28/03/2023

Phase-1
CODE-B

Corporate Office: Aakash Tower, 8, Pusa Road, New Delhi-110005, Ph.011-47623456

FINAL TEST SERIES for NEET-2023

MM : 720 **Test-3** **Time : 3 Hrs. 20 Mins.**

Topics covered :

Physics : Gravitation, Mechanical Properties of Solid, Mechanical Properties of Fluids, Thermal Properties of Matter

Chemistry : Equilibrium, Redox Reactions, Hydrogen, The *s*-Block Elements (Alkali and Alkaline Earth Metals)

Botany : Cell: The Unit of Life, Cell Cycle and Cell Division, Transport in Plants

Zoology : Digestion and Absorption, Breathing and Exchange of Gases, Body Fluids and Circulation

Instructions :

(i) There are two sections in each subject, i.e. Section-A & Section-B. You have to attempt all 35 questions from Section-A & only 10 questions from Section-B out of 15.

(ii) 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.

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

(iv) Mark should be dark and completely fill the circle.

(v) Dark only one circle for each entry.

(vi) Dark the circle in the space provided only.

(vii) 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

Choose the correct answer :

SECTION - A

1. A body is floating in the liquid with 40% of its volume outside the liquid. When entire system is accelerated downward with an acceleration $g/4$, then the percentage of its volume inside the liquid will be

   (1) 40%

   (2) 50%

   (3) 60%

   (4) 70%

2. Two metal plates of dimensions 10 cm × 3 cm and 5 cm × 9 cm are made to move with the same velocity on a liquid film spread on a smooth table then ratio of force required in these two cases is

   (1) 1 : 2 (2) 1 : 1

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

3. Three liquids of equal masses are taken in three identical cubical vessels *A*, *B* and *C*. Their densities are ρ_A, ρ_B and ρ_C respectively, $(\rho_A > \rho_B > \rho_C)$. The pressure exerted by the liquid on the base of the cubical vessel is

   (1) Same in all the vessel

   (2) Minimum in vessel *A*

   (3) Minimum in vessel *B*

   (4) Minimum in vessel *C*

4. There is a metal cube inside a block of ice which is floating on the surface of water. The ice melts completely and metal falls in water. Water level in the container

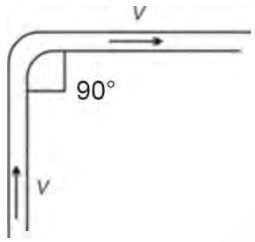
(1) Falls

(2) Rise

(3) Remains same

(4) Nothing can be concluded

5. A fire hydrant delivers water of density ρ at a volume flow rate L. The water travels vertically upwards through the hydrant and then does 90° bend to emerge horizontally at speed v. The pipe nozzle have uniform cross-section throughout. The force exerted by the water on the corner of hydrant, is



(1) ρvL

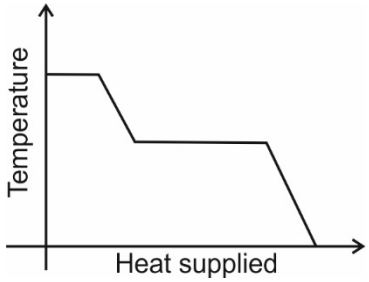
(2) $\sqrt{2}\rho vL$

(3) $2\rho vL$

(4) Zero

6. A block of ice at –10°C is slowly heated and converted to steam at 100°C. Which of the following curves represents the phenomenon qualitatively?

(1)



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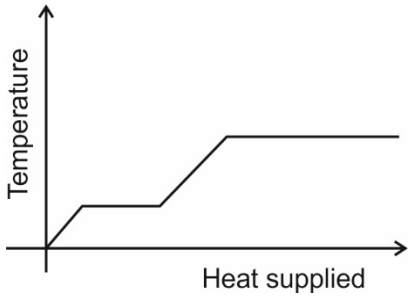

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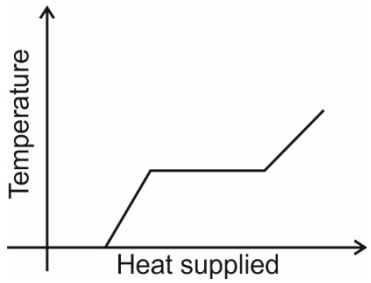

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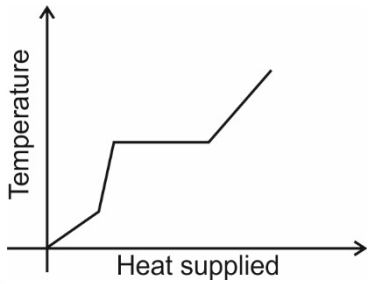


7. A wire of length l is hanging from a fixed support. The length changes to l_1 and l_2 when masses m and $2m$ are suspended separately from its free end. Then l is equal to

(1) $2l_1 - l_2$ (2) $l_1 - l_2$

(3) $l_1 - 2l_2$ (4) $3l_1 - 2l_2$

8. A steel wire can support a maximum load of W before reaching its elastic limit. How much load can another wire, made out of identical steel, but with double the radius of cross section as that of the first wire, support before reaching its elastic limit

(1) $2W$ (2) W

(3) $8W$ (4) $4W$

9. Consider the following statements

(a) With increase in temperature, viscosity of gas increases

(b) With decrease in temperature, viscosity of liquids increases

Correct statements are

(1) Only (a) (2) Only (b)

(3) Both (a) and (b) (4) Neither (a) nor (b)

10. A circular plate of radius R and weight W is made to rest on surface of water. If a minimum pull of $W + F$ is required to clear the plate off the water surface then value of F is (where T is the surface tension of water)

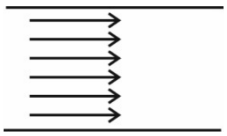
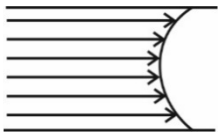
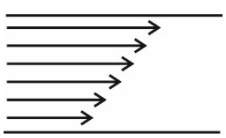
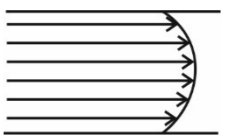
(1) πRT

(2) πR^2T

(3) $2\pi RT$

(4) $4\pi RT$

11. A viscous fluid is flowing through a cylindrical tube. The velocity distribution of the fluid is best represented by the diagram

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

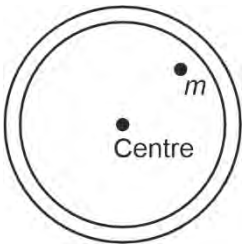
12. Kinetic energy of a satellite in an orbit depends on
(1) Mass of satellite only
(2) Radius of orbit only
(3) Mass of central planet only
(4) All above three quantities

13. Consider a planet in solar system which has mass equal to that of the earth and average density twice that of the earth. If an object weighs w on earth, then its weight on the planet is
(1) w (2) $2w$
(3) $(2)^{2/3}w$ (4) $2^{1/3}w$

14. If the acceleration due to gravity on the surface of earth is g, the speed with which a body reaches the earth's surface, when released from a height equal to radius of earth is
(1) $\sqrt{gR}$ (2) $\sqrt{2gR}$
(3) $2\sqrt{gR}$ (4) $\sqrt{\frac{gR}{2}}$

15. A uniform spherical shell gradually expands maintaining shape. Then gravitational potential at centre will (mass remains constant)
(1) Increases
(2) Decreases
(3) Remains constant
(4) Oscillates

16. The force between a hollow sphere of mass M and point mass m inside the shell is



(1) Magnitude of force is constant and attractive in nature
(2) Attractive and magnitude depends on the position of point mass with respect to centre
(3) It is zero everywhere inside the shell
(4) It is zero only at centre

17. If the kinetic energy of a satellite moving around a planet is doubled. Then it will
(1) Move in a circular orbit of smaller radius
(2) Move in an orbit of elliptical shape
(3) Move in a circular orbit of greater radius
(4) Escape from the gravitational pull of planet

18. A uniform thin rod of mass M and length l is bent to form a semicircle of radius R. The gravitational potential at the centre of circle is
(1) Zero (2) $-\frac{\pi GM}{l}$
(3) $-\frac{2\pi GM}{l}$ (4) $-\frac{GM}{\pi l}$

19. A body of mass 500 g is thrown upwards with a velocity 20 m/s and reaches back to surface of planet in 20 s. Then weight of the body on the planet is
(1) 2 N (2) 4 N
(3) 5 N (4) 1 N

20. The quantities of heat required to raise the temperatures of two solid steel spheres of r and $2r$ respectively through 1 K each are in the ratio of
(1) 1 : 4 (2) 1 : 8
(3) 1 : 1 (4) 8 : 27

21. The temperature of 200 g of water is to be raised from 20°C to 60°C by adding steam at 100°C to it. The mass of steam required for this purpose nearly is
(1) 10 g
(2) 14 g
(3) 6 g
(4) 18 g

22. It is difficult to cook rice in open vessel by boiling it at high altitudes because of
(1) High boiling point due to low pressure
(2) Low boiling point due to low pressure
(3) Low boiling point due to high pressure
(4) High boiling point due to high pressure

23. The factors that affect the elasticity of a substance is
(1) Change in temperature
(2) Impurity in substance
(3) Hammering
(4) All of these

24. When a beam is bent, then
(1) Only compressive strain is produced
(2) Only tensile strain is produced
(3) Both tensile as well as compressive strain is produced
(4) Strain is never produced

25. Due to addition of impurities, the modulus of elasticity
(1) Will increase
(2) Will decrease
(3) Remain constant
(4) May increase or decrease

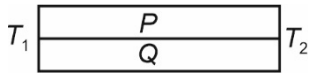
26. Which among the following is correctly matched?

(1)	Venturi meter	Stokes' law
(2)	Hydraulic lift	Archimedes principle
(3)	Blood flow and heart attack	Bernoulli's theorem
(4)	Swing of cricket ball	Pascal's law

27. Soap helps in cleaning clothes, because
(1) It attracts the dirt particles
(2) It increase the angle of contact between water and substance like grease and oil
(3) It increase the cohesive force between water molecules
(4) It decreases the surface tension of water

28. The unit of thermal conductivity is
(1) $J\ m^{-1}\ s^{-1}\ K^{-1}$ (2) $J\ s^{-1}\ K^{-1}$
(3) $J\ m^{-1}\ s\ K$ (4) $J\ m\ K^{-1}$

29. Two rods *P* and *Q* of different materials are welded together as shown in the figure. Their thermal conductivities are *K* and 3*K* and length and cross-section area are same. The thermal conductivity of the composite rod will be



(1) 2*K* (2) 4*K*
(3) 3*K* (4) 2.5*K*

30. 200 g of water at 30°C is added to 100 g of ice at 0°C. The final temperature of the mixture will be
(1) 4°C
(2) 0°C
(3) 7°C
(4) 2°C

31. Surface of a lake is at 1.5°C. The temperature of the bottom of the lake is
(1) 1.5°C
(2) 4°C
(3) 2.5°C
(4) 0°C

32. Which among the following processes need the involvement of gravity?
(1) Radiation
(2) Conduction
(3) Natural convection
(4) Forced convection

33. "A good absorber is a good emitter" is explained by
(1) Stefan's law
(2) Wien's law
(3) Kirchhoff's law
(4) Newton's law cooling

34. Column I contains some quantities/laws and Column II contains their expressions. Match the Column I with Column II and choose the correct option. (Symbols have their usual meaning)

	Column I		**Column II**
A.	Wien's displacement law	(P)	$\left(\frac{R}{r}\right)^2 \sigma T^4$
B.	Thermal resistance	(Q)	$eA\sigma T^4$
C.	Stefan's law	(R)	$\lambda_m T$ = constant
D.	Solar constant	(S)	$\frac{L}{KA}$

(1) A(R), B(P), C(Q), D(S)
(2) A(P), B(Q), C(R), D(S)
(3) A(R), B(S), C(Q), D(P)
(4) A(S), B(P), C(Q), D(R)

35. Given below are two statements one is labelled as assertion (A) and other is labelled as reason (R).

Assertion (A): Snow is better insulator than ice.

Reason (R): Snow contains air packets and air is good insulator of heat.

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

(1) Both (A) and (R) are correct and (R) is correct explanation of (A).

(2) Both (A) and (R) are correct and (R) is not the correct explanation of (A).

(3) (A) is correct but (R) is incorrect.

(4) (A) is incorrect but (R) is correct.

SECTION - B

36. The spectrum from a black body radiation is

(1) Line spectrum

(2) Band spectrum

(3) Continuous spectrum

(4) Both (1) and (2)

37. The emissivity of a tungsten lamp is nearly

(1) 1.0 (2) 0.8

(3) 0.1 (4) 0.4

38. In which of the following phenomena, the heat travels with speed of light?

(1) Thermal radiation (2) Thermal conduction

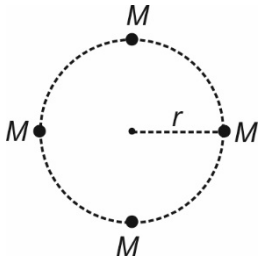
(3) Natural convection (4) Forced convection

39. The power radiated by a black body is P and it radiates maximum energy around the wavelength λ_0 . If the temperature of the black body is now changed so that it radiates maximum energy around the wavelength $\frac{3\lambda_0}{4}$, the power radiated by it will increase by factor of

(1) $\frac{256}{81}$ (2) $\frac{64}{27}$

(3) $\frac{16}{9}$ (4) $\frac{4}{3}$

40. Four similar particles of mass M are orbiting in a circle of radius r in the same angular direction because of their gravitational attractive force. The velocity of each particle is



(1) $\frac{1}{2}\sqrt{\frac{GM}{r}(1+2\sqrt{2})}$ (2) $\sqrt{\frac{GM}{r}(1+2\sqrt{2})}$

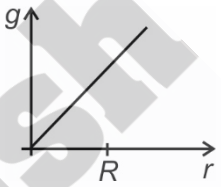
(3) $\sqrt{\frac{GM}{r}\left(\frac{1+2\sqrt{2}}{2}\right)}$ (4) $\sqrt{\frac{GM}{r}\left(\frac{1+4\sqrt{2}}{2}\right)}$

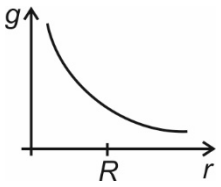
41. Two small masses M_1 and M_2 are placed at distance d apart. The minimum speed with which a particle of mass m projected from a point midway between the two masses, so as to escape to infinity, is

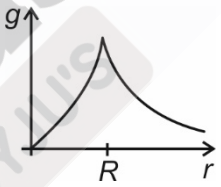
(1) $v=\sqrt{\frac{2G(M_1+M_2)}{d}}$ (2) $v=\sqrt{\frac{G(M_1+M_2)}{d}}$

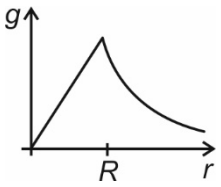
(3) $v=2\sqrt{\frac{G(M_1+M_2)}{d}}$ (4) $v=\frac{1}{2}\sqrt{\frac{G(M_1+M_2)}{d}}$

42. The variation of acceleration due to gravity as one moves away from centre of earth is best shown in graph (R is radius of earth)

(1) 

(2) 

(3) 

(4) 

43. If the sun and the planets carry huge amounts of opposite charges, then which is incorrect corresponding to Kepler's laws of planetary motion?

(1) All three of Kepler's laws would still be valid

(2) Only the third law will be valid

(3) The first law will still be valid

(4) The second law will not change

44. A uniform solid sphere of mass M and radius a is surrounded symmetrically by a uniform thin spherical shell of equal mass and radius $2a$. The gravitational potential at a distance $\frac{3a}{2}$ from centre is

(1) $-\frac{2GM}{3a}$ (2) $-\frac{7}{6}\frac{GM}{a}$

(3) $-\frac{GM}{2a}$ (4) $-\frac{4GM}{3a}$

45. A satellite is orbiting very close to the surface of earth in same sense. A particle is to be projected from the satellite to just escape from the gravitational field of earth. The escape speed from the earth surface is v_e. The speed imparted to the particle with respect to satellite

(1) Will be less than v_e

(2) Will be more than v_e

(3) Will be equal to v_e

(4) Will be zero

46. At what depth below the surface of earth, the value of g is same as that at a height of 5 km?

(1) 1.25 km (2) 2.5 km

(3) 5 km (4) 10 km

47. Ploughing help to retain water by soil

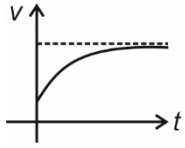
(1) By breaking capillaries

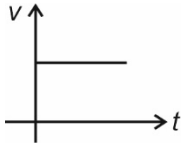
(2) By creating capillaries

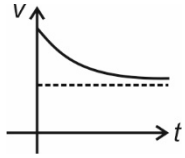
(3) By turning the soil upside down

(4) By turning the soil downside up

48. A spherical ball is dropped in a long column of viscous liquid from some height h. The speed (v) of the ball varies with time (t) may be represented as (At t = 0 the ball enters the liquid)

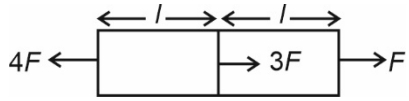
(1) 

(2) 

(3) 

(4) All of these

49. A bar is subjected to axial forces as shown in the figure. If Y be the Young's modulus of bar and A is its cross-sectional area, then total elongation will be



(1) $\frac{4Fl}{AY}$ (2) $\frac{5Fl}{AY}$

(3) $\frac{Fl}{AY}$ (4) $\frac{3Fl}{AY}$

50. A uniform cubical block is subjected to volumetric compression, which decreases its each side by 1%. The Bulk strain produced in it, is

(1) 0.01 (2) 0.02

(3) 0.04 (4) 0.03

CHEMISTRY

SECTION - A

51. Which among the following is heterogeneous equilibrium?

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

(2) $2KClO_3(s) \rightleftharpoons 2KCl(s) + 3O_2(g)$

(3) $CH_3COOH(aq) \rightleftharpoons CH_3COO^-(aq) + H^+(aq)$

(4) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

52. **Assertion (A):** Catalyst increases concentration of product at equilibrium.

Reason (R): Catalyst helps equilibrium to attain faster.

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

(1) (A) is correct but (R) is not correct

(2) (A) is not correct but (R) is correct

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

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

53. **Statement-I:** Solubility of gas increases on increasing pressure.

Statement-II: Dissolution of gas in water is generally exothermic process.

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

54. **Statement-I:** Oxidation state of Na in Na_2O_2 is +2.

Statement-II: Oxygen shows –2 oxidation state in normal oxides.

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

55. Layer test is used to identify

(1) Cl^- and F^- (2) Cl^- and Br^-

(3) Cl^- and I^- (4) Br^- and I^-

56. Match List-I with List-II.

	List-I (ions)		**List-II Oxidation state of 'Br'**
i.	BrO^-	(a)	+3
ii.	BrO_2^-	(b)	+5
iii.	BrO_3^-	(c)	+7
iv.	BrO_4^-	(d)	+1

Choose the correct answer from options given below.

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

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

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

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

57. **Assertion (A):** Oxidation state of O in O_2F_2 is +1.

Reason (R): Fluorine has an oxidation number of –1 in all of it's compounds.

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

(1) (A) is correct but (R) is not correct

(2) (A) is not correct but (R) is correct

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

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

58. **Statement-I:** Deuterium is heaviest isotope of hydrogen.

Statement-II: Tritium emits low energy β^- particles.

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

59. **Assertion (A):** $Mg(HCO_3)_2$ is converted to insoluble $Mg(OH)_2$ on boiling.

Reason (R): Permanent hardness can be removed by boiling.

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

(1) (A) is correct but (R) is not correct

(2) (A) is not correct but (R) is correct

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

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

60. Reagent used in Clark process for removal of hardness is

(1) $Ca(OH)_2$ (2) $CaCO_3$

(3) $Ca(NO_3)_2$ (4) $CaCl_2$

61. Which among the following is correct for structure of H_2O_2 in solid phase?

(1) Planar and polar molecule

(2) Non-planar and polar molecule

(3) Planar and non-polar molecule

(4) Non-planar and non-polar molecule

62. Which of the following is most soluble in H_2O?

(1) AgBr ($K_{sp} = 5.0 \times 10^{-13}$)

(2) AgCl ($K_{sp} = 1.8 \times 10^{-10}$)

(3) CuS ($K_{sp} = 6.3 \times 10^{-36}$)

(4) AgI ($K_{sp} = 8.3 \times 10^{-17}$)

63. pH of a solution obtained by mixing equal volumes of 0.3 M HCl and 0.1 M NaOH is

(1) 1 (2) 1.5

(3) 2 (4) 2.5

64. Molarity of H^+ ion in a solution which is obtained after mixing 20 ml, 0.1 M NH_4OH with 30 ml, 0.05 M HCl will be

(pK_b of NH_4OH = 4.76)

(1) 3×10^{-6} M (2) 3.4×10^{-7} M

(3) 1.7×10^{-9} M (4) 3×10^{-5} M

65. Which of the following salts will have the lowest pH in water?

(1) NaCl

(2) CH_3COOK

(3) NH_4Cl

(4) CH_3COONH_4

66. If for the reaction

$2NOBr(g) \rightleftharpoons 2NO(g) + Br_2(g)$

$K_C = 3 \times 10^6$, then the K_p for the reaction at the same temperatures will be

(1) $3 \times 10^6(RT)^2$ (2) $\frac{RT}{3\times10^6}$

(3) $\frac{3\times10^6}{RT}$ (4) 3×10^6 RT

67. The pK_a of a weak acid HX and pK_b of a weak base BOH are 4.76 and 4.75 respectively. The pH of the solution of salt BX will be

(1) 6.990 (2) 7.01

(3) 7.005 (4) 6.995

68. Consider the following equilibrium constants for a triprotic acid, H_3PO_4.

$H_3PO_4 \rightleftharpoons H^+ + H_2PO_4^- ; K_1$

$H_2PO_4^- \rightleftharpoons H^+ + HPO_4^{2-} ; K_2$

$HPO_4^{2-} \rightleftharpoons H^+ + PO_4^{3-} ; K_3$

Which of the following is the correct order?

(1) $K_3 > K_2 > K_1$ (2) $K_1 > K_2 > K_3$

(3) $K_1 > K_3 > K_2$ (4) $K_2 > K_1 > K_3$

69. Value of which physical property of H_2O is greater than that of D_2O?

(1) Dielectric constant (2) Density

(3) Viscosity (4) Molar mass

70. $PbS(s) + H_2O_2(aq) \xrightarrow{\text{acidic medium}} (X) + H_2O$

In the above reaction (X) is

(1) $PbSO_4$ (2) Pb_3O_4

(3) PbO_2 (4) $Pb(OH)_2$

71. Correct order of densities of alkali metals is

(1) Li < Na < K < Rb (2) Rb < K < Na < Li

(3) Li < K < Na < Rb (4) Li < Rb < K < Na

72. Oxidation state of zinc in zinc amalgam is

(1) Zero (2) + 1

(3) + 2 (4) – 2

73. Minimum and maximum oxidation state possible for carbon in its compounds is

(1) + 2 and + 4 (2) –2 and + 4

(3) –4 and + 4 (4) 0 and + 4

74. **Statement-I:** When acidic $K_2Cr_2O_7$ is mixed with H_2O_2, a deep blue colour is observed.

Statement-II: Oxidation state of Cr in CrO_5 is +6.

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

75. CaC_2 reacts with water to produce

(1) CH_3OH (2) CH_3COOH

(3) C_2H_2 (4) CH_4

76. Number of H_2O molecules co–ordinated to Cu^{2+} ion in structure of $CuSO_4.5H_2O$ molecule is

(1) 2 (2) 3

(3) 5 (4) 4

77. Oxidation numbers of N in NO_3^- ion, of S in S_8 and of Br in BrO^- ion, respectively, are

(1) + 3, 0 and + 1 (2) + 5, 0 and + 1

(3) – 3, 0 and – 1 (4) + 3, +4 and + 1

78. Correct order of melting points of alkali metal halides is

(1) Fluoride > Chloride > Bromide > Iodide

(2) Iodide > Bromide > Chloride > Fluoride

(3) Fluoride > Iodide > Chloride > Bromide

(4) Chloride > Iodide > Fluoride > Bromide

79. Sodium hydroxide is prepared by the electrolysis of sodium chloride in Castner-Kellner cell. Cathode of the cell is

(1) Graphite (2) Mercury

(3) Platinum (4) Copper

80. Most soluble metal sulphate among the following is
(1) $BeSO_4$ (2) $SrSO_4$
(3) $CaSO_4$ (4) $BaSO_4$

81. Maximum ionic mobility in aqueous medium will be observed for
(1) K^+ (2) Na^+
(3) Rb^+ (4) Cs^+

82. Lithium shows similarities in chemical properties with which of the following metal?
(1) Na (2) Al
(3) Mg (4) Ba

83. Dead burnt plaster is
(1) $CaSO_4.½H_2O$ (2) $CaSO_4.2H_2O$
(3) $MgSO_4.5H_2O$ (4) $CaSO_4$

84. LiCl is deliquescent, it crystallises as
(1) $LiCl.H_2O$ (2) $LiCl.2H_2O$
(3) $LiCl.4H_2O$ (4) $LiCl.6H_2O$

85. Thermally most stable metal hydride is
(1) KH (2) NaH
(3) LiH (4) CsH

SECTION - B

86. If for $A_2(g) + B_2(g) \rightleftharpoons 2AB(g)$; $K_C = 10^{-2}$

then for $AB \rightleftharpoons \frac{1}{2}A_2 + \frac{1}{2}B_2$; $K_C = K$

Value of K will be
(1) 100 (2) 10
(3) 0.1 (4) 0.01

87. pH of 10^{-8} M HCl will be
(1) 8 (2) 6
(3) 6.97 (4) 7.03

88. If yield of products for given reaction increases with increase in temperature and pressure then choose the correct relation.

$aA(g) \rightleftharpoons bB(g) + cC(g)$; $\Delta H = X$ kJ mol^{-1}

(1) a > b + c; X > 0 (2) a < b + c; X > 0
(3) a > b + c; X < 0 (4) a < b + c; X < 0

89. pH of a mixture obtained on mixing 100 ml 0.1 M CH_3COOH and 50 ml 0.05 M NaOH will be
(K_a $CH_3COOH = 1.8 \times 10^{-5}$)
(1) 5.24 (2) 4.29
(3) 4.76 (4) 2.84

90. Oxidation state of hydrogen in KHF_2 is
(1) +1 (2) +2
(3) –1 (4) –2

91. Number of moles of $K_2Cr_2O_7$ that can be reduced by 6 moles ferrous sulphate is
(1) 1 (2) 2
(3) 4 (4) 6

92. From the following statements, identify the correct statement(s).
(a) Oxidation state of S is +8 in H_2SO_5.
(b) In $CaOCl_2$ chlorine is present in two different oxidation states.
(c) Oxidation state of oxygen is $\frac{-1}{2}$ in KO_2.
(1) (a), (b) & (c) (2) (a) & (c) only
(3) (b) & (c) only (4) (b) only

93. Chemical formula of compound that is formed by combination of bivalent cation A, pentavalent cation B and divalent anion C is
(1) $A_3(BC_4)_2$ (2) ABC_4
(3) A_4BC_3 (4) $A_2(BC_4)_3$

94. Which among the following will give H_2 gas on reaction with water?
(1) SiH_4 (2) PH_3
(3) NH_3 (4) CaH_2

95. The volume strength of 5 M H_2O_2 will be
(1) 28 V (2) 56 V
(3) 11.2 V (4) 22.4 V

96. Polymeric hydride can be formed by
(1) Be (2) Ca
(3) N (4) O

97. Match List-I with List-II.

	List-I (Hydride)		**List-II (Classification)**
a.	HF	(i)	Interstitial hydride
b.	CH_4	(ii)	Electron rich hydride
c.	BH_3	(iii)	Electron precise hydride
d.	CrH	(iv)	Electron deficient hydride

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

98. In synthetic resin method, the exhausted anion exchange resin bed can be regenerated by treatment with

(1) Dilute NaOH (2) Dilute NaCl

(3) Dilute HCl (4) Dilute KCl

99. **Assertion (A):** LiCl is insoluble in ethanol and acetone.

Reason (R): Due to high polarisation in LiCl it is soluble in organic solvents.

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

(1) (A) is correct but (R) is not correct

(2) (A) is not correct but (R) is correct

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

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

100. Least soluble hydroxide among the following is

(1) $Ba(OH)_2$ (2) $Sr(OH)_2$

(3) $Ca(OH)_2$ (4) $Be(OH)_2$

BOTANY

SECTION - A

101. Nucleoid but not nuclear membrane is present in

(1) *Volvox*

(2) *Chlamydomonas*

(3) *Anabaena*

(4) Yeast

102. All of the following are surface structures of bacteria, **except**

(1) Flagella

(2) Fimbriae

(3) Inclusion bodies

(4) Pili

103. The molecules move along the concentration gradient in

(a) Simple diffusion

(b) Active transport

(c) Facilitated diffusion

(1) (b) only (2) (c) only

(3) (a) and (c) only (4) (a) only

104. Complete the below given statement by choosing the **correct** option for A and B.

" A microfibrils in the cell walls of the guard cells are oriented B , making it easier for the stoma to open."

	A	B
(1)	Pectin	Longitudinally
(2)	Cellulose	Radially
(3)	Pectin	Radially
(4)	Cellulose	Longitudinally

105. Read the following statements related to root pressure and choose the **correct** option.

A. Root pressure is related to re-establishment of continuous chains of water molecules in xylem under enormous tension created by transpiration.

B. Root pressure is mainly responsible for mass flow of water and nutrients.

C. Effect of root pressure is observable when transpiration is high.

D. In tomato, root pressure is responsible for the loss of water in the form of liquid droplets through hydathodes.

(1) Only A is true

(2) Only B is true

(3) Both A and D are true

(4) Both B and C are true

106. Daughter cells produced after meiosis I are similar to daughter cells produced after meiosis II, in

(1) Chromosome number

(2) DNA content

(3) Having sister chromatids

(4) Chromatid number per chromosome

107. Both the matrix of mitochondria and the stroma of chloroplast contain

(1) Linear dsDNA

(2) Enzymes for starch synthesis

(3) Protein synthesising machinery

(4) Enzymes of TCA cycle

108. Cell wall present as outer boundary in all, **except**
(1) Fungal cell (2) Algal cell
(3) Animal cell (4) Plant cell

109. The **correct** expression of a fully turgid cell is
(1) $\psi_w = \psi_s$ (2) DPD = OP
(3) OP – TP = 0 (4) $\psi_w = \psi_s - \psi_p$

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

Assertion (A): At the sink, water moves out of the phloem and eventually returns to the xylem.

Reason (R): The loss of solutes from phloem produces a high-water potential in the phloem.

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

111. Transport proteins which act as control points for the quantity and types of solutes that reach the xylem are found in
(1) Pericycle (2) Endodermis
(3) Hypodermis (4) Epidermis

112. Read the following statements and choose the **correct** option.

Statement A: Stroma contains a large number of organized flattened membranous sacs.

Statement B: Stroma contains ribosomes that are smaller than cytoplasmic ribosomes.

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

113. The membrane of erythrocyte in human beings constitutes approximately
(1) 42% proteins and 50% lipids
(2) 40% proteins and 52% lipids
(3) 52% proteins and 40% lipids
(4) 50% proteins and 40% lipids

114. Separation of homologous chromosomes occurs in
(1) Telophase II (2) Anaphase-I
(3) Anaphase-II (4) Telophase-I

115. Select the **incorrect** statement w.r.t. ribosomes.
(1) Present in all living organisms.
(2) Composed of one larger and one smaller subunit.
(3) Eukaryotic cells have only 80S ribosomes.
(4) Free ribosome synthesizes proteins.

116. Mark the following statements as true **(T)** or false **(F)** and select the **correct** option.

A. Morphology of chromosomes is best studied during metaphase.
B. Nucleolus reappear during prophase whereas disappear during telophase.
C. All organisms form gametes through meiosis as gametes are always haploid.

	A	B	C
(1)	T	T	T
(2)	T	F	F
(3)	F	F	T
(4)	T	F	T

117. Microtubules are involved in the formation of all of the following structures given, **except**
(1) Cytoskeleton in animal cells
(2) Axoneme of cilia
(3) Cell plate in plant cells
(4) Spindle fibres in bacterial cells

118. How many of the given cell organelles are non-membrane bound and can be seen in a higher plant cell?

Centriole, Mitochondria, Ribosome, Peroxisome, Nucleolus, Lysosome, Golgi complex

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

119. Cell 'A' and cell 'B' have osmotic potential and pressure potential –12 bars and 4 bars, and –10 bars and 2 bars respectively. What will be the **correct** option regarding this?
(1) There will be no net flow of water between cells
(2) Water will move from the cell B to cell A
(3) Water will move from the cell A to cell B
(4) Cell A has more Ψ_W than cell B

120. The complex formed by a pair of synapsed homologous chromosomes is called
(1) Chiasmata
(2) Bivalent
(3) Synaptonemal complex
(4) Kinetochore

121. What will be DNA amount in meiotic II products if DNA is 40 pg in meiocyte at G_2 stage?
(1) 10 pg
(2) 20 pg
(3) 40 pg
(4) 80 pg

122. Mark the **incorrect** statement.
(1) Apoplastic pathway is faster than symplastic pathway
(2) Passive absorption of water is the most common and rapid method
(3) Absorption of water is high if the soil is logged with water
(4) Xylem is mainly associated with translocation of water, mineral salts, hormones and organic nitrogen

123. Which of the following chromosome appear I-shaped during anaphase?
(1) Metacentric
(2) Telocentric
(3) Sub metacentric
(4) Acrocentric

124. Which of the following does not contribute in the transpirational pull?
(1) Root pressure
(2) Surface tension
(3) Cohesion
(4) Adhesion

125. Chromosomes are arranged at equatorial plate during
(1) Prophase (2) Anaphase
(3) Metaphase (4) Telophase

126. If APC (Anaphase promoting complex) is defective in human cell, it effects
(1) Crossing over
(2) Separation of sister chromatids
(3) Linkage
(4) Dissolution of synaptonemal complex

127. Eukaryotic flagella is different from prokaryotic flagella as the former is
(1) Made up of tubulin proteins
(2) Made up of flagellin proteins
(3) Devoid of cytoskeleton filaments
(4) Not involved in locomotion

128. Identify the **incorrect** one for cristae.
(1) Contain oxysomes
(2) Are infoldings of outer mitochondrial membrane
(3) Have elementary particles
(4) Increase surface area of inner membrane

129. Cell theory was proposed by
(1) Robert Hooke
(2) Schleiden and Schwann
(3) Altmann
(4) Robert Brown

130. Formation of glycolipids and glycoproteins occur in
(1) Golgi bodies (2) RER
(3) Lysosomes (4) Nuclear membrane

131. What is the arrangement of microtubules in the structure that helps in the formation of basal body of flagella?
(1) 9 + 2 (2) 9 + 0
(3) 18 + 2 (4) 27 + 2

132. Sugar translocation in the plants mainly occur in the form of __A__ by __B__ .

Choose the **correct** option for 'A' and 'B'

	A	B
(1)	Starch	Phloem
(2)	Glucose	Xylem
(3)	Sucrose	Seive tubes
(4)	Sucrose	Companion cells

133. The structure which provides gummy or sticky character to bacterial cell
(1) is made up of peptidoglycan
(2) is responsible to determine the shape of the cell
(3) Comprises polysaccharides
(4) is found in all bacterial cells

134. **Assertion (A):** Higher plant cells lack spindle fibres during mitosis.

Reason (R): Centrioles form spindle fibres during cell division.

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

(1) A is false but R is true

(2) A is true but R is false

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

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

135. A special type of diffusion when water is absorbed by solid particles of a substance without forming a solution is called

(1) Endosmosis (2) Plasmolysis

(3) Imbibition (4) Osmosis

SECTION - B

136. Mark the **wrongly** matched pair.

(1) Interkinesis – DNA replication takes place

(2) G_1 – Post mitotic gap phase

(3) Interphase – Covers more than 95% of total duration of cell cycle

(4) G_0 phase – No proliferation of cells

137. Maximum loss of water in the form of vapours occurs through

(1) Stomata (2) Lenticel

(3) Bark (4) Cuticle

138. The ___ face of golgi complex gives rise to the secretory vesicles.

(1) Convex (2) *cis*

(3) Maturing (4) Forming

139. The cells that do not divide further exit __A__ stage and enter quiescent stage.

Choose the option to fill in the blank.

(1) G_2 phase (2) S phase

(3) G_1 phase (4) G_0 phase

140. When a pressure greater than atmospheric pressure is applied then water potential of the pure water

(1) Remains same *i.e.* zero

(2) Increases

(3) Decreases

(4) Becomes negative

141. All of the following features are true for lipids of plasma membrane, **except**

(1) Tails are hydrophobic

(2) Polar heads are towards the inner sides

(3) May consist of phosphoglycerides

(4) Major lipids are phospholipids

142. In which of the following phase of cell cycle crossing over takes place?

(1) Zygotene (2) Pachytene

(3) Leptotene (4) Diplotene

143. Select the immobile element in plants.

(1) Ca (2) N

(3) P (4) K

144. Which cell organelle mainly stores proteins?

(1) Amyloplast (2) Elaioplasts

(3) Chromoplasts (4) Aleuroplasts

145. Vacuoles involved in excretion in *Amoeba* is

(1) Sap vacuoles (2) Gas vacuoles

(3) Food vacuoles (4) Contractile vacuoles

146. If the osmotic concentration of cell sap is lower than the surrounding solution then the

(1) Solution is hypertonic

(2) Cell sap is hypertonic

(3) Solution is hypotonic

(4) Cell sap surely has lower Ψ_W than solution

147. Match the columns w.r.t. nucleus and choose the **correct** option.

	Column I		**Column II**
a.	Perinuclear space	(i)	Site for rRNA synthesis
b.	Nuclear Envelope	(ii)	Separates the two membranes of nucleus
c.	Nucleoplasm	(iii)	Connected to ER
d.	Nucleolus	(iv)	Contains highly extended and elaborate nucleoprotein

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

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

148. Which structure shows the analogy with mitochondria in prokaryotes?

(1) Chromatophores (2) Flagella

(3) Mesosome (4) Inclusion bodies

149. The enzyme recombinase is required at which stage of meiosis?
(1) One in which terminalisation of chiasmata takes place
(2) One in which tetrad is clearly visible
(3) One in which synapsis takes place
(4) One which is also called dictyotene

150. Facilitated diffusion differs from active transport as the former
(1) Is an uphill process
(2) Is selective in nature
(3) Does not require ATP
(4) Requires special membrane proteins

ZOOLOGY

SECTION - A

151. A granulated, nucleated blood cell that secretes inflammatory mediators like histamine is
(1) Neutrophil (2) Basophil
(3) Eosinophil (4) Monocyte

152. Choose the **incorrect** statement w.r.t lymphatic system in humans.
(1) The fluid is drained into major arteries through lymph vessels.
(2) It consists of lymphatic capillaries, lymphatic vessels, lymphatic nodes and lymphatic ducts.
(3) The walls of larger lymphatic vessels are similar to veins.
(4) The fluid present in the lymphatic system is called the lymph that is an important carrier for nutrients, hormones, *etc*.

153. A healthy individual has how much haemoglobin in every 1000 mL of blood?
(1) 12 – 16 gms (2) 120 – 160 gms
(3) 12 – 16 mg (4) 1.2 – 1.6 gm

154. Coagulation of blood requires a cascade of reactions, during which prothrombin is converted into thrombin by
(1) Thromboplastin
(2) Fibrinogen
(3) Thrombokinase
(4) Fibrin

155. While studying a normal ECG, the heart beat rate can be determined by usually counting the
(1) P-waves
(2) QRS complexes
(3) T-waves
(4) PR intervals

156. Amount of monocytes in total WBCs is equal to the amount of
(1) Erythrocytes in blood
(2) Proteins in plasma
(3) Water in plasma
(4) Eosinophils and basophils in total WBCs

157. Choose the **correct** option w.r.t. cardiac output in man.
(1) Stroke volume = Cardiac output × heart rate
(2) Cardiac output = Stroke volume × respiratory rate
(3) Cardiac output = Stroke volume × heart rate
(4) Stroke volume = Cardiac output × respiratory rate

158. Match column I with column II and select the **correct** option.

	Column I		**Column II**
a.	Heart attack	(i)	Heart muscle is suddenly damaged by an inadequate blood supply
b.	Heart failure	(ii)	Heart stops beating
c.	Cardiac arrest	(iii)	Heart is not pumping blood effectively enough to meet the needs of the body

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

159. All of the following are secreted by a gland situated between the limbs of the 'C" shaped duodenum, **except**
(1) Insulin (2) Nuclease
(3) Dipeptidase (4) Glucagon

160. Erythroblastosis foetalis can be avoided by administering _____ to the mother immediately _____.

Choose the **correct** option that fills the blanks respectively.

(1) Rh antigen; before the delivery of the second child

(2) Rh antigen; before the delivery of the first child

(3) Anti-Rh antibodies; after the delivery of the first child

(4) Anti-Rh antibodies; after the delivery of the second child only

161. **Assertion (A):** Adult human RBCs are enucleated and lack major cellular organelles.

Reason (R): All the internal space of RBCs is available for oxygen transport.

In the light of above statements, select 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

162. A special neural centre is present in which part of the brain that can moderate the cardiac function through ANS?

(1) Pons (2) Cerebellum

(3) Hypothalamus (4) Medulla oblongata

163. Receptors associated with aortic arch and carotid artery are sensitive to

(1) O_2 and N_2 (2) CO_2 and H^+

(3) CO_2 only (4) O_2 only

164. Minimum amount of both O_2 and CO_2 is transported by/as

(1) Bicarbonates

(2) RBCs

(3) Being dissolved in plasma

(4) Combining with haemoglobin

165. Every 2 L of deoxygenated blood delivers approximately how much CO_2 to the alveoli under normal physiological conditions in an adult man?

(1) 80 mL (2) 8 L

(3) 4 mL (4) 40 mL

166. Read statements **A** and **B** and choose the **correct** option.

A. Pharynx is called the sound box.

B. Diaphragm is a dome shaped muscular structure which separates thoracic cavity from abdominal cavity.

(1) Only A is correct

(2) Both A and B are correct

(3) Only B is correct

(4) Both A and B are incorrect

167. Select the **incorrect** match.

(1) Vomit centre – Lies in medulla oblongata

(2) Trachea – Lined by complete elastic cartilaginous rings

(3) Total lung capacity – Approximately 5800 mL

(4) Asthma – Caused by allergens

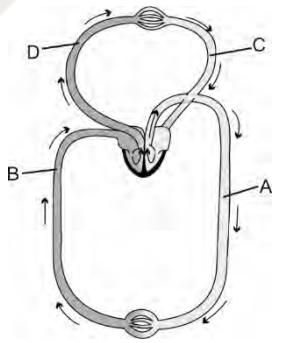
168. How many of the following structures given in the box below are present inside the lungs?

Alveolar ducts, Larynx, Initial bronchioles, Trachea, Secondary bronchi

(1) Four (2) Five

(3) Two (4) Three

169. In the diagram given below, identify A, B, C and D.



Choose the **correct** option.

	A	B	C	D
(1)	Vena cava	Dorsal aorta	Pulmonary vein	Pulmonary artery
(2)	Vena cava	Dorsal aorta	Pulmonary artery	Pulmonary vein
(3)	Dorsal aorta	Vena cava	Pulmonary vein	Pulmonary artery
(4)	Dorsal aorta	Vena cava	Pulmonary artery	Pulmonary vein

170. A _____ curve is obtained when percentage saturation of haemoglobin with O_2 is plotted against the pO_2.

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

(1) Hyperbolic
(2) Sigmoid
(3) Straight
(4) Rectangular hyperbolic

171. In which of the following locations pO_2 is more than 40 mm Hg?

(a) Systemic veins (b) Pulmonary vein
(c) Systemic arteries (d) Pulmonary artery

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

172. The thoracic chamber is formed dorsally by 'X' and ventrally by 'Y'.

Select the option **correctly** identifying X and Y w.r.t. humans.

	X	**Y**
(1)	Sternum	Vertebral column
(2)	Sternum	Ribs
(3)	Diaphragm	Ribs
(4)	Vertebral column	Sternum

173. Pulmonary ventilation is defined as

(1) Utilisation of O_2 by the cells for catabolic reactions and resultant release of CO_2
(2) Mechanism by which atmospheric air is drawn in and CO_2 rich alveolar air is released out
(3) Diffusion of gases across alveolar membrane
(4) Transport of gases by the blood

174. One of the major cause of which of the following disorder is cigarette smoking?

(1) Asthma
(2) Occupational respiratory disorder
(3) Emphysema
(4) Pneumonia

175. How many of the items given in the box below are present in the saliva?

Na^+, K^+, Salivary amylase, Lysozyme, HCO_3^- ions

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

176. Some substances like glucose and some amino acids are absorbed with the help of the carrier proteins. This mechanism is called the

(1) Simple diffusion (2) Active transport
(3) Facilitated transport (4) Osmosis

177. The physiologic value of fats in humans is

(1) Equal to the physiologic value of proteins in humans
(2) Less than the gross calorific value of fats in humans
(3) Less than the gross calorific value of proteins in humans
(4) Less than the physiologic value of carbohydrates + proteins in humans

178. Which of the following is found in sub-mucosal layer of duodenum?

(1) Gastric glands
(2) Brunner's glands
(3) Microvilli
(4) Crypts of Lieberkuhn

179. Consider the following reactions and choose the option which **correctly** identifies A, B and C.

Di and Monoglycerides $\xrightarrow{A}$ Fatty acids + Glycerol

Nucleic acids $\xrightarrow{B}$ Nucleotides

Starch $\xrightarrow{C}$ Disaccharides

(1) A-Lipase, B-Nuclease, C-Amylase
(2) A-Lipase, B-Nucleotidase, C-Maltase
(3) A-Lipase, B-Nucleosidase, C-Sucrase
(4) A-Amylase, B-Nuclease, C-Lactase

180. In humans, each tooth is embedded in a socket of jaw bone. This type of dentition is called

(1) Diphyodont (2) Thecodont
(3) Pleurodont (4) Heterodont

181. Select the **incorrect** match w.r.t. salivary gland and its location in humans.

(1) Sub-mandibular gland – Lower jaw
(2) Sub-lingual gland – Below the tongue
(3) Parotid gland – Cheek
(4) Sub-maxillary gland – Inside buccal cavity

182. The first heart sound is

(1) Produced by closure of semilunar valves
(2) High pitched
(3) Of short duration
(4) Produced during ventricular systole

183. The food is not properly digested leading to a feeling of fullness in
(1) Jaundice (2) Indigestion
(3) Constipation (4) Diarrhoea

184. Choose the **incorrect** feature w.r.t. marasmus.
(1) Simultaneous deficiency of proteins and calories
(2) Found in child more than one year in age
(3) Mother's milk is replaced too early by other foods
(4) Mental faculties are impaired

185. Bile juice contains all of the following, **except**
(1) Bile salts (2) Cholesterol
(3) Phospholipids (4) Lipases

SECTION - B

186. Gills are respiratory organs of
(1) Terrestrial arthropods
(2) All adult amphibians
(3) Most aquatic arthropods
(4) All annelids

187. In humans, the opening in septum formed by thick fibrous tissue, separating the chambers on left side of the heart, is guarded by
(1) Two flaps
(2) Half-moon shaped flaps
(3) Three flaps
(4) No flaps

188. In a standard ECG, P-wave represents the
(1) Atrial depolarisation
(2) Atrial repolarisation
(3) Joint diastole
(4) Ventricular systole

189. The blood group which is known as universal donor is
(1) O –ve (2) O +ve
(3) AB –ve (4) AB +ve

190. Choose the **incorrect** option w.r.t. the atrio-ventricular node of heart.
(1) It is a specialised cardiac musculature called nodal tissue
(2) Present in lower left corner of the right atrium
(3) It is close to the atrio-ventricular septum
(4) It generates the maximum number of action potentials

191. Minute volume of respiration is calculated as
(1) Tidal volume × (Breathing rate + heart rate)
(2) Tidal volume × Breathing rate
(3) Vital capacity × Breathing rate
(4) Breathing rate × Heart rate

192. The factor causing left shift of O_2-dissociation curve is
(1) High pO_2
(2) High pCO_2
(3) Higher temperature
(4) High concentration of H^+ ions

193. Total volume of the air a person can expire after a normal inspiration is represented by
(1) TV + ERV (2) VC – IC
(3) ERV + RV (4) FRC – RV

194. In humans, route of air during expiration is
(1) Alveoli → Trachea → Bronchi → Bronchioles → Nasal cavities
(2) Alveoli → Bronchioles → Pharynx → Larynx → Nasal cavities
(3) Alveoli → Bronchi → Bronchioles → Trachea → Nasal cavities
(4) Alveoli → Bronchioles → Bronchi → Trachea → Nasal cavities

195. Which of the following is not made up of cartilage?
(1) Larynx
(2) Epiglottis
(3) C-shaped rings around trachea
(4) Pharynx

196. Match column I with column II and choose the **correct** option.

	Column I		**Column II**
a.	Jaundice	(i)	Chylomicrons
b.	Water	(ii)	Bilirubin increases in blood
c.	Fatty acids	(iii)	Osmosis
d.	Nucleosidases	(iv)	Succus entericus

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

197. All of the following are functions of the buccal cavity, **except**
(1) Mastication of food into smaller particles
(2) Adhering the masticated food particles into a bolus to facilitate swallowing
(3) Absorption of certain drugs
(4) Carry out about 30% of protein digestion and absorptive function of ingested food

198. If parietal cells of stomach are not functioning properly leading to decrease in its secretion, then which of the following is **incorrect** for this condition?
(1) Digestion of proteins will not occur properly in the stomach
(2) It may lead to anaemia
(3) Excoriation of the mucosal epithelium of stomach will increase
(4) The pH of stomach will increase

199. Complete the analogy and select the **correct** option.
HCl : Pepsin : : _____ : Chymotrypsin
(1) Trypsin (2) Enterokinase
(3) Chymotrypsinogen (4) Pepsin

200. The dental formula for monophyodont teeth in humans is
(1) $\frac{2123}{2123}$ (2) $\frac{2102}{2102}$
(3) $\frac{0021}{0021}$ (4) $\frac{1002}{1002}$

❑ ❑ ❑

28/03/2023

Phase-1
CODE-B

Corporate Office: Aakash Tower, 8, Pusa Road, New Delhi-110005, Ph.011-47623456

FINAL TEST SERIES for NEET-2023

MM : 720 **Test-3** **Time : 3 Hrs. 20 Mins.**

Answers

1. (3)	41. (3)	81. (4)	121. (1)	161. (1)
2. (3)	42. (4)	82. (3)	122. (3)	162. (4)
3. (1)	43. (2)	83. (4)	123. (2)	163. (2)
4. (1)	44. (2)	84. (2)	124. (1)	164. (3)
5. (2)	45. (1)	85. (3)	125. (3)	165. (1)
6. (2)	46. (4)	86. (2)	126. (2)	166. (3)
7. (1)	47. (1)	87. (3)	127. (1)	167. (2)
8. (4)	48. (4)	88. (1)	128. (2)	168. (4)
9. (3)	49. (2)	89. (2)	129. (2)	169. (3)
10. (3)	50. (4)	90. (1)	130. (1)	170. (2)
11. (4)	51. (2)	91. (1)	131. (2)	171. (3)
12. (4)	52. (2)	92. (3)	132. (3)	172. (4)
13. (3)	53. (3)	93. (1)	133. (3)	173. (2)
14. (1)	54. (2)	94. (4)	134. (1)	174. (3)
15. (1)	55. (4)	95. (2)	135. (3)	175. (3)
16. (3)	56. (1)	96. (1)	136. (1)	176. (3)
17. (4)	57. (3)	97. (2)	137. (1)	177. (2)
18. (2)	58. (2)	98. (1)	138. (3)	178. (2)
19. (4)	59. (1)	99. (2)	139. (3)	179. (1)
20. (2)	60. (1)	100. (4)	140. (2)	180. (2)
21. (2)	61. (2)	101. (3)	141. (2)	181. (4)
22. (2)	62. (2)	102. (3)	142. (2)	182. (4)
23. (4)	63. (1)	103. (3)	143. (1)	183. (2)
24. (3)	64. (3)	104. (2)	144. (4)	184. (2)
25. (4)	65. (3)	105. (3)	145. (4)	185. (4)
26. (3)	66. (4)	106. (1)	146. (1)	186. (3)
27. (4)	67. (3)	107. (3)	147. (4)	187. (1)
28. (1)	68. (2)	108. (3)	148. (3)	188. (1)
29. (1)	69. (1)	109. (3)	149. (2)	189. (1)
30. (2)	70. (1)	110. (2)	150. (3)	190. (4)
31. (2)	71. (3)	111. (2)	151. (2)	191. (2)
32. (3)	72. (1)	112. (4)	152. (1)	192. (1)
33. (3)	73. (3)	113. (3)	153. (2)	193. (1)
34. (3)	74. (3)	114. (2)	154. (3)	194. (4)
35. (1)	75. (3)	115. (3)	155. (2)	195. (4)
36. (3)	76. (4)	116. (2)	156. (2)	196. (3)
37. (4)	77. (2)	117. (4)	157. (3)	197. (4)
38. (1)	78. (1)	118. (3)	158. (4)	198. (3)
39. (1)	79. (2)	119. (1)	159. (3)	199. (1)
40. (1)	80. (1)	120. (2)	160. (3)	200. (3)

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FINAL TEST SERIES for NEET-2023

MM : 720 **Test-3** **Time : 3 Hrs. 20 Mins.**

Answers and Solutions

PHYSICS

SECTION - A

1. Answer (3)

The fraction of body inside the fluid remains unchanged.

2. Answer (3)

$$F = \eta A\frac{dv}{dx}$$

$$\frac{F_1}{F_2} = \frac{A_1}{A_2}$$

$$= \frac{10\times 3}{5\times 9}$$

$$= \frac{30}{45}$$

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

3. Answer (1)

$$P = \rho gh = \rho g\frac{m}{\rho A} = \frac{mg}{A}$$

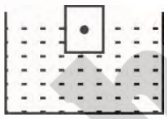
Same masses of liquids will exert same force at base of container.

4. Answer (1)

$$(V_{FD})_i = \frac{M_{ice}}{\rho_w} + \frac{M_{cube}}{\rho_w}$$

$$(V_{FD})_f = \frac{M_{ice}}{\rho_w} + \frac{M_{cube}}{\rho_{cube}}$$

$$(V_{FD})_f < (V_{FD})_i \Rightarrow \text{Falls}$$



5. Answer (2)

$$\vec{F} = \frac{d\vec{p}}{dt}$$

V is the volume flow rate

$$\vec{p_1} = \rho v dV\hat{j}$$

$$\vec{p_f} = \rho v dV\hat{i}$$

$$\vec{F} = \frac{d\vec{p}}{dt}$$

$$\vec{F} = v\rho\frac{dV}{dt}(\hat{i} - \hat{j})$$

$$|\vec{F}| = \sqrt{2}\,\rho vL$$

6. Answer (2)

During phase change temperature of the substance remains same.

7. Answer (1)

$$Y = \frac{Fl}{\Delta lA}$$

$$\frac{mgl}{(l_1 - l)A} = \frac{2mgl}{(l_2 - l)A}$$

$$\Rightarrow \quad l_2 - l = 2(l_1 - l)$$

$$\Rightarrow \quad l = 2l_1 - l_2$$

8. Answer (4)

Maximum load = Maximum stress × Area of cross-section

9. Answer (3)

With increase in temperature, viscosity of liquids decreases and that of gas increases.

10. Answer (3)

$F = T \times 2\pi R = 2\pi RT$

11. Answer (4)

Velocity profile of a viscous fluid in a cylindrical pipe of uniform diameter is a parabola.

12. Answer (4)

$$K = \frac{GMm}{2r}$$

13. Answer (3)

Weight = $w = mg$

$$g = \frac{GM}{R^2}$$

$$M = \frac{4}{3}\pi R^3 d$$

$$R^3 = \frac{3M}{4\pi d}$$

$$R \propto \frac{1}{d^{1/3}},\ g \propto d^{2/3}$$

Weight on earth $w = kmd^{2/3}$

Weight on planet $w_P = km(2d)^{2/3}$

$w_P = w(2)^{2/3}$

14. Answer (1)

Apply law of conservation of energy

$$-\frac{GMm}{2R} + 0 = -\frac{GMm}{R} + \frac{1}{2}mv^2$$

$$v = \sqrt{\frac{GM}{R}} = \sqrt{gR}$$

15. Answer (1)

$V = -\frac{GM}{r}$ [as radius increases potential increases]

16. Answer (3)

Inside a spherical shell gravitational field is zero everywhere.

17. Answer (4)

$$(K.E)_i = \frac{+GM_eM}{2(R_e + h)};\ (K.E)_f = \frac{GM_eM}{R_e + h},$$

$$P.E = -\frac{GM_eM}{R_e + h},\ T.E = 0$$

18. Answer (2)

$$I = \pi R$$

$$R = \frac{I}{\pi}$$

$$V = -\int \frac{Gdm}{R} = -\frac{G}{R}\int dm = -\frac{GM}{R}$$

$$V = -\frac{\pi GM}{I}$$

19. Answer (4)

$$T = \frac{2u}{g}$$

$$\Rightarrow\ 20 = \frac{2 \times 20}{g'}$$

$$g' = 2\ \text{m/s}^2$$

Now weight = mg' = 0.5 × 2 = 1 N

20. Answer (2)

$$Q = ms\Delta T$$

$$\frac{Q_1}{Q_2} = \frac{m_1}{m_2}$$

$$= \frac{\rho\frac{4}{3}\pi r^3}{\rho\frac{4}{3}\pi(2r)^3} = \frac{1}{8}$$

21. Answer (2)

$mL_f + ms\ (100 - 60) = 200 \times 1 \times (60 - 20)$

$m(540 + 40) = 200 \times 40$

$$m = \frac{200 \times 40}{580} = 13.8\ \text{g} \approx 14\ \text{g}$$

22. Answer (2)

At high altitudes pressure is low due to which the boiling point reduces.

23. Answer (4)

All of the above given factors affect the elasticity of a substance.

24. Answer (3)

When a beam is bent then some portion is extended and some is compressed.

25. Answer (4)

Impurity added may be more or less elastic than the material.

26. Answer (3)

Working of venturi meter, blood flow and heart attack is explained by Bernoulli's principle. Hydraulic lift is based on Pascal's law, swing of cricket ball is explained by magnus effect.

27. Answer (4)

Soap solution reduces the surface tension and also reduces the angle of contact between water and substance like grease and oil.

28. Answer (1)

$$\dot{Q} = \frac{KAd\theta}{dx}$$

$$K = \frac{\dot{Q}dx}{Ad\theta}$$

Unit of K is $\frac{(J/s)(m)}{(m^2)(K)}$

Unit of K is $J\ s^{-1}\ m^{-1}\ K^{-1}$

29. Answer (1)

$$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{K(2A)}{L} = \frac{K_1A}{L} + \frac{K_2A}{L}$$

$$K = \frac{K_1 + K_2}{2} = \frac{K + 3K}{2} = 2K$$

30. Answer (2)

Heat required to convert 100 g ice at 0°C to water at 0°C is

Q = mL = 100 × 80 = 8000 cal

Heat released as water cools from 30° to 0°C is

Q_1 = 200 × 1 × 300 = 6000 cal

Since $Q_1 < Q$, Hence final temperature will be 0°C

31. Answer (2)

If temperature of lake surface is lesser than 4°C, the bottom of lake generally remain at 4°C.

32. Answer (3)

Natural convection need involvement of gravity.

33. Answer (3)

According to Kirchhoff's law. "A good absorber is a good emitter too".

34. Answer (3)

Wien's displacement law	$\lambda_m T$ = constant
Thermal resistance	$R = \frac{L}{KA}$
Stefan's law	$H = e\sigma AT^4$
Solar constant	$S = \left(\frac{R}{r}\right)^2 \sigma T^4$

35. Answer (1)

Snow contains air packets and air is good insulator of heat, hence snow is better insulator than ice.

SECTION - B

36. Answer (3)

The spectrum from black body radiation is continuous.

37. Answer (4)

Emissivity of tungsten is nearly 0.4.

38. Answer (1)

In radiation, the heat energy is carried with speed of light.

39. Answer (1)

$$\lambda T = \text{constant}$$

$$\Rightarrow T_2 = \frac{4}{3}T_1$$

Power $\propto T^4$

40. Answer (1)

Net gravitational force = centripetal force.

$$\frac{GMM}{4r^2} + \frac{2GMM}{(r\sqrt{2})^2}\cos 45° = \frac{Mv^2}{r}$$

$$\frac{GMM}{r^2}\left[\frac{1}{4} + \frac{1}{\sqrt{2}}\right] = \frac{Mv^2}{r}$$

$$v = \frac{1}{2}\sqrt{\frac{GM}{r}(1 + 2\sqrt{2})}$$

41. Answer (3)

Apply energy conservation law

$$-\frac{GM_1m}{d/2} + \left(-\frac{GM_2m}{d/2}\right) + \frac{1}{2}mv^2 = 0$$

$$v = 2\sqrt{\frac{G(M_1 + M_2)}{d}}$$

42. Answer (4)

$$g \propto \begin{cases} r & r \le R \\ \frac{1}{r^2} & r \ge R \end{cases}$$

43. Answer (2)

Due to opposite charges, attraction forces will support the gravitational force.

44. Answer (2)

$$V = -\frac{2GM}{3a} + \left(-\frac{GM}{2a}\right)$$

$$= -\frac{7}{6}\frac{GM}{a}$$ [using principle of superposition]

45. Answer (1)

Particle has initial orbital speed so to escape from earth's gravitational field, escape speed w.r.t. satellite will be lesser than v_e.

46. Answer (4)

Value of g at height

$$\Rightarrow g' = g\left[1-\frac{2h}{R_e}\right], \text{ If } h << R_e$$

Value of g at depth $\Rightarrow g'' = g\left[1-\frac{d}{R_e}\right]$

$$\frac{2h}{R_e} = \frac{d}{R_e}$$

$d = 2h = 2 \times 5 = 10$ km

47. Answer (1)

Ploughing help to retain water by soil due to breaking of capillaries through which water evaporate.

48. Answer (4)

Velocity of ball at surface of liquid $v = \sqrt{2gh}$

If $v < v_T$, the v increase and attain v_T

If $v = v_T$, the velocity of ball will remain unchanged

If $v > v_T$, the ball will retard till v_T and then speed will remains same as v_T

49. Answer (2)

$\Delta l = \Delta l_1 + \Delta l_2$

$$\Delta l = \frac{4Fl}{AY} + \frac{Fl}{AY}$$

$$= \frac{5Fl}{AY}$$

50. Answer (4)

$$\frac{\Delta a}{a} = 0.01$$

$$\frac{\Delta V}{V} = \frac{3\Delta a}{a} = 0.03$$

CHEMISTRY

SECTION - A

51. Answer (2)

Components are present in different phases in heterogeneous equilibrium.

52. Answer (2)

Catalyst does not change concentration of reactant and product at equilibrium.

53. Answer (3)

Solubility of gas increases with increase in pressure and decrease in temperature.

54. Answer (2)

Alkali metals (Na, K, Rb etc) can show +1 oxidation state only in its compounds.

55. Answer (4)

Since Br_2 and I_2 are coloured and could be dissolved in CCl_4 it can be identified by Layer test.

56. Answer (1)

BrO^- → +1

BrO_2^- → +3

BrO_3^- → +5

BrO_4^- → +7

57. Answer (3)

Since F can show '–1' oxidation state in all of it's compounds, O will have +1 oxidation state. in O_2F_2.

58. Answer (2)

Isotope	Hydrogen	Deuterium	Tritium
Mass number	1	2	3

59. Answer (1)

$Mg(HCO_3)_2$ and $Ca(HCO_3)_2$ give temporary hardness that can be removed as carbonates on boiling.

60. Answer (1)

To remove temporary hardness of water.

$Ca(OH)_2$ is used in Clark's process.

61. Answer (2)

H_2O_2 molecule has open book like structure, it is a polar molecule.

62. Answer (2)

For the given salts

$$s = \sqrt{K_{sp}}$$

$$s_{AgCl} = \sqrt{1.8\times10^{-10}} = 1.34\times10^{-5}M$$

$\therefore$ AgCl will be most soluble among the given salts.

63. Answer (1)

Since HCl is in excess

$$[H^+] = \frac{N_AV_A - N_BV_B}{V_A + V_B}$$

$$= \frac{0.3V - 0.1V}{2V} = 0.1$$

pH = –log(0.1) = 1

64. Answer (3)

Number of milimoles of NH_4OH = 2

Number of milimoles of HCl = 1.5

Mixture will be basic buffer solution

$$pOH = pK_b + \log\frac{[NH_4Cl]}{[NH_4OH]}$$

$$= 4.76 + \log\left(\frac{1.5}{0.5}\right) = 5.24$$

pH = 14 – pOH = 14 – 5.24 = 8.76

$[H^+] = 10^{-8.76} = 1.7 \times 10^{-9}$ M

65. Answer (3)

Aqueous solution of NH_4Cl is acidic due to cationic hydrolysis.

$$NH_4^+ + H_2O \rightleftharpoons NH_4OH + H^+ \quad pH < 7$$

66. Answer (4)

$\because \Delta n_g = 3 - 2 = 1$

$$K_p = K_C(RT)^{\Delta n_g}$$

$$= 3\times10^6(RT)^1$$

$$= 3\times10^6RT$$

67. Answer (3)

$$pH = 7 + \frac{1}{2}\left[pK_a - pK_b\right]$$

$$= 7 + \frac{1}{2}[4.76 - 4.75]$$

$$= 7 + 0.005$$

$$= 7.005$$

68. Answer (2)

Successive ionisation constants of polyprotic acid decreases hence for H_3PO_4, ionisation constant decreases as $K_1 > K_2 > K_3$

69. Answer (1)

Dielectric constant of H_2O is 78.39 $C^2/N.m^2$ and that of D_2O is 78.06 $C^2/N.m^2$.

70. Answer (1)

$PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$

71. Answer (3)

Down the group density increases except for K which has lower density than Na, due to its large size.

72. Answer (1)

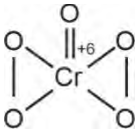
In Zn – Hg, Oxidation state of Zn = 0

73. Answer (3)

C can exhibit + 4 to – 4 oxidation states.

74. Answer (3)

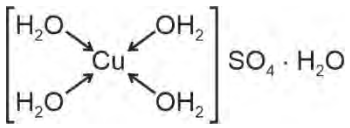
When acidic $K_2Cr_2O_7$ is mixed with H_2O a deep blue colour is observed due to formation of CrO_5.



75. Answer (3)

$$CaC_2 \xrightarrow{H_2O} C_2H_2(g).$$

76. Answer (4)



Four H_2O molecules are co-ordinate bonded.

77. Answer (2)

In S_8 oxidation state of S is zero.

78. Answer (1)

For alkali metal halide as size of halogen will increase covalent character will increase which will result in decrease in melting point.

Hence order of MP is Fluoride > Chloride > Bromide > Iodide

79. Answer (2)

In Castner–Kellner cell NaOH is prepared.

Cathode : $Na^+ + e^- \xrightarrow{Hg} Na(Hg)$

80. Answer (1)

Solubility of group II metal sulphates decreases down the group.

81. Answer (4)

Hydrated ionic radii order is as,

$Na^+ > K^+ > Rb^+ > Cs^+$. Therefore, ionic mobility decreases as $Cs^+ > Rb^+ > K^+ > Na^+$.

82. Answer (3)

Li shows similarities in properties with Mg and this is known as diagonal relationship.

83. Answer (4)

$CaSO_4$ is called dead burnt plaster. It is formed when gypsum is heated above 393 K.

84. Answer (2)

LiCl crystallises as $LiCl.2H_2O$.

85. Answer (3)

Small anion forms stable compound with smaller cation.

SECTION - B

86. Answer (2)

As reaction is reversed and co-efficients are multiplied with $\frac{1}{2}$, so equilibrium constant.

$$K = \left(\frac{1}{10^{-2}}\right)^{1/2} = 10$$

87. Answer (3)

As concentration of strong acid is less than 10^{-7} M

$[H^+] \approx [SA] + 10^{-7}$

$= 10^{-8} + 10^{-7} = 1.1 \times 10^{-7}$

$pH = -\log[H^+] = -\log(1.1 \times 10^{-7}) = 6.97$

88. Answer (1)

- On increasing pressure equilibrium shifts towards less number of gaseous molecules hence a > b + c.
- On increasing temperature yield of endothermic reaction increases, hence x > 0.

89. Answer (2)

	CH_3COOH +	NaOH	$\rightleftharpoons$ CH_3COONa +	H_2O
t = 0,	10 m mol	2.5 m mol		0
t = t,	7.5 m mol	0		2.5 m mol

$$pH = pK_a + \log\frac{[CH_3COONa]}{[CH_3COOH]}$$

$$= 4.76 + \log\left(\frac{2.5}{7.5}\right)$$

$= 4.76 - 0.47 = 4.29$

90. Answer (1)

Since fluorine is most electronegative element, so in KHF_2, F will be in –1 and H will be +1 oxidation state.

91. Answer (1)

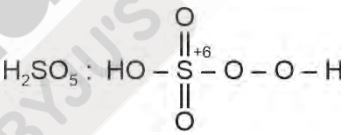
Number of g-equivalents of the two reactants will be equal, so, g-equivalent of $K_2Cr_2O_7$ = g-equivalents of $FeSO_4$.

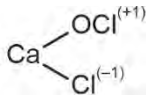
$(mol \times n\text{-factor})_{K_2Cr_2O_7} = (mol \times n\text{-factor})_{FeSO_4}$

$n \times 6 = 6 \times 1$

$n = 1$

92. Answer (3)

H_2SO_5 : 

$CaOCl_2$: 

$KO_2 \rightarrow K^+ + O_2^-$

Hence oxidation state of oxygen is $\frac{-1}{2}$.

93. Answer (1)

Algebraic sum of all the oxidation state of the elements for any compound must be zero for $A_3(BC_4)_2 = 3(+2) + 2(+5) + 8(-2) = 0$.

94. Answer (4)

Saline hydride gives H_2 gas on reaction with water. $CaH_2(s) + H_2O(l) \rightarrow H_2(g) + Ca(OH)_2$

95. Answer (2)

Volume strength = 11.2 × M

= 11.2 × 5

= 56 V

96. Answer (1)

Be forms polymeric hydride by 3c – 2e bonds.

97. Answer (2)

CrH → Interstitial hydride

HF → Electron rich hydride

CH_4 → Electron precise hydride

BH_3 → Electron deficient hydride

98. Answer (1)

In synthetic resin method, the exhausted anion exchange resin bed can be regenerated by treatment with dilute alkali.

99. Answer (2)

Due to covalent nature of LiCl it is soluble in most of organic solvents like ethanol and acetone.

100. Answer (4)

Order of solubility

$Be(OH)_2 < Ca(OH)_2 < Sr(OH)_2 < Ba(OH)_2$

BOTANY

SECTION - A

101. Answer (3)

Prokaryotes have nucleoid. *Volvox*, *Chlamydomonas* and yeast are eukaryotic organisms.

102. Answer (3)

Inclusion bodies reserve food material in the cytoplasm.

103. Answer (3)

Active transport is uphill transport which requires ATP as molecules move against the concentration gradient.

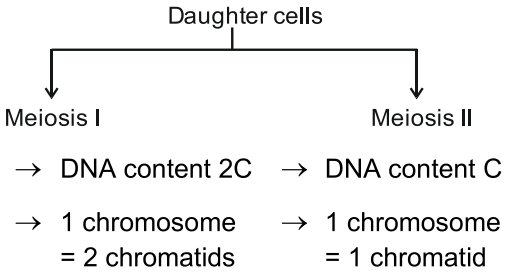
104. Answer (2)

In guard cells cellulose microfibrils are oriented radially making it easier for the stoma to open.

105. Answer (3)

Root pressure contributes in re-establishment of water column in xylem. Root pressure is responsible for guttation. Effect of root pressure is observable when transpiration is low.

106. Answer (1)



107. Answer (3)

Both mitochondria and chloroplast contain circular dsDNA, 70S ribosome and protein synthesising machinery.

108. Answer (3)

Animal cells lack cell wall.

109. Answer (3)

In a turgid cell DPD = 0 so, OP = TP.

110. Answer (2)

The loss of solutes from phloem produces a high water potential in the phloem, which results in movement of water from phloem to xylem.

111. Answer (2)

Endodermal cells are involved in the quantitative and qualitative movement of water and minerals into the xylem.

112. Answer (4)

Stroma contains a large number of organized flattened membranous sacs called thylakoids which are arranged in stack called grana. The ribosomes of the chloroplasts (70S) are smaller than the cytoplasmic ribosomes (80S)

113. Answer (3)

The membrane of erythrocyte has approximately 52 percent proteins and 40 percent lipids.

114. Answer (2)

The two homologous chromosomes separate from each other during anaphase-I.

115. Answer (3)

Eukaryotic cells have 80S ribosomes in cytoplasm and 70S ribosomes inside the mitochondria and plastids.

116. Answer (2)

Nucleolus disappear during prophase. In haploid organisms gametes form by mitosis.

117. Answer (4)

Bacteria divide by amitosis in which spindle fibres are not formed.

118. Answer (3)

Centriole, ribosome and nucleolus are non-membrane bound but centrioles are not seen in higher plants.

119. Answer (1)

Cell A, Ψ_s = – 12 bars

Ψ_p = 4 bars

Ψ_w = – 12 + 4 = – 8 bars

Cell B, Ψ_s = – 10 bars

Ψ_p = 2 bars

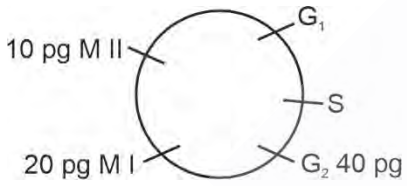
Ψ_w = – 10 + 2 = – 8 bars

Movement of water occurs from high Ψ_w to low Ψ_w, so no net flow of water takes place as both systems have same Ψ_w.

120. Answer (2)

A pair of synapsed homologous chromosomes is called a bivalent or a tetrad.

121. Answer (1)



122. Answer (3)

Water logged soil is considered as physiologically dry soil so absorption of water is less in this type of soil.

123. Answer (2)

Telocentric chromosome appear I-shaped in anaphase.

124. Answer (1)

Root pressure does not contribute in transpirational pull.

125. Answer (3)

Metaphase is marked by the alignment of chromosomes at equatorial plate.

126. Answer (2)

APC controls sister chromatids separation during cell division.

127. Answer (1)

Eukaryotic flagella is made up of microtubules, which are formed of tubulin proteins.

128. Answer (2)

Cristae are infoldings of inner mitochondrial membrane.

129. Answer (2)

Schleiden and Schwann together formulated the cell theory.

130. Answer (1)

Golgi apparatus is the important site of formation of glycoproteins and glycolipids.

131. Answer (2)

9 + 0 arrangement of microtubule is found in centriole. Centriole helps in the formation of basal bodies which give rise to cilia and flagella.

132. Answer (3)

Photosynthates are translocated from source to sink, by sieve tubes, (a component of phloem).

133. Answer (3)

Capsule provide sticky character to the bacterial cell.

134. Answer (1)

Spindle fibres are also formed in higher plants.

135. Answer (3)

Absorption of water by hydrophilic solid particles without forming a solution is called imbibition.

SECTION - B

136. Answer (1)

Interkinesis is gap phase between meiosis I and meiosis II and it lacks DNA replication.

137. Answer (1)

Transpiration can occur through stomata, lenticels, bark and cuticle but maximum is through stomata.

138. Answer (3)

Maturing or *trans* face gives rise to the secretory vesicles.

139. Answer (3)

G_0 is quiescent stage of cell cycle. Cell exit G_1 stage and enter G_0 stage.

140. Answer (2)

If a pressure greater than atmospheric pressure is applied to pure water, then water potential increases.

141. Answer (2)

Lipids of plasma membrane contain polar heads towards the outer sides and non-polar tails towards inner sides.

142. Answer (2)

Crossing over takes place in pachytene.

143. Answer (1)

Ca is immobile element in plants.

144. Answer (4)

Aleuroplasts are the type of plastids which store proteins.

145. Answer (4)

In some protozoans, like *Amoeba*, contractile vacuole is important for osmoregulation and excretion.

146. Answer (1)

Hypertonic solution has more amount of solutes than the cell sap.

147. Answer (4)

The outer and inner membrane of nuclear envelope are separated by a space known as perinuclear space. The outer nuclear membrane is often connected to ER. Nucleoplasm contains nucleolus and highly extended and elaborate nucleoproteins fibres called chromatin. Nucleolus is the site for rRNA synthesis.

148. Answer (3)

Mesosomes are infoldings of plasma membrane present in some bacteria. They are involved in respiration as they contain respiratory enzymes.

149. Answer (2)

Recombinase is required for recombination which takes place in pachytene.

150. Answer (3)

Active transport uses energy to transport and pump molecules against a concentration gradient.

ZOOLOGY

SECTION - A

151. Answer (2)

Basophils secrete histamine, serotonin, etc, and are involved in inflammatory reactions.

152. Answer (1)

The principle lymphatic vessels *i.e.* thoracic duct and right lymphatic duct drain the lymph into left and right subclavian veins respectively.

153. Answer (2)

A healthy individual has 12 – 16 gms of haemoglobin in every 100 mL of blood.

154. Answer (3)

An enzyme complex, thrombokinase, is required for the conversion of prothrombin to thrombin.

155. Answer (2)

QRS complex represents the depolarisation of the ventricles, which initiates the ventricular contraction. Thus, by counting the number of QRS complexes that occur in a given time period, the heart beat rate can be determined.

156. Answer (2)

Monocytes constitute 6 – 8% of total WBCs.

90 – 92% of plasma is water and proteins contribute 6 – 8% of it.

157. Answer (3)

Stroke volume multiplied by the number of heart beats per minute gives the cardiac output.

158. Answer (4)

Heart failure means the state of heart when it is not pumping blood effectively enough to meet the needs of the body. It is sometimes called congestive heart failure because congestion of the lungs is one of the main symptoms of this disease. Heart failure is not the same as cardiac arrest (when the heart stops beating) or a heart attack (when the heart muscle is suddenly damaged by an inadequate blood supply).

159. Answer (3)

Dipeptidase is secreted by brush border cells of the intestinal mucosa.

160. Answer (3)

In erythroblastosis foetalis, in subsequent pregnancies, the Rh antibodies from the mother (Rh –ve) can leak into the blood of the foetus (Rh +ve) and destroy the foetal RBCs.

161. Answer (1)

Mature RBCs are devoid of nucleus in most of the mammals and are biconcave in shape. They have an iron containing complex protein called haemoglobin.

162. Answer (4)

Medulla oblongata regulates cardiovascular reflexes.

163. Answer (2)

The role of O_2 in regulation of respiratory rhythm is quite insignificant in humans.

164. Answer (3)

About 3 per cent of O_2 and 7 per cent of CO_2 are carried in a dissolved state through plasma.

165. Answer (1)

Every 100 mL of deoxygenated blood delivers approximately 4 mL of CO_2 to the alveoli.

Every 1000 mL of blood delivers = 40 mL of CO_2

Every 2000 mL of blood delivers = 80 mL of CO_2

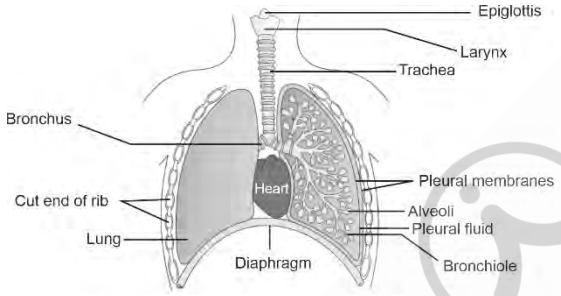
166. Answer (3)

Larynx is called the sound box.

167. Answer (2)

Trachea is lined with incomplete rings of hyaline cartilage.

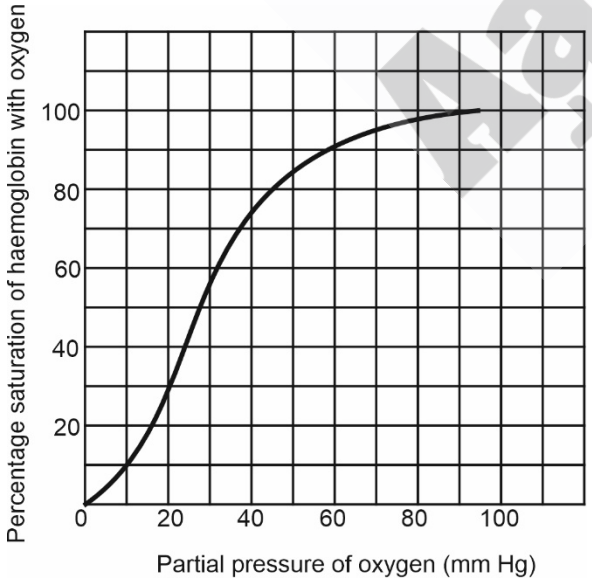
168. Answer (4)



169. Answer (3)

Vena cava and pulmonary artery carry deoxygenated blood.

170. Answer (2)



171. Answer (3)

Pulmonary vein and systemic arteries carry oxygenated blood (pO_2 = 95 mm Hg). Pulmonary artery and systemic veins carry deoxygenated blood (pO_2 = 40 mm Hg).

172. Answer (4)

The thoracic chamber is formed dorsally by vertebral column, ventrally by sternum, laterally by the ribs and on the lower side by diaphragm.

173. Answer (2)

Utilisation of O_2 by the cells for catabolic reactions and resultant release of CO_2 is called as cellular respiration.

174. Answer (3)

Asthma is due to inflammation of bronchi and bronchioles.

175. Answer (3)

The saliva secreted into the oral cavity contains electrolytes (Na^+, K^+ Cl^-, HCO_3^-), enzymes, (salivary amylase and lysozyme).

176. Answer (3)

Passive diffusion occurs along the concentration gradient. Active transport occurs against the concentration gradient and hence requires energy.

177. Answer (2)

Gross calorific values of carbohydrates, proteins and fats are 4.1 kcal/g, 5.65 kcal/g and 9.45 kcal/g, respectively, whereas their physiologic values are 4.0 kcal/g, 4.0 kcal/g and 9.0 kcal/g, respectively.

178. Answer (2)

Brunner's glands are present in submucosa of duodenum, rest of the given structures are located in mucosal layer of gut.

179. Answer (1)

$$\text{Nucleic acids} \xrightarrow{\text{Nucleases}} \text{Nucleotides} \xrightarrow{\text{Nucleotidases}} \text{Nucleosides} \xrightarrow{\text{Nucleosidases}}$$

Sugars + Nitrogenous bases

180. Answer (2)

Heterodont dentition means different types of teeth.

181. Answer (4)

All salivary glands are situated just outside the buccal cavity.

182. Answer (4)

The first heart sound, Lub associated with the closure of the atrio-ventricular valves, is low pitched and of longer duration.

183. Answer (2)

In constipation, the faeces are retained within the colon.

In diarrhoea, there is abnormal frequency of bowel movement and increased liquidity of faecal discharge. In jaundice, liver is affected.

184. Answer (2)

Marasmus is found in infants less than a year in age.

185. Answer (4)

Bile contains no enzymes.

SECTION - B

186. Answer (3)

Gills are respiratory organs of most aquatic arthropods, molluscs and fishes.

187. Answer (1)

The AV valve between the left atrium and left ventricle has 2 flaps or cusps and is called bicuspid or mitral valve.

188. Answer (1)

The QRS complex represents the depolarisation of the ventricles.

The T-wave represents the repolarisation of the ventricles.

189. Answer (1)

Persons with blood group O –ve have no blood group antigens on their RBC surface so they can donate blood to persons with any blood group.

190. Answer (4)

The SAN (sino-atrial node) can generate the maximum number of action potentials, *i.e.*, 70-75 min^{-1} and is therefore, called the pacemaker of heart.

191. Answer (2)

A healthy man can inspire or expire nearly 6000-8000 mL of air per minute.

192. Answer (1)

High pCO_2, higher temperature and high concentration of H^+ ions shifts the O_2-dissociation curve to right side.

193. Answer (1)

EC = TV + ERV

VC = ERV + TV + IRV

= ERV + IC

FRC = ERV + RV

194. Answer (4)

Air enters through nostrils during inspiration and exchange of air takes place in the alveoli. Pharynx is the common passage for food and air.

195. Answer (4)

Larynx is a cartilaginous box.

Epiglottis is a thin elastic cartilaginous flap.

196. Answer (3)

a. Jaundice – Bilirubin increases in blood
b. Water – Osmosis
c. Fatty acids – Chylomicrons
d. Nucleosidases – Succus entericus

197. Answer (4)

About 30 percent of starch is hydrolysed in buccal cavity.

198. Answer (3)

Parietal cells of stomach secrete HCl and intrinsic factor.

HCl activates pepsinogen into pepsin.

Intrinsic factor is essential for the absorption of vitamin B_{12}.

199. Answer (1)

Trypsinogen is activated by enterokinase into active trypsin which in turn activates the other enzymes in the pancreatic juice.

200. Answer (3)

Premolars and last molars are monophyodont in humans.

❑ ❑ ❑