28/03/2024

Phase-I
CODE-A

Aakash
Medical | IIT-JEE | Foundations

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FINAL TEST SERIES for NEET-2024

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

Test -3
(Home Assignment)

Topics covered :

Physics : Gravitation, Mechanical Properties of Solids, Mechanical Properties of Fluids, Thermal Properties of Matter
Chemistry : Equilibrium, Redox Reactions, The *p*-Block Elements (Group-13 & 14)
Botany : Cell: The Unit of Life, Cell Cycle and Cell Division
Zoology : 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. Unit of the quantity g/G in S.I system will be (Here symbols have their usual meaning)

(1) kg/m^2

(2) m/kg^2

(3) m^2/kg

(4) kg^2/m

2. Three masses m, $2m$ and $3m$ are placed at the three vertices of an equilateral triangle of side a. The gravitational potential energy of the system will be

(1) $\frac{-9Gm^2}{a}$ (2) $\frac{-11Gm^2}{a}$

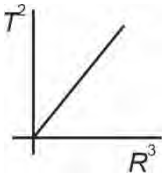
(3) $\frac{-7Gm^2}{a}$ (4) $\frac{-5Gm^2}{a}$

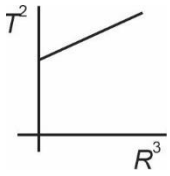
3. The kinetic energy of a satellite in its orbit around the earth is E. The additional kinetic energy given to the satellite so as to enable to escape from gravitational pull of the earth is

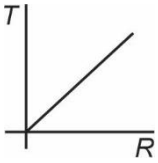
(1) $4E$ (2) $2E$

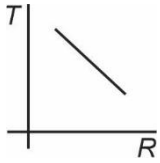
(3) $\sqrt{2}E$ (4) E

4. Which of the following graph is correct between time period of revolution (T) and its radius of orbit (R) for the motion of a satellite revolving about a planet?

(1) 

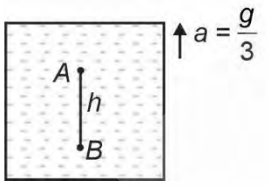
(2) 

(3) 

(4) 

5. 30% volume of a floating cubical block is outside the water. The relative density of the block is
(1) 0.3 (2) 0.6
(3) 0.4 (4) 0.7

6. A container filled with liquid is moving upwards with acceleration $\frac{g}{3}$ and distance A and B is h. If density of liquid in the container is ρ, then pressure difference between A and B is



(1) $\frac{\rho gh}{3}$ (2) $\frac{2\rho gh}{3}$
(3) $\frac{4\rho gh}{3}$ (4) ρgh

7. Water droplets are spherical in free fall condition due to
(1) Gravity
(2) Viscosity
(3) Air drag
(4) Surface tension

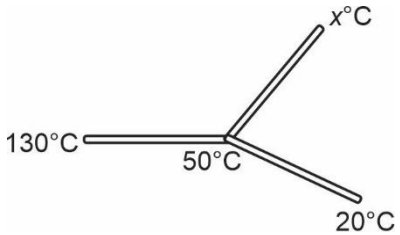
8. If two wires of same material and of same area of cross-section have length ratio 2 : 3, then under the effect of same stretching force their respective elongation will be in ratio
(1) 1 : 1 (2) 4 : 9
(3) 2 : 3 (4) 3 : 4

9. Longitudinal strain is meaningful in
(1) Liquid (2) Gasses
(3) Solid (4) Both (1) and (3)

10. **Statement (A):** Steel is more elastic than rubber.
Statement (B): Upto proportional limit Hooke's law is applicable.
(1) Both statement (A) and statement (B) are correct
(2) Both statement (A) and statement (B) are incorrect
(3) Statement (A) is correct and statement (B) is incorrect
(4) Statement (A) is incorrect and statement (B) is correct

11. The 50 parts of Kelvin scale is equal to 'n' parts of Fahrenheit scale, where 'n' is
(1) 50 (2) 90
(3) 100 (4) 180

12. Three identical rods made of same material are joined together as shown in figure. The value of x is



(1) 30 (2) 10
(3) 20 (4) Zero

Space for Rough Work

13. Surface tension of water is 0.072 N/m. The excess pressure inside the water drop of radius 1.2 mm is
(1) 60 N/m^2 (2) 240 N/m^2
(3) 180 N/m^2 (4) 120 N/m^2

14. Two capillary tubes of radii 0.2 cm and 0.4 cm are dipped in same liquid. The ratio of height through which liquid will rise in the tubes is
(1) 2 : 3 (2) 1 : 4
(3) 4 : 1 (4) 2 : 1

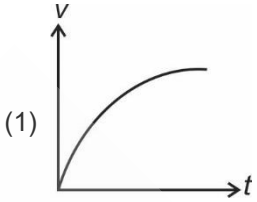
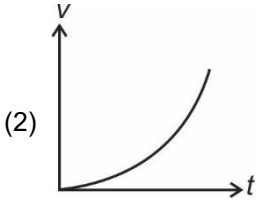
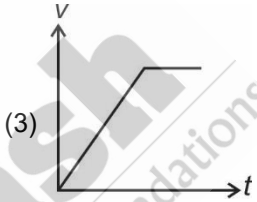
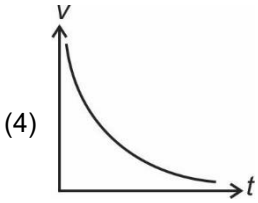
15. The working of venturimeter is based on
(1) Torricelli's law (2) Bernoulli's theorem
(3) Archimedes principle (4) Stoke's law

16. A cylindrical vessel is filled with water upto height H. A hole is bored in the wall at depth h from the free surface of water. For maximum range h should be equal to
(1) $\frac{H}{4}$ (2) $\frac{3H}{4}$
(3) $\frac{H}{2}$ (4) H

17. The escape velocity of an object from the surface of a planet is v_e. A particle starts from rest at a large distance from the planet, reaches the planet only under gravitational attraction, and passes through a smooth tunnel through its centre. Its speed at the centre of the planet will be
(1) $\sqrt{1.5}v_e$ (2) $\frac{v_e}{\sqrt{2}}$
(3) v_e (4) Zero

18. Three identical point masses, each of mass 1 kg lie in the x–y plane at points (0, 0) (0, 2 m) and (2 m, 0). The gravitational force on the mass at the origin is
(1) $\frac{G}{4}(-\hat{i}-\hat{j})$ (2) $\frac{G}{4}(-\hat{i}+\hat{j})$
(3) $\frac{G}{4}(\hat{i}+\hat{j})$ (4) $\frac{G}{4}(\hat{i}-\hat{j})$

19. A tank full of water has a small hole at its bottom. Let t_1 be the time taken to empty first one third of the tank and t_2 be the time taken to empty second one third of the tank and t_3 be the time taken to empty rest of the tank then
(1) $t_1 = t_2 = t_3$
(2) $t_1 > t_2 > t_3$
(3) $t_1 < t_2 < t_3$
(4) $t_1 > t_2 < t_3$

20. A piece of cork when released from rest at the bottom of a deep lake, it moves up. Its velocity v is plotted against time t. Which of the following best represents the resulting curve?
(1) 
(2) 
(3) 
(4) 

21. A tank of height 5 m is full of water. There is a hole of cross sectional area 1 cm^2 in its bottom. The initial volume of water that will come out from this hole per second is (g = 10 m/s^2)
(1) 10^{-3} m^3/s (2) 10^{-4} m^3/s
(3) 10 m^3/s (4) 10^{-2} m^3/s

22. A soap bubble in vacuum has a radius of 3 cm and another soap bubble in vacuum has a radius of 4 cm. If the two bubbles coalesce under isothermal condition, then the radius of the new bubble is
(1) 2.3 cm (2) 4.5 cm
(3) 5 cm (4) 7 cm

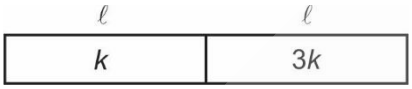
Space for Rough Work

23. A constant volume gas thermometer shows pressure reading of 50 cm and 90 cm of mercury at 0°C and 100°C respectively. When the pressure reading is 60 cm of mercury, the temperature is
(1) 25°C
(2) 40°C
(3) 15°C
(4) 12.5°C

24. The coefficient of volume expansion of a liquid is $49 \times 10^{-5}\ K^{-1}$. The fractional change in its density when the temperature is raised by 30°C, will be nearly
(1) 7.5×10^{-2} (2) 3.0×10^{-2}
(3) 1.5×10^{-2} (4) 1.1×10^{-2}

25. Surface of the lake is at 2°C. Find the temperature of the bottom of the lake
(1) 2°C (2) 3°C
(3) 4°C (4) 1°C

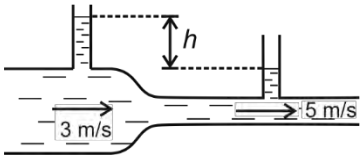
26. Consider a compound slab consisting of two different materials having equal thickness and thermal conductivities k and $3k$ respectively as shown in figure. The equivalent thermal conductivity of the slab is



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

27. The following four wires are made of the same material. Which of these will have the largest extension when the same tension is applied?
(1) Length 50 cm and diameter 2 mm
(2) Length 100 cm and diameter 1 mm
(3) Length 200 cm and diameter 2 mm
(4) Length 300 cm and diameter 3 mm

28. An incompressible liquid is flowing through a horizontal tube in streamline manner as shown in figure. The value of h is (in meters)



(1) 1 (2) 0.8
(3) 3.8 (4) 4.2

29. The length of a metal wire is l_1 when the tension in it is T_1 and is l_2 when the tension is T_2. The unstretched length of the wire is
(1) $\frac{l_1T_1 + l_2T_2}{T_1 + T_2}$ (2) $\frac{l_1 + l_2}{2}$
(3) $\frac{l_1T_2 - l_2T_1}{T_2 - T_1}$ (4) $\frac{l_1T_2 - l_2T_1}{T_2 + T_1}$

30. The Young's modulus of the material of a wire is numerically equal to the
(1) Stress required to increase its length four times
(2) Stress required to produce unit strain
(3) Strain produced in it
(4) Half the strain produced in it

31. At what height from the surface of earth, value of acceleration due to gravity becomes $\frac{1}{9}$ th of its value at surface of earth? (R is radius of earth)
(1) $3R$ (2) $2R$
(3) R (4) $\frac{R}{3}$

32. A lunar month of a planet consists of 84 days. If the distance between centres of planet and its moon becomes triple of its present value, then number of days in new lunar month will be close to
(1) 27 days (2) 848 days
(3) 172 days (4) 436 days

Space for Rough Work

33. A uniform cylindrical rod of length L, cross-sectional area A and Young's modulus Y is acted upon by the forces shown in the figure. The elongation of the rod is

(1) $\frac{3FL}{5AY}$ (2) $\frac{2FL}{5AY}$

(3) $\frac{3FL}{8AY}$ (4) $\frac{8FL}{3AY}$

34. There is a horizontal film of soap solution. On it a thread is placed in the form of a loop. The film is pierced inside the loop and the thread becomes a circular loop of radius R. If the surface tension of the soap solution be T, then tension in the thread will be

(1) $\pi R^2 T$ (2) $2RT$

(3) RT (4) $\frac{\pi R^2}{T}$

35. A body is projected at an angle 60° from surface of Earth with velocity $\sqrt{2gR}$. Final kinetic energy of object is (symbols have usual meanings)

(1) Zero (2) mgR

(3) $\frac{mgR}{2}$ (4) Infinite

SECTION-B

36. In planetary motion, the angular momentum conservation leads to the law of

(1) Orbit

(2) Areas

(3) Period

(4) Conservation of kinetic energy

37. The acceleration due to gravity is g at a point r distance from the centre of earth of radius R. If $r < R$, then

(1) $g \propto r$ (2) $g \propto r^{-1}$

(3) $g \propto r^{-2}$ (4) $g \propto r^2$

38. If g is the acceleration due to gravity on the earth's surface, the gain in potential energy of an object of mass m raised from the surface of the earth to a height equal to radius R of the earth is

(1) $\frac{mgR}{2}$ (2) $2mgR$

(3) mgR (4) $\frac{mgR}{4}$

39. The escape velocity for a body projected vertically upward from the surface of earth is 11 km/s. If the body is projected at an angle of 45° with the vertical, then escape velocity will be

(1) 11 km/s (2) $11\sqrt{2}$ km/s

(3) $\frac{11}{\sqrt{2}}$ km/s (4) 5 km/s

40. A cube is subjected to a uniform volume compression. If the side of the cube decreases by 1%, the bulk strain is

(1) 0.03 (2) 0.06

(3) 0.02 (4) 0.01

41. The absorptance and reflectance of a material is 0.2 and 0.4 respectively. If heat incident on it is 400 J/s. Then energy transmitted in 10 s is

(1) 160 J (2) 1600 J

(3) 2400 J (4) 240 J

42. Two liquids having masses in the ratio 2 : 1 at the temperature of 30°C and 20°C respectively are mixed with each other. If temperature of the mixture is 26°C, then ratio of their specific heat capacities $S_1 : S_2$ is

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

(3) $\frac{3}{8}$ (4) $\frac{8}{3}$

Space for Rough Work

43. The terminal velocity (v) of a small sized spherical body of radius r falling vertically in a viscous liquid is such that

(1) $v \propto \frac{1}{r}$

(2) $v \propto r$

(3) $v \propto r^2$

(4) $v \propto \frac{1}{r^2}$

44. When a capillary is dipped into a liquid, the levels of liquid inside and outside are equal. The angle of contact of the liquid inside the capillary is

(1) Zero (2) 90º

(3) 45° (4) 60°

45. Consider a water droplet having radius 10^{-2} m. It is broken into identical 1000 droplets. If surface tension of the water is 0.075 N/m then change in surface energy is

(1) $27\pi \times 10^{-5}$ J (2) $30\pi \times 10^{-5}$ J

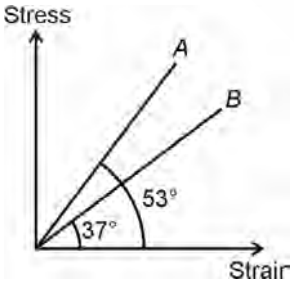
(3) $27\pi \times 10^{-3}$ J (4) $30\pi \times 10^{-3}$ J

46. If velocity head of a stream of water is equal to 10 cm, then its speed of flow is approximately

(1) 1.0 m/s (2) 1.4 m/s

(3) 140 m/s (4) 10 m/s

47. The stress versus strain graphs for two wires made of different materials A and B are as shown in the figure. If Y_A and Y_B are the Young's moduli of the materials, then



(1) $Y_B = 2Y_A$

(2) $Y_A = Y_B$

(3) $Y_B = 3Y_A$

(4) $Y_B = \frac{9}{16}Y_A$

48. A bimetallic strip has two different metal bars 1 and 2 welded parallel to their length. Given thermal coefficient of linear expansion $\alpha_1 > \alpha_2$ and length of bars is same. Upon cooling, the strip will bend with

(1) Remains straight

(2) Concave on side 1

(3) Convex on side 1

(4) Any of the above is possible

49. A beaker is completely filled with water at 4°C. It will overflow if (ignore expansion of beaker)

(1) Heated above 4°C

(2) Cooled below 4°C

(3) Both (1) and (2)

(4) It will not overflow at all

50. A planet of mass m revolves around the sun of mass M in a circular orbit of radius r with angular speed ω. Another planet of mass $2m$ revolves around the sun in circular orbit of radius $4r$ with angular velocity ω'. Then $\frac{\omega}{\omega'}$ is

(1) 4

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

(3) 8

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

Space for Rough Work

CHEMISTRY

SECTION - A

51. Which among the following aqueous salt solution is acidic in nature?
(1) Sodium acetate
(2) Potassium chloride
(3) Ammonium sulphate
(4) Sodium cyanide

52. Percentage ionization of 0.01 M acetic acid in 0.2 M HCl [$K_a(CH_3COOH) = 1.8 \times 10^{-5}$] is
(1) 0.09% (2) 0.009%
(3) 0.9% (4) 9.1%

53. Consider the following equilibria with their equilibrium constants

$2NH_3(g) \rightleftharpoons N_2(g) + 3H_2(g)$, K_1

$N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$, K_2

$2H_2(g) + O_2(g) \rightleftharpoons 2H_2O(g)$, K_3

The equilibrium constant (K) for the reaction $4NH_3(g) + 5O_2(g) \rightleftharpoons 4NO(g) + 6H_2O(g)$ will be

(1) $K_1^2K_2^2K_3^3$ (2) $K_1^2K_2^3K_3^2$
(3) $K_1^3K_2^2K_3^2$ (4) $K_1^2K_2^2K_3^2$

54. For which of the following reversible reaction, $K_P > K_C$?
(1) $2NO(g) \rightleftharpoons N_2(g) + O_2(g)$
(2) $NO(g) + O_3(g) \rightleftharpoons NO_2(g) + O_2(g)$
(3) $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$
(4) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

55. The number of sigma and pi bonds present in borazine, respectively are
(1) 12 and 3 (2) 6 and 3
(3) 9 and 4 (4) 3 and 3

56. Given below are two statements:

Statement (I): On increasing temperature, pOH of water decreases.

Statement (II): On increasing temperature, K_w of water decreases.

In the light of above statements, choose the **correct** option among the following.
(1) Statement (I) is true but statement (II) is false
(2) Statement (I) is false but statement (II) is true
(3) Both statement (I) and statement (II) are true
(4) Both statement (I) and statement (II) are false

57. Consider the reversible reaction

$A_2(g) + 2B_2(g) \rightleftharpoons C(s) + 3D_2(g)$

The correct expression for the equilibrium constant is
(1) $\frac{[D_2]^3}{[A_2]\times[B_2]^2}$ (2) $\frac{[C]\times[D_2]}{[A_2]^2\times[B_2]}$
(3) $\frac{[D_2]^3}{2[A_2]\times[B_2]}$ (4) $\frac{[A_2][B_2]^2}{[C]\times 3[D_2]}$

58. The conjugate acid of HSO_4^- is
(1) SO_4^{2-} (2) SO_3
(3) H_2SO_4 (4) H_2SO_3

59. 0.5 moles of CH_3COONa are mixed with 0.2 moles of HCl in an aqueous solution. The pH of the resulting solution will be
[Given pK_a of $CH_3COOH = 4.74$]; [log 3 = 0.48]
(1) 5.12 (2) 4.10
(3) 4.92 (4) 4.45

Space for Rough Work

60. $P_4 + 3NaOH + 3H_2O \longrightarrow PH_3 + 3NaH_2PO_2$

The equivalent mass of P_4 in the above reaction is (M = Molecular weight of P_4)

(1) $\frac{M}{3}$ (2) $\frac{M}{12}$

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

61. Select the compound which can behave as a reducing agent only

(1) SO_2 (2) SO_3

(3) H_2S (4) HNO_2

62. Consider the given reaction.

$$aBr_2 + 5H_2O_2 \rightarrow bBrO_3^- + 4H_2O + cH^+$$

The values of a, b and c for the balanced redox reaction respectively are

(1) 2, 1, 4 (2) 1, 2, 2

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

63. Oxidation number of central carbon atom in C_3O_2 is

(1) Zero (2) + 2

(3) + 1 (4) + 4

64. Disproprotionation reaction is not shown by

(1) HClO (2) $HClO_2$

(3) $HClO_3$ (4) $HClO_4$

65. The number of mole(s) of $KMnO_4$ that will be needed to react with one mole of Sn^{2+} ion in acidic solution is

(1) 1 (2) $\frac{2}{5}$

(3) $\frac{6}{5}$ (4) 2

66. Which of the following is a self-indicator?

(1) MnO_4^- (2) $S_2O_3^{2-}$

(3) $C_2O_4^{2-}$ (4) SO_4^{2-}

67. Given the standard electrode potentials

$K^+/K = -2.93$ V, $Ag^+/Ag = 0.8$ V,

$Zn^{2+}/Zn = -0.76$V and $Cr^{3+}/Cr = -0.74$V

Select the **correct** statement.

(1) Zn can reduce K^+, Ag^+ and Cr^{3+}

(2) Zn can reduce Ag^+, Cr^{3+} but not K^+

(3) Zn can reduce K^+ but not Ag^+ and Cr^{3+}

(4) Zn can reduce K^+, Cr^{3+} but not Ag^+

68. In a closed system at equilibrium, $NH_2COONH_4(s) \rightleftharpoons 2NH_3(g) + CO_2(g)$, if the partial pressure of CO_2 is doubled then partial pressure of $NH_3(g)$ will become

(1) $3\sqrt{2}$ times of the original total pressure

(2) $\frac{1}{3\sqrt{2}}$ times of the original total pressure

(3) $\frac{\sqrt{2}}{3}$ times of the original total pressure

(4) $\frac{3}{\sqrt{2}}$ times of the original total pressure

69. (a) $H_2O_2 + O_3 \rightarrow H_2O + 2O_2$

(b) $PbS + H_2O_2 \rightarrow PbSO_4 + H_2O$

Role of hydrogen peroxide in the above reactions is respectively

(1) Oxidising in (a) and reducing in (b)

(2) Reducing in (a) and oxidising in (b)

(3) Reducing in both (a) and (b)

(4) Oxidising in both (a) and (b)

70. In which among the following compounds, oxygen carry +2 oxidation state?

(1) RbO_2

(2) O_2F_2

(3) OF_2

(4) H_2O_2

Space for Rough Work

71. The solubility of CdS in 0.4 M Na_2S solution would be (K_{sp} of CdS is 8×10^{-27})

(1) 2×10^{-26} mol/L (2) 4×10^{-14} mol/L

(3) 4×10^{-26} mol/L (4) 2×10^{-27} mol/L

72. For the reaction,

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g),\ \Delta_r H = -x\ kJmol^{-1}$$

Which of the following statements is not true?

(1) Addition of inert gas at constant volume will not have any effect on equilibrium

(2) Addition of $N_2(g)$ at equilibrium will shift the reaction in backward direction

(3) Decrease in temperature will shift the reaction to forward direction

(4) The increase in pressure will shift the equilibrium to the right

73. Which of the following on hydrolysis followed by condensation polymerisation yields straight chain polymers?

(1) $MeSiCl_3$ (2) Me_2SiCl_2

(3) Me_3SiCl (4) Me_4Si

74. The product P and Q in the following reaction respectively are

$$HCOOH \xrightarrow[Conc.H_2SO_4]{373\ K} P + Q$$

(1) H_2 and CO (2) H_2O and CO_2

(3) H_2 and CO_2 (4) H_2O and CO

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

Assertion (A): In H_3PO_4, higher order ionisation constants (Ka_2 and Ka_3) are smaller than lower order ionization constant (Ka_1).

Reason (R): In H_3PO_4, it is more difficult to remove a positively charged proton from a negative ions ($H_2PO_4^-$ and HPO_4^{2-}) due to electrostatic forces.

In the light of the 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) (A) is false but (R) is true

76. Aluminium chloride in acidified aqueous solutions forms a complex ion 'A' in which hybridisation state of Al is B. A and B respectively are

(1) $[Al(H_2O)_6]^{3+}$, sp^3d^2

(2) $[Al(H_2O)_4]^{3+}$, dsp^3

(3) $[Al(H_2O)_6]^{3+}$, d^2sp^3

(4) $[Al(H_2O)_4]^{3+}$, sp^3

77. Match **List-I** with **List-II** and select the correct option.

	List-I Oxide		**List-II Chemical nature**
a.	CO	(i)	Acidic
b.	In_2O_3	(ii)	Amphoteric
c.	Ga_2O_3	(iii)	Basic
d.	SiO_2	(iv)	Neutral

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

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

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

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

78. Strongest Lewis acid among the following boron halides is

(1) BF_3

(2) BCl_3

(3) BBr_3

(4) BI_3

Space for Rough Work

79. Given below are two statements :

Statement (I): Graphite has layered structure.

Statement (II): Carbon black is obtained by burning hydrocarbons in a limited supply of air.

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 Statements (I) and (II) are correct

(4) Both Statements (I) and (III) are incorrect

80. Oxidation number of chlorine in $CaOCl_2$ is (are)

(1) –1 only (2) +1 only

(3) Both +1 and –1 (4) –2 only

81. Aqueous solution of which of the following act as buffer?

(1) NaCl (2) NH_4Cl

(3) NH_4CN (4) KCl

82. The value of $\Delta G°$ at 300K if equilibrium constant for the reaction $K_{eq} = 10^3$ is

(1) –4.14 kcal mol^{-1} (2) –2.18 kcal mol^{-1}

(3) 4.14 kcal mol^{-1} (4) –41.4 cal mol^{-1}

83. Number of bridge B – H – B bonds in a B_2H_6 molecule is

(1) 2 (2) 4

(3) 1 (4) 3

84. According to inert pair effect, Pb shows its more stable oxidation state as

(1) + 1 (2) + 2

(3) + 3 (4) + 4

85. Which among the following mixture of gases is called producer gas?

(1) CO + H_2

(2) CO + H_2O

(3) CO + N_2

(4) CO_2 + N_2

SECTION-B

86. Following two equilibriums are simultaneously taking place in a vessel

$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ and

$COCl_2(g) \rightleftharpoons CO(g) + Cl_2(g)$

If CO(g) is introduced into the vessel then the amount of

(1) PCl_5 will remain same

(2) PCl_3 will be decreased

(3) PCl_5 will be decreased

(4) $COCl_2$ will be decreased

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

Assertion (A): I_2 is a mild oxidising agent.

Reason (R): I_2 can be used for titrating sodium thiosulphate.

In the light of the 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) (A) is false but (R) is true

88. Match List-I with List-II and select the correct option.

	List-I		List-II
a.	$3Mg(s) + N_2(g) \xrightarrow{\Delta} Mg_3N_2(s)$	(i)	Disproportionation reaction
b.	$S_8(s) + 12OH^-(aq) \rightarrow 4S^{2-}(aq) + 2S_2O_3^{2-}(aq) + 6H_2O(l)$	(ii)	Non-metal displacement reaction
c.	$2KClO_3(s) \xrightarrow{\Delta} 2KCl(s) + 3O_2(g)$	(iii)	Decomposition reaction
d.	$Fe(s) + 2HCl(aq) \rightarrow FeCl_2(aq) + H_2(g)$	(iv)	Combination reaction

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

89. Among the following solvents, solubility of AgCl will be minimum in
(1) 0.1 M $AgNO_3$ (2) 0.1 M $CaCl_2$
(3) 0.5 M NaCl (4) 0.1 M NH_3

90. If pK_a of acid HX is 4, then K_b of X^- ion will be
(1) 5×10^{-9} (2) 1×10^{-10}
(3) 1×10^{-4} (4) 2×10^{-5}

91. CCl_4 cannot be hydrolysed because
(1) Carbon is less electronegative than chlorine
(2) Carbon has no vacant *d*-orbital
(3) Carbon has extremely small size
(4) CCl_4 is tetrahedral in shape

92. Formula unit present in pyrosilicates is
(1) SiO_4^{4-} (2) $Si_4O_6^{4-}$
(3) $Si_2O_7^{6-}$ (4) $Si_2O_4^{4-}$

93. Select an incorrect statement about borazine
(1) It has its molecular formula $B_3N_3H_6$
(2) It is also known as inorganic benzene
(3) Nitrogen is sp^3 hybridized
(4) Boron is sp^2 hybridized

94. Consider the following statements.
Statement (I): CO is highly poisonous in nature.
Statement (II): CO prevents haemoglobin in the red blood corpuscles from carrying oxygen round the body.
Choose the **correct** option.
(1) Both statement (I) and statement (II) are correct
(2) Both Statements (I) and (II) are incorrect
(3) Statement (I) is correct but statement (II) is incorrect
(4) Statement (I) is incorrect but statement (II) is correct

95. Three centre-two electron bond is present in
(1) H_3BO_3 (2) $Na_2B_4O_7$
(3) B_2H_6 (4) Al_2Cl_6

96. The pH of resulting solution obtained by mixing equal volume of 0.2 M HCl and 0.1 M H_2SO_4 will be
(1) 0.7 (2) 1.2
(3) 0.4 (4) 1.5

97. The correct order of atomic radius of the given elements is
(1) In > Ga > Al > B (2) In > Al > Ga > B
(3) Ga > In > Al > B (4) Ga > Al > B > In

98. Which pair will not show common ion effect?
(1) CH_3COOH + HCl
(2) HNO_3 + HCl
(3) NH_4OH + NH_4Cl
(4) HCOOH + HCOONa

99. Consider the following cell reaction.
$Zn(s) + Ni^{2+}(aq) \rightarrow Zn^{2+}(aq) + Ni(s)$
The value of E°_{cell} is (Given: $E^\circ_{Ni^{2+}/Ni} = -0.25$ V, $E^\circ_{Zn^{2+}/Zn} = -0.76$ V)
(1) 1.01 V (2) –1.01 V
(3) –0.51 V (4) 0.51 V

100. Consider the following statements.
Statement (I): Aurous chloride and auric chloride are written as Au(I)Cl and Au(III)Cl_3 respectively.
Statement (II): $Hg_2(I)Cl_2$ is the oxidised form of $Hg(II)Cl_2$.
Choose the **correct** option.
(1) Statement (I) is correct but statement (II) is incorrect
(2) Statement (I) is incorrect but statement (II) is correct
(3) Both Statements (I) and (II) are correct
(4) Both Statements (I) and (II) are incorrect

Space for Rough Work

BOTANY

SECTION - A

101. Which one of the following is not an inclusion body found in prokaryotes?
(1) Cyanophycean granules
(2) Phosphate granules
(3) Glycogen granules
(4) Lysosome

102. The primary role of the contractile vacuole in *Amoeba* is
(1) Photosynthesis
(2) Osmoregulation and excretion
(3) Protein synthesis
(4) Energy storage

103. Which process usually marks the end of the M-Phase?
(1) DNA replication
(2) Centriole duplication
(3) Cytokinesis
(4) Karyokinesis

104. Match the following columns and select the **correct** option:

	Column I		**Column II**
a.	Synthesis of RNA and protein	(i)	S-phase
b.	The centriole duplicates	(ii)	G_0-phase
c.	Interval between mitosis and initiation of DNA replication	(iii)	G_1-phase
d.	The cells remain metabolically active but do not proliferate	(iv)	G_2-phase

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

105. Given below are two statements:

Statement I: The golgi apparatus modifies and packages materials for delivery within or outside the cell.

Statement II: Golgi apparatus is closely associate with the ER, in structural as well as functional aspects.

In the light of the 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 statements I and II are correct
(4) Both statements I and II are incorrect

106. Which among the following is a function of lysosomes in eukaryotic cells?
(1) Energy production
(2) Synthesis of nucleic acid
(3) Digestion of macromolecules
(4) Involved in light dependent respiration

107. The enzyme recombinase is involved in which stage of prophase?
(1) Leptotene (2) Pachytene
(3) Diplotene (4) Zygotene

108. Condensation and coiling of chromatin fibres begin during which sub-stage of prophase I?
(1) Zygotene
(2) Leptotene
(3) Pachytene
(4) Diakinesis

Space for Rough Work

109. Which statement is **true** for ribosomes?
(1) These are made up of ribosomal RNAs and proteins
(2) Free ribosomes synthesize lipids
(3) The prokaryotic ribosomes are 80S type
(4) These are composed of two identical subunits

110. What is the impact of meiosis on genetic variability in the population of organisms from one generation to the next?
(1) It induces variation by reducing DNA content
(2) It involves recombination of sister chromatids and produces genetic recombinants
(3) It increases the chromosomal number
(4) It increases genetic variability

111. Which of the given components of mitochondria has oxysomes?
(1) Cisternae (2) Grana
(3) Cristae (4) Centrosome

112. If a diploid cell with 20 chromosomes and 32 C DNA enters a cell cycle then what will be the number of chromosomes and DNA content after S-phase?
(1) 20 chromosomes and 32 C DNA
(2) 20 chromosomes and 64 C DNA
(3) 40 chromosomes and 32 C DNA
(4) 40 chromosomes and 64 C DNA

113. Cytoskeleton are involved in all of the given functions, **except**
(1) Maintenance of shape of cells
(2) Mechanical support to cell
(3) β-oxidation of fats
(4) Motility

114. Identify the correct statements and select the correct option
a. Cytokinesis marks the end of cell division.
b. Cells exit the G_1 phase to enter into G_0 stage.
c. Mitochondria and plastids get doubled in G_2 phase and distributed between daughter cells during cytokinesis.
d. Anaphase I involves separation of identical sister chromatids.
(1) a and b only (2) b, c and d
(3) a, b and c (4) b and d

115. Plants grew continuously throughout their life because of the occurrence of mitotic divisions in
A. Apical meristem B. Lateral meristems
C. Parenchyma D. Collenchyma
(1) Both A and B (2) Both A and C
(3) Both B and C (4) Both C and D

116. Which of the given is **not** true for the most dramatic period of cell cycle?
(1) Reorganisation of all components of the cell
(2) Starts with the nuclear division
(3) Lasts for more than 95% of the duration of cell cycle
(4) It involves active cell division

117. Arrange the following in ascending order of their size
P. Red blood cells
Q. Mycoplasma
R. Bacteria
(1) Q < R < P (2) Q < P < R
(3) P < R < Q (4) R < Q < P

118. Select the events which occur twice during meiosis.
a. Nuclear division
b. Division of cytoplasm
c. DNA replication
d. Bivalent formation
e. Equational division

Space for Rough Work

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

119. In which of the given stage of mitosis, the metacentric chromosomes clearly appear as V-shaped?
(1) Prophase (2) Anaphase
(3) Metaphase (4) Telophase

120. Kinetochores are
(1) Terminal ends of chromosomes
(2) Present around primary constriction and help in formation of bivalent
(3) Present near nuclear envelope and take part in spindle formation
(4) Present around centromere and provide a site for attachment to the spindle fibers

121. The three parts of a bacterial flagellum are
(1) Filament, hook and basal body
(2) Filament, basal body and axoneme
(3) Hook, basal body and axoneme
(4) Basal body, satellite and central hub

122. Select the **correct** statement(s) regarding the structure of a chromosome.
a. Telomeres seal the ends of chromosome and prevent their shortening or chromosome loss.
b. Two sister chromatids are held together by the centromere
c. In sub-metacentric chromosome, one extremely short and one very long arm is present
(1) a and c (2) b and c
(3) Only a (4) a and b

123. Site of synthesis of ribosomal RNA is
(1) Nuclear membrane (2) Nucleolus
(3) Lysosomes (4) Ribosomes

124. What will be the outcome if the pH in lysosomes is increased to alkaline?
(1) The lysosomal enzymes will become more active
(2) Hydrolytic enzymes will function more efficiently
(3) Hydrolytic enzymes of lysosome become inactive
(4) Carbohydrate, lipids, proteins will digest more easily

125. All of the following statements are true for metaphase, **except**
(1) Condensation of chromosomes is completed
(2) Spindle fibres attach to small disc-shaped structure of chromosomes
(3) Chromosomes are moved to spindle equator and get aligned along metaphase plate through spindle fibres to both poles
(4) Chromosomes cluster at opposite spindle poles and their identity is lost as discrete elements

126. Read the following Assertion (A) and Reason (R) and select the **correct** option.
Assertion (A): Meiosis introduces new combination of traits in the progeny.
Reason (R): In Zygotene stage, homologous chromosomes pair to form bivalents, and undergo crossing over.
(1) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(2) (A) is true but (R) is false
(3) Both (A) and (R) are false
(4) Both (A) and (R) are true and (R) is the correct explanation of (A)

Space for Rough Work

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

Statement A: Chiasmata forms in diakinesis stage.

Statement B: Cells at the end of prophase, when viewed under the microscope, shows golgi complexes, ER, nucleolus and the nuclear envelope.

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

128. Which of the following is the **correct** sequence of occurrence of sub stages of prophase I?

(1) Diakinesis → Diplotene → Pachytene → Zygotene → Leptotene
(2) Leptotene → Zygotene → Pachytene → Diplotene → Diakinesis
(3) Diplotene → Zygotene → Leptotene → Pachytene → Diakinesis
(4) Leptotene → Diakinesis → Zygotene → Diplotene → Pachytene

129. Match the following columns and select the **correct** option.

	Column I		**Column II**
a.	Ribosomes	(i)	Schleiden and Schwann
b.	Golgi apparatus	(ii)	George Palade
c.	*Omnis cellula-e cellula*	(iii)	Camillo Golgi
d.	Cell theory	(iv)	Rudolf Virchow

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

130. Read the following statements w.r.t. significance of mitosis

a. The growth of multicellular organisms is due to mitosis.
b. It helps in cell repair.
c. It helps to restore the nucleo-cytoplasmic ratio of cell.
d. It leads to variation which are very important for the process of evolution.

Select the **correct** option.

(1) Only b is incorrect
(2) a, b and d are correct
(3) Only d is correct
(4) a, b and c are correct

131. The start of second phase of mitosis is marked by

(1) Formation of asters and spindle euqator
(2) Complete disintegration of nuclear envelope
(3) Movement of chromosomes to spindle equator
(4) Splitting of centromere and separation of chromatids

132. Na^+ - K^+ pump exemplifies

(1) Active transport
(2) Passive transport
(3) Transport of molecules which does not use ATP
(4) An energy independent process

133. In oocytes of some vertebrates, which of the given sub-stages of prophase-I can last for months or years?

(1) Leptotene (2) Zygotene
(3) Pachytene (4) Diplotene

134. Nuclear envelope is present in,

(1) *Rhizobium* (2) *Ulothrix*
(3) *Spirulina* (4) *Methanobacterium*

Space for Rough Work

135. The best stage to study the shape of the chromosomes is

(1) Anaphase

(2) Metaphase

(3) Prophase

(4) Telophase

SECTION - B

136. Select the **incorrect** match

(1) Membraneless structure – Centrosome

(2) Provide support to plasma membrane – Microfilament

(3) They arise from the centriole like basal bodies – Cilia and flagella

(4) Pericentriolar satellites – Form boundary of cilia

137. Read the following Assertion (A) and Reason (R) statements and select the **correct** option.

Assertion (A): Mitochondria are called power house of the cell.

Reason (R): They produce cellular energy in the form of ATP.

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

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

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

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

138. Read the following statements about plastids and state **true (T)** or **false (F)** for them

a. Amyloplasts store carbohydrates.

b. In chromoplasts, fat soluble pigments like carotene and xanthophylls are present.

c. Aleuroplasts store oils and fats.

	a	**b**	**c**
(1)	T	F	T
(2)	T	T	F
(3)	F	T	F
(4)	F	F	T

139. At which stage chromosomal material gets untangled?

(1) Metaphase

(2) Prophase

(3) Telophase

(4) Anaphase

140. Which of the given is not true for a tetrad?

(1) Two chromosomes having same genes on similar loci

(2) Formed by a pair of chromosomes

(3) Contains four sister chromatids

(4) Clearly visible in pachytene stage

141. In plant cell, middle lamella is chiefly made up of

(1) Cellulose

(2) Mannans

(3) Calcium pectate

(4) Calcium carbonate

142. Select the **correct** option w.r.t. events which lead to formation of syncytium.

(1) Karyokinesis not followed by cytokinesis

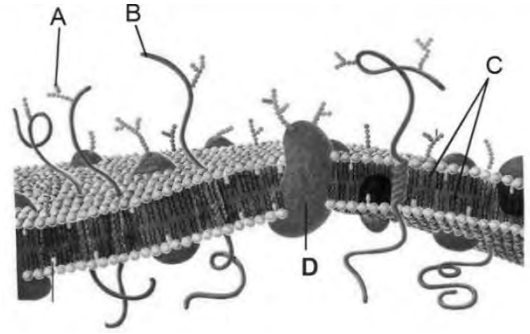
(2) Karyokinesis not followed by disappearance of nuclear membrane

(3) Nuclear division without DNA duplication

(4) Cytokinesis followed by karyokinesis

Space for Rough Work

143. Consider the given diagram and select the **correct** option w.r.t. labelled components (A-D).



	A	B	C	D
(1)	Lipid	Cholesterol	Peripheral protein	Integral protein
(2)	Cholesterol	Integral protein	Sugar	Peripheral protein
(3)	Sugar	Peripheral protein	Phospholipid bilayer	Integral protein
(4)	Sugar	Integral protein	Cholesterol	Lipid

144. Membrane proteins are classified into which of the following groups on the basis of ease of extraction?
(1) Acidic and basic
(2) Polar and non-polar
(3) Integral and peripheral
(4) Structural and enzymatic

145. Intracellular membranous compartmentalisation is the characteristic of
(1) Prokaryotes (2) Viruses
(3) Diatoms (4) *Nostoc*

146. If average duration of cell cycle of a normally dividing eukaryotic cell is 120 minutes then, what should be the duration of interphase in it?
(1) 120 minutes
(2) More than 114 minutes
(3) 60 minutes
(4) Less than 30 minutes

147. Mitosis is also known as equational division, because
(1) Parent cell forms two daughter cells
(2) Number of chromosomes in parent and progeny cells remains the same
(3) There is an equal cytokinesis
(4) Number of chromosomes becomes half in progeny as of the parent cell

148. If the gamete of an angiosperm has four chromosomes, then its parental cell had
(1) 16 chromosomes during anaphase-I
(2) 4 bivalents aligned on the equatorial plate during metaphase-I
(3) 16 tetrads during pachytene
(4) 16 chromosomes during G_2 stage

149. Which of the given events occur during S-phase of cell cycle?
A. Replication of DNA
B. Duplication of semi-autonomous cell organelles
C. Synthesis of tubulin proteins
D. Duplication of centrioles in the cytoplasm of higher plant cells.
(1) A and D only (2) B and C only
(3) A, C and D only (4) Only A

150. Select the **correct** sequence of events taking place in mitotic anaphase.
A – Chromatids separate
B – Centromeres split
C – Chromatids move to opposite poles
(1) B $\rightarrow$ A $\rightarrow$ C
(2) C $\rightarrow$ B $\rightarrow$ A
(3) A $\rightarrow$ B $\rightarrow$ C
(4) A $\rightarrow$ C $\rightarrow$ B

Space for Rough Work

ZOOLOGY

SECTION - A

151. The outer pleural membrane is found in close proximity with all of the following, **except**
(1) Diaphragm
(2) Ribs
(3) Sacrum
(4) Sternum

152. Rate of diffusion of O_2 at alveoli and tissue site is independent of
(1) Partial pressure of O_2
(2) Solubility of O_2
(3) Thickness of diffusion membrane
(4) Rate of diffusion of CO_2

153. In a healthy adult man, under normal physiological conditions, the value of sum of TV, ERV and IRV is
(1) Equal to FRC (2) Less than TLC
(3) More than VC (4) Equal to EC

154. Select the correct match w.r.t. organisms and their respiratory structures.
(1) Prawn – Gills
(2) *Rana tigrina* – Tracheal tubes
(3) *Pterophyllum* – Lungs
(4) *Struthio* – Skin

155. All of the following are true w.r.t. enzyme carbonic anhydrase, **except**
(1) Present in a very high concentration in RBCs
(2) At tissue site, it enables the formation of HCO_3^- and H^+ from H_2CO_3
(3) At alveolar site, it catalyses the formation of CO_2 and H_2O from H_2CO_3
(4) It's co-factor is Mg^{2+}

156. The formation of oxyhaemoglobin at alveolar site is facilitated by all of the following factors, **except**
(1) Low pCO_2 (2) High pO_2
(3) Low pH (4) Low temperature

157. In the pulmonary vein, the partial pressure of gas which has 20-25 times higher solubility than that of O_2 in blood is
(1) Less than the partial pressure of CO_2 in atmospheric air
(2) Equal to the partial pressure of O_2 in tissues
(3) More than the partial pressure of O_2 in atmospheric air
(4) More than the partial pressure of CO_2 in pulmonary artery

158. **X** is the amount of O_2 delivered to the tissues by every 300 mL of oxygenated blood whereas **Y** is the amount of CO_2 delivered to the alveoli by every 400 mL of deoxygenated blood in an adult human, under normal physiological conditions.
Identify the approximate value of **X** and **Y** and select the correct option.

	X (mL)	**Y (mL)**
(1)	25	30
(2)	5	4
(3)	30	25
(4)	15	16

159. Read the following statements carefully.
Statement (A): During forced expiration, internal inter-costal muscles relax leading to the pulling of ribs in inward direction.
Statement (B): During normal inspiration, diaphragm and external inter-costal muscles contract to increase the volume of thoracic chamber in the antero-posterior and dorso-ventral axis respectively.

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Select the **correct** option.

(1) Both statements (A) and (B) are correct

(2) Only statement (A) is correct

(3) Both statements (A) and (B) are incorrect

(4) Only statement (B) is correct

160. How many of the structures given in the box below constitute conducting part of human respiratory system which are also supported by incomplete cartilaginous rings?

Trachea, Primary bronchi, Tertiary bronchi, Initial bronchioles, Terminal bronchioles, Alveoli

Select the **correct** option.

(1) Four (2) Six

(3) Three (4) Two

161. *Erythroblastosis foetalis* can be avoided by administering _____ to the mother immediately after the delivery of the first child.

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

(1) Anti-Rh antigens

(2) Anti-Rh antibodies

(3) Rh toxoid

(4) Rh antigens

162. In which of the following organisms, water does not circulate through its body cavity to facilitate the cells to exchange essential substances?

(1) *Hydra* (2) *Sycon*

(3) *Obelia* (4) *Pheretima*

163. In a cardiac cycle of a normal adult human, the flow of blood into the ventricles increases by about 30% during

(1) Joint diastole

(2) Atrial systole

(3) Ventricular systole

(4) Atrial diastole

164. Select the **incorrect** match w.r.t. a healthy man.

(1) Water – 90-92 per cent of blood plasma

(2) Proteins – 6-8 per cent of blood plasma

(3) Formed elements – 45 per cent of blood plasma

(4) Haemoglobin – 12-16 gms per decilitre of blood

165. During coagulation of blood, coagulum is formed mainly by a network of threads called

(1) Fibrins

(2) Thrombokinase

(3) Thrombin

(4) Thrombocytes

166. The oxygenated blood does not enter into the any heart chamber of

(1) Amphibians

(2) Reptiles

(3) Mammals

(4) Fishes

167. Though the whole of the nodal tissue is auto-excitable but after removal of SAN, there would be great impact on the contractile activity of the heart. Which of the following options does not correctly justify the above scenario?

(1) In nodal tissue, only SAN is responsible for the depolarisation of ventricles.

(2) The SAN can generate maximum number of action potentials.

(3) SAN is responsible for initiating the rhythmic contractile activity of the heart.

(4) The SAN is the pacemaker of the heart.

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168. All of the following statements are true for lymph, **except**
(1) It has same mineral distribution as that in plasma
(2) It is a colourless fluid containing specialised lymphocytes
(3) It contains larger proteins and most of the formed elements in it
(4) It is an important carrier for nutrients and hormones

169. Select the **incorrect** statement w.r.t. formed elements present in human blood.
(1) RBCs are enucleated so as to provide all their internal space to haemoglobin for oxygen transport.
(2) Monocytes are agranulocytes which later transform into macrophages in tissues.
(3) Eosinophils are the cells responsible for secretion of histamine and serotonin.
(4) Basophils are the least abundant white blood cells.

170. One feature common to both fishes and humans is
(1) Number of chambers present in their heart
(2) Presence of pulmonary circulation
(3) Only deoxygenated blood is pumped out by the heart
(4) Presence of closed type of circulation

171. A chronic disorder in which alveolar walls are damaged because of which respiratory surface is decreased and whose one of the major cause includes cigarette smoking is
(1) Asthma
(2) Silicosis
(3) Pneumonia
(4) Emphysema

172. When percentage saturation of Hb with O_2 is plotted against the pO_2, the shape of the curve will be
(1) A straight line (2) Sigmoid
(3) Hyperbola (4) Parabola

173. The epithelial tissue present in the alveoli of human lungs is
(1) Ciliated columnar (2) Squamous
(3) Glandular (4) Compound

174. The effect of sympathetic neural signals on the rate of heart beat is similar to the effect of _____ on heart.
Select the **correct** option to fill in the blank.
(1) ANF (2) Norepinephrine
(3) Acetylcholine (4) PTH

175. In a hypothetical scenario, what would be the immediate result, if the chordae tendineae connected to Mitral valve are cut?
(1) Opening and closure of valve remains unaffected
(2) Decrease in the flow of blood in pulmonary artery
(3) Decrease in the flow of blood in aorta
(4) Increase in flow of blood in pulmonary veins

176. Choose the **correct** blood flow pathway in systemic circulation w.r.t. humans.
(1) Right ventricle $\xrightarrow[\text{artery}]{\text{Pulmonary}}$ Lungs $\xrightarrow[\text{veins}]{\text{Pulmonary}}$ Left atrium
(2) Left ventricle $\xrightarrow{\text{Aorta}}$ Body tissues $\xrightarrow{\text{Vena cava}}$ Right atrium
(3) Right ventricle $\xrightarrow{\text{Aorta}}$ Lungs $\xrightarrow[\text{artery}]{\text{Pulmonary}}$ Left atrium
(4) Left ventricle $\xrightarrow[\text{artery}]{\text{Pulmonary}}$ Body tissues $\xrightarrow[\text{cava}]{\text{Vena}}$ Right atrium

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177. Select the conducting part of nodal tissue that passes through the proximal part of inter ventricular septum.
(1) AV bundle
(2) Purkinje fibres
(3) Chordae tendineae
(4) Sino-atrial node

178. Upon holding the breath, the condition among the following which is mainly responsible for an urge to breath is
(1) Falling pO_2 in blood
(2) Increasing pCO_2 in blood
(3) Increasing pO_2 in blood
(4) Falling pCO_2 in blood

179. Read the following statements carefully.
Statement (A): Tunica intima is the outer layer of wall of blood vessels made up of squamous endothelium.
Statement (B): The tunica media is comparatively thin in the veins than corresponding arteries.
Select the **correct** option.
(1) Both statements (A) and (B) are correct
(2) Both statement (A) and (B) are incorrect
(3) Only statement (A) is correct
(4) Only statement (B) is correct

180. In a hypothetical scenario, if the component of nodal tissue which is present in the lower left corner of the right atrium, close to the atrio ventricular septum is removed from human heart, what would be the effect of this removal?
(1) The maintenance of the cardiac rhythmicity would be disturbed
(2) The contractile rhythmicity of the heart would remain normal as before
(3) The cardiac output would increase
(4) There would be delay in spreading the impulses to the atria of heart

181. Select the **incorrect** statement w.r.t. disorders of circulatory system.
(1) In atherosclerosis, the coronary arteries get affected.
(2) Angina occurs when enough oxygen does not reach the heart muscles.
(3) Heart failure is the state of heart when it is suddenly damaged by an inadequate blood supply.
(4) Hypertension affects vital organs like brain and kidney.

182. 'X' are the cell fragments produced from megakaryocytes and reduction in their normal count can lead to clotting disorders.
Identify 'X' and select its **correct** number per mm^3 of human blood.
(1) 5 millions - 5.5 millions
(2) 6000 - 8000
(3) 1.5 lakhs to 3.5 lakhs
(4) 30,000 - 60,000

183. Select the **incorrect** match

(1)	Fibrinogens	–	Required for coagulation of blood
(2)	Albumins	–	Maintains osmotic balance in body
(3)	Globulins	–	Involved in defense mechanisms of the body
(4)	Serum	–	Plasma with clotting factors

184. In a standard ECG, which of the following represents the **correct** activity w.r.t. human heart?

(1)	P-wave	–	Depolarisation of the atria
(2)	QRS complex	–	Ending of the ventricular diastole
(3)	T-wave	–	Depolarisation of the ventricles
(4)	End of T-wave	–	Marks the beginning of ventricular systole

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185. The set of organisms in which blood is pumped out of the heart and the cells and tissues are directly bathed in it is

(1) *Saccoglossus*, *Corvus*, *Ornithorhynchus, Culex*

(2) *Anopheles*, *Locusta*, *Canis*, *Aplysia*

(3) *Pheretima*, *Nereis*, *Bombyx*, *Apis*

(4) *Pinctada*, *Limulus*, *Balanoglossus*, *Periplaneta*

SECTION - B

186. Cardiac activity can be regulated by all, **except**

(1) Neural centre present in medulla oblongata

(2) Inputs of autonomic nervous system

(3) Atrio-ventricular septum present in heart

(4) Activity of adrenal medullary hormones

187. Suppose the cardiac output of a person is 5 L/min. Blood volume in left ventricle at the end of diastole and systole is 150 mL and 100 mL respectively. What would be his heart rate?

(1) 100 beats per minute

(2) 75 beats per minute

(3) 120 beats per minute

(4) 50 beats per minute

188. Read the following statements.

Statement A: The cardiac output of an athlete is usually higher than that of an ordinary man.

Statement B: The body has the ability to alter the stroke volume as well as the heart rate and thereby the cardiac output.

Choose the **correct** option.

(1) Only statement A is correct

(2) Only statement B is correct

(3) Both statements A and B are correct

(4) Both statements A and B are incorrect

189. The middle layer of the walls of blood vessels in human body possesses

(1) More white fibres and striated muscles

(2) More yellow fibres and multinucleated muscle fibres

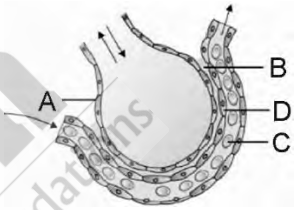
(3) White fibres, muscle fibres and endothelium

(4) Smooth muscles and elastic fibres

190. After the delivery of the first Rh +ve child, *erythroblastosis foetalis* could be a possibility for subsequent pregnancies in which of the following conditions?

	Blood group of mother	**Blood group of foetus**
(1)	A^+	A^-
(2)	O^-	B^+
(3)	B^+	AB^-
(4)	O^-	O^-

191. Observe the given figure.



Which of the following labelled structures is not the part of the diffusion membrane?

(1) C

(2) A

(3) D

(4) B

192. Higher number of RBCs in the blood of a mountain dweller in comparison to a person residing in plains can be explained by

(1) Lack of pollutants in higher mountainous regions

(2) Less pO_2 in atmospheric air in mountains requiring more RBCs to supply the required amount of O_2 to tissues

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(3) Better nutrition intake by mountain dwellers
(4) Enhanced erythropoiesis in mountain dwellers due to high exposure to UV rays

193. **Assertion (A):** The two pleural membranes of human lungs fuse with each other during inhalation.

Reason (R): Fluid present between the two pleural membranes helps to maintain a positive pressure in the pleural cavity during inhalation.

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

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

194. Which of the following statements is **incorrect** with respect to functional residual capacity?

(1) Cannot be measured by a spirometer
(2) It includes ERV and RV
(3) It is the volume of air that will remain in the lungs after a normal expiration
(4) It is the volume of air remaining in the lungs even after a forcible expiration

195. Match the column I and column II w.r.t. transport of O_2 and CO_2 in humans.

	Column I		**Column II**
a.	About 70% of CO_2	(i)	Transported as carbamino-haemoglobin
b.	About 97% of O_2	(ii)	Transported as bicarbonates
c.	About 7% of CO_2	(iii)	Transported as oxyhaemoglobin
d.	Nearly 20-25% of CO_2	(iv)	Transported in dissolved state through plasma

Select the **correct** option.

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

196. Increased concentration of CO_2 and hydrogen ions are being recognised by **'X'** situated adjacent to **'Y'** present in the human brain.

Select the **correct** option that identify 'X' and 'Y' respectively

(1) Respiratory rhythm centre, Pneumotaxic centre
(2) Pneumotaxic centre, Chemosensitive area
(3) Chemosensitive area, Respiratory rhythm centre
(4) Chemosensitive area, Pneumotaxic centre

197. Consider this hypothetical scenario, where the cardiac output of a person is 7000 mL and his stroke volume is 70 mL.

Calculate the duration of his cardiac cycle.

(1) 0.7 seconds
(2) 0.8 seconds
(3) 0.9 seconds
(4) 0.6 seconds

198. A person with anti-B antibodies in his plasma can donate blood to all, **except**

(1) A person with both A and B antigens on his RBCs
(2) A person with no antibodies against blood antigens in his plasma
(3) A person with both anti-A and anti-B antibodies in his plasma
(4) A person with A antigens on his RBCs

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199. Match column I with column II.

	Column I		Column II
a.	Opening of Mitral valve	(i)	During ventricular systole
b.	Opening of semilunar valves	(ii)	Between right ventricle and pulmonary artery
c.	Location of tricuspid valve	(iii)	During ventricular diastole
d.	Location of semilunar valves	(iv)	Between right atrium and right ventricle

Select the **correct** option.

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

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

200. One of the significance of hepatic portal system is

(1) To decrease the volume of blood reaching systemic circulation

(2) To directly utilize the nutrients and send them to pulmonary circulation

(3) That the absorbed nutrients directly reach the pulmonary circulation at a faster rate

(4) To eliminate the toxic substances present in absorbed food

❑ ❑ ❑

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