PHYSICS

(SECTION-A)

1. The temperature of the sun is measured with
(A) Platinum thermometer
(B) Gas thermometer
(C) Pyrometer
(D) Vapour pressure thermometer

2. Thermoelectric thermometer is based on
(A) Photoelectric effect (B) Seeback effect
(C) Compton effect (D) Joule effect

3. At what temperature the centigrade (Celsius) and Fahrenheit, readings are the same
(A) – 40° (B) + 40°
(C) 36.6° (D) – 37°

4. Mercury thermometers can be used to measure temperatures upto
(A) 100°*C* (B) 212°*C*
(C) 360°*C* (D) 500°*C*

5. Which of the following parameters does not characterize the thermodynamic state of matter
(A) Volume (B) Temperature
(C) Pressure (D) Work

6. A thermally insulated container is divided into two parts by a screen. In one part the pressure and temperature are *P* and *T* for an ideal gas filled. In the second part it is vacuum. If now a small hole is created in the screen, then the temperature of the gas will
(A) Decrease
(B) Increase
(C) Remain same
(C) None of the above

7. A vessel containing 5 *litres* of a gas at 0.8 *m* pressure is connected to an evacuated vessel of volume 3 *litres*. The resultant pressure inside will be (assuming whole system to be isolated)
(A) 4/3 *m* (B) 0.5 *m*
(C) 2.0 *m* (D) 3/4 *m*

8. Two non-reactive monoatomic ideal gases have their atomic masses in the ratio 2 : 3. The ratio of their partial pressures, when enclosed in a vessel kept at a constant temperature, is 4 : 3. The ratio of their densities is:
(A) 1 : 4 (B) 1 : 2
(C) 6 : 9 (D) 8 : 9

9. Ratio among linear expansion coefficient (α), areal expansion coefficient (β) and volume expansion coefficient (γ) is
(A) 1 : 2 : 3 (B) 3 : 2 : 1
(C) 4 : 3 : 2 (D) None of these

10. The equation of state for 5g of oxygen at a pressure P and temperature T, when occupying a volume V, will be :
(A) PV = (5/32) RT (B) PV = 5RT
(C) PV = (5/2) RT (D) PV = (5/16) RT

11. A quantity of heat required to change the unit mass of a solid substance, from solid state to liquid state, while the temperature remains constant, is known as
(A) Latent heat
(B) Sublimation
(C) Hoar frost
(D) Latent heat of fusion

12. Melting point of ice
(A) Increases with increasing pressure
(B) Decreases with increasing pressure
(C) Is independent of pressure
(D) Is proportional to pressure

13. 80 *gm* of water at 30°*C* are poured on a large block of ice at 0°*C*. The mass of ice that melts is
(A) 30 *gm* (B) 80 *gm*
(C) 1600 *gm* (D) 150 *gm*

14. Two liquids *A* and *B* are at 32°*C* and 24°*C*. When mixed in equal masses the temperature of the mixture is found to be 28°*C*. Their specific heats are in the ratio of
(A) 3 : 2 (B) 2 : 3
(C) 1 : 1 (D) 4 : 3

15. The thermal capacity of 40 *gm* of aluminium (specific heat = 0.2 *cal*/*gm*/°*C*) is
(A) 40 *cal*/°*C* (B) 160 *cal*/°*C*
(C) 200 *cal*/°*C* (D) 8 *cal*/°*C*

16. The mechanical equivalent of heat *J* is
(A) A constant
(B) A physical quantity
(C) A conversion factor
(D) None of the above

17. Water falls from a height of 210*m*. Assuming whole of energy due to fall is converted into heat the rise in temperature of water would be (*J* = 4.3 *Joule*/*cal*)
(A) 42°*C* (B) 49°*C*
(C) 0.49°*C* (D) 4.9°*C*

18. 4200 J of work is required for
(A) Increasing the temperature of 10 gm of water through $10°C$
(B) Increasing the temperature of 100 gm of water through $10°C$
(C) Increasing the temperature of 1 kg of water through $10°C$
(D) Increasing the temperature of 10 kg of water through $10°C$

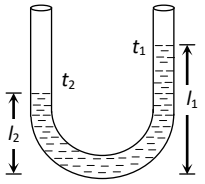
19. Triple point of water is
(A) $273.16°F$ (B) $273.16\ K$
(C) $273.16°C$ (D) $273.16\ R$

20. The amount of work, which can be obtained by supplying 200 cal of heat, is
(A) 840 $dyne$ (B) 840 W
(C) 840 erg (D) 840 J

21. Which of the following is the unit of specific heat
(A) $J\,kg\,°C^{-1}$ (B) $J/kg\,°C$
(C) $kg\,°C/J$ (D) $J/kg\,°C^{-2}$

22. Latent heat of 1gm of steam is 536 cal/gm, then its value in $joule/kg$ is
(A) 2.25×10^{6} (B) 2.25×10^{3}
(C) 2.25 (D) None

23. In a vertical U-tube containing a liquid, the two arms are maintained at different temperatures t_1 and t_2. The liquid columns in the two arms have heights l_1 and l_2 respectively. The coefficient of volume expansion of the liquid is equal to



(A) $\dfrac{l_1-l_2}{l_2t_1-l_1t_2}$ (B) $\dfrac{l_1-l_2}{l_1t_1-l_2t_2}$
(C) $\dfrac{l_1+l_2}{l_2t_1+l_1t_2}$ (D) $\dfrac{l_1+l_2}{l_1t_1+l_2t_2}$

24. Consider a mixture of oxygen and hydrogen kept at room tempertaure. As compared to a hydrogen molecule an oxygen molecule hits the wall
(A) With greater average speed
(B) with smaller average speed
(C) with greater average kinetic energy
(D) with smaller average kinetic energy.

25. In thermodynamic process, 200 $Joules$ of heat is given to a gas and 100 $Joules$ of work is also done on it. The change in internal energy of the gas is
(A) 100 J (B) 300 J
(C) 419 J (D) 24 J

26. If temperature of the gas is increased to three times, then its root mean square velocity becomes :
(A) 3 times (B) 9 times
(C) $\dfrac{1}{2}$ times (D) $\sqrt{3}$ times

27. 300 calories of heat is supplied to raise the temperature of 50 gm of air from 20°C to 30°C without any change in its volume. Change in internal energy per gram of air is
(A) zero (B) 0.6 calories
(C) 1.2 calories (D) 6.0 calories

28. First law of thermodynamics is a special case of
(A) Newton's law
(B) Law of conservation of energy
(C) Charle's law
(D) Law of heat exchange

29. If the ratio of specific heat of a gas at constant pressure to that at constant volume is γ, the change in internal energy of a mass of gas, when the volume changes from V to 2V constant pressure p, is
(A) $R/(\gamma-1)$ (B) pV
(C) $pV/(\gamma-1)$ (D) $\gamma pV/(\gamma-1)$

30. A perfect gas goes from state A to another state B by absorbing $8\times10^{5}J$ of heat and doing $6.5\times10^{5}J$ of external work. It is now transferred between the same two states in another process in which it absorbs $10^{5}J$ of heat. Then in the second process
(A) Work done on the gas is $0.5\times10^{5}J$
(B) Work done by gas is $0.5\times10^{5}J$
(C) Work done on gas is $10^{5}J$
(D) Work done by gas is $10^{5}J$

31. In an isothermal expansion
(A) Internal energy of the gas increases
(B) Internal energy of the gas decreases
(C) Internal energy remains unchanged
(D) Average kinetic energy of gas molecule decreases

32. In an isothermal change, an ideal gas obeys
(A) Boyle's law
(B) Charle's law
(C) Gaylussac law
(D) None of the above

33. A monoatomic gas $(\gamma = 5/3)$ is suddenly compressed to $\frac{1}{8}$ of its original volume adiabatically, then the pressure of the gas will change to
(A) $\frac{24}{5}$
(B) 8
(C) $\frac{40}{3}$
(D) 32 times its initial pressure

34. Which is the correct statement
(A) For an isothermal change PV = constant
(B) In an isothermal process the change in internal energy must be equal to the work done
(C) For an adiabatic change $\frac{P_2}{P_1} = \left(\frac{V_2}{V_1}\right)^{\gamma}$, where γ is the ratio of specific heats
(D) In an adiabatic process work done must be equal to the heat entering the system

35. For adiabatic processes $\left(\gamma = \frac{C_p}{C_v}\right)$
(A) $P^{\gamma}V$ = constant (B) $T^{\gamma}V$ = constant
(C) $TV^{\gamma-1}$ =constant (D) TV^{γ} = constant

(SECTION-B)

36. A gas expands under constant pressure P from volume V_1 to V_2. The work done by the gas is
(A) $P(V_2 - V_1)$ (B) $P(V_1 - V_2)$
(C) $P(V_1^{\gamma} - V_2^{\gamma})$ (D) $P\frac{V_1V_2}{V_2 - V_1}$

37. A diatomic gas initially at $18°C$ is compressed adiabatically to one-eighth of its original volume. The temperature after compression will be
(A) $10^{o}C$ (B) $887^{o}C$
(C) $668\,K$ (D) $144^{o}C$

38. **Assertion :** Air quickly leaking out of a balloon becomes coolers
Reason : The leaking air undergoes adiabatic expansion.
(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 the assertion and reason both are false.

39. Which of the following quantities is zero on an average for the molecules of an ideal gas in equilibrium ?
(A) kinetic energy (B) momentum
(C) density (D) speed

40. Equation for an ideal gas is :
(A) PV = nRT (B) PV^{γ} = constant
(C) $C_p - C_V = R$ (D) none of these

41. In equilibrium, the velocity of molecules of a gas depends on its temperature as
(A) $u \propto T$ (B) $u \propto \frac{1}{T}$
(C) $u \propto \sqrt{T}$ (D) $u \propto T^0$

42. Two balloons are filled, one with pure He gas and the other by air, respectively. If the pressure and temperature of these balloons are same, then the number of molecules per unit volume is
(A) more in the He filled balloon
(B) same in both balloons
(C) more in air filled balloon
(D) in the ratio of 1 : 4

43. The gases carbon-monoxide (CO) and nitrogen at the same temperature and same number of mole have kinetic energies E_1 and E_2 respectively. Then :
(A) $E_1 = E_2$
(B) $E_1 > E_2$
(C) $E_1 < E_2$
(D) E_1 and E_2 cannot be compared

44. When temperature of a gas is increased then which of the following statements is always true ?
(A) Work is done on the gas
(B) Heat is supplied to gas
(C) Internal energy of gas is increased
(D) pressure of gas remains unchanged.

45. The root mean square and most probable speed of the molecules in a gas are

(A) same

(B) different

(C) cannot say

(D) depends on nature of the gas

46. The internal energy of a mono-atomic gas is -

(A) $\frac{5RT}{2}$ (B) $\frac{3RT}{2}$

(C) $\frac{5RT}{3}$ (D) $\frac{7RT}{3}$

47. In the isothermal expansion of an ideal gas. Select wrong statement:

(A) there is no change in the temperature of the gas

(B) there is no change in the internal energy of the gas

(C) the work done by the gas is equal to the heat supplied to the gas

(D) the work done by the gas is equal to the change in its internal energy

48. **Assertion :** The melting point of ice decreases with increase of pressure.

Reason : Ice contracts on melting.

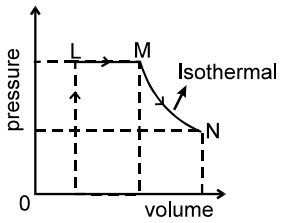
(A) If both assertion and reason are true and reason is the correct explanation of assertion.

(B) If both assertion and reason are true but reason is not the correct explanation of assertion.

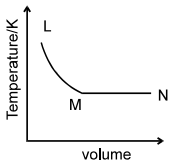
(C) If Assertion is true but reason is false.

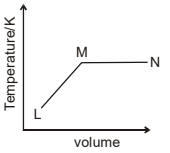
(D) If both assertion and reason are false.

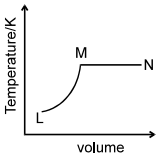
49. A fixed mass of ideal gas undergoes changes of pressure and volume starting at L, as shown in Figure.

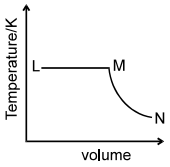


Which of the following is correct :

(A) 

(B) 

(C) 

(D) 

50. Match **Column – I** and **Column – II** and choose the correct from the given choices.

Column – I		**Column – II**	
(i)	Root mean square speed of gas molecules	(P)	$\frac{1}{3}nmv^{-2}$
(ii)	Pressure exerted by ideal gas	(Q)	$\sqrt{\frac{3RT}{M}}$
(iii)	Average kinetic energy of a molecule	(R)	$\frac{5}{2}RT$
(iv)	Total internal energy of 1 mole of a diatomic gas	(S)	$\frac{3}{2}k_BT$

(A) (i) - (R),(ii) - (P),(iii) - (S),(iv) - (Q)

(B) (i) - (Q),(ii) - (R),(iii) - (S),(iv) - (P)

(C) (i) - (Q),(ii) - (P),(iii) - (S),(iv) - (R)

(D) (i) - (R),(ii) - (Q),(iii) - (P),(iv) - (S)

(SECTION-A)

51. In which of the following reactions, increase in the pressure at constant temperature does not affect the moles at equilibrium with ?

(A) $2NH_3(g) \rightleftharpoons N_2(g) + 3H_2(g)$

(B) $C(g) + \frac{1}{2} O_2(g) \rightleftharpoons CO(g)$

(C) $H_2(g) + \frac{1}{2} O_2(g) \rightleftharpoons H_2O(g)$

(D) $H_2(g) + I_2(g) \rightleftharpoons 2\,HI(g)$

52. The conditions favourable for the reaction : $2SO_2(g)+O_2(g) \rightleftharpoons 2SO_3(g)$; $\Delta H° = -198$ kJ are :

(A) low temperature, high pressure
(B) any value of T and P
(C) low temperature and low pressure
(D) high temperature and high pressure

53. The yield of product in the reaction
$2A(g) + B(g) \rightleftharpoons 2C(g) + Q$ kJ
would be lower at :
(A) low temperature and low pressure
(B) high temperature & high pressure
(C) low temperature and high pressure
(D) high temperature & low pressure

54. Which of the following statements is false in case of equilibrium state ?
(A) There is no apparent change in properties with time
(B) It is dynamic in nature
(C) It can be attained from either side of the reaction
(D) It can be attained from the side of the reactants only

55. At any moment before a reversible reaction attains equilibrium it is found that –
(A) The rate of the forward reaction is increasing and that of backward reaction is decreasing
(B) The rate of the forward reaction is decreasing and that of backward reaction is increasing
(C) The rate of both forward and backward reactions is increasing
(D) The rate of both forward and backward` reactions is decreasing

56. According to Law of Mass action, the rate of reaction is directly proportional to -
(A) molarities of the reactants
(B) normalities of the reactants
(C) molalities of the reactants
(D) mole fractions of the reactants

57. The value of K_P for the reaction $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ is 50. What is the value of K_C ?
(A) 30 (B) 40 (C) 50 (D) 70

58. In which of the following reaction, the value of K_P will be equal to K_C ?
(A) $N_2(g) + O_2(g) \rightleftharpoons 2NO\ (g)$
(B) $PCl_5\ (g) \rightleftharpoons PCl_3\ (g) + Cl_2(g)$
(C) $2NH_3\ (g) \rightleftharpoons N_2(g) + 3H_2(g)$
(D) $2SO_2\ (g) + O_2(g) \rightleftharpoons 2SO_3\ (g)$

59. At 444º C, the equilibrium constant K for the reaction

$2AB_{(g)} \rightleftharpoons A_{2(g)} + B_{2(g)}$ is $\frac{1}{64}$.

The degree of dissociation of AB will be -
(A) 10% (B) 20 %
(C) 30% (D) 50%

60. In a chemical equilibrium, the equilibrium constant is found to be 2.5. If the rate constant of backward reaction is 3.2×10^{-2}, the rate constant of forward reaction is -
(A) 8.0×10^{-2} (B) 4.0×10^{-2}
(C) 3.5×10^{-2} (D) 7.6×10^{-3}

61. For the reaction
$C\ (s) + CO_2\ (g) \rightleftharpoons 2CO\ (g)$
the partial pressure of CO_2 and CO are 2.0 and 4.0 atm respectively at equilibrium. The K_p for the reaction is –
(A) 0.5 (B) 4.0
(C) 8.0 (D) 32.0

62. $\frac{K_p}{K_c}$ for the gaseous reaction –

(a) $2\,A + 3\,B \rightleftharpoons 2C$

(b) $2\,A \rightleftharpoons 4B$

(c) $A + B + 2C \rightleftharpoons 4D$

would be respectively -
(A) $(RT)^{-3}$, $(RT)^2$, $(RT)^{\circ}$
(B) $(RT)^{-3}$, $(RT)^{-2}$, $(RT)^{-1}$
(C) $(RT)^{-3}$, $(RT)^2$, (RT)
(D) None of the above

63. An unknown compound A dissociates at 500ºC to give products as follows -

$A(g) \rightleftharpoons B(g) + C(g) + D(g)$

Vapour density of the equilibrium mixture is 50 when it dissociates to the extent to 10%. What will be the molecular weight of compound A ?

(A) 120 (B) 130
(C) 134 (D) 140

64. In the reaction, $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g) + X$ cal, most favourable condition of temperature and pressure for greater yield of SO_3 are –

(A) Low temperature and low pressure
(B) High temperature and low pressure
(C) High temperature and high pressure
(D) Low temperature and high pressure

65. The reaction in which the yield of the products can not be increased by the application of high pressure is

(A) $PCl_3(g) + Cl_2(g) \rightleftharpoons PCl_5(g)$
(B) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$
(C) $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$
(D) $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$

66. Which of the following will shift the reaction $PCl_3(g) + Cl_2(g) \rightleftharpoons PCl_5(g)$ to the left side?

(A) Addition of PCl_5
(B) Increase in pressure
(C) Decrease in temperature
(D) Catalyst

67. Consider the reaction, $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$; in closed container at equilibrium. What would be the effect of addition of $CaCO_3$ on the equilibrium concentration of CO_2 ?

(A) Increases
(B) Decreases
(C) Remains unaffected
(D) Data is not sufficient to predict it

68. In chemical reaction $A \rightleftharpoons B$, the system will be known in equilibrium when

(A) A completely changes to *B*
(B) 50% of *A* changes to *B*
(C) The rate of change of *A* to *B* and *B* to *A* on both the sides are same
(D) Only 10% of *A* changes to *B*

69. The active mass of 64 gm of HI in a two litre flask would be

(A) 2 (B) 1
(C) 5 (D) 0.25

70. In the reversible reaction $A + B \rightleftharpoons C + D$, the concentration of each *C* and *D* at equilibrium was 0.8 mole/litre, then the equilibrium constant K_c will be

(A) 6.4 (B) 0.64
(C) 1.6 (D) 16.0

71. The equilibrium constant in a reversible reaction at a given temperature

(A) Depends on the initial concentration of the reactants
(B) Depends on the concentration of the products at equilibrium
(C) Does not depend on the initial concentrations
(D) It is not characteristic of the reaction

72. $CH_3COOH_{(l)} + C_2H_5OH_{(l)} \rightleftharpoons CH_3COOC_2H_{5(l)} + H_2O_{(l)}$ In the above reaction, one mole of each of acetic acid and alcohol are heated in the presence of little conc. H_2SO_4. On equilibrium being attained

(A) 1 mole of ethyl acetate is formed
(B) 2 mole of ethyl acetate are formed
(C) 1/2 moles of ethyl acetate is formed
(D) 2/3 moles of ethyl acetate is formed

73. **Assertion :** pH of blood is maintained inspite of acidic foods.

Reason : Acidity of foods is not so large to change the pH of blood.

(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 both assertion and reason are false

74. Which of the following can act both as Bronsted acid and Bronsted base ?

(A) Cl^- (B) HCO_3^-
(C) H_3O^+ (D) OH^-

75. The degree of dissociation in a weak electrolyte increases :

(A) On increasing dilution
(B) On increasing pressure
(C) On decreasing dilution
(D) None of these

76. Which one has pH =12 ?

(A) 0.01 M KOH (B) 1 M KOH
(C) 1 M NaOH (D) 0.5 M $Ca(OH)_2$

77. The pH value of 1.0×10^{-8} M HCl solution is less than 8 because

(A) HCl is completely ionised at this concentration
(B) The ionization of water is negligible
(C) The ionization of water cannot be assumed negligible in comparison with this low concentration of HCl
(D) The pH cannot be calculated at such a low concentration of HCl

78. The hydrolysis constant of 0.5 M ammonium benzoate is 6.25×10^{-6}. The percentage hydrolysis of the salt is :

(A) 0.25 (B) 0.177
(C) 0.125 (D) 0.50

79. Buffer solutions have constant acidity and alkalinity because :

(A) these give unionised acid or base on reaction with added acid or alkali.
(B) acids and alkalies in these solution are shielded from attack by other ions.
(C) they have large excess of H^+ or OH^- ions.
(D) they have fixed value of pH.

80. The conjugate acid of NH_2^- is

(A) NH_3 (B) NH_2OH
(C) NH_4^+ (D) N_2H_4

81. For a binary weak electrolyte, the degree of dissociation is proportional to the-

(A) Dilution
(B) Square root of dilution
(C) Concentration
(D) Square root of concentration

82. If the first, second and third ionisation constant of a tribasic acid are K_{a1} & K_{a2} and K_{a3} respectively then –

(A) $K_a = K_{a_1} \times K_{a_2} \times K_{a_3}$ (B) $K_a = \dfrac{K_{a_1}}{K_{a_2} \times K_{a_3}}$

(C) $K_{a_2} = \dfrac{K_{a_1} \times K_a}{K_{a_3}}$ (D) None of these

83. Ostwald's dilution law for a weak acid HA may be given as –

(A) $K_a = \dfrac{\alpha.c}{(1-\alpha)c}$ (B) $K_a = \dfrac{\alpha^2.c}{(1-\alpha)}$

(C) $K_a = \left(\dfrac{\alpha^2}{(1-\alpha)}.c\right)^2$ (D) $K_a = \dfrac{\alpha^2.c}{1-\alpha^2}$

84. The pK_w of water at 50º C is 13.40. An aqueous solution at 50ºC has pH = 7. This solution is–

(A) Acidic (B) Alkaline
(C) Neutral (D) Amphoteric

85. For an acid solution the $[OH^-]$ is –

(A) $> 10^{-7}$ (B) $< 10^{-7}$
(C) 10^{-14} (D) 10^{-7}

(SECTION-B)

86. The pH of two solutions are 5 and 3 respectively. What will be the pH of the solution made by mixing equal volumes of the above solutions?

(A) 3.5 (B) 4.5 (C) 3.3 (D) 4.0

87. If $pK_b > pK_a$ then the solution of the salt of weak acid and weak base will be -

(A) Neutral (B) Acidic
(C) Basic (D) Amphoteric

88. For a salt of weak acid and weak base [$pK_a - pK_b$] would be equal to –

(A) 2 pH + pK_w (B) 2 pH – log 10^{-14}
(C) 2 pH – pK_w (D) None of these

89. The solution of blue vitriol in water is acidic because –

(A) $CuSO_4$ reacts with water
(B) Cu^{2+} reacts with water
(C) SO_4^{2-} reacts with water
(D) $CuSO_4$ removes OH^- ions from water

90. Which one of the following mixture does not act as a buffer solution?

(A) Boric acid and borax
(B) Sodium phosphate & disodium hydrogen phosphate
(C) Sodium propionate and propionic acid
(D) Sodium acetate and sodium propionate

91. If s is the molar solubility of Ag_2SO_4, then –

(A) 3 $[Ag^+]$ = s (B) $[Ag^+]$ = s
(C) $[2Ag^+]$ = s (D) [SO_4^{2-}] = s

92. The pH of buffer of $NH_4OH + NH_4Cl$ - type is given by -

(A) pH = pK_b
(B) pH = 1/2pK_b – 1/2 log [salt]/[base]
(C) pH = 14 – pK_b – log [salt]/[base]
(D) pH = pOH – pK_b + [salt]/ [base]

93. Which of the following will produce a buffer solution when mixed in equal volumes ?
(A) 0.1 mol dm^{-3} NH_4OH and 0.1 mol dm^{-3} HCl
(B) 0.05 mol dm^{-3} NH_4OH and 0.1 mol dm^{-3} HCl
(C) 0.1 mol dm^{-3} NH_4OH and 0.05 mol dm^{-3} HCl
(D) 0.1 mol dm^{-3} CH_4COONa and 0.1 mol dm^{-3} NaOH

94. pH range of colour change for methyl orange indicator is-
(A) 6.2 - 7.6 (B) 4.0 - 5.6
(C) 3.2 - 4.4 (D) 9.4 - 10.6

95. Methyl Orange is-
(A) Acidic indicator
(B) Basic Indicator
(C) Neutral
(D) None of the above

96. The aqueous solution of which of the following sulphides would contain maximum concentration of S^{2-} ions?
(A) MnS ($K_{sp} = 1.1 \times 10^{-21}$)
(B) ZnS ($K_{sp} = 1.1 \times 10^{-23}$)
(C) PbS ($K_{sp} = 1.1 \times 10^{-35}$)
(D) CuS ($K_{sp} = 1.1 \times 10^{-30}$)

97. **Assertion :** The equilibrium constant for the reaction $CaSO_4.5H_2O(s) \rightleftharpoons CaSO_4.3H_2O(s) + 2H_2O(g)$ is

$$K_C = \frac{[CaSO_4.3H_2O][H_2O]^2}{[CaSO_4.5H_2O]}$$

Reason : Equilibrium constant is the ratio of the product of molar concentration of the substances produced to the product of the molar concentrations of reactants with each concentrations term raised to the power equal to the respective stoichiometric 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.

98. **Assertion :** The value of K gives us a relative idea about the extent to which a reaction proceeds.
Reason : The value of K is independent of the stochiometry of reactants and products at the point of equilibrium.
(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.

99. **Assertion :** A ionic product is used for any types of electrolytes whereas solubility product is applicable only to sparingly soluble salts.
Reason : Ionic product is defined at any stage of the raction whereas solubility product is only appicable to the saturation stage.
(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.

100. **Assertion :** A solution of $FeCl_3$ in water produce brown precipitate on standing.
Reason : Hydrolysis of $FeCl_3$ takes place in water
(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.

BIOLOGY

BOTANY (SECTION-A)

101. Read the following four statements (A-D) on photosynthesis.

A. Photosynthesis is an oxidoreductive process.

B. The stroma of chloroplast is responsible for the synthesis of ATP and NADPH.

C. Membrane system of chloroplast is responsible for photochemical reaction.

D. Photosynthesis does not take place in the ground tissue of leaves.

Select the right option having both incorrect statements.

(A) (A) and (D) (B) (B) and (D)
(C) (B) and (C) (D) (C) and (D)

102. The first action spectrum. of photosynthesis was described by __A__ using __ B__ and __C__.

	A	B	C
(A)	T. W. Engelmann	Cladophora	Anaerobic bacteria
(B)	T. W. Engelmann	Cladophora	Aerobic bacteria
(C)	Jan Ingenhousz	Spirogyra	Aerobic bacteria
(D)	Julius von Sachs	Chlorella	Anaerobic bacteria

103. Name of the scientist who first reported that plants purify foul air.

(A) Van Niel (B) Joseph Priestley
(C) Robin hill (D) Ingenhousz

104. ____showed that in the presence of sunlight, only the green parts of the plants could release oxygen.

(A) Ingenhousz (B) Van Niel
(C) Priestley (D) Julius von Sachs

105. _____found that glucose is produced in the green part of the plant.

(A) Joseph Priestley
(B) T. W. Engelmann
(C) Julius Von Sachs
(D) Jan Ingenhousz

106. Select the incorrect match.

(A) T. W. Engelmann-Action spectrum
(B) Blackman-Law of limiting factor
(C) Van Neil-Enhancement effect
(D) Melvin Calvin C3 pathway

107. Match the following and choose the correct option.

Column I	Column II
(A) Chlorophyll *a*	(i) Yellow orange
(B) Chlorophyll *b*	(ii) Yellow
(C) Xanthophyll	(iii) Blue green
(D) Carotene	(iv) Yellow green

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

108. The graphic curve showing the relative rates of photosynthesis at different wavelengths of light

(A) Is absorption spectrum.
(B) Is action spectrum.
(C) Was first worked out by Engelmann.
(D) Both (B) and (C).

109. The primary pigment of photosynthesis

(A) Forms the reaction centre of photosystem.
(B) Forms the antenna molecule.
(C) Is chlorophyll a molecule.
(D) All, except (B).

110. Maximum photosynthesis takes place in the light of visible spectrum

(A) Red and far red. (B) Blue and violet.
(C) Green. (D) Blue and red.

111. Who received the Nobel Prize for working out the early carbon pathway of photosynthesis?

(A) Calvin (B) Krebs
(C) Von Niel (D) Kamen

112. Which fraction of the visible spectrum of solar radiations is primarily absorbed by carotenoids of higher plants?

(A) Violet and blue
(B) Blue and green
(C) Green and red
(D) Yellow and orange

113. Match the column and choose the correct option with X respect to chloroplast.

Column I	Column II
A. Light reaction	(i) Enzymatic process
B. Dark reaction	(ii) Synthesis of assimilatory power
	(iii)Membranous system
	(iv) Photolysis of water
	(v) RuBisCo

A	B
(A) (ii), (iii), (iv)	(i), (v)
(B) (iii), (iv)	(i), (ii), (v)
(C) (i), (iii), (iv)	(ii), (iv)
(D) (ii), (v)	(ii), (iii), (iv)

114. Discovery of Emerson effect has clearly shown the existence of
(A) Two distinct photochemical reactions of processes.
(B) Photorespiration.
(C) Light and dark reactions in photosynthesis.
(D) Two types of photo system.

115. For evolution of one molecule of oxygen, how many light quanta are required?
(A) Four (B) Eight
(C) Six (D) Twelve

116. Read the following four statements A, B, C, and D and select the correct option having both incorrect statements.
(A) Antennae molecules are made up of hundreds of pigment molecules bound to proteins.
(B) Antennae pigments help to make photosynthesis more efficient by absorbing different wavelength of light.
(C) Only PS II is function in cyclic photophosphorylation.
(D) In PS I, the reaction centre is chlorophyll a, which absorbs light of 680 nm.
(A) (A) and (C) (C) (C) and (D)
(B) (B) and (C) (D) (B) and (D)

117. Red drop discovered by Emerson is due to the disruption of photochemical activity of
(A) Carotenoids.
(B) PS I.
(C) PS II.
(D) Both (B) and (C).

118. Photosystem consists of
(A) Reaction centre.
(B) Antenna molecule.
(C) Primary electron acceptor.
(D) All of these.

119. The reaction centre of PS I is __A__ and the reaction centre of PS II is____
(A) P_{680}, P_{700}. (B) P_{700}, P_{680}.
(C) P_{700}, P_{780}. (D) P_{780}, P_{700}.

120. The primary electron acceptor in photophosphorylation in the light phase is noncyclic
(A) Ferredoxin. (B) Cytochrome b.
(C) Pheophytin. (D) Plastocyanin.

121. Which of the following generates the proton gradient across the thylakoid membrane?
(A) Spitting of water in thylakoid lumen
(B) Removal of electrons from stroma to outside during ETS
(C) Reduction of NADP to NADPH by NADP reductase enzyme
(D) All of these

122. Which of the chemiosmosis? following is not the requirement of
(A) Proton pump
(B) Proton gradient
(C) ATP synthase
(D) More proton in stroma than in lumen

123. Statement A: PS II is located in the appressed region grana thylakoid.of
Statement B: PS II absorbs light of 680 nm of visible spectrum.
Select the correct option.
(A) Only (A) is correct.
(B) Only (B) is correct.
(C) Both (A) and (B) are correct.
(D) Both (A) and (B) are incorrect.

124. Read the following statements and state them as true (T) and false (F).
A. A photosystem consists of a reaction centre, LHC, and an electron acceptor.
B. The final acceptor of electrons during noncyclic flow of electron is $NADP^+$.
C. During phosphorylation, the chloroplast stroma become more acidic than the interior of thylakoid membrane.
D. The cytochrome system transports electron and pumps H^+ from stroma to thylakoid membrane.

	A	B	C	D
(A)	T	F	F	T
(B)	T	T	F	T
(C)	F	F	T	T
(D)	T	T	F	F

125. Enzyme ATPase is made up of two component F_0 and F_1.Which of these undergo conformational changes due to the breakdown of proton gradient to release energy?
(A) F_0
(B) F_1
(C) Both F_0 and F_1
(D) NADP reductase

126. The first step of Z scheme is
(A) Splitting of water.
(B) Photoexcitation of chlorophyll molecule.
(C) Release of oxygen.
(D) Synthesis of reducing power.

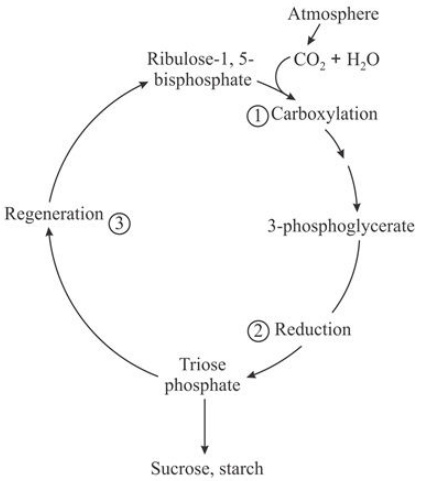
127. Where does the dark reaction of photosynthesis takes place?
(A) Stroma of chloroplast
(B) Thylakoid lumen
(C) Thylakoid membrane
(D) Non-appressed part of grana

128. The biosynthetic phase of photosynthesis
(A) Involves use of ATP and NADPH to produce sugar.
(B) Takes place in the stroma of chloroplast.
(C) Does not depend directly on the presence of light.
(D) Depends on the product of light reaction.
The correct statements are
(A) Only (B) and (C).
(B) Only (A), (B), and (C).
(C) Only (A) and (C).
(D) (A), (B), (C), and (D).

129. The numbers of ATP molecules consumed for the synthesis of one glucose molecule by rice and maize plants are, respectively,
(A) 18, 30. (B) 18, 12.
(C) 18, 18. (D) 30, 18.

130. Kranz anatomy is one of the features of the leaves of
(A) C_3 plants only.
(B) C_4 plants only.
(C) C_4 and CAM plants.
(D) C_3 and C_4 plants.

131. Study the cyclic pathway given below.



Select the incorrect statement with respect to the above pathway.
(A) The first step is the most crucial step.
(B) Carboxylation is catalysed by the RuBisCo enzyme, which results in the formation of the first stable product.
(C) The second step involves utilisation of ATP and NADPH.
(D) Both ATP and ribulose 1,5 bisphosphate regenerate during step 3.

132. The correct sequence of cell organelles involved in photorespiration is
(A) Chloroplast, peroxisome, mitochondria.
(B) Peroxisome, mitochondria, chloroplast.
(C) Mitochondria, chloroplast, peroxisome.
(D) Chloroplast, mitochondria, peroxisome.

133. Consider the following statements on C_4 plants and select the correct option.
(A) They are adapted to dry temperate regions.
(B) They have a special type of leaf anatomy.
(C) They show response to high light intensities.
(D) They lack a process called photorespiration.
(A) (A) and (C) are correct.
(B) (A), (B), and (D) are correct.
(C) (B), (C), and (D) are correct.
(D) (A), (B), (C), and (D) are correct.

134. The primary acceptor of CO, in sugarcane plant is
(A) RuBP. (B) PEP.
(C) OAA. (D) Malic acid.

135. The C_4 plants are more photosynthetically efficient than C_3 plants because
(A) The CO_2 compensation point is more.
(B) CO_2 generated during photorespiration is trapped and recycled through PEP carboxylase.
(C) They have more chloroplast.
(D) The C_4 pathway allows photosynthesis to occur at very low concentration of CO_2.

(SECTION-B)

136. High photosynthetic efficiency is found in
(A) C_3 plants.
(B) C_4 plants.
(C) CAM plants.
(D) C_4 and CAM plants.

137. In C_4 plants
(i) Light reaction occurs in __A__
(ii) C_4 pathway occurs in __ B__
(iii) C_3 pathway occurs in __C__

	A	B	C
(A)	Mesophyll cell chloroplast	Mesophyll cell chloroplast	Bundle sheath cell chloroplast
(B)	Bundle sheath cell chloroplast	Mesophyll cell chloroplast	Bundle sheath cell chloroplast
(C)	Mesophyll cell chloroplast	Mesophyll cell cytoplasm	Bundle sheath cell chloroplast
(D)	Mesophyll cell chloroplast	Mesophyll cell chloroplast	Bundle sheath cell cytoplasm

138. In *Opuntia*, the concentration of organic acid
(A) Increases during the day.
(B) Decreases during the day.
(C) Decreases during night,
(D) Both (A) and (C).

139. Read the following statements and select the correct option.
A. C_4 plants gave greater productivity of biomass.
B. C_4 plants have double carboxylation separation by time.
C. Chloroplast in bundle sheath cell lacks RuBisCo.
(A) Only (A) is correct.
(B) (A) and (B) are correct.
(C) (B) and (C) are correct.
(D) (A), (B), and (C) are correct.

140. Substrate for photorespiration is
(A) Glyoxylate. (B) Glycolate.
(C) Glycine. (D) RuBP.

141. C_4 plants are adapted to saline environment due to
(A) Occurrence of organic acids.
(B) Kranz anatomy.
(C) Dimorphic chloroplast.
(D) All of these.

142. Which of the following holds false with respect to photorespiration?
(A) Chloroplast: oxygenation of RuBP
(B) Peroxisome: Glycolate oxidised into glyoxylate
(C) Mitochondria: Serine covered into glycine
(D) Peroxisome: Glycosylate converted into glycine

143. The overall reaction
$CO_2 + H_2O + NADPH_2 + ATP \rightarrow Sugar + ADP + iP + NADP^+$
(A) Represents the Hill reaction of photosynthesis.
(B) Is an exergonic process.
(C) Requires many enzymes.
(D) More than one option is correct.

144. I. Primary CO_2 acceptor
II. Extent of photorespiration
III. Presence of Calvin cycle
IV. Leaf anatomy
V. Carboxylase enzyme
Which one does not differ between C, and C, plants?
(A) I and V (B) Only III
(C) II and III (D) (IV) and (V)

145. Who gave the "law of limiting factors"?
(A) Emerson (B) Jan Ingenhousz
(C) Blackman (D) Engelmann

146. CO_2 saturation point for C_3 plants (A) and C_4 plants (B) is

	A	B
(A)	360 µL/L	450 µL/L
(B)	450 µL/L	360 µL/L
(C)	250 µL/L	150 µL/L
(D)	360 µL/L	650 µL/L

147. Read the following statements and state them as true (T) or false (F).
A. If CO_2 concentration increases up to 0.05%, the rate of photosynthesis increases for short terms.
B. The C_3 and C_4 plants respond similarly to CO_2 concentration.
C. C_3 plants respond to high temperature and show higher photosynthetic rate.
D. Light reaction is less temperature sensitive than dark reaction.

	A	B	C	D
(A)	T	F	F	T
(B)	T	F	F	F
(C)	F	T	T	F
(D)	F	F	T	T

148. C_3 plants respond to higher CO_4 concentration by showing increased rates of photosynthesis, leading to higher productivity. This feature has been used for some greenhouse crops such as
(A) Maize and sugarcane.
(B) Wheat and sorghum.
(C) Tomato and sugarcane.
(D) Tomato and bell pepper.

149. Given below are two statements :

Statement I : The forces generated transpiration can lift a xylem-sized column of water over 130 meters height.

Statement II : Transpiration cools leaf surfaces sometimes 10 to 15 degrees evaporative cooling.

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

(A) Both **Statement I** and **Statement II** are correct

(B) Both **Statement I** and **Statement II** are incorrect

(C) **Statement I** is correct but **Statement II** is incorrect

(D) **Statement I** is incorrect but **Statement II** is correct

150. Match **List I** with **List II** :

List I

A. Cohesion

B. Adhesion

C. Surface tension

D. Guttation

List II

I. More attraction in liquid phase

II. Mutual attraction among water molecules

III. Water loss in liquid phase

IV. Attraction towards polar surfaces

Choose the **correct** answer from the options given below :

(A) A – II, B – IV, C – I, D – III

(B) A – IV, B – III, C – II, D – I

(C) A – III, B – I, C – IV, D – II

(D) A – II, B – I, C – IV, D – III

ZOOLOGY (SECTION-A)

151. Erythrocytes, leucocytes and platelets are collectively called formed elements and they constitute nearly____ percent of blood.

(A) 45 (B) 75 (C) 25 (D) 90

152. Identify the wrong statement w.r.t. leucocytes.

(A) They are colourless due to lack of haemoglobin.

(B) They are devoid of nucleus.

(C) Lymphocytes and monocytes are agranulocytes.

(D) Neutrophils, basophils and eosinophils are different types of granulocytes.

153. Plasma without the clotting factors is called

(A) Lymph (B) Blood

(C) Serum (D) Interstitial fluid

154. Which of the following is an incorrect statement w.r.t. blood plasma?

(A) It is a straw coloured, viscous fluid constituting 55% of blood.

(B) Fibrinogen, globulins and albumins are the major plasma proteins.

(C) Plasma also has small amount of minerals like Na^+, Ca^{2+}, Mg^{2+}, HCO_3^-, Cl^-, etc.

(D) Factor for coagulation or clotting of blood are also present in the plasma in active form.

155. Match the options given in column I with those in column II.

Column I	**Column II**
A. Albumin	(i) Defence mechanism
B. Globulin	(ii) Osmotic balance
C. Fibrinogen	(iii) Blood coagulation

(A) A-(i), B (ii), C-(iii)

(B) A-(ii), B-(i), C-(iii)

(C) A-(iii), B-(i), C-(ii)

(D) A-(iii), B-(ii), C-(i)

156. Which of the following statements are incorrect?

(i) Important role of lymphocytes is to produce antibodies.

(ii) Neutrophils have multilobed nucleus.

(iii) Basophils are formed by breakdown of megakaryocytes.

(iv) Monocytes have large round nucleus.

(v) The normal WBC count in blood is 6000-8000 mm^3.

(A) (i) and (ii) (B) (ii) and (iii)

(C) (iii) and (iv) (D) (iv) and (v)

157. The blood group AB cannot be given to a recipient with blood group A, because

(A) the recipient has antibodies B

(B) the recipient has antibodies A

(C) the recipient has antigen B

(D) the recipient lacks antibodies B

158. Select the incorrect statement from the following:

(A) Vitamin K is used for synthesis of prothrombin.

(B) Deficiency of clotting factor IX causes Christmas disease.

(C) Citrates and oxalates act as anticoagulants by chelating calcium from blood.

(D) Blood clot is formed by polymerization of monomers of fibrinogen.

159. The role of enzyme thrombokinase is

(A) Conversion of fibrinogen into fibrin

(B) Conversion of prothrombin into thrombin

(C) Formation of urea in liver

(D) Cellular respiration

160. Erythroblastosis foetalis is a disorder due to Rh blood groups if the blood groups of father and mother are, respectively.
(A) Rh $^{-}$ve and Rh $^{+}$ve
(B) Rh $^{+}$ve and Rh $^{-}$ve
(C) Rh $^{+}$ve and Rh $^{+}$ve
(D) Rh $^{-}$ve and Rh $^{-}$ve

161. The blood corpuscles lacking nuclei are.
(A) Platelets and neutrophils
(B) Platelets and erythrocytes
(C) Erythrocytes and lymphocytes
(D) Basophils and eosinophils

162. Select the correct statement w.r.t. safe blood transfusion..
(A) The donor RBCs should not contain antibodies against recipient serum.
(B) The recipient serum should not contain antibodies against donor RBC antigens.
(C) The recipient serum should not contain antigens against antibodies present in donor serum.
(D) The recipient RBCs should not have antigens found on donor RBCs.

163. The first heart sound is produced
(A) When semilunar valves close
(B) In the beginning of atrial systole
(C) In the beginning of ventricular systole due to close down of AV valves
(D) In the beginning of ventricular diastole

164. The volume of blood pumped by each ventricle during a cardiac cycle is
(A) Called stroke volume
(B) Around 70 mL
(C) Reduced in patients with heart failure
(D) All of the above are correct

165. The pulmonary artery is connected to the aorta during foetal life by
(A) Foramen ovale
(B) Ductus arteriosus
(C) Fossa ovalis
(D) Ductus venosus

166. Select the incorrect statement from the following:
(A) The wall of ventricles is thicker than the wall of atria.
(B) Heart murmurs are heard using stethoscope in case of defectives and leaky valves.
(C) Contraction of right ventricle pump blood into systemic aorta.
(D) All vertebrates have muscular chambered heart.

167. Read the following statements:
(i) Vasa vasorum are small blood vessels supplying the walls of thicker vessels.
(ii) Systemic heart refers to the left atrium and left ventricle in higher vertebrates.
(iii) Chordae tendineae prevent the bulging of AV valves into ventricles during strong atrial contraction.
(iv) Stimulation of vagus nerve increases the heart rate. Which of the above statements are correct?
(A) (i) and (ii) (B) (i) and (iii)
(C) (iii) and (iv) (D) (i) and (iv)

168. Which of the following valves is in contact withoxygenated blood only?
(A) Thebesian valve
(B) Eustachian valve
(C) Right atrioventricular valve
(D) Mitral valve

169. Read the following statements and choose the correct option:
Statement I: The simultaneous contraction of both the atria causes atrial systole which increases the flow of blood into ventricles by about 30 percent.
Statement II: During ventricular systole, oxygenated blood is pumped into aorta while deoxygenated blood is pumped into pulmonary arteries.
(A) Both statements are correct
(B) Both statements are incorrect
(C) Only statements I is correct
(D) Only statements II is correct

170. Athletes have lower heart rate than others due to
(A) Lower cardiac output
(B) Higher stroke volume
(C) Slow metabolism
(D) Higher adrenaline levels

171. If a person goes into cardiac arrest, the ECG shows
(A) Flattened P-wave
(B) Flattened QRS complex
(C) Flattened T-wave
(D) All of these

172. Human heart is termed myogenic because
(A) Sympathetic nerves can increase the heart rate
(B) Heart has thick layer of cardiac muscle in its wall
(C) Impulse for heart beat is generated in the pacemaker
(D) Impulse for heart beat is generated outside the heart

173. Which of the following is the correct pathway for the conduction of impulse in heart?
(A) SA node-AV bundle -AV node-Purkinje fibres
(B) AV node-SA node-AV bundle-Purkinje fibres
(C) SA node-AV node-AV bundle-Purkinje fibres
(D) AV bundle-SA node-AV node-Purkinje fibres

174. Insufficient flow of blood to the walls of heart is called
(A) Oedema (B) Ischaemia
(C) Bradycardia (D) Heart block

175. Which of the following is an incorrect statement?
(A) Rise in blood pressure beyond 140 mmHg (systolic) and 90 mmHg (diastolic) is called hypertension.
(B) Congestion of lungs is seen in patients with heart failure.
(C) Interrupted blood flow to the walls of heart causes stroke.
(D) Dextrocardia is a condition in which heart is shifted to right side.

176. Deposition of cholesterol, fats, fibres and lipids in the walls of arteries resulting in narrowing of their lumen is called
(A) Cardiac arrest (B) Atherosclerosis
(C) Heart failure (D) Fibrillation

177. Read the following statements:
Statement I: A portal vein does not carry blood directly to heart but forms a network of capillaries in another or intermediate organ before reaching the heart.
Statement II: Hepatic and hypophysial portal systems are present in humans.
Select the correct option:
(A) Both statements are correct
(B) Both statements are incorrect
(C) Only statements I is correct
(D) Only statement II is correct

178. The wastes removed from blood during Krebs Henseleit cycle are
(A) CO and ammonia
(B) CO, and Urea
(C) CO, and ammonia
(D) Uric acid and urea

179. Choose the odd one w.r.t. uricotelic animals:
(A) Birds
(B) Reptiles
(C) Land snails
(D) Aquatic amphibians

180. Which of the following is an incorrect statement?
(A) Many terrestrial amphibians, mammals and marine fishes excrete urea.
(B) Flame cells are the excretory structures in flatworms, rotifers, some annelids and cephalochordates.
(C) Small amount of uric acid may be retained in the kidney matrix of some animals to maintain desired osmolarity.
(D) The chief excretory waste of humans is synthesized by liver and eliminated by kidneys.

181. The amino acids participating in Krebs Henseleit cycle are
(A) Ornithine, citrulline and lysine
(B) Ornithine, citrulline and arginine
(C) Lysine, glycine and cysteine
(D) Cysteine, methionine and glycine

182. Read the following statements and choose the correct option:
Statement I: Each nephron has two parts, i.e., glomerulus and renal tubule.
Statement II: Vasa recta are absent or highly reduced in juxtamedullary nephrons.
(A) Both statements are correct.
(B) Both statements are incorrect.
(C) Only statement (I) is correct.
(D) Only statement (II) is correct.

183. Identify the wrong statement:
(A) The U-shaped blood vessel running parallel to the Henle's loop is vasa recta.
(B) Collecting ducts enter the medulla and form ducts of Bellini.
(C) The peritubular capillaries arise from afferent arteriole.
(D) The structural and functional unit of each kidney is called uriniferous tubule.

184. The glomerulus along with Bowman's capsule is called
(A) Malpighian tubule
(B) Renal corpuscle
(C) Malpighian body
(D) Both (B) and (C)

185. Which part of nephron allows reabsorption of small amount of urea into medullary interstitium?
(A) PCT
(B) DCT
(C) Collecting duct
(D) Descending limb of Henle's loop

(SECTION-B)

186. The descending limb of Henle's loop is
(A) Permeable to water and electrolytes
(B) Impermeable to water and electrolytes
(C) Permeable to water but impermeable to electrolytes
(D) Permeable to electrolytes but impermeable to water

187. During micturition, urine is passed out by
(A) Contraction of detrusor muscles by sympathetic stimulation.
(B) Relaxation of urethral sphincters by sympathetic stimulation.
(C) Contraction of external urethral sphincters.
(D) Contraction of detrusor muscles and relaxation of sphincters by parasympathetic stimulation

188. Which of the following does not occur in response to release of angiotensin II?
(A) Vasoconstriction
(B) Increase in blood pressure
(C) Release of mineralocorticoids
(D) Decreased reabsorption of Na' from renal tubules

189. Which of the following does not occur in response to release of atrial natriuretic factor (ANF)?
(A) Increase the elimination of sodium in urine.
(B) Stimulates renin-angiotensin mechanism.
(C) Causes vasodilation and decreases the blood pressure.
(D) Inhibit renin-angiotensin mechanism and increase the volume of urine.

190. If a person passes a very dilute urine but his blood glucose level is normal and experiences excessive thirst, then it may be due to
(A) Fall of blood sugar level
(B) Decrease in vasopressin release from posterior pituitary
(C) Excessive release of insulin
(D) Excessive release of glucagon

191. Renin is a hormone secreted by juxtaglomerular cells in response to
(A) Low blood pressure
(B) High blood Pressure
(C) High blood volume
(D) High glomerular blood flow

192. Macula densa cells are present in
(A) PCT
(B) DCT
(C) Collecting duct
(D) Afferent arteriole

193. Which of the following causes an increase in sodium reabsorption in the distal convoluted tubule?
(A) Increase in aldosterone level
(B) Increase in antidiuretic hormone levels
(C) Decrease in aldosterone levels
(D) Decrease in antidiuretic hormone levels

194. Which of the following can increase blood pressure due to vasoconstrictor action?
(A) Atrial natriuretic factor
(B) Aldosterone
(C) Vasopressin
(D) Both (B) and (C)

195. Identify the correct statement regarding urine formation:
(A) The collecting duct is impermeable to water and thus helps in diluting urine.
(B) Decrease in blood pressure can increase GFR.
(C) To prevent diuresis, ADH facilitates water reabsorption from the distal parts of nephron.
(D) Counter current mechanism works around the glomerulus and PCT.

196. Ketone bodies are observed in urine of patients with
(A) Starvation
(B) Diabetes mellitus
(C) Both (A) and (B)
(D) Diabetes insipidus

197. Sebaceous glands secrete sebum containing
(A) Waxes (B) Sterols
(C) Fatty acids (D) All of these

198. Presence of pus in urine is called
(A) Albuminuria (B) Pyuria
(C) Glycosuria (D) Proteinuria

199. Accumulation of urea in blood of patients suffering with renal failure is called
(A) Cystitis (B) Haematuria
(C) Uremia (D) Nephritis

200. The yellow colour of urine is due to
(A) Bilirubin (B) Biliverdin
(C) Urochrome (D) Uric acid