



**Aakash**

Medical | IIT-JEE | Foundations

Corporate Office : AESL, 3rd Floor, Incuspace Campus-2, Plot No. 13, Sector-18,  
Udyog Vihar, Gurugram, Haryana - 122015, Ph.+91-1244168300

MM : 720

Time : 180 Min.

Fortnightly Test for NEET-2026\_RM(P1)\_FT-05A

**Topics Covered:**

**Physics:** Thermal Properties of Matter, Thermodynamics, Kinetic Theory  
**Chemistry:** Equilibrium

**Botany:** Anatomy of Flowering Plants  
**Zoology:** Locomotion & Movement-II: (Upto muscles and bone disorders), Neural Control & Coordination

**General Instructions :**

Duration of Test is 3 hrs.

The Test consists of 180 questions. The maximum marks are 720. There are four parts in the question paper consisting of Physics, Chemistry, Botany and Zoology having 45 questions in each part of equal weightage.

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

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

Mark should be dark and completely fill the circle.

Dark only one circle for each entry.

Dark the circle in the space provided only.

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

**PHYSICS**

1. On heating a cylindrical metallic rod, its length increases by 2%. Then area of cross-section of rod will
  - (1) Decrease by 2%
  - (2) Increase by 2%
  - (3) Decrease by 4%
  - (4) Increase by 4%
2. The pressure that has to be applied to the ends of a steel rod of length 10 cm to keep its length constant when its temperature is raised by 50°C is  
(For steel Young's modulus is  $2 \times 10^{11} \text{ N m}^{-2}$  and coefficient of thermal expansion is  $1.1 \times 10^{-5} \text{ K}^{-1}$ ).
  - (1)  $2.2 \times 10^8 \text{ Pa}$
  - (2)  $1.1 \times 10^8 \text{ Pa}$
  - (3)  $2.2 \times 10^7 \text{ Pa}$
  - (4)  $1.1 \times 10^7 \text{ Pa}$
3. Two rods of different materials with coefficient of linear expansion  $\alpha_1$  and  $\alpha_2$  and Young's modulii,  $Y_1$  and  $Y_2$  respectively are separately fixed between two rigid massive walls. The rods are heated through same increase in temperature. There is no bending of rods. If  $\frac{\alpha_1}{\alpha_2} = \frac{2}{3}$ , then the thermal stress developed in the two rods will be same, provided  $\frac{Y_1}{Y_2}$  is equal to
  - (1) 2 : 3
  - (2) 1 : 1
  - (3) 3 : 2
  - (4) 4 : 9
4. If a bimetallic strip is heated, it will
  - (1) Bend towards the metal with lower thermal expansion coefficient
  - (2) Bend towards the metal with higher thermal expansion coefficient
  - (3) Twist itself into helix
  - (4) Have no bending

5. The volume coefficient of expansion of the vessel is one fourth of the volume coefficient of expansion of liquid. Then the ratio of absolute to apparent expansion of liquid is

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

6. 30 g ice at  $0^{\circ}\text{C}$  is mixed with 2 g steam at  $100^{\circ}\text{C}$ . The final temperature of the mixture is

(1)  $0^{\circ}\text{C}$   
 (2)  $100^{\circ}\text{C}$   
 (3)  $50^{\circ}\text{C}$   
 (4)  $65^{\circ}\text{C}$

7. Two liquids 'A' and 'B' of equal masses are initially at  $60^{\circ}\text{C}$  and  $90^{\circ}\text{C}$ . The ratio of the specific heats of A and B is 2:1. If they are thoroughly mixed, the resultant temperature will be

(1)  $75^{\circ}\text{C}$   
 (2)  $70^{\circ}\text{C}$   
 (3)  $80^{\circ}\text{C}$   
 (4)  $95^{\circ}\text{C}$

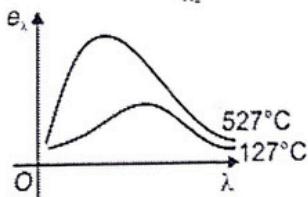
8. Two metallic plates of equal thickness and length are connected end to end and a common plate is constructed. The equivalent thermal conductivity of the resultant plate will be

(1)  $K_1 + K_2$   
 (2)  $\frac{2K_1K_2}{K_1+K_2}$   
 (3)  $\frac{K_1+K_2}{2}$   
 (4)  $\frac{K_1K_2}{K_1+K_2}$ .

9. A solid sphere is at temperature  $T$ . The sphere is cut into two halves. The fraction of energy emitted per second by half sphere to that by complete sphere is

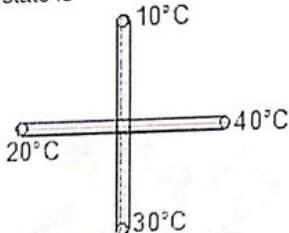
(1)  $\frac{1}{2}$   
 (2)  $\frac{1}{4}$   
 (3)  $\frac{1}{16}$   
 (4)  $\frac{3}{4}$

10. The spectrum of a black body at temperature  $127^{\circ}\text{C}$  and  $527^{\circ}\text{C}$  is shown in figure. If  $A_1$  and  $A_2$  are the area under two curves, then  $\frac{A_1}{A_2}$  is



(1) 1 : 16  
 (2) 16 : 1  
 (3) 4 : 1  
 (4) 1 : 4

11. Four identical metal rods are connected as shown in figure. Assume there is no heat loss through side walls of the rods and no radiation loss, the junction temperature in steady state is



(1)  $22^{\circ}\text{C}$   
 (2)  $26^{\circ}\text{C}$   
 (3)  $25^{\circ}\text{C}$   
 (4)  $32^{\circ}\text{C}$

12. A cylindrical rod has temperature  $T_1$  and  $T_2$  at its ends. The rate of flow of heat is 80 cal/s. If its radius and length are doubled keeping temperature at the ends same, then rate of flow of heat will be

(1) 80 cal/s  
 (2) 40 cal/s  
 (3) 120 cal/s  
 (4) 160 cal/s

13. Ice starts forming in lake with water at  $0^{\circ}\text{C}$  when the atmospheric temperature is below  $0^{\circ}\text{C}$ . If the time taken to form 1 cm of ice is 5 min then time taken to form 2 cm of ice will be

(1) 15 min  
 (2) 20 min  
 (3) 10 min  
 (4) 30 min

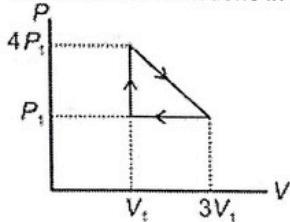
14. A black body has wavelength corresponding to maximum intensity is  $\lambda_m$  at 1500 K. Its corresponding wavelength at 3000 K will be

- $\lambda_m$
- $2\lambda_m$
- $\frac{\lambda_m}{2}$
- $\frac{\lambda_m}{4}$

15. Newton's law of cooling is used in laboratory for determination of

- Specific heat of gases
- Latent heat of liquids
- Specific heat of liquids
- Specific heat of solids

16. The amount of work done in the following cyclic process is

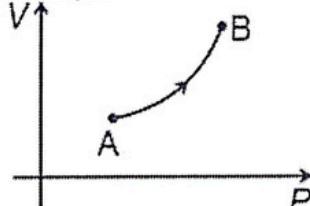


- $P_1V_1$
- $3P_1V_1$
- $6P_1V_1$
- $12P_1V_1$

17. An amount  $Q$  of heat is added to a monoatomic ideal gas in a process in which gas performs a work  $(\frac{2Q}{5})$ . In this process

- $C = \frac{5}{2}R$
- $P = \text{constant}$
- $V = \text{constant}$
- Both (1) and (2)

18. On a volume-pressure ( $V-P$ ) diagram given below, an ideal gas moves from A to B. During the process, internal energy of the gas



- Continuously increases
- Continuously decreases
- First increases and then decreases
- First decreases and then increases

19. If to a given sample of gas 50 J of heat is given and the work done in expansion by gas is 30 J, then change in internal energy of the gas is

- 20 J
- 30 J
- 50 J
- 80 J

20. A gas is expanded to double of its volume by two different processes. One is isobaric and other is isothermal. Let  $W_1$  and  $W_2$  be the respective work done, then (assume same initial volume for both)

- $W_2 = W_1 \ln(2)$
- $W_2 = \frac{W_1}{\ln(2)}$
- $W_2 = \frac{W_1}{2}$
- $W_1 = W_2$

21. Two cylinders A and B fitted with pistons contain equal amounts of ideal diatomic gas at 300 K. The piston of A is free to move, while that of B is fixed. Same amount of heat is given to gas in each cylinder. If the rise in temperature of gas in A is 30 K, then rise in temperature of gas in B is

- 32 K
- 42 K
- 36 K
- 47 K

22. In a thermodynamic system working substance is an ideal gas, its internal energy is in the form of

- Kinetic energy only
- Kinetic and potential energy
- Potential energy only
- None of these

23. The internal energy of air in a room of volume  $100 \text{ m}^3$  at atmospheric pressure is

- (1)  $2.5 \times 10^7 \text{ J}$
- (2)  $1.25 \times 10^7 \text{ J}$
- (3)  $5 \times 10^7 \text{ J}$
- (4)  $1.4 \times 10^7 \text{ J}$

24. A gas obeys a law  $PV^2 = \text{constant}$ , in addition to gas equation  $PV = \mu RT$ . If temperature of the gas is doubled, what will be percentage change in volume?

- (1) Decrease by 50%
- (2) Decrease by 60%
- (3) Increase by 100%
- (4) Decrease by 100%

25. For one mole of a diatomic gas, the ratio of heat transfer at constant pressure to work done by the gas is

- (1) 2 : 1
- (2) 4 : 1
- (3) 5 : 2
- (4) 7 : 2

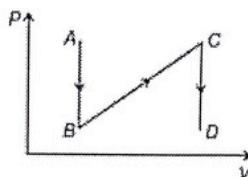
26. The volume of a monoatomic gas is compressed to  $\left(\frac{1}{27}\right)$  of its initial volume during isothermal process. The pressure of the gas changes to ( $P_1$  = initial pressure)

- (1)  $9 P_1$
- (2)  $18 P_1$
- (3)  $27 P_1$
- (4)  $81 P_1$

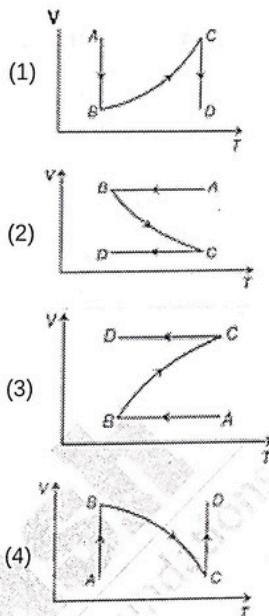
27. When an ideal gas ( $\gamma = \frac{5}{3}$ ) is heated under constant pressure, what percentage of given heat energy is utilized in doing external work?

- (1) 40%
- (2) 30%
- (3) 60%
- (4) 20%

28. The pressure (P) – volume (V) graph of an ideal gas is shown below



The corresponding volume (V)–temperature (T) graph is



29. An ideal gas is compressed to half of its initial volume by means of different process. In which of the following process work done will be maximum?

- (1) Isochoric
- (2) Isothermal
- (3) Adiabatic
- (4) Isobaric

30. A : Molar heat capacity of a gas is zero for adiabatic process.  
R : Adiabatic process does not allow heat exchange.

- (1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion
- (2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
- (3) Assertion is true statement but Reason is false
- (4) Both Assertion and Reason are false statements

31. A heat engine works between  $227^\circ\text{C}$  and  $77^\circ\text{C}$ . The efficiency of heat engine cannot be

- (1) 25 %
- (2) 27.5 %
- (3) 33 %
- (4) 15 %

32. The efficiency of a Carnot engine is 0.7. It rejects 30 J of heat to the sink. The work done by the engine is

- (1) 30 J
- (2) 50 J
- (3) 80 J
- (4) 70 J

33. A gas is enclosed in a vessel of volume  $9V$  at a pressure  $P_0$ . It is being pumped out of the vessel by means of a piston pump with a stroke volume  $V$ . The pressure of the gas in vessel after two strokes is

- (1)  $\frac{9P_0}{10}$
- (2)  $\frac{81P_0}{100}$
- (3)  $\frac{P_0}{4}$
- (4)  $\frac{P_0}{2}$

34. Which one of following is not an assumption of kinetic theory of gases

- (1) The volume occupied by the molecules of the gas is negligible in comparison to volume of container
- (2) The intermolecular force of attraction between the molecules of a gas is negligible
- (3) The collision between the molecules are elastic
- (4) All molecules have same speed

35. The pressure exerted on the walls of a container by a gas is due to the fact that gas molecules are

- (1) Sticking to the walls because collision are inelastic
- (2) Lossing their kinetic energy during collision
- (3) Getting direction from other molecules
- (4) Changing their momenta due to collision with the walls

36. Match the columns and tick the correct option

**Column I**

**Column II**

- |  |                                 |
|--|---------------------------------|
| a. Average speed of gas molecules                        | (i) $\frac{3}{2}k_B T$          |
| b. Root mean square speed of gas molecules               | (ii) $\frac{3}{2}RT$            |
| c. Average translational kinetic energy of a molecule    | (iii) $\sqrt{\frac{3RT}{M}}$    |
| d. Average translational kinetic energy of 1 mole of gas | (iv) $\sqrt{\frac{8RT}{\pi M}}$ |

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

37. Consider the following statements.

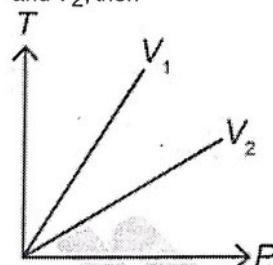
**Statement I:** At high pressure and low temperature the molecules of real gas are far apart and molecular interactions are negligible.

**Statement II:** For an ideal gas at constant temperature, pressure of a given mass of gas varies inversely with volume.

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

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

38. The figure shows temperature ( $T$ ) versus pressure ( $P$ ) graphs for certain amount of ideal gas at two volumes  $V_1$  and  $V_2$ , then

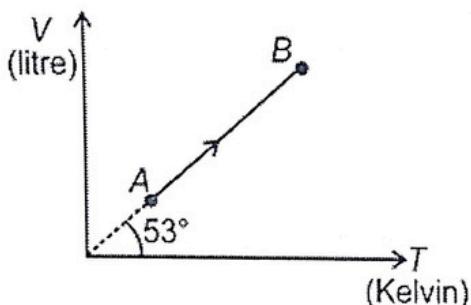


- (1)  $V_1 = V_2$
- (2)  $V_1 < V_2$
- (3)  $V_1 > V_2$
- (4) Insufficient information

39. A cylinder contains 12 kg of gas at pressure of  $10^7 \text{ N/m}^2$ . The quantity of gas taken out of the cylinder, if final pressure is  $3 \times 10^6 \text{ N/m}^2$ , will be (temperature of gas is constant)

- (1) 3.6 kg
- (2) 8.4 kg
- (3) 4.6 kg
- (4) 5.2 kg

40. V-T curve for 2 moles of gas is a straight line having positive slope and passes through origin as shown in figure. Find pressure at A



- (1)  $1.25 \times 10^4$   
 (2)  $2.50 \times 10^4$   
 (3)  $5.23 \times 10^3$   
 (4)  $6.25 \times 10^3$
41. If the degree of freedom for an ideal gas is  $f$ , then value of molar specific heat at constant pressure  $C_p$  is

- (1)  $\frac{f}{2}R$   
 (2)  $\left(1 + \frac{f}{2}\right)R$   
 (3)  $\left(1 + \frac{2}{f}\right)R$   
 (4)  $\frac{2}{f}R$

42. A flask contains Argon and Chlorine in ratio 2 : 1 by mass. The temperature of mixture is 27°C. The ratio of average translational kinetic energy per molecule of two gases is

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

43. Three moles of a monoatomic gas ( $\gamma = \frac{5}{3}$ ) are mixed with one mole of a diatomic gas ( $\gamma = \frac{7}{5}$ ). The value of  $\gamma$  for the mixture will be  
 (1)  $\frac{9}{11}$   
 (2)  $\frac{11}{7}$   
 (3)  $\frac{12}{7}$   
 (4)  $\frac{15}{7}$

44. The ratio of mean free paths of two gas molecules with molecular radii  $r$  and  $2r$  respectively is (Assume number density of gases is same)  
 (1) 4 : 1  
 (2) 2 : 1  
 (3) 1 : 2  
 (4) 4 : 3

45. A gas mixture contains 2 moles of oxygen and 4 moles of neon at temperature  $T$ , neglecting all vibration modes, total internal energy of system is  
 (1)  $4.5 RT$   
 (2)  $5.5 RT$   
 (3)  $11 RT$   
 (4)  $9.5 RT$

### CHEMISTRY

46. Given below are two statements  
**Statement I:**  $K_C$  increases with increase in temperature for endothermic reaction.  
**Statement II:**  $K_C$  decreases with increase in temperature for exothermic reaction.  
 In the light of above statements, choose the most appropriate answer from the options given below  
 (1) Statement I is correct but statement II is incorrect  
 (2) Statement I is incorrect but statement II is correct  
 (3) Both statement I and statement II are correct  
 (4) Both statement I and statement II are incorrect

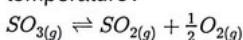
47. Equilibrium constant for a reaction with standard Gibbs free energy of  $-9.2$  kcal at  $127^\circ\text{C}$  will be  
 (1)  $10^{10}$   
 (2)  $10^5$   
 (3) 50  
 (4) 500

48. If equal volumes of two acids, with pH 2 and 3 respectively are mixed, then pH of resultant solution will nearly be

- (1) 5
- (2) 1
- (3) 2.5
- (4) 2.26

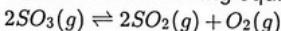
49. If equilibrium constant  $K_C$  for reaction,

$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$  is 9, then what will be equilibrium constant for following reaction at same temperature?



- (1) 3
- (2)  $\frac{1}{3}$
- (3) 27
- (4)  $\frac{1}{\sqrt{3}}$

50. Consider the following equilibrium,



If the initial pressure of  $SO_3(g)$  is 500 mm Hg and total pressure at equilibrium is 600 mm Hg, then the value of  $K_p$  will be

- (1) 5.42 mm Hg
- (2) 25.72 mm Hg
- (3) 44.44 mm Hg
- (4) 76.62 mm Hg

51. Match reaction in List-I with their correct relation of  $K_p$  and  $K_c$  in List-II

List-I

- (a)  $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$  (i)  $K_p = K_c(RT)^{-2}$
- (b)  $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$  (ii)  $K_p = K_c(RT)$
- (c)  $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$  (iii)  $K_p = K_c$
- (d)  $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$  (iv)  $K_p = K_c(RT)^{-1}$

List-II

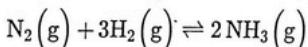
- (1) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)
- (2) (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)
- (3) (a)-(iv), (b)-(ii), (c)-(i), (d)-(iii)
- (4) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)

52. On hydrolysis of sucrose, equilibrium constant  $K_c$  of the reaction is  $2 \times 10^{-13}$  at 300 K.  $\Delta G^\circ$  at 300K will be

- (1)  $2.16 \times 10^6 \text{ J mol}^{-1}$
- (2)  $-7.64 \times 10^4 \text{ J mol}^{-1}$
- (3)  $-2.67 \times 10^4 \text{ J mol}^{-1}$
- (4)  $-1.26 \times 10^3 \text{ J mol}^{-1}$

53. Given below are two statements : one is labelled as Assertion (A) and other is labelled as Reason (R)

**Assertion (A) :** Addition of an inert gas at constant volume to the following reaction at equilibrium

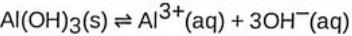


Favours the reaction in forward direction

**Reason (R) :** Addition of an inert gas at constant volume shifts equilibrium towards lesser number of gaseous moles In the light of above statements, choose the most appropriate answer from the options given below

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

54. If the concentration of  $OH^-$  ions in the reversible reaction



is halved, then the equilibrium concentration of  $Al^{3+}(aq)$  will become

- (1) 8 times
- (2) 6 times
- (3)  $\frac{1}{8}$  times
- (4)  $\frac{1}{6}$  times

55. Higher yield of NO in  $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$  can be obtained at

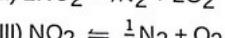
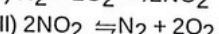
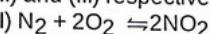
$$[\Delta H \text{ of the reaction} = +180.7 \text{ kJ mol}^{-1}]$$

- A. Higher temperature
- B. Lower temperature
- C. Higher concentration of  $N_2$
- D. Higher concentration of  $O_2$

Choose the correct answer from the options given below :

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

56.  $K_1$ ,  $K_2$  and  $K_3$  are equilibrium constant of the following (I), (II) and (III) respectively.

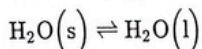


The correct relation from the following is

- (1)  $K_1 = \frac{1}{K_2} = \frac{1}{K_3}$
- (2)  $K_1 = \frac{1}{K_2} = \frac{1}{(K_3)^2}$
- (3)  $K_1 = \sqrt{K_2} = K_3$
- (4)  $K_1 = \frac{1}{K_2} = K_3$

57. Given below are two statements

**Statement (I):** For the system,



on increasing pressure, at constant temperature equilibrium shifts to forward direction.

**Statement (II):** Ice is denser than water.

In the light of above statements, choose the most appropriate answer from the options given below.

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

58. Given below are two statements

**Statement I :** If  $Q_c > K_c$ , the reaction will proceed in the backward direction.

**Statement II :** If  $Q_c < K_c$ , the reaction will proceed in the forward direction

In the light of above statements, choose the correct answer from the options given below.

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

59. Which among the following is not a homogeneous equilibrium?

- (1)  $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$
- (2)  $\text{CH}_3\text{COOC}_2\text{H}_5(\text{aq}) + \text{H}_2\text{O}(\text{l}) \rightleftharpoons \text{CH}_3\text{COOH}(\text{aq}) + \text{C}_2\text{H}_5\text{OH}(\text{aq})$
- (3)  $\text{CaCO}_3(\text{s}) \rightleftharpoons \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
- (4)  $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$

60. Which of the following will change the value of equilibrium constant?

- (1) Change in pressure
- (2) Change in concentration of product
- (3) Change in amount of catalyst
- (4) Change in temperature

61. Given below are two statements: one is labelled as

**Assertion (A)** and the other is labelled as **Reason (R)**.

**Assertion (A):** Catalyst increases the rate of both forward and backward reaction with equal value which results in an increase of equilibrium constant value.

**Reason (R):** Catalyst decreases the value of activation energy of the reaction.

In the light of the above statements, choose the most appropriate answer from the options given below:

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

62. Select the correct expression

- (1)  $\Delta G = -\Delta G^\circ + RT \ln K$
- (2)  $\Delta G = \Delta G^\circ - RT \ln K$
- (3)  $\Delta G = \Delta G^\circ + RT \ln Q$
- (4)  $\Delta G^\circ = RT \ln K$

63. If at equilibrium  $\text{HI}$  dissociates 50%, then  $K_{\text{eq}}$  for the reaction  $2\text{HI}(\text{g}) \rightleftharpoons \text{H}_2(\text{g}) + \text{I}_2(\text{g})$  is

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

64. Select the incorrect statement regarding physical equilibria.

- (1) Equilibrium is possible in closed system
- (2) All measurable properties of the system remain constant
- (3) Both the opposing processes stops at equilibrium
- (4) At equilibrium there is a dynamic but stable conditions

65. A 0.2 M solution of monoprotic acid is 40% ionised. The ionization constant of this acid is

- (1)  $5.33 \times 10^{-2}$
- (2)  $4.7 \times 10^{-4}$
- (3)  $2 \times 10^{-1}$
- (4)  $3.23 \times 10^{-2}$

66. Give below are two statements one is assertion (A) other is reason (R).

**Assertion (A) :** NaOH and HCl are the strong electrolytes.  
**Reason (R) :** Strong electrolytes gets completely ionised in the aqueous solution.

In the light of above statements choose the correct option.

(1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Both Assertion and Reason are false statements

67. The conjugate acid and conjugate base of  $H_2PO_4^-$  respectively are

(1)  $H_3PO_4$  and  $PO_4^{3-}$

(2)  $HPO_4^{2-}$  and  $H_3PO_4$

(3)  $H_3PO_4$  and  $HPO_4^{2-}$

(4)  $PO_4^{3-}$  and  $H_3PO_4$

68. Which of the following can act as both Bronsted acid as well as Bronsted base?

(1)  $HPO_4^{2-}$

(2)  $H_3PO_3$

(3)  $HPO_3^{2-}$

(4)  $PO_4^{3-}$

69. Lewis base among the following is

(1)  $CH_4$

(2)  $AlCl_3$

(3)  $B_2H_6$

(4)  $PH_3$

70. Arrange the following fluids in their decreasing order of pH.

(a) Lemon juice

(b) Human blood

(c) Black coffee

(d) Milk of magnesia

(1) (a) > (d) > (b) > (c)

(2) (d) > (b) > (c) > (a)

(3) (b) > (c) > (d) > (a)

(4) (d) > (b) > (a) > (c)

71. Consider the following statements

(a) HF is stronger acid than  $H_2O$

(b)  $BF_3$  is a Lewis acid

(c) Conjugate bases of weak acids are very strong

The correct statements are

(1) (a) and (b) only

(2) (b) and (c) only

(3) (a) and (c) only

(4) (a), (b) and (c)

72. At  $90^\circ C$ , the  $pK_w = 12$ , pH of water will be

(1) 6

(2) 7

(3) 8

(4) 5

73. pH of  $1 \times 10^{-8} M$  NaOH solution is

(1) 7.04

(2) 6.96

(3) 8

(4) 6

74. Given below are two statements one is assertion (A) other is reason (R).

**Assertion (A) :** The ionisation of  $CH_3COOH$  is suppressed on adding  $CH_3COONa$ .

**Reason (R) :** Common ion effect is observed on addition of acetate ions to acetic acid solution.

In the light of above statements choose the correct option.

(1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Both Assertion and Reason are false statements

75. The percent ionisation of 0.02 M acetic acid in 0.2 M HCl will be nearly ( $K_a$  of acetic acid is  $1.74 \times 10^{-5}$ )

(1) 0.009%

(2) 0.08%

(3) 0.002%

(4) 0.02%

76. Given below are two statements

**Statement I :** Very high purity sodium chloride is obtained by passing HCl gas through saturated solution of sodium chloride.

**Statement II :** In saturated solution of NaCl, HCl gas causes common ion effect.

In the light of the above statements, choose the correct answer from the options given below

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

77. Given below are two statements:

**Statement I:** Aqueous solution of sodium acetate is basic

**Statement II:** In case of  $\text{CH}_3\text{COONH}_4$ , pH is independent of the concentration of solution

In the light of the above statements, choose the correct answer from the option given below.

- (1) Statement I is true but statement II is false
- (2) Statement I is false but statement II is true
- (3) Both statement I and statement II are true
- (4) Both statement I and statement II are false

78. pH of 0.02 M sodium acetate solution is ( $\text{pK}_a$  of  $\text{CH}_3\text{COOH}$  = 4.74)

- (1) 7.51
- (2) 10.87
- (3) 8.52
- (4) 9.86

79. Match Column-I with Column-II

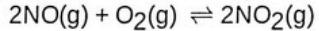
	Column-I (Salts)	Column-II (pH)
a.	0.1 M NaCl	(i) $\frac{1}{2}[\text{pK}_W + \text{pK}_a + \log C]$
b.	0.1 M $\text{NH}_4\text{Cl}$	(ii) $\frac{1}{2}[\text{pK}_W - \text{pK}_b + \text{pK}_a]$
c.	0.1 M $\text{CH}_3\text{COONa}$	(iii) $\frac{\text{pK}_W}{2}$
d.	0.1 M $\text{NH}_4\text{CN}$	(iv) $\frac{1}{2}[\text{pK}_W - \text{pK}_b - \log C]$

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

80. Which of the following salt undergoes cationic hydrolysis ?

- (1)  $\text{NH}_4\text{Cl}$
- (2)  $\text{NaHCO}_3$
- (3)  $\text{NaNO}_3$
- (4)  $\text{NaCN}$

81. Consider the following reaction at equilibrium



If helium is introduced at constant pressure then

- (1) Formation of  $\text{NO}_2$  will increase
- (2) Equilibrium constant of the reaction will change
- (3) Dissociation of  $\text{NO}_2$  will increase
- (4) There is no effect on equilibrium

82. Which of the following mixture is a buffer solution?

- (1)  $\text{NaCl} + \text{NaOH}$
- (2)  $\text{HCl} + \text{NH}_4\text{Cl}$
- (3)  $\text{CH}_3\text{COOH} + \text{HCl}$
- (4)  $\text{NH}_4\text{OH} + \text{NH}_4\text{Cl}$

83. Which will make basic buffer solution?

- (1) 50 mL of 0.1 M  $\text{NaOH} + 25 \text{ mL of } 0.1 \text{ M } \text{CH}_3\text{COOH}$
- (2) 100 mL of 0.1 M  $\text{HCl} + 200 \text{ mL of } 0.1 \text{ M } \text{NH}_4\text{OH}$
- (3) 100 mL of 0.2 M  $\text{HCl} + 100 \text{ mL of } 0.1 \text{ M } \text{NH}_4\text{OH}$
- (4) 50 mL of 0.1 M  $\text{CH}_3\text{COOH} + 100 \text{ mL of } 0.1 \text{ M } \text{NaOH}$

84. Consider the following statements.

**Statement I:** The solution which resist change in pH on dilution or with addition of small amount of acid or base is called buffer solution.

**Statement II:** A mixture of benzoic acid and sodium benzoate acts as buffer solution.

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

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

85. The solubility of  $\text{AgCl}$  in 0.1 M aqueous solution of  $\text{CaCl}_2$  is ( $\text{K}_{\text{sp}}$  of  $\text{AgCl}$  is  $1.8 \times 10^{-10}$ )

- (1)  $1.8 \times 10^{-9} \text{ mol L}^{-1}$
- (2)  $9 \times 10^{-9} \text{ mol L}^{-1}$
- (3)  $9 \times 10^{-10} \text{ mol L}^{-1}$
- (4)  $1.8 \times 10^{-10} \text{ mol L}^{-1}$

86. Match column I with column II.

Column I (salt)	Column II ( $K_{sp}$ )
a. $\text{CaF}_2$	(i) $27\text{s}^4$
b. $\text{Mg}_3(\text{PO}_4)_2$	(ii) $\text{s}^2$
c. $\text{Fe(OH)}_3$	(iii) $4\text{s}^3$
d. $\text{ZnS}$	(iv) $108\text{s}^5$

Choose the correct option.

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

87. In which of the following solutions, solubility of  $\text{BaSO}_4$  will be maximum?

- (1) 0.1 M  $\text{BaCl}_2$
- (2) 0.1 M  $\text{Na}_2\text{SO}_4$
- (3) 0.1 M NaCl
- (4) 0.01 M  $\text{H}_2\text{SO}_4$

88. What would be the molar solubility of barium sulphate if solubility product of  $\text{BaSO}_4$  is  $1.1 \times 10^{-10}$  at 298 K?

- (1)  $3.15 \times 10^{-5} \text{ mol L}^{-1}$
- (2)  $1.05 \times 10^{-5} \text{ mol L}^{-1}$
- (3)  $2.2 \times 10^{-10} \text{ mol L}^{-1}$
- (4)  $1.1 \times 10^{-10} \text{ mol L}^{-1}$

89. The correct order of solubility for the given salts  $\text{CuCl}$  ( $K_{sp} = 1.7 \times 10^{-6}$ ),  $\text{PbCO}_3$  ( $K_{sp} = 7.4 \times 10^{-14}$ ) and  $\text{SnS}$  ( $K_{sp} = 1.0 \times 10^{-25}$ ) is

- (1)  $\text{CuCl} > \text{SnS} > \text{PbCO}_3$
- (2)  $\text{CuCl} > \text{PbCO}_3 > \text{SnS}$
- (3)  $\text{PbCO}_3 > \text{SnS} > \text{CuCl}$
- (4)  $\text{SnS} > \text{PbCO}_3 > \text{CuCl}$

90. When 200 ml of 0.2 M  $\text{CH}_3\text{CO}_2\text{H}$  is mixed with 200 ml of 0.2 M NaOH then pH of resulting solution is [ $pK_a$  for  $\text{CH}_3\text{CO}_2\text{H} = 4.74$  and  $\log 2 = 0.3$ ]

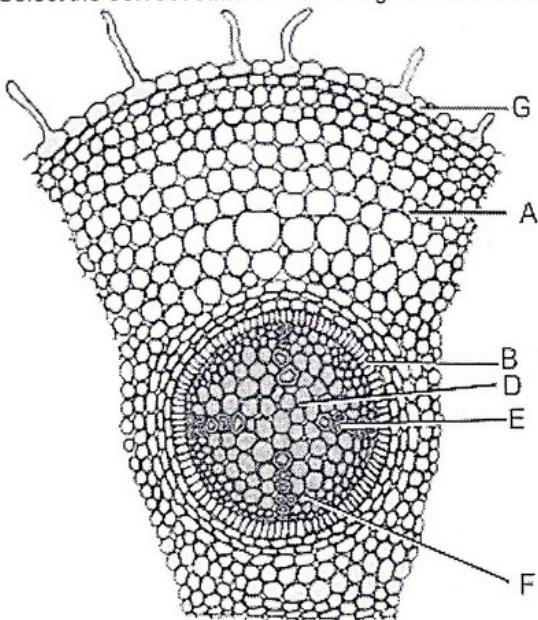
- (1) 9.1
- (2) 8.52
- (3) 8.87
- (4) 4.75

BOTANY

91. The structure which is present in monocot stem is

- (1) Endodermis
- (2) Pericycle
- (3) Sclerenchymatous hypodermis
- (4) Medullary rays

92. Select the correct statement for the given labelled diagram



- (1) A, B and G tissue are made up of dead cells
- (2) B, D, E and F tissues are made up of more than one types of cells
- (3) D, E and F constitute the stele
- (4) A, E, F and G tissues perform the function of photosynthesis

93. Which of the following statements is not correct w.r.t. trichomes?

- (1) They may be branched or unbranched
- (2) They help in preventing the water loss due to transpiration
- (3) They are usually unicellular
- (4) They may be soft or stiff

94. Select the mismatched pair.

- |                  |  |
|------------------|--|
| (1) Collenchyma  | - Assimilates food when contains chloroplasts  |
| (2) Sclerenchyma | - Lignified cell wall has few or numerous pits |
| (3) Parenchyma   | - Intercellular spaces are never present       |
| (4) Sclereids    | - Spherical, oval or cylindrical cells         |

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

95. Choose the incorrect statement w.r.t. epidermis.

- (1) Outermost layer of the primary plant body
- (2) Made up of elongated and compactly arranged cells
- (3) Generally forms a continuous, multilayered structure
- (4) Often covered with cuticle

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

**Assertion(A):** The vascular bundles in the roots of dicotyledons are said to be exarch.

**Reason(R):** In roots, metaxylem lies towards the centre and the protoxylem lies towards the periphery of the organ.

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

97. How many of the following features is/are correct regarding bulliform cells of grass leaves?

- (a) Large size
  - (b) Presence of chlorophyll
  - (c) Curl leaves inwards to minimise water loss
  - (d) Present on adaxial epidermis
- (1) One
  - (2) Two
  - (3) Three
  - (4) Four

98. Hypodermis is

- (1) Innermost layer of cortex
- (2) Outermost sub-zone of cortex in stems
- (3) Multilayered in roots
- (4) Collenchymatous in monocots

99. Conjunctive tissue and medullary rays are usually seen in A and B of angiosperms respectively.

Select the correct option for A and B.

- (1) A - Stem; B - Leaf
- (2) A - Root; B - Leaf
- (3) A - Root; B - Stem
- (4) A - Leaf; B - Root

100. The common feature between a dicot leaf and a monocot stem is presence of

- (1) Conjunctive tissue between xylem and phloem
- (2) Bundle sheath cells around vascular bundles
- (3) Pith and medullary rays
- (4) Ring arrangement of vascular bundles

101. Epiblema is

- (1) Innermost layer of the cortex
- (2) Outermost layer of stele in monocot
- (3) Outermost epidermal layer in roots
- (4) Storage tissue in cortex

## 102. Guard cells of stomata

- (1) Lack chloroplasts
- (2) Have thick outer wall in dicots
- (3) Are dumb bell shaped in grasses
- (4) Surround subsidiary cells

## 103. Match column I with column II and select the correct option.

	Column I	Column II
a.	Stomata	(i) Prevent loss of water
b.	Cuticle	(ii) Regulate transpiration and gaseous exchange
c.	Mesophyll	(iii) Involved in secondary growth
d.	Cambium	(iv) Possesses chloroplasts and carry out photosynthesis

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

## 104. Read the given comparative features of two plant specimens 'X' and 'Y' and choose the correct option

	Character	'X'	'Y'
•	Hypodermis	Sclerenchymatous	Absent
•	Endodermis	Absent	Distinct
•	Xylem	Endarch	Exarch
•	Bundle sheath cells	Present	Absent

'X' and 'Y' are most likely to be

- (1) X → Gram leaf, Y → Maize stem
- (2) X → Wheat root, Y → Mustard leaf
- (3) X → Grass stem, Y → Mango root
- (4) X → Sunflower root, Y → Maize root

## 105. Transverse section of which plant part shows the following anatomical features?

- a. Endodermis is comprised of a single layer of barrel-shaped cells without any intercellular spaces.
  - b. Small or inconspicuous pith.
  - c. Radial vascular bundles
  - d. Two to four xylem bundles
- (1) Dicot root
  - (2) Monocot root
  - (3) Monocot stem
  - (4) Dicot stem

## 106. Match List I with List II

	List-I		List-II
a.	Vessels	(i)	Elongated or tube like cells with thick lignified walls and tapering ends
b.	Phloem parenchyma	(ii)	Not found in flowering plants
c.	Tracheids	(iii)	Made up of elongated, tapering cylindrical cells and it is absent in most of the monocotyledons
d.	Albuminous cells	(iv)	Members are interconnected through perforations in their common walls

Choose the correct option.

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

## 107. Read the following statements and choose the correct option.

**Statement A :** Stem of barley shows parenchymatous pericycle.

**Statement B :** Palisade tissue is present towards upper epidermis in monocot leaves.

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

## 108. In flowering plants, the element of xylem tissue which is responsible for radial conduction of water

- (1) Has lignin deposited thick cell walls
- (2) Is made up of cells having prominent nucleus and dense cytoplasm
- (3) Is composed of elongated cells that are fused together to form tube like structure
- (4) Has the cells with obliterated lumen

## 109. (A) The abaxial epidermis generally bears more stomata than the adaxial epidermis.

- (B) The epidermis of both the upper surface and lower surface of the leaf has a conspicuous cuticle
  - (C) The tissue between the upper and the lower epidermis is made up of parenchyma.
  - (D) The vascular bundles are surrounded by a layer of bundle sheath cells.
- Identify the features that are common in both dorsiventral and isobilateral leaves and choose the correct option

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

110. In which of the following aspects monocot root and dicot stem are anatomically similar?

- (1) Presence of well developed pith
- (2) Having thick walled cells just below the epidermis
- (3) Having conjoint vascular bundles
- (4) Presence of parenchymatous medullary rays

111. Choose the odd one out w.r.t. function of pericycle.

- (1) May act as storage organ
- (2) Forms lateral roots
- (3) Forms vascular cambium during secondary growth
- (4) Gives rise to root hair

112. All of the following are constituents of stele, except

- (1) Pericycle
- (2) Starch sheath
- (3) Vascular bundles
- (4) Pith

113. Cortex is the region found between

- (1) Epidermis and stele
- (2) Pericycle and endodermis
- (3) Endodermis and pith
- (4) Endodermis and vascular bundle

114. Guard cells are bordered by subsidiary cells. Subsidiary cells are

- (1) Highly lignified epidermal cells
- (2) Modified epidermal cells
- (3) Rich in chloroplast
- (4) Highly suberised cells

115. In dicot leaf, vascular bundles differ in size. It is due to

- (1) Absence of bulliform cells
- (2) Distribution of more stomata on lower epidermis
- (3) Presence of reticulate venation
- (4) Dorsiventral type of leaf

116. Read the given assertion (A) and reason (R) and choose the correct option.

**Assertion (A)** : In stems of grasses, large sized vascular bundles are arranged in a ring-like manner.

**Reason (R)** : The large sized vascular bundles in monocot stem are densely arranged towards the periphery as compared to smaller ones.

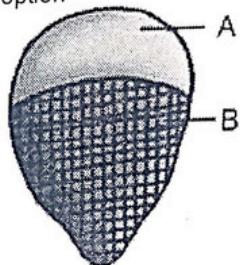
Both (A) and (R) are true and (R) is the correct explanation of (A)

Both (A) and (R) are true but (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

117. Identify the given vascular bundle and select the correct option



(1) In given vascular bundle, A is xylem and B is phloem

(2) This vascular bundle is observed in monocot stem and leaf

(3) This is found in dicot roots

(4) This is open vascular bundle

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

	Column I	Column II
a.	Rhizodermis	(i) Has casparyan strips in roots
b.	Endodermis	(ii) Has cells that form root hairs
c.	Conjunctive tissue	(iii) Primary meristem
d.	Intrafascicular cambium	(iv) Present between xylem and phloem which are arranged radially in alternate manner

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

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

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

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

119. Mesophyll is present but not differentiated into two regions in

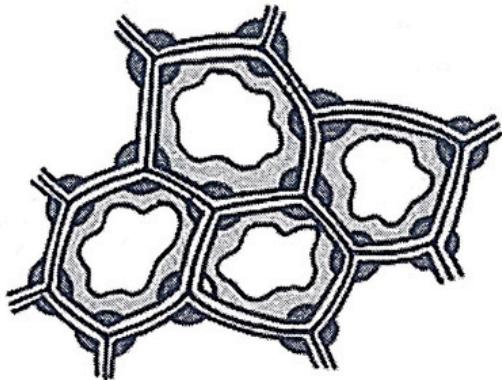
(1) Dorsiventral leaf

(2) Dicotyledonous leaf

(3) Isobilateral leaf

(4) Monocotyledonous root

120. Regarding different primary permanent tissues of plants, which one of the following properties is exclusive to the tissue shown in the below given diagram?



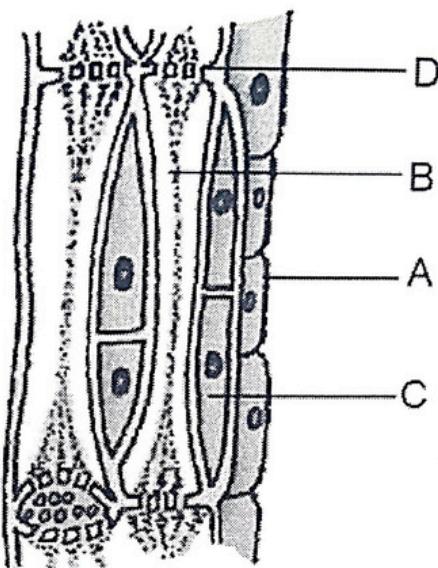
- (1) It is composed of oval, spherical or polygonal cells
- (2) It has cells that are living and nucleated

Along with having chloroplasts their cells are thickened  
 (3) at the corners due to deposition of cellulose, hemicellulose and pectin  
 (4) This tissue provides mechanical strength to the plant

121. Pericycle forms semi-lunar patches of sclerenchyma cells in

- (1) Dicot roots
- (2) Monocot stems
- (3) Dicot stems
- (4) Monocot roots

122. Examine the figure given below and choose the correct option for it.



- (1) 'D' represents the structures through which major transport of water and minerals occurs.
- (2) 'A' represents the parenchymatous cells that help in maintaining pressure gradient in the element of phloem.
- (3) 'B' represents the only dead element of phloem.
- (4) 'C' represents the long, narrow cells that are found to be absent in gymnosperms and pteridophytes.

123. Endodermis is the component of

- (1) Conducting tissue system
- (2) Ground tissue system
- (3) Vascular tissue system
- (4) Epidermal tissue system

124. Cells of the outer-most covering of the whole plant body

- (1) Are parenchymatous with a small amount of cytoplasm lining the cell wall and a large vacuole
- (2) Have a deposition of water-impermeable waxy material lignin
- (3) Are not interconnected with each other due to lack of plasmodesmatal connections
- (4) Are sclerenchymatous with hard cell walls as they protect the plants from mechanical injuries

125. Stomatal apparatus comprises of

- (1) Guard cells only
- (2) Guard cells and stomatal aperture only
- (3) Guard cells, stomatal aperture and subsidiary cells
- (4) Guard cells and subsidiary cells only

126. Read the given statements (A-D) and choose the option with **incorrect** one(s).

- A. Roots of grasses differ from roots of sunflower, as the former lack suberin depositions in the innermost layer of cortex.
- B. In a typical young dicot stem, the outermost protective layer may bear trichomes and a few stomata.
- C. Ground tissue system forms the main bulk of the plant body.
- D. Monocotyledonous and dicotyledonous plants show marked variations in their internal structures but they do not differ in type and location of vascular bundles.

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

127. Protoxylem and metaxylem are similar in

- (1) Diameter of vessels
- (2) Respective position in root and stem
- (3) Relative state of maturity
- (4) Being the primary xylem

128. Cuticle is not found on the epidermis of

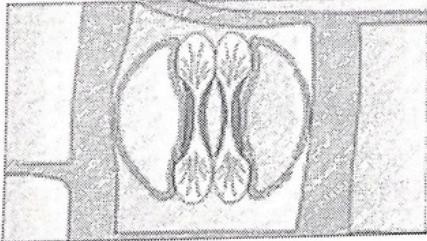
- (1) Dicot leaf
- (2) Monocot leaf
- (3) Dicot root
- (4) Dicot stem

129. Few layers of \_\_\_\_\_ cells are present next to endodermis in dicot root.

Select the **correct** option to fill in the blank.

- (1) Collenchymatous
- (2) Thick walled parenchymatous
- (3) Sclerenchymatous
- (4) Thin walled chlorenchymatous

130. The following figure shows the type of stomata, seen in



- (1) Grasses
- (2) Bean
- (3) Gram
- (4) Pea

131. Vascular bundles in dicotyledons are considered as open because

- (1) Vessels are with perforations
- (2) Cambium is present
- (3) Xylem is surrounded by phloem
- (4) A bundle sheath is absent over each bundle

132. A student while cutting transverse section of plant part observed scattered vascular bundles of various sizes, covered by bundle sheath cells. He also observed water containing cavities inside vascular bundle. This indicates that it can be a transverse section of

- (1) Cucurbit stem
- (2) Maize stem
- (3) Rice root
- (4) Mustard root

133. Arrange the following components in an order from inside to outside, in a dicot stem, then choose **correct** option.

- A. Vascular bundles
- B. Pith
- C. Pericycle
- D. Cortex

- (1) A – B – C – D
- (2) D – C – A – B
- (3) B – A – C – D
- (4) B – D – C – A

134. Root hair and trichome both are

- (1) Always unicellular
- (2) Branched
- (3) Epidermal outgrowths
- (4) Responsible for preventing water loss

135. All of the below given are functions of epidermal tissue system in plants, except

- (1) Secretion of sticky substances
- (2) Control of transpiration
- (3) Protection from external injuries
- (4) Mechanical support and transport of water and minerals

136.Which one is not a part of brain stem in humans?

- (1) Corpus callosum
- (2) Mid brain
- (3) Pons
- (4) Medulla oblongata

137.Select the incorrect statement regarding synapses :

- (1) Chemical synapses use neurotransmitters
- (2) Impulse transmission across a chemical synapse is always faster than that across an electrical synapse.
- (3) The membranes of presynaptic and postsynaptic neurons are in close proximity in an electrical synapse.
- (4) Electrical current can flow directly from one neuron into the other across the electrical synapse.

138.A chemical synapse is formed by

- (1) Only synaptic cleft
- (2) Only pre-synaptic membrane and synaptic knob
- (3) Connection through gap junctions between dendrite and post-synaptic membrane
- (4) Pre-synaptic membrane, synaptic cleft and post-synaptic membrane

139.Cerebellum is concerned with

- (a) Integration of informations received from auditory system
  - (b) Control of cardiovascular reflexes
  - (c) Regulation of sexual behaviour
- Choose the correct option

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

140.Decreased levels of which of the following hormones is the major cause of osteoporosis in old age women?

- (1) Thymosin
- (2) Estrogen
- (3) Oxytocin
- (4) ADH

141.Chronic auto immune disorder affecting neuro muscular junction leading to fatigue, weakening and paralysis of skeletal muscle is called as:

- (1) Gout
- (2) Arthritis
- (3) Muscular dystrophy
- (4) Myasthenia gravis

142.Human neural system is divided into the central neural system and the peripheral neural system. The former division includes

- (1) Brain and cranial nerves
- (2) Brain and spinal cord
- (3) Spinal cord and spinal nerves
- (4) Cranial and spinal nerves

143.A man went for a trek on mountains. As he was climbing, he suddenly came across a venomous green-coloured snake. At this point, which one of the following is most likely the immediate response of his neuro-hormonal control system?

- Sympathetic nervous system gets activated to decrease his heart rate for flight or fight response
- Release of acetylcholine decreases across the synaptic cleft to induce rapid movement of smooth muscles
- Cerebral cortex directly activates the parasympathetic division of the brain
- Sympathetic nervous system is activated releasing catecholamines from the adrenal medulla

144.Which among the following is function of neurosecretory cells of hypothalamus?

- (1) Intersensory associations
- (2) To control memory and intelligence
- (3) Secretion of hypothalamic hormones
- (4) Maintain respiratory rhythm of the body

145.A unipolar neuron

- (1) Does not have soma or body
- (2) Possesses a single dendrite and single axon process
- (3) Possesses cell body with one axon only
- (4) Has numerous axons

146.In an accident, a man suffered from a severe fracture in the longest bone of his body. This longest bone is called

- (1) Tibia
- (2) Sternum
- (3) Femur
- (4) Patella

147.Autonomic nervous system is a division of peripheral neural system (PNS) in which motor fibres transmit impulses from

- (1) Involuntary organs to CNS
- (2) CNS to involuntary muscles
- (3) CNS to voluntary muscles
- (4) Voluntary organs to CNS

148. Match list I with list II:

List I	List II
a. Between frontal and parietal bones	(i) Fibrous joint, suture is present between bones
b. Between atlas and axis vertebrae	(ii) Pivot joint, sidewise rotational movement
c. Between carpal and metacarpal of thumb	(iii) Saddle joint, oppositional movement of thumb
d. Between femur and tibia	(iv) Knee joint placed in category of hinge joint

Choose the correct answer from the options given below.

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

149. Choose the incorrect match w.r.t parts of human brain and structure related to it.

- (1) Midbrain – Corpora quadrigemina
- (2) Hindbrain – Thalamus
- (3) Forebrain – Diencephalon
- (4) Brain stem – Medulla oblongata

150. Assertion (A) : Hypothalamus is situated at the base of the thalamus and contains neurosecretory cells.

Reason (R) : It regulates body temperature, urge for eating and drinking.

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

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

151. Select the correct statement w.r.t. vertebral column in adult humans.

- (1) It is formed by 26 serially arranged units called vertebrae and is ventrally placed in the body.
- (2) Each vertebra except atlas has a central canal through which neural canal passes.
- (3) First vertebra is the axis and it articulates with the occipital condyles.
- (4) The number of cervical vertebrae are seven in almost all mammals including human beings.

152. In humans, at the point of fusion of ilium, ischium and pubis, there is a cavity to which the thigh bone articulates. This cavity is called

- (1) Glenoid cavity
- (2) Acromion
- (3) Acetabulum
- (4) Pubic symphysis

153. The total number of girdle bones in an adult human are equal to the total number of

- (1) Facial bones
- (2) Ear ossicles
- (3) Cranial bones
- (4) Limb bones

154. How many of the bones mentioned in the box below is/are not included in appendicular skeleton of humans?

Coxal bone, Ulna, Sacrum, Stapes, Zygomatic

Select the correct option.

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

155. Choose the option that represents the correct order of involvement of following in movement of an impulse.

- (1) Cyton → Axon hillock → Dendrites → Axon terminal → Synaptic knob
- (2) Perikaryon → Dendrites → Axon terminal → Synaptic knob → Axon hillock
- (3) Dendrites → Cyton → Axon terminal → Axon hillock → Synaptic knob
- (4) Dendrites → Cell body → Axon hillock → Axon terminal → Synaptic knob

156. Assertion (A): The 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup> pairs of ribs are called vertebrochondral (false) ribs.

Reason (R): These ribs do not articulate directly with the sternum but join the seventh rib with the help of hyaline cartilage.

In light of above statements, choose the correct option.

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

157. Match the column I with column II w.r.t humans and choose the correct option.

Bone	Number of bone
a. Limb bones	(i) 24
b. Ribs	(ii) 14
c. Facial bones	(iii) 06
d. Girdle bones	(iv) 120

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

158. Among the following, choose the property which is common between functional unit of neural system and anatomical unit of muscle.

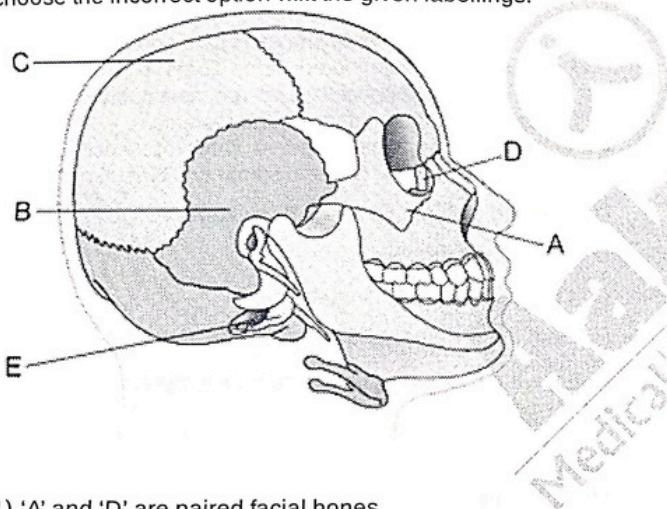
- (1) Contractility
- (2) Elasticity
- (3) Extensibility
- (4) Excitability

159. In an adult human, which of the following matches is incorrect w.r.t. the number of bones of forelimb and hindlimb?

Forelimb	Hindlimb
(1) Phalanges	– Phalanges
(2) Metacarpals	– Metatarsals
(3) Carpals	– Tarsals
(4) Humerus	– Femur

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

160. Observe the following diagram of a human skull and choose the incorrect option w.r.t. the given labellings.



- (1) 'A' and 'D' are paired facial bones.
- (2) Like mandible, 'C' is also an unpaired bone.
- (3) 'E' is a bony projection at the base of the skull that articulates with atlas vertebra.
- (4) Like the parietal bone of skull, 'B' is also a paired cranial bone.

161. Depolarisation of neural membranes is caused due to

- (1) Rapid influx of  $\text{Na}^+$  ions
- (2) Rapid influx of  $\text{K}^+$  ions
- (3) Rapid efflux of  $\text{Na}^+$  ions
- (4) Rapid influx of  $\text{Cl}^-$  ions

162. In humans, the inner part of cerebral hemisphere has opaque white appearance. It is mainly due to the presence of

- (1) Unmyelinated nerve fibres
- (2) Myelinated nerve fibres
- (3) Only cell bodies of the nerve fibres
- (4) Only dendrites of the nerve fibres

163. How many of the following statements is/are not correct?

- a. Ethmoid and sphenoid are unpaired cranial bones.
- b. Sacrum and coccyx in an adult human are examples of fused bones.

c. Mandible and maxilla are paired facial bones.

Select the correct option.

- (1) Zero
- (2) One
- (3) Three
- (4) Two

164. A part of human brain called 'X' has a centre which controls urge for eating.

Identify 'X' and choose the incorrect option w.r.t. it.

- (1) It is the basal part of the diencephalon.
- (2) The hormones released by it regulate the synthesis and secretion of anterior pituitary hormones.
- (3) Along with the limbic system, it regulates the expression of emotional reactions.
- (4) It acts as the major coordinating centre for sensory and motor signalling.

165. How many of the functions mentioned in the box below are regulated by the limbic system of human brain along with the hypothalamus?

Autonomic response, Olfaction, Motivation, Emotional reactions, Sexual behaviour
--

Select the correct option.

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

166. The structure which connects the left and right cerebral hemispheres in human brain is

- (1) Corpus callosum
- (2) Cerebral aqueduct
- (3) Corpora quadrigemina
- (4) A deep longitudinal cleft

167. Choose the option which represents **incorrect** set of facial bones in humans.

- (1) Maxilla, zygomatic, nasal, lacrimal, palatine
- (2) Maxilla, zygomatic, nasal, ethmoid, palatine
- (3) Maxilla, zygomatic, vomer, lacrimal, palatine
- (4) Maxilla, zygomatic, nasal, lacrimal, mandible

168. **Assertion (A)** : Binding of neurotransmitters to receptors on the pre-synaptic membrane can open ion channels that allow entry of only  $\text{Na}^+$ .

**Reason (R)** : Entry of  $\text{Na}^+$  can generate a new action potential in the pre-synaptic neurons.

In the light of above statements, select the **correct** option.

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

(2) Both Assertion and Reason are true but Reason is not the correct explanation of the Assertion.

(3) Assertion is true statement but Reason is false.

(4) Both Assertion and Reason are false statements.

169. On the basis of following characters, identify 'A' and 'B' in a human.

- A. Pliable matrix due to chondroitin salts  
B. Hard matrix due to calcium salts

Select the correct option.

(1) A-Cartilage present at the joint between 8<sup>th</sup> and 7<sup>th</sup> rib,  
B-Sternum

(2) A-Fibula, B-Sternum

(3) A-Hyaline cartilage, B-Fibrous cartilage

(4) A-Fibula, B-Pubic symphysis

170. Select the part of the human brain which has centres that can moderate the cardiac functions through the autonomic nervous system.

- (1) Cerebrum
- (2) Midbrain
- (3) Medulla oblongata
- (4) Corpora quadrigemina

171. All of the following are parts of forebrain, except

- (1) Cerebellum
- (2) Corpus callosum
- (3) Association areas
- (4) Hypothalamus

172. Innermost meninx closest to brain tissue is

- (1) Grey matter
- (2) Pia mater
- (3) Dura mater
- (4) Arachnoid mater

173. In humans, the long slender collar bone articulates with the

- (1) Head of humerus, which forms the shoulder joint
- (2) Scapula, a triangular flat bone present in the ventral part of the thorax
- (3) Acromion, a flat expanded process of spine of scapula
- (4) Glenoid cavity, a depression present above the acromion

174. In humans, a cup-shaped bone called patella covers the knee

- (1) Dorsally
- (2) Ventrally
- (3) Laterally
- (4) Dorso-ventrally

175. In humans, the part of brain that is connected to spinal cord and has centres which control gastric secretions is

- (1) Cerebellum
- (2) Medulla oblongata
- (3) Thalamus
- (4) Hypothalamus

176. Read the given statements and select the **correct** option.

**Statement A** : Unmyelinated nerve fibres in PNS are not enclosed by Schwann cells and are commonly found in autonomous and the somatic neural systems.

**Statement B** : Myelinated nerve fibres are enclosed by Schwann cells and are found in spinal and cranial nerves.

(1) Both the statements A and B are correct

(2) Only statement A is incorrect

(3) Only statement B is incorrect

(4) Both the statements A and B are incorrect

177. Choose the **correct** option to complete the analogy w.r.t an adult human.

Axial skeleton : 80 bones :: Appendicular skeleton :

- (1) 100 bones
- (2) 120 bones
- (3) 126 bones
- (4) 122 bones

178. Scapula is a large triangular bone situated in the dorsal part of the thorax between

- (1) Second and seventh ribs
- (2) First and sixth ribs
- (3) Third and seventh ribs
- (4) First and twelfth ribs

179. Consider an axonal membrane in which a segment gets depolarised. Now, with respect to this segment, the direction of flow of current on the inner surface and on the outer surface of axonal membrane is in which direction?

- (1) Same
- (2) Opposite
- (3) Perpendicular
- (4) Parallel

180. The  $\text{Na}^+ - \text{K}^+$  pump which maintains ionic gradients across the resting neuronal membrane, transports

- (1) 2  $\text{Na}^+$  inwards for 3  $\text{K}^+$  out of the cell
- (2) 2  $\text{K}^+$  outwards for 3  $\text{Na}^+$  into the cell
- (3) 3  $\text{Na}^+$  outwards for 2  $\text{K}^+$  into the cell
- (4) 3  $\text{K}^+$  inwards for 2  $\text{Na}^+$  out of the cell

