\rho gH$

Now match the given columns and select the correct option from the codes given below.

Codes

- a) i – p, ii – r, iii – q, iv – s  
 b) i – p, ii – s, iii – q, iv – r  
 c) i – s, ii – r, iii – p, iv – q  
 d) i – p, ii – q, iii – r, iv – s

45. Match the columns.

Column I		Column II	
A)	Pascal's law	(p)	Rise or fall of liquids in very narrow tubes due to adhesion–cohesion effects
B)	Archimedes' principle	(q)	Pressure applied to a confined fluid is transmitted equally in all directions
C)	Capillarity	(r)	Irregular, eddy-filled motion that appears once speed exceeds the critical condition
D)	Turbulent flow	(s)	Upthrust equals the weight of displaced fluid, causing apparent loss of weight

- a) A → p; B → s; C → r; D → q  
 b) A → s; B → r; C → q; D → p  
 c) A → q; B → s; C → p; D → r  
 d) A → r; B → q; C → p; D → s

### CHEMISTRY

46. Choose the correct stability order of group 13 elements in their +1 oxidation state.

- a) Al < Ga < In < Tl  
 b) Tl < In < Ga < Al  
 c) Al < Ga < Tl < In  
 d) Al < Tl < Ga < In

47. The correct order of bond enthalpy ( $\text{kJ mol}^{-1}$ ) is:

- a)  $\text{C} - \text{C} > \text{Si} - \text{Si} > \text{Ge} - \text{Ge} > \text{Sn} - \text{Sn}$
- b)  $\text{C} - \text{C} > \text{Si} - \text{Si} > \text{Sn} - \text{Sn} > \text{Ge} - \text{Ge}$
- c)  $\text{Si} - \text{Si} > \text{C} - \text{C} > \text{Sn} - \text{Sn} > \text{Ge} - \text{Ge}$
- d)  $\text{Si} - \text{Si} > \text{C} - \text{C} > \text{Ge} - \text{Ge} > \text{Sn} - \text{Sn}$

48. Bucky ball or buckminsterfullerene:

- a) An allotrope of carbon
- b) It is referred as  $\text{C} - 60$
- c) It has  $\text{sp}^2$  hybridized nature and resembles with soccer ball
- d) All of the above

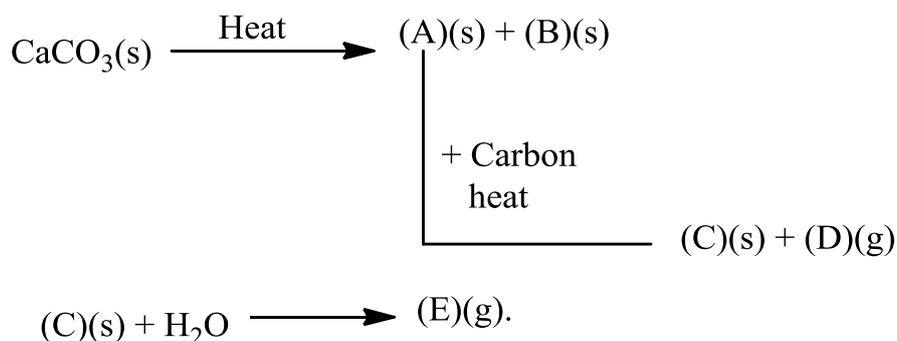
49. Given below are two statements:

**Statement 1:** Group 13 trivalent halides get easily hydrolysed by water due to their covalent nature.

**Statement 2:**  $\text{AlCl}_3$  upon hydrolysis in acidified aqueous solution forms octahedral  $[\text{Al}(\text{H}_2\text{O})_6]^{3+}$  ion.

- a) Statement 1 is true but statement 2 is false.
- b) Statement 1 is false but statement 2 is true.
- c) Both statements 1 and 2 are false.
- d) Both statements 1 and 2 are true.

50.



The compound  $(\text{E})(\text{g})$  is :

- a)  $\text{CO}$
- b)  $\text{CO}_2$
- c)  $\text{CH}_4$
- d)  $\text{C}_2\text{H}_2$

51. The stability of monohalides of group 13 elements

- a) Increases down the group.
- b) Decreases down the group.
- c) First increases and then decreases
- d) First decreases and then increases

52. Which one is covalent compound.

- a)  $\text{Al}_2(\text{SO}_4)_3$
- b)  $\text{Al}_2\text{O}_3$
- c)  $\text{AlCl}_3$
- d)  $\text{AlF}_3$

53. Carbon shows tetravalency due to

- a)  $\text{sp}^3$  hybridisation
- b)  $\text{dsp}^2$  hybridisation
- c)  $\text{sp}^2$  hybridisation
- d) All of these

54. The hybrid states of C in diamond and graphite are respectively:

- a)  $\text{sp}^2, \text{sp}^3$
- b)  $\text{sp}^3, \text{sp}^2$
- c)  $\text{sp}^2, \text{sp}^2$
- d)  $\text{sp}^3, \text{sp}^3$

55. Match the following

	Column I		Column II
A	Inorganic benzene	I	Diamond
B	Inorganic graphite	II	Mordant
C	Jeweller's borax	III	BN (Boron Nitride)
D	Alum	IV	$B_3N_3H_6$
E	Lubricating agent	V	$Na_2B_4O_7 \cdot 5H_2O$
F	An abrasive	VI	Graphite

a) A – I, B – III, C – IV, D – II, E – VI, F - I

b) A – IV, B – II, C – V, D – III, E – VI, F - I

c) A – VI, B – III, C – V, D – II, E – IV, F - I

d) A – IV, B – III, C – V, D – II, E – VI, F - I

56. Which of the following structure is similar to graphite?

a)  $B_4C$

b)  $B_2H_6$

c) BN

d) B

57. The hybridisation of boron atom in orthoboric acid ( $H_3BO_3$ ) is

a) sp

b)  $sp^2$

c)  $sp^3$

d)  $sp^3d$

58.  $C_{60}$  can be regarded as a huge ball made up of:

a) Several conjugated alkene units rather than an aromatic molecule

b) Graphite units

c) Several aromatic benzene molecules.

d) Several tetrahedrons.

59. Which of the following types of forces bind together the carbon atoms in diamond?

a) Ionic

b) Covalent

c) Dipolar

d) Van der Waal's

60. Which of the following has least tendency to undergo catenation?

a) C

b) Si

c) Ge

d) Sn

61. **Assertion:** Among the carbon allotropes, diamond is an insulator, whereas graphite is a good conductor of electricity

**Reason:** Hybridization of carbon in diamond and graphite are  $sp^3$  and  $sp^2$  respectively.

a) Both assertion and reason are correct, but the reason is not the correct explanation for the assertion.

b) Both assertion and reason are correct, but the reason is the correct explanation for the assertion.

c) Both assertion and reason are incorrect.

d) Assertion is incorrect statement, but reason is correct.

62. Which of the following sequence of T and F is correct for given statements. Here T stands for the true and F stands for false statement.

(i) The tendency to show +2 oxidation state increase in the sequence  $Ge < Sn < Pb$ .

(ii) Tin in +2 state is a reducing agent.

(iii) Lead compounds in +2 state are strong oxidising agents.

(iv) In tetravalent state molecules of group 13 elements act as electrons donor species.

a) TTTT

b) TTFF

c) TTFT

d) TFFT

63.  $CO_2$  is used for extinguishing fire because

a) It has a relatively high critical temperature

b) In solid state, it is called dry ice

c) It is neither combustible nor a supporter of combustion

d) It is a colourless gas

64. When Al is added to KOH solution

a) No action takes place

b) Oxygen gas is evolved

c) Water is produced

d) Hydrogen gas is evolved

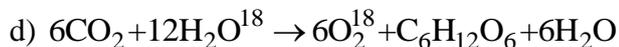
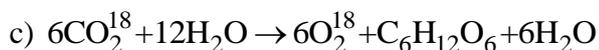
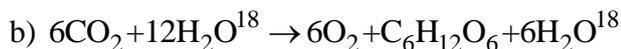




83. Which of the following is a good conductor of electricity?  
 a) Diamond  
 b) Graphite  
 c) Coal  
 d) None of these
84. Which of the following is a true acid anhydride?  
 a)  $\text{Al}_2\text{O}_3$   
 b) CO  
 c)  $\text{CO}_2$   
 d) CaO
85. What is the hybridisations of carbon atoms present in fullerene?  
 a)  $\text{sp}^2$   
 b) sp  
 c)  $\text{sp}^3$   
 d)  $\text{sp}^3\text{d}$
86. The correct statements from the following are:  
 A. The decreasing order of atomic radii of group 13 elements is  $\text{Tl} > \text{In} > \text{Ga} > \text{Al} > \text{B}$ .  
 B. Down the group 13 electronegativity decreases from top to bottom.  
 C. Al dissolves in dil. HCl and liberate  $\text{H}_2$  but conc.  $\text{HNO}_3$  renders Al passive by forming a protective oxide layer on the surface.  
 D. All elements of group 13 exhibits highly stable +1 oxidation state.  
 E. Hybridisation of Al in  $[\text{Al}(\text{H}_2\text{O})_6]^{3+}$  ion is  $\text{sp}^3\text{d}^2$ .  
 Choose the correct answer from the options given below.  
 a) C and E only  
 b) A, C and E only  
 c) A, B, C and E only  
 d) A and C only
87. Given below are two statements:  
**Statement 1:** The decrease in first ionization enthalpy from B to Al is much larger than that from Al to Ga.  
**Statement 2:** The d orbitals in Ga are completely filled.  
 In the light of the above statements, choose the most appropriate answer from the options given below.  
 a) Statement 1 is incorrect but statement 2 is correct.  
 b) Both the statements 1 and 2 are correct  
 c) Statement 1 is correct but statement 2 is incorrect.  
 d) Both the statements 1 and 2 are incorrect.
88. The inter layer distance in graphite is  
 a) Very small, the layers being tightly packed.  
 b) Many times greater than the covalent radius of carbon.  
 c) Approximately  $4\frac{1}{2}$  times the covalent radius of Carbon.  
 d) The same as the covalent radius of carbon.
89.  $\text{A} \xrightarrow{\text{Red hot coke}} \text{CO} \xrightarrow{\text{Cl}_2} \text{C} \xrightarrow{\text{H}_2\text{O}} 2 \text{HCl} + \text{A}$ . The compounds A and C are  
 a)  $\text{CO}_2$ ,  $\text{COCl}_2$   
 b) CO,  $\text{COCl}_2$   
 c) C,  $\text{CO}_2$   
 d)  $\text{CO}_2$ , CO
90. Which of the following statement (s) are correct?  
 a) Graphite can act as electron donor or electron acceptor toward atom and ions that penetrate between the layers.  
 b) The electrical conductivity of graphite is much similar to metals in the direction parallel to planes, but behaves like semiconductor in the direction perpendicular to planes.  
 c) The oxidation products of graphite with alkaline permanganate support the hexagonal structure of graphite.  
 d) All of the above

## BIOLOGY

91. Which one of the following equations suggests that O<sub>2</sub> released during photosynthesis comes from water?



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

**Statement 1:** In leaves, the mesophyll cells have a large number of chloroplasts.

**Statement 2:** At lower light incident conditions, chloroplasts will be aligned parallel to the walls of mesophyll cells.

a) Both statement 1 and 2 are correct.

b) Statement 1 is correct but statement 2 is incorrect.

c) Statement 1 is incorrect but statement 2 is correct.

d) Both statement 1 and 2 are incorrect.

93. If green plant cells are incubated with O<sup>18</sup> labelled water, which of the following molecules will become radioactive when the cells are exposed to light?

a) O<sub>2</sub>

b) CO<sub>2</sub>

c) H<sub>2</sub>O

d) Sugar

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

**Statement 1:** Light driven reactions in photosynthesis are called photochemical reactions.

**Statement 2:** The reactions which are not directly light driven but depend on the products of light reactions are called dark reactions.

a) Both statement 1 and 2 are correct.

b) Statement 1 is correct but statement 2 is incorrect.

c) Statement 1 is incorrect but statement 2 is correct.

d) Both statement 1 and 2 are incorrect.

95. A plant is provided with ideal conditions for photosynthesis and supplied with isotope <sup>14</sup>CO<sub>2</sub>. When the products of the process are analyzed carefully, what would be the nature of products?

a) Both glucose and oxygen are normal.

b) Both glucose and oxygen are labelled.

c) Only glucose is labelled and oxygen is normal.

d) Only oxygen is labelled but glucose is normal.

96. Which of the following statements is/are not correct regarding chlorophyll *a*?

i) Chlorophyll *b*, xanthophylls and carotenoids absorb light and transfer the energy to chlorophyll *a*.

ii) It is the primary photosynthetic pigment.

iii) In pure state, it is red in colour and thus it absorbs more blue wavelength of light than the red wavelength.

iv) Most of the photosynthesis takes place in the green regions of the spectrum.

a) (i) and (iii)

b) (iii) and (iv)

c) (ii) only

d) (iv) only

97. For NADPH + H<sup>+</sup> formation

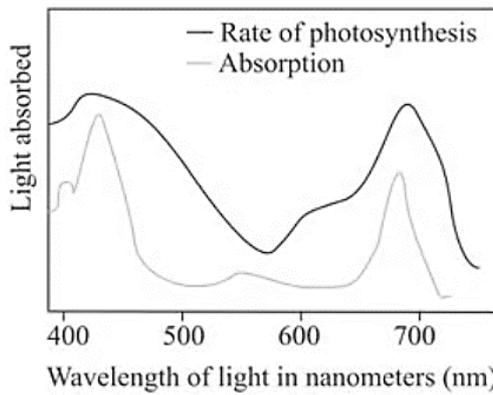
a) only PS I is required

b) only PS II is required

c) both PS I and PS II required

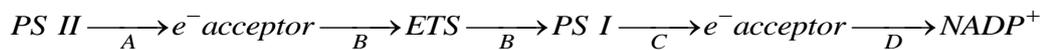
d) only stroma is required.

98. Consider the above given figure and select the option that can be best concluded from it.



- The action spectrum shows a graphic representation of amount of light of same wavelengths absorbed by a pigment.
- Absorption spectrum depicts the relative rates of photosynthesis at different wavelengths of light.
- Graph showing action spectrum of photosynthesis corresponds closely to the absorption spectrum of chlorophyll *a*.
- None of these

99. The Z scheme of photophosphorylation follows the following sequence.



Which of the following options is correct for A, B, C and D transfer of electrons?

- |    | <b>A</b> | <b>B</b> | <b>C</b> | <b>D</b> |
|----|----------|----------|----------|----------|
| a) | Uphill   | Downhill | Uphill   | Downhill |
| b) | Downhill | Uphill   | Downhill | Uphill   |
| c) | Downhill | Uphill   | Uphill   | Downhill |
| d) | Uphill   | Downhill | Downhill | Uphill   |

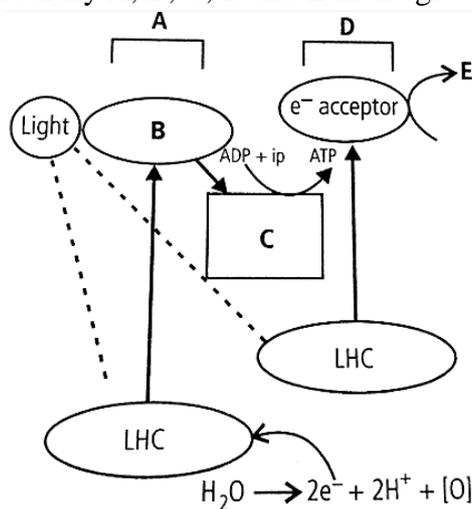
100. Read the following statements and select the correct option.

**Statement 1:** In PS II, red light causes the electrons to become excited and jump into an orbit farther from their atomic nucleus.

**Statement 2:** The movement of electrons from acceptor molecule to different cytochromes of electron transport system is downhill type.

- Both statement 1 and 2 are correct.
- Statement 1 is correct but statement 2 is incorrect.
- Statement 1 is incorrect but statement 2 is correct.
- Both statement 1 and 2 are incorrect.

101. Identify A, B, C, D and E in the given flow chart showing Z-scheme of light reaction.



	A	B	C	D	E
a)	P <sub>700</sub>	H <sup>+</sup> acceptor	e <sup>-</sup> acceptor	P <sub>680</sub>	NADPH
b)	Photosystem I	e <sup>-</sup> acceptor	ETS	Photosystem II	NADPH
c)	Photosystem II	H <sup>+</sup> acceptor	ETS	P <sub>700</sub>	NADPH
d)	Photosystem II	e <sup>-</sup> acceptor	ETS	Photosystem I	NADPH

102. Read the following statements and select the correct one(s).

- i) PS I is involved in non-cyclic photophosphorylation only.
- ii) PS II is involved in both cyclic and non-cyclic photophosphorylation.
- iii) Stroma lamellae membranes possess PS I only, whereas grana lamellae membranes possess both PS I and PS II.

- a) (i) only
- b) (ii) only
- c) (iii) only
- d) (i), (ii) and (iii)

103. In cyclic photophosphorylation, the electron released by reaction center (P<sub>700</sub>) is ultimately accepted by

- a) ferredoxin
- b) NADP<sup>+</sup>
- c) reaction center (P<sub>700</sub>)
- d) Plastocyanin.

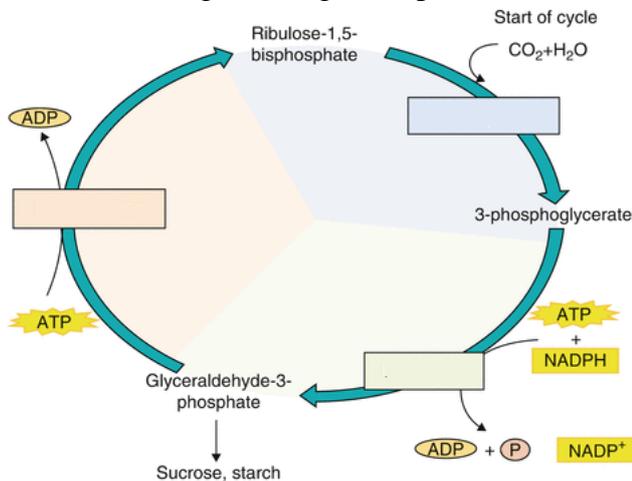
104. Read the following statements and select the correct option.

**Statement 1:** In photosynthesis, during ATP synthesis, protons accumulate in the lumen of thylakoid.

**Statement 2:** In respiration, during ATP synthesis, protons accumulate in the intermembrane space of mitochondria.

- a) Both statement 1 and 2 are correct.
- b) Statement 1 is correct but statement 2 is incorrect.
- c) Statement 1 is incorrect but statement 2 is correct.
- d) Both statement 1 and 2 are incorrect.

105. What does the given diagram represent?



- a) C<sub>1</sub> cycle
- b) C<sub>3</sub> cycle
- c) C<sub>2</sub> cycle
- d) C<sub>4</sub> cycle

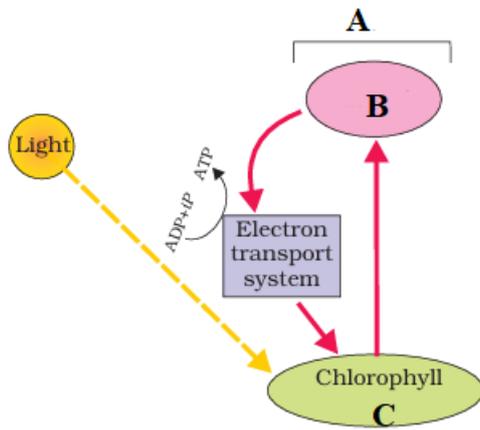
106. Read the following statements and select the correct option.

**Statement 1:** During the splitting of water, protons or hydrogen ions are produced which accumulate within the lumen of the thylakoids.

**Statement 2:** Photolysis of water takes place in inner side of the thylakoid membrane.

- a) Both statement 1 and 2 are correct.
- b) Statement 1 is correct but statement 2 is incorrect.
- c) Statement 1 is incorrect but statement 2 is correct.
- d) Both statement 1 and 2 are incorrect.

107. Study the given flow chart of cyclic photophosphorylation and select the correct option for A, B and C.

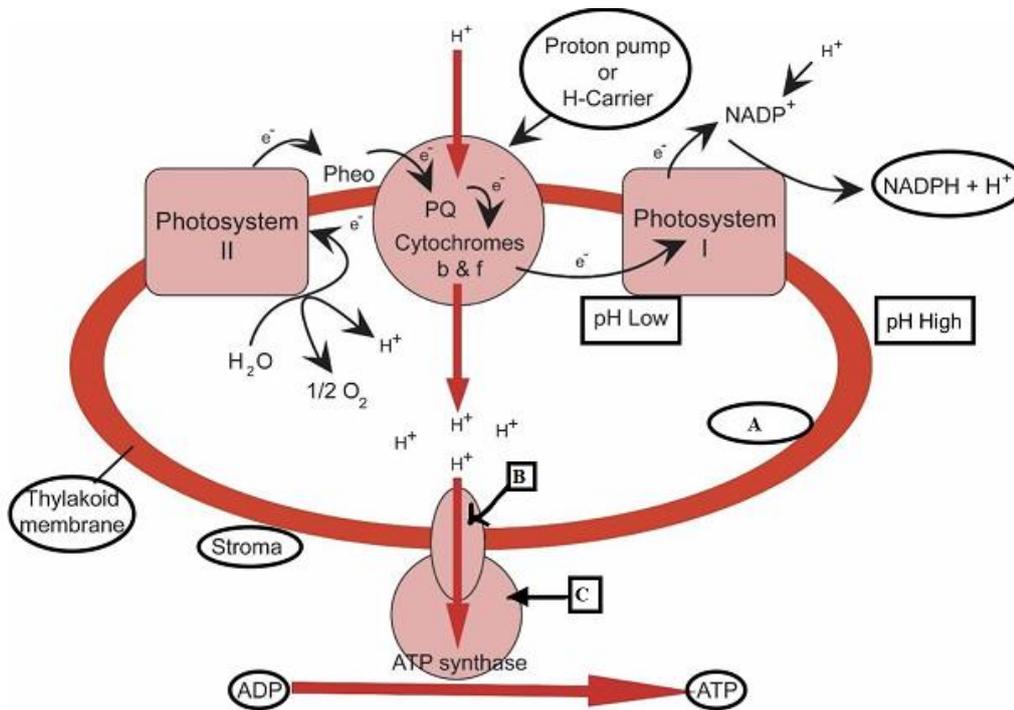


- |    | A     | B              | C         |
|----|-------|----------------|-----------|
| a) | PS I  | $e^-$ acceptor | $P_{680}$ |
| b) | PS I  | $e^-$ acceptor | $P_{700}$ |
| c) | PS II | Cytochrome     | $P_{700}$ |
| d) | PS II | Cytochrome     | $P_{680}$ |

108. Which mobile electron carrier accepts electrons from PS II and transfers them to the cytochrome b6f complex while transporting protons from stroma to lumen?

- |                  |                 |
|------------------|-----------------|
| a) Plastoquinone | b) Plastocyanin |
| c) Ferredoxin    | d) $NADP^+$     |

109. Identify the parts marked as A, B and C in the given figure showing ATP synthesis through chemiosmosis.



- |    | A                 | B      | C      |
|----|-------------------|--------|--------|
| a) | Thylakoid lumen   | $CF_0$ | $CF_1$ |
| b) | Thylakoid lumen   | $CF_1$ | $CF_0$ |
| c) | Stroma lamellae   | $CF_0$ | $CF_1$ |
| d) | Chloroplast lumen | $CF_1$ | $CF_0$ |

110. Breakdown of proton gradient developed during chemiosmosis leads to the release of

- |           |          |           |            |
|-----------|----------|-----------|------------|
| a) oxygen | b) water | c) energy | d) protons |
|-----------|----------|-----------|------------|

**111.** Read the following statements and select the correct option.

**Statement 1:** Carboxylation is the most crucial step of Calvin cycle where  $\text{CO}_2$  is utilised for the carboxylation of RuBP.

**Statement 2:** Carboxylation is catalysed by the enzyme RuBisCO which results in the formation of two molecules of 3-PGA.

- a) Both statement 1 and 2 are correct.
- b) Statement 1 is correct but statement 2 is incorrect.
- c) Statement 1 is incorrect but statement 2 is correct.
- d) Both statement 1 and 2 are incorrect.

**112.**  $\text{CO}_2$  combines with RuBP in the presence of enzyme RuBisCO to form 3-PGA. This step of the Calvin cycle is included under

- a) carboxylation
- b) oxygenation
- c) reduction
- d) regeneration

**113.** Consider the following statements with respect to the  $\text{C}_4$  pathway and select the correct ones.

- i) Mesophyll cells possess both RuBisCO and PEPcase enzymes.
- ii) Initial  $\text{CO}_2$  fixation occurs in mesophyll cells.
- iii) Final  $\text{CO}_2$  fixation occurs in bundle sheath cells.

- a) (i) and (ii)
- b) (ii) and (iii)
- c) (i) and (iii)
- d) (i), (ii) and (iii)

**114.** During fixation of one molecule of  $\text{CO}_2$  by  $\text{C}_3$  plants, Number of ATP and NADPH required are

- a) 3 ATP and 2 NADPH
- b) 5 ATP and 2 NADPH
- c) 12 ATP and 12 NADPH
- d) 32 ATP and 3 NADPH

**115.** Match column I with column II and select the correct option using the codes given below.

	Column I		Column II
A	Carboxylation	I	Formation of glucose
B	Reduction	II	Phosphorylation to reform RuBP
C	Regeneration	III	Carbon dioxide fixation
D	Photochemical reaction	IV	Oxygen release

- a) A – III, B – I, C – II, D – IV
- b) A – III, B – II, C – I, D – IV
- c) A – I, B – III, C – II, D – IV
- d) A – II, B – III, C – I, D – IV

**116.** Select the incorrect statement with respect to Kranz anatomy.

- a) 'Kranz' means 'wreath' and is a reflection of the arrangement of cells.
- b) The bundle sheath cells may form several layers around the vascular bundles.
- c) The bundle sheath cells have a large number of chloroplasts, thick walls impervious to gaseous exchange and no intercellular spaces.
- d) The bundle sheath cells have thin walls that permit gaseous exchange and possess large intercellular spaces.

**117.** Match column I with column II and select the correct option from the given codes.

	Column I		Column II
A	$\text{C}_3$ plants	I	Sorghum
B	$\text{C}_4$ plants	II	Maize
		III	Helianthus

**A      B**

- a) II      I, III
- b) I, III    II
- c) III      I, II
- d) I, II     III

118. Select the correct statement regarding the first stable product formed in Hatch and Slack pathway in C<sub>4</sub> plants.

- a) Oxaloacetate is formed by carboxylation of phosphoenol pyruvate (PEP) in the bundle sheath cells.
- b) Oxaloacetate is formed by carboxylation of Phosphoenol pyruvate (PEP) in the mesophyll cells.
- c) Phosphoglyceric acid is formed in the mesophyll cells.
- d) Phosphoglyceric acid is formed in the bundle sheath cells.

119. Match column I with column II and select the correct option from the given codes.

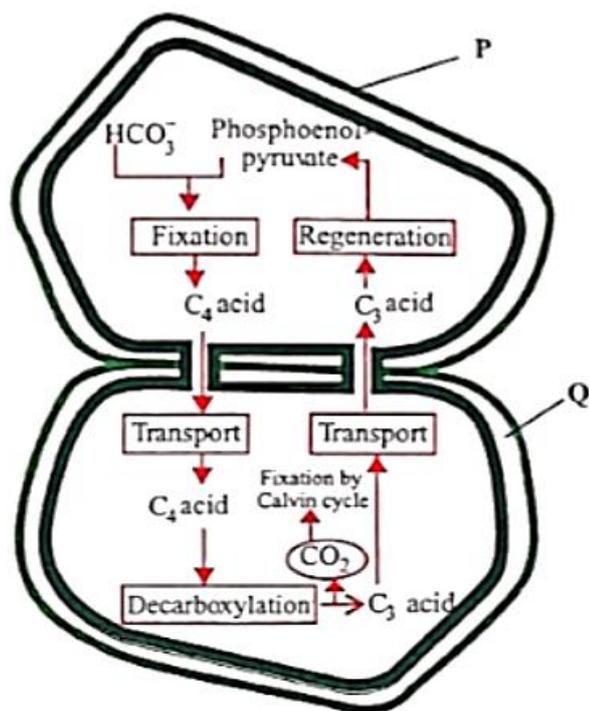
	Column I		Column II
A	C <sub>4</sub> pathway	I	Kranz anatomy
B	Chlorophyll b	II	Accessory photosynthetic pigment
C	PS II	III	Photo-oxidation of H <sub>2</sub> O

- a) A – I, B – II, C – III
- b) A – III, B – II, C – I
- c) A – I, B – III, C – II
- d) A – II, B – I, C – III

120. In an experiment in which photosynthesis is performed during the day, you provide a plant with radioactive carbon dioxide (<sup>14</sup>CO<sub>2</sub>) as a metabolic tracer. The <sup>14</sup>C is incorporated first into oxaloacetic acid. The plant is best characterized as a

- a) C<sub>4</sub> plant
- b) C<sub>3</sub> plant
- c) both (a) and (b)
- d) insectivorous plant.

121. Which kind of cells are represented by letters P and Q in the given figure showing C<sub>4</sub> pathway?



P Q

- a) Palisade parenchyma Spongy parenchyma
- b) Spongy parenchyma Palisade parenchyma
- c) Mesophyll cell Bundle sheath cell
- d) Bundle sheath cell Mesophyll cell

122. Which of the following with respect to early experiments of photosynthesis is mismatched?

- a) Joseph Priestley - Showed that plants release O<sub>2</sub>
- b) Jan Ingenhousz - Showed that sunlight is essential for photosynthesis
- c) Julius von Sachs - Proved that plants produce glucose when they grow.
- d) T.W. Engelmann - Showed that the green substance is located within special bodies in plants



**131.Assertion:** The stroma lamellae have both PS I and PS II.

**Reason:** Thylakoid membranes possess photosynthetic pigments and coupling factor.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false.
- d) If assertion is false but reason is true.

**132.**How many ATP and NADPH<sub>2</sub> are required for the synthesis of one molecule of glucose during Calvin cycle?

- a) 12 ATP and 16 NADPH<sub>2</sub>
- b) 18 ATP and 16 NADPH<sub>2</sub>
- c) 12 ATP and 12 NADPH<sub>2</sub>
- d) 18 ATP and 12 NADPH<sub>2</sub>

**133.Assertion:** The proton gradient is broken down due to the movement of protons across the membrane to stroma through the transmembrane channel of the F<sub>0</sub> of the ATPase.

**Reason:** The breakdown of proton gradient leads to release of energy.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false.
- d) If assertion is false but reason is true.

**134.**In light reaction, plastoquinone facilitates the transfer of electrons from

- a) PS-II to Cytb<sub>6</sub>f complex
- b) Cytb<sub>6</sub>f complex to PS-I
- c) PS-I to NADP<sup>+</sup>
- d) PS-I to ATP synthase

**135.Assertion:** Dark reactions are called the biosynthetic phase of photosynthesis.

**Reason:** Dark reactions do not directly depend on the presence of light but are dependent on the products of the light reaction, i.e., ATP and NADPH.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false.
- d) If assertion is false but reason is true.

**136.**In photosynthesis, the light-independent reactions take place at

- a) photosystem II
- b) Stromal matrix
- c) thylakoid lumen
- d) photosystem I

**137.Assertion:** The first product of CO<sub>2</sub> fixation in C<sub>3</sub> pathway is OAA.

**Reason:** The first product of CO<sub>2</sub> fixation in C<sub>4</sub> pathway is 4 carbon compound.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false.
- d) If assertion is false but reason is true.

**138.**A plant is exposed to very bright light. What is correct in this environmental condition?

- a) The accessory pigments promote light absorption.
- b) Chlorophylls are subjected to photo-oxidation.
- c) Accessory pigments absorb less light and transfer to chl a.
- d) Chlorophylls absorb light and transfer to accessory pigments.

**139.Assertion:** The C<sub>4</sub> plants have a special type of leaf anatomy called Kranz anatomy.

**Reason:** The bundle sheath cells do not form layers around the vascular bundles.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false.
- d) If assertion is false but reason is true.

**140.** The reaction center in PS II has an absorption maximum at

- a) 660 nm
- b) 780 nm
- c) 680 nm
- d) 700 nm

**141. Assertion:** The primary CO<sub>2</sub> acceptor in C<sub>4</sub> pathway is a 3-carbon molecule phosphoenol pyruvate (PEP).

**Reason:** The enzyme responsible for this fixation is PEP carboxylase or PEP case.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false.
- d) If assertion is false but reason is true.

**142.** A plant in your garden avoids photo respiratory losses, has improved water use efficiency, shows high rates of photosynthesis at high temperatures and has improved efficiency of nitrogen utilization. In which of the following physiological groups would you assign this plant?

- a) CAM
- b) Nitrogen fixer
- c) C<sub>3</sub>
- d) C<sub>4</sub>

**143. Assertion:** In C<sub>4</sub> plants, the bundle sheath cells are rich in an enzyme Phosphoenol pyruvate carboxylase (PEP case).

**Reason:** In C<sub>4</sub> plants, the mesophyll cells lack enzyme Ribulose bisphosphate carboxylase-oxygenase (RuBisCO).

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false.
- d) If assertion is false but reason is true.

**144.** Which of the following is not a product of light reaction of photosynthesis?

- a) ATP
- b) NADH
- c) NADPH
- d) Oxygen

**145. Assertion:** In C<sub>4</sub> plants, photorespiration does not occur.

**Reason:** C<sub>4</sub> plants have a mechanism that increases the concentration of CO<sub>2</sub> at the enzyme site.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false.
- d) If assertion is false but reason is true.

**146.** Which of the following statements is incorrect?

- a) Cyclic photophosphorylation involves both PS I and PS II.
- b) Both ATP and NADPH+H<sup>+</sup> are synthesized during non-cyclic photophosphorylation.
- c) Stroma lamellae have PS I only and lack NADP reductase.
- d) Grana lamellae have both PS I and PS II.

**147. Assertion:** Photorespiration is a wasteful process.

**Reason:** In photorespiratory pathway, there is no synthesis of sugars or ATP.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false.
- d) If assertion is false but reason is true.

**148.** Which one of the following ions is essential for photolysis of water?

- a) Manganese
- b) Zinc
- c) Copper
- d) Boron

**149.Assertion:** The external factors that affect photosynthesis are number, size, age and orientation of leaves, mesophyll cells and chloroplasts and the amount of chlorophyll.

**Reason:** The plant or internal factors are dependent on the genetic predisposition and the growth of the plant.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false.
- d) If assertion is false but reason is true.

**150.** Which of the following are required for the dark reaction of photosynthesis?

A. Light            B. Chlorophyll            C. CO<sub>2</sub>            D. ATP            E. NADPH

Choose the correct answer from the options given below.

- a) A, B and C only
- b) B, C and D only
- c) C, D and E only
- d) D and E only

**151.Assertion:** C<sub>3</sub> plants respond to increased CO<sub>2</sub> concentration by increasing the rate of photosynthesis.

**Reason:** The higher productivity of some greenhouse crops such as tomatoes and bell peppers is due to increased CO<sub>2</sub> concentration.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false.
- d) If assertion is false but reason is true.

**152.** In Kranz anatomy, the bundle sheath cells have

- a) thin walls, many intercellular spaces and no chloroplasts.
- b) thick walls, no intercellular spaces and large number of chloroplasts.
- c) thin walls, no intercellular spaces and several chloroplasts
- d) thick walls, many intercellular spaces and few chloroplasts.

**153.Assertion:** Tropical plants have a higher optimum temperature for photosynthesis than temperate plants.

**Reason:** The optimum temperature for photosynthesis of different plants depends on their habitat.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true and reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false.
- d) If assertion is false but reason is true.

**154.** Which of the following correctly describes the process of photorespiration in C<sub>3</sub> plants?

- a) RuBP binds with CO<sub>2</sub> to form two molecules of phosphoglycerate (PGA)
- b) RuBP binds with O<sub>2</sub> to form one molecule of phosphoglycerate and one molecule of phosphoglycolate
- c) RuBP binds with O<sub>2</sub> to form two molecules of glucose
- d) RuBP binds with CO<sub>2</sub> to form one molecule of phosphoglycolate and one molecule of glucose.

**155.** Given below are two statements.

**Statement 1:** The primary CO<sub>2</sub> acceptor in C<sub>4</sub> plants is Phosphoenol pyruvate and is found in the mesophyll cells.

**Statement 2:** Mesophyll cells of C<sub>4</sub> plants lack RuBisCO enzyme.

- a) Both statement 1 and 2 are correct.
- b) Both statement 1 and 2 are incorrect.
- c) Statement 1 is correct but statement 2 is incorrect.
- d) Statement 1 is incorrect but statement 2 is correct.

156. In a chloroplast the highest number of protons are found in

- a) Intermembrane space
- b) antennae complex
- c) stroma
- d) lumen of thylakoids.

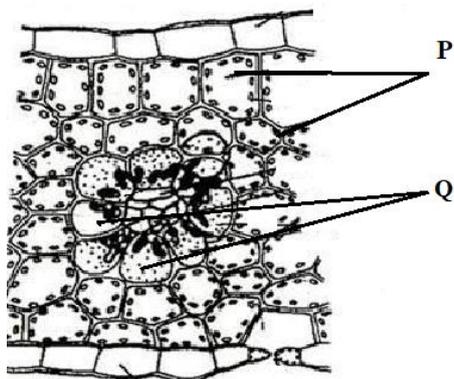
157. Consider the following statements regarding starch and sucrose synthesis during day time and select the correct ones.

- i) Triose phosphate is confined to chloroplast and is utilized for the synthesis of starch only.
  - ii) Triose phosphate is translocated to cytosol from chloroplast.
  - iii) Triose phosphate is utilized for the synthesis of both starch and sucrose.
  - iv) Triose phosphate is translocated from cytosol to chloroplast.
- a) (i) and (iii)                      b) (ii) and (iii)                      c) (ii) and (iv)                      d) (iii) and (iv)

158. Which one of the following is not true regarding the release of energy during ATP synthesis through chemiosmosis? It involves

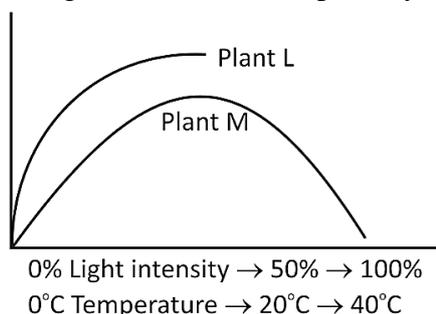
- a) breakdown of proton gradient
- b) breakdown of electron gradient
- c) movement of protons across the membrane to the stroma
- d) reduction of NADP to NADPH<sub>2</sub> on the stroma side of the membrane.

159. Refer to the given cross section of a C<sub>4</sub> leaf and select the incorrect option.



- a) P are the chloroplasts in which thylakoids are stacked together to form grana.
- b) P are the chloroplasts which can perform light reaction, evolve molecular O<sub>2</sub> and produce assimilatory power.
- c) Q are the chloroplasts in which thylakoids occur as stroma lamellae.
- d) Q are the chloroplasts in which CO<sub>2</sub> is fixed by Phosphoenol pyruvic acid to form oxaloacetic acid.

160. When two plants L and M were exposed to different light intensities and temperatures, they showed changes in their rates of photosynthesis, which have been represented in the following graph.



The graph indicates that

- a) Plant L is a C<sub>3</sub> plant for which the light saturation point is 100% of full sunlight
- b) Plant M is a C<sub>4</sub> plant for which the optimum temperature is around 20°C.
- c) Plant M is a C<sub>3</sub> plant which is more affected at higher temperature and higher light intensity as compared to plant L.
- d) plant L is a C<sub>4</sub> plant and cannot function at light intensities above the saturation point.

161. Match the following with respect to early experiments of photosynthesis

	Column I		Column II
A	Variegated leaf experiment	I	CO <sub>2</sub> is necessary for photosynthesis
B	Moll's half leaf experiment	II	Importance of chlorophyll II.
C	Jan Ingenhousz	III	Essential role of light in photosynthesis
D	Engelmann	IV	First action spectrum
		V	Evolution of O <sub>2</sub> in light reaction

- A B C D
- a) II I III IV  
 b) I II III IV  
 c) IV I III II  
 d) III I II IV

162. When wheat and sugarcane leaves are fed with radioactive <sup>14</sup>CO<sub>2</sub>, in which molecule would the radioactivity appear first in these plants?

**Wheat** **Sugarcane**

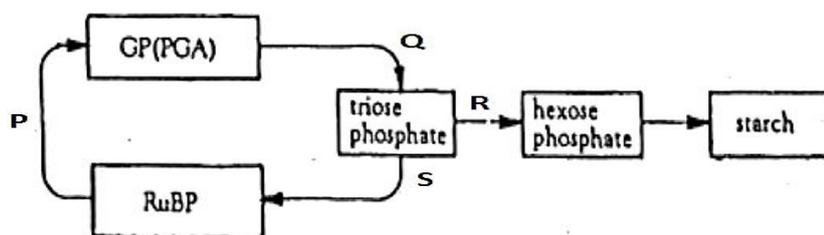
- a) 3 – phosphoglycerate Oxaloacetate  
 b) 3 – phosphoglycerate 3 – phosphoglycerate  
 c) Oxaloacetate Oxaloacetate  
 d) Malate 3 – phosphoglycerate

163. Match the columns and identify the correct option.

	Column I		Column II
A	Oxygen-evolving complex (water-splitting complex)	I	Pigments
B	Proton concentration gradient across thylakoid membrane.	II	High oxygen
C	Absorb light at specific wavelength	III	ATP synthesis
D	Photorespiration	IV	Photolysis of water

- A B C D
- a) IV III I II  
 b) IV I III II  
 c) II I IV III  
 d) II IV III I

164. The given diagram represents the Calvin cycle.

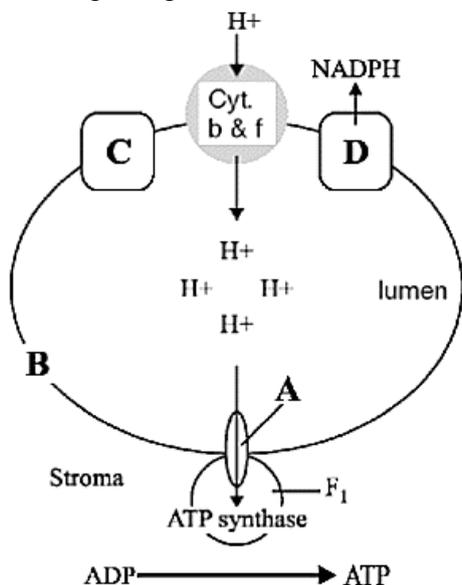


At which stage is CO<sub>2</sub> incorporated?

- a) P                      b) Q                      c) R                      d) S



- 171.**What is the assimilatory power produced in light reactions?  
 a) NADPH  
 b) ATP and NADPH  
 c) ATP and FADH  
 d) RuBP
- 172.**Consider the following statements with respect to photosynthesis and identify the correct statements.  
 I. The first carbon dioxide acceptor in  $C_4$  cycle is PGA.  
 II. In  $C_3$  plants, the first stable product of photosynthesis during dark reaction is RuBP.  
 III. Cyclic photophosphorylation results in the formation of ATP.  
 IV. Oxygen which is liberated during photosynthesis comes from water.  
 a) I and II  
 b) I and III  
 c) III and IV  
 d) II and III
- 173.**The enzyme that is not found in a  $C_3$  plant is  
 a) RuBP carboxylase  
 b) PEP carboxylase  
 c) NADP reductase  
 d) ATP synthase
- 174.**Why  $C_4$  plants are special? Because,  
 I. they have a special type of leaf anatomy.  
 II. They tolerate higher temperature.  
 III. they show a response to high light intensities.  
 IV. They lack a process called photorespiration.  
 V. they have greater productivity of biomass.  
 a) I and II  
 b) I, III and IV  
 c) I, II, III and IV  
 d) all of these
- 175.**PEP is primary  $CO_2$  acceptor in  
 a)  $C_4$  plants  
 b)  $C_3$  plants  
 c)  $C_2$  plants  
 d) both  $C_3$  and  $C_4$  plants
- 176.**The temperature optimum for photosynthesis depends on the habitat a plant is adapted to. Which option correctly reflects this?  
 a) Sugarcane/maize (tropical) have a higher temperature optimum than wheat/pea (temperate).  
 b) Wheat/pea (temperate) have a higher temperature optimum than sugarcane/maize (tropical).  
 c) All green plants have the same temperature optimum for photosynthesis.  
 d) Temperature optimum for photosynthesis is unrelated to a plant's habitat.
- 177.**During light reaction in photosynthesis the following are formed  
 a) ATP and sugar  
 b) hydrogen,  $O_2$  and sugar  
 c) ATP, hydrogen donor and  $O_2$   
 d) ATP, hydrogen and  $O_2$  donor.
- 178.**The diagram given below shows ATP synthesis through chemiosmosis.



Which option shows the correct labelling of A, B, C and D in the diagram?

- a) A – F<sub>1</sub>, B – Thylakoid membrane, C – photosystem (I), D – photosystem (II)
- b) A – F<sub>0</sub>, B – Thylakoid membrane, C – photosystem (I), D – photosystem (II)
- c) A – F<sub>1</sub>, B – Thylakoid membrane, C – photosystem (II), D – photosystem (I)
- d) A – F<sub>0</sub>, B – Thylakoid membrane, C – photosystem (II), D – photosystem (I)

179. Match the following and select the correct answer.

	Column I		Column II
A	Grana	I	Internal membranes of chloroplast containing pigments
B	Stroma	II	Stacks of thylakoids
C	Thylakoids	III	Links between grana
D	Stroma lamella	IV	Semi-liquid matrix present around thylakoids

**A    B    C    D**

- a)    II    I    IV    III
- b)    II    III    IV    I
- c)    II    IV    I    III
- d)    IV    I    III    II

180. **Statement 1:** The current availability of CO<sub>2</sub> levels is limiting to the C<sub>3</sub> plants.

**Statement 2:** CO<sub>2</sub> compensation point threshold value is more for C<sub>3</sub> plants than C<sub>4</sub> plants.

- a) Both statements 1 and 2 are correct.
- b) Both statements 1 and 2 are incorrect.
- c) Statement 1 is correct and statement 2 is incorrect.
- d) Statement 1 is incorrect and statement 2 is correct.