Sky Tutorials
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IIT-JEE | NEET | Foundation

NEET

Time: 200 Minute   **M.M. 720**

ALL INDIA SKY TEST SERIES

Pulse Batch – Neet

Date : 30/10/2023

SYLLABUS

PHYSICS	CHEMISTRY	BOTANY	ZOOLOGY
Previous + SHM	Previous + Coordination compound + G.O.C.	Anatomy of flowering plants + Transport in plants (Upto Imbibition)	Excretory product and their elimination

Please read the instructions carefully. You are allotted **5** minutes specifically for this purpose.

INSTRUCTIONS:

1. This Question paper is divided in to four parts physics, chemistry, botany, zoology and each part is further divided into two sections.

    Section –A contains 35 Questions Section B contains 15 questions. Please ensure that the Questions paper you have received contains **ALL THE QUESTIONS** in each Part.

2. **In Section A all the 35 Questions are compulsory and in Section B Contain 15 Question, out of these**

    15 Questions, candidates can choose to attempt any 10 Questions.

    Each Question has four choices (a), (b), (c), (d) out of which **only one is correct & Carry 4 marks each 1 mark** will be deducted for each wrong answer.

GENERAL INSTRUCTION

1. Use only **blue/black pen (avoid gel pen)** for darkening the bubble.
2. Indicate the correct answer for each question by filling appropriate bubble in your **OMR** answer sheet.
3. The answer sheet will be checked through computer hence; the answer of the question must be marked by –shading the circles against the question by dark **blue/black pen**
4. Blank papers, Clipboards, Log tables, Slide Rule, Calculator, Cellular Phones Papers and Electronic Gadgets in any form are **not** allowed to be carried inside the examination hall.
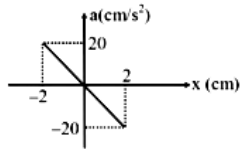
Name of the candidate: _____

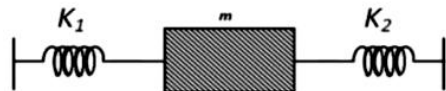Signature of the candidate: _____Signature of the invigilator: _____

PHYSICS

SECTION - A

1. The acceleration-displacement graph of a particle executing simple harmonic motion is shown in the figure. The frequency of oscillation is.

   (a) $\dfrac{\sqrt{2.5}}{\pi} S^{-1}$

   (b) $2\pi\sqrt{10}s^{-1}$

   (c) $\dfrac{1}{2\pi}\sqrt{5}s^{-1}$

   (d) $\dfrac{1}{2\pi}\sqrt{20}s^{-1}$

2. The amplitude and time period of SHM are 0.8 cm and 0.2 s respectively. If the initial phase is $\pi/2$ radian, then the equation representing SHM is
   (a) y = 0.8 cos $10\pi t$
   (b) y = 0.8 sin πt
   (c) y = 3 × 0.8 sinπt
   (d) y = 0.8 sin $10\pi t$

3. There is a pendulum executing simple harmonic motion and its maximum kinetic energy is K_1. If the length of the pendulum is doubled and it performs simple harmonic motion with the same angular amplitude as in the first case, its maximum kinetic energy is K_2 Relation between them is
   (a) K_2
   (b) $K_2 = 2 K_1$
   (c) $K_2 = K_1$
   (d) $K_2 = \dfrac{K_1}{4}$

4. Find the resultant amplitude of the following simple harmonic equations:
   $X_1 = 5\sin\omega t$
   $X_2 = 5\sin(\omega t + 53^o)$
   $X_3 = -10\cos\omega t$
   (a) 5
   (b) 10
   (c) 15
   (d) 20

5. A particle at end of a spring executes simple harmonic motion with a period t_1 , while the corresponding period of another spring is t_2 . If two springs are connected in series then time period is T, them which one is true? (Consider same mass of particle in all cases)
   (a) $T = t_1 + t_2$
   (b) $T^2 = t_1^2 + t_2^2$
   (c) $T = t_1^{-1} + t_2^{-1}$
   (d) $T = t_1^{-2} + t_2^{-2}$

6. A particle is vibrating in simple harmonic motion with amplitude of 4 cm. The displacement of the particle when kinetic energy becomes half of total energy is
   (a) 10 cm
   (b) $\sqrt{2}$ cm
   (c) 2 cm
   (d) $2\sqrt{2}$ cm

7. The displacement of a particle varies according to the relation x = 4 (cos πt + sin πt). The amplitude of the particle as :
   (a) 8
   (b) – 4
   (c) 4
   (d) $4\sqrt{2}$

8. A particle starts oscillating simple harmonically from its equilibrium position with time period T .The ratio of KE and PE of the particle at the t=T/12 is
   (a) 1 : 4
   (b) 2 : 1
   (c) 3 : 1
   (d) 4 : 1

9. A particle executing simple harmonic motion along y- axis has its motion described by the equation, $y = A \sin(\omega t) + B$.The amplitude of simple harmonic motion is–
   (a) A
   (b) B
   (c) A + B
   (d) $\sqrt{A+B}$

10. If at some instant of time, the displacement of a simple harmonic oscillator is 0.02 m and its acceleration is 2 ms^{-2}, then the angular frequency of the oscillator is
    (a) 100 rad/s
    (b) 10 rad/s
    (c) 1 rad/s
    (d) 0.1 rad/s

11. A mass M is suspended from a spring of negligible mass. The spring is pulled a little and then released so that the mass executes SHM of time period T. If the mass is increased by m, the time period becomes 5T/3. Then the ratio of m/M is
    (a) 3/5
    (b) 25/9
    (c) 16/9
    (d) 5/3

12. A horizontal platform with an object placed on it is executing SHM in the vertical direction. The amplitude of oscillation is 2.5 cm. What must be the least period of these oscillations so that the object is not detached?
    (a) π S
    (b) $\dfrac{\pi}{5}$ S
    (c) $\dfrac{\pi}{10}$ S
    (d) $\dfrac{\pi}{15}$ S

13. Two springs of force constants K_1 and K_2, respectively, are connected to a mass m, as shown. The frequency of oscillation of the mass is f. if both K_1 and K_2 are made four times their original values, the frequency of oscillation becomes

    (a) f/2
    (b) f/4
    (c) 4f
    (d) 2f

14. The potential energy of a particle executing S.H.M is 2.5 J, when its displacement is half of its amplitude. The total energy of the particle is
    (a) 2.5 J
    (b) 10 J
    (c) 12 J
    (d) 20 J

15. A particle executes simple harmonic motion (amplitude = A) between x = -A and x = +A. the time taken for it to go from 0 to A/2 is T_1 and to go from A/2 to A is T_2. Then
    (a) $T_1 < T_2$ (b) $T_1 > T_2$
    (c) $T_1 = T_2$ (d) $T_1 = 2T_2$

16. The ratio of frequency of two pendulum are 2 : 3, then their lengths are in the ratio
    (a) $\sqrt{\dfrac{2}{3}}$ (b) $\sqrt{\dfrac{3}{2}}$ (c) $\dfrac{4}{9}$ (d) $\dfrac{9}{4}$

17. Which of the following quantity is always positive in a simple harmonic motion?
    (a) $\vec{F}.\vec{a}$ (b) $\vec{v}.\vec{r}$ (c) $\vec{a}.\vec{r}$ (d) $\vec{F}.\vec{r}$

18. A body is executing SHM. When the displacement of the body from the mean position is 4cm and 5cm, the values of the corresponding velocity of the body are 10cm/s and 8 cm/s, respectively. The time period of the body is
    (a) $2\pi s$ (b) $\dfrac{\pi}{2}s$ (c) πs (d) $\dfrac{3\pi}{2}s$

19. The displacement of two identical particles executing SHM is represented by equations $x_1 = 4\sin\left(10t + \dfrac{\pi}{6}\right)$ and $x_2 = 5\cos\omega t$. For what value of ω energy of both the particles is same?
    (a) 16 units   (b) 6 units
   (c) 4 units   (d) 8 units

20. The equation of simple harmonic motion of a particle is $a + 4\pi^2 x = 0$ where a the instantaneous linear acceleration at displacement x. The frequency of motion is.
    (a) $1\,Hz$ (b) $4\pi\,Hz$ (c) $\dfrac{1}{4}Hz$ (d) $4Hz$

21. The time period of a particle executing S.H.M. is 8s. At t =0 it is at the mean position. The ratio of the distance covered by the particle in the 1st second to the 2nd second is
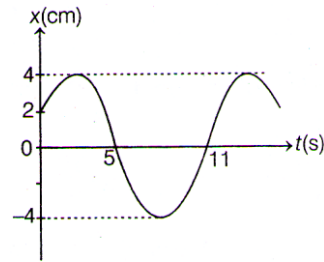   (a) $\dfrac{1}{\sqrt{2}+1}$ (b) $\sqrt{2}$ (c) $\dfrac{1}{\sqrt{2}}$ (d) $\sqrt{2}+1$

22. Two identical springs are connected in parallel and series as shown in figure. If f_p and f_s are frequencies of arrangement, what is f_s/f_p?
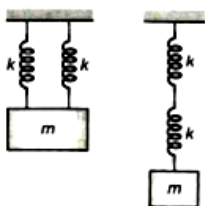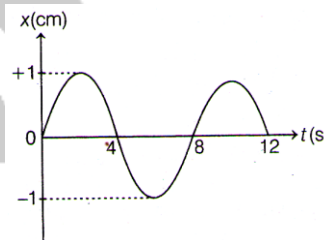

    (a) 1 : 2   (b) 2 : 1   (c) 1 : 3   (d) 3 : 1

23. Figure shows the position-time graph of an object in SHM. The correct equation representing this motion is
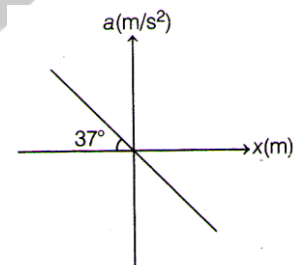

    (a) $2\sin\left(\dfrac{2\pi}{5}t + \dfrac{\pi}{6}\right)$ (b) $4\sin\left(\dfrac{\pi}{5}t + \dfrac{\pi}{6}\right)$
    (c) $4\sin\left(\dfrac{\pi}{6}t + \dfrac{\pi}{3}\right)$ (d) $4\sin\left(\dfrac{\pi}{6}t + \dfrac{\pi}{6}\right)$

24. The x-t graph of a particle undergoing simple harmonic motion is below. The acceleration of the particle at $t = \dfrac{4}{3}s$ is

    (a) $\dfrac{\sqrt{3}}{32}\pi^2 cm/s^2$ (b) $\dfrac{-\pi^2}{32}cm/s^2$
    (c) $\dfrac{\pi^2}{32}cm/s^2$ (d) $-\dfrac{\sqrt{3}}{32}\pi^2 cm/s^2$

25. The acceleration-displacement graph of a particle executing simple harmonic motion is shown in figure. The time period of simple harmonic motion is


    (a) $\dfrac{4\pi}{\sqrt{3}}s$ (b) $\dfrac{2\pi}{\sqrt{3}}s$ (c) $2\pi s$ (d) $\dfrac{4\pi}{3}s$

26. A particle of mass m is executing SHM. If amplitude is a and frequency n, the value of its force constant will be
    (a) mn^2 (b) $4mn^2a^2$ (c) ma^2 (d) $4\pi^2 mn^2$

27. A particle is executing SHM along x-axis with origin as the mean position. If velocity v of the particle is related with position x as $9v^2 = 36 - x^2$, then time period of the oscillation will be

    (a) 3 s   (b) 3π s   (c) 6 s   (d) 6π s

28. Five identical springs are used in the following three configurations. The time periods of verticle oscillations in configurations (i), (ii) and (iii) are in the ratio
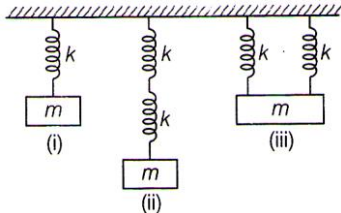
    (a) $1:\sqrt{2}:\dfrac{1}{\sqrt{2}}$ (b) $2:\sqrt{2}:\dfrac{1}{\sqrt{2}}$

    (c) $\dfrac{1}{\sqrt{2}}:2:1$ (d) $2:\dfrac{1}{\sqrt{2}}:1$

29. The ratio of time period of three identical springs, If they are first joined in parallel and then in series is (Assume same mass is suspended from them)

    (a) $1:3$ (b) $2:1$ (c) $2:3$ (d) $9:1$

30. A particle of mass m is performing linear simple harmonic motion. Its equilibrium is at x = 0, force constant is k and amplitude of SHM is A. The maximum power supplied by the restoring force to the particle during SHM will be

    (a) $\dfrac{k^{\frac{3}{2}}A^2}{\sqrt{m}}$ (b) $\dfrac{2k^{\frac{3}{2}}A^2}{\sqrt{m}}$ (c) $\dfrac{k^{\frac{3}{2}}A^2}{3\sqrt{m}}$ (d) $\dfrac{k^{\frac{3}{2}}A^2}{2\sqrt{m}}$

31. Two particles are oscillating along two close parallel straight lines side by side, with the same frequency and amplitudes. They pass each other moving in opposite directions when their displacement is half of the amplitude. The phase difference between the particles is

    (a) $\dfrac{\pi}{6}$ (b) 0   (c) $\dfrac{2\pi}{3}$ (d) π

32. A simple pendulum of length l is suspended in a car. The car starts moving on a horizontal road according to the equation $x = \dfrac{g}{2}\sqrt{3}\, t^2$ .Find the time period of oscillations of the pendulum.

    (a) $2\pi\sqrt{\dfrac{l}{g}}$ (b) $\pi\sqrt{\dfrac{l}{2g}}$

    (c) $2\pi\sqrt{\dfrac{l}{2g}}$ (d) $2\pi\sqrt{\dfrac{l}{g\sqrt{3}}}$

33. After learing SHM, Guddu a curious student of Xlth class, designed a spring pendulum with identical springs of spring constant k and a small block of mass m as shown in figure.

    When block is at rest, it just touches the lower spring. So, Guddu forgot to connect lower spring with block. The time period of oscillation of the block when it is slightly pushed downward and released is
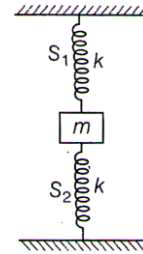
    (a) $2\pi\sqrt{\dfrac{m}{2k}}$ (b) $2\pi\sqrt{\dfrac{2m}{k}}$

    (c) $\pi\sqrt{\dfrac{m}{2k}}$ (d) $\pi\sqrt{\dfrac{m}{k}}\left[1+\dfrac{1}{\sqrt{2}}\right]$

34. If time period of SHM is T, then minimum time taken by the particle to move from x = 0 to $A/\sqrt{2}$ will be :

    (a) T/6   (b) T/8   (c) T/3   (d) T/12

35. The maximum velocity of a particle in SHM is v. If the amplitude is doubled and the time period of the oscillation decreased to $\dfrac{1}{3}$ of its original value, the maximum velocity becomes:

    (a) 18 v (b) 12 v (c) 6 v (d) 3v

SECTION -B

36. A light rod of length l has two masses m1 and m2 attached to its two ends. The moment of inertia of the system about an axis perpendicular to the rod and passing through the centre of mass is

    (a) $\dfrac{m_1 m_2}{m_1 + m_2}l^2$ (b) $\dfrac{m_1 + m_2}{m_1\, m_2}l^2$

   (c) $(m_1 + m_2)l^2$ (d) $\sqrt{m_1 m_2}\, l^2$

37. A solid sphere of mass m and radius R is rotating about its diameter. A solid cylinder of the same mass and same radius is also rotating about its geometrical axis with an angular speed twice that of the sphere. The ratio of their kinetic energies of rotation (*Esphere* / *ECylinder*) will be

    (a) 2 : 3   (b) 1 : 5   (c) 1 : 4   (d) 3 : 1

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38. A rope is wound around a hollow cylinder of mass 3 kg and radius 40 cm. What is the angular acceleration of the cylinder if the rope is pulled with a force of 30 N?
    (a) 25 m/s^2　　　　(b) 0.25 rad/s^2
    (c) 25 rad/s^2　　　(d) 5 m/s^2

39. A uniform rod of mass m and length l is suspended by two strings at its ends as shown. When one of the strings is cut, the rod starts falling with an initial angular acceleration
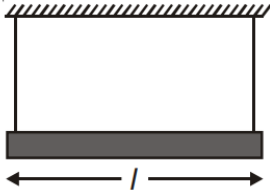
    (a) $\dfrac{g}{l}$　　(b) $\dfrac{g}{2l}$　　(c) $\dfrac{3g}{2l}$　　(d) $\dfrac{3g}{4l}$

40. A constant torque acting on a uniform circular wheel changes its angular momentum from A_0 to $4A_0$ in 4 seconds. The magnitude of this torque is
    (a) $\dfrac{3A_o}{4}$　　(b) A_o　　(c) $4A_o$　　(d) $12\,A_o$

41. The angular momentum of a particle performing uniform circular motion is L. If the kinetic energy of partical is doubled and frequency is halved, then angular momentum becomes
    (a) L/2　(b) 2L　　(c) L/4　(d) 4L

42. Two point masses m and 3m are placed at distance r. The moment of inertia of the system about an axis passing through the centre of mass of system and perpendicular to the line joining the point masses is
    (a) $\dfrac{3}{5}mr^2$　(b) $\dfrac{3}{4}mr^2$　(c) $\dfrac{3}{2}mr^2$　(d) $\dfrac{6}{7}mr^2$

43. Four thin uniform rods each of length L and mass m are joined to form a square. The moment of inertia of square about an axis along its one diagonal is
    (a) $\dfrac{mL^2}{6}$　(b) $\dfrac{2}{3}mL^2$　(c) $\dfrac{2mL^2}{4}$　(d) $\dfrac{4mL^2}{3}$

44. Four spheres of diameter 2a and mass M are placed with their centres on the four corners of a square of side b. Then moment of inertia of the system about an axis about one of the sides of the square is
    (a) $Ma^2 + 2Mb^2$　　　(b) Ma^2
    (c) $Ma^2 + 4Mb^2$　　　(d) $\dfrac{8}{5}Ma^2 + 2Mb^2$

45. The moment of inertia of a thin uniform circular disc about one of its diameter is I. Its moment of inertia about an axis tangent to it and perpendicular to its plane is
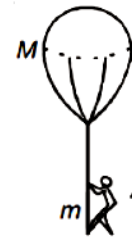   (a) 2I/3　(b) 2I　　(c) I/2　　(d) 6I

46. A particle of mass m is moving with constant velocity v parallel to the x-axis as shown in the figure. Its angular momentum about origin O is
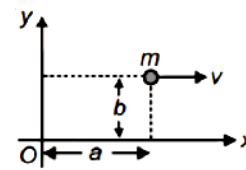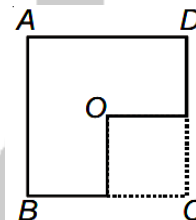

    (a) mvb　　　　　　(b) mva
    (c) $mv\sqrt{a^2 + b^2}$　　(d) $mv(a+b)$

47. A man of mass m is suspended in air by holding the rope of a balloon of mass M. As the man climbs up the rope, the balloon

    (a) Move upward　　　(b) Moves downward
    (c) Remains stationary　(d) Cannot say

48. From a uniform square plate, one-fourth part is removed as shown. The centre of mass of remaining part will lie on

    (a) OC　　(b) OA　　　(c) OB　　　(d) OD

49. Figure shows a composite system of two uniform rods of lengths as indicated. Then the coordinates of the centre of mass of the system of rods are
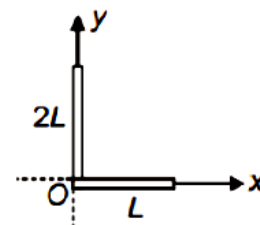
    (a) $\left(\dfrac{L}{2}, \dfrac{2L}{3}\right)$　　　(b) $\left(\dfrac{L}{4}, \dfrac{2L}{3}\right)$
    (c) $\left(\dfrac{L}{6}, \dfrac{2L}{3}\right)$　　　(d) $\left(\dfrac{L}{6}, \dfrac{L}{3}\right)$

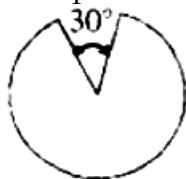50. From a complete ring of mass M and radius R, a 30° sector is removed The moment of inertia of the incomplete ring about an axis passing through the centre of the ring and perpendicular to the plane of the ring is

   (a) $\dfrac{9}{12}MR^2$ (b) $\dfrac{11}{12}MR^2$ (c) $\dfrac{11.3}{12}MR^2$ (d) MR²
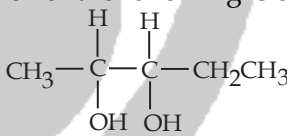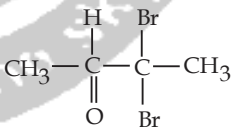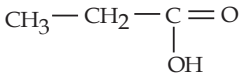
CHEMISTRY

SECTION - A

51. In the complex, $[Cr(NH_3)_4Cl_2]^+$, the oxidation number of Cr is
    (a) +4   (b) +3   (c) +2   (d) +6

52. The IUPAC names of the complex $[Pt(NH_3)_3Br(NO_2)Cl]\,Cl$ is
    (a) triammine chloridobromidonitro platinum (IV) chloride
    (b) triammine bromidchloridonitro platinum (IV) chloride
    (c) triammine bromidochloridonitro platinum (II) chloride
    (d) triammine chloridobromidonitro platinum (II) chloride

53. The correct order of the stoichiometrices of AgCl formed when AgNO₃ in excess is treated with the complexes : $CoCl_3.6NH_3, CoCl_3.5NH_3,$ $CoCl_3.4NH_3$ respectively is
    (a) 1 AgCl, 3 AgCl, 2 AgCl
    (b) 3 AgCl, 1 AgCl, 2 AgCl
    (c) 3 AgCl, 2 AgCl, 1 AgCl
    (d) 2 AgCl, 3 AgCl, 1 AgCl

54. Primary valency of $[Pt(NH_3)_4Cl_2]^{2+}$ ion
    (a) 6   (b) 5   (c) 4   (d) 2

55. Which of the following complexes have lowest molar conductance?
    (a) $CoCl_3.3NH_3$ (b) $CoCl_3.4NH_3$
    (c) $CoCl_3.5NH_3$ (d) $CoCl_3.6NH_3$

56. The coordination number of platinum in $[Pt(NH_3)_4Cl_2]^{2+}$ ion is
    (a) 2   (b) 4   (c) 6   (d) 8

57. Which of the following ligands is not a chelating agent ?
    (a) EDTA   (b) en
    (c) Oxalate   (d) Pyridine

58. IUPAC name of $K_3[Fe(CN)_6]$ is
    (a) potassium ferricyanide
    (b) potassium hexacyanoferrate (I)
    (c) potassium hexacynoferrate (III)
    (d) potassium hexacyanoferrate (II)

59. The IUPAC name of $K_2[Ni(CN)_4]$ is
    (a) potassium tetracyanonickelate (II)
    (b) potassium tetracyanatonickelate (III)
    (c) potassium tetracyanatonickel (II)
    (d) potassium tetracyanonickel (III)

60. In the brown ring complex $[Fe(H_2O)_5(NO)]SO_4$, nitric oxide behave as
    (a) NO^+ (b) neutral, no molecule
    (c) NO^- (d) NO^{2-}

61. Ammonia gas does not evolve from the complex $FeCl_3.4NH_3$ but it gives white precipitate with aqueous solution of AgNO₃. Coordination number of central metal ion in the above complex is six. Give IUPAC name of the complex.
    (a) Ammoniumtrichlorotriammineferric (III)
    (b) Tetraammineferric (III) chloride
    (c) Dichlorotetraammineferrate (II) chloride
    (d) Tetraamminedichloro iron (III) chloride.

62. In the complex ion $[Co(NH_3)_6]^{3+}$, the NH₃ molecules are linked to the central metal ion by
    (a) ionic bonds   (b) covalent bonds
    (c) coordinate bonds   (d) hydrogen bonds

63. The effective atomic number of Cr (atomic no. 24) in $[Cr(NH_3)_6]Cl_3$ is
    (a) 35   (c) 27   (c) 33   (d) 36

64. How many ions are produced from $[Co(NH_3)_6]Cl_3$ in solution ?
    (a) 6   (b) 4   (c) 3   (d) 2

65. EDTA has coordination number
    (a) 3   (b) 4   (c) 5   (d) 6

66. In solid $CuSO_4.5H_2O$ copper is coordinated to number of water molecules equal to
    (a) 5   (b) 4   (c) 1   (d) 2

67. A ligand can also be regarded as
    (a) Lewis acid   (b) Bronsted base
    (c) Lewis base   (d) Bronsted acid

68. Which one of the following is tridentate ligand?
(a) NO_2^- (b) Oxalate ion
(c) Glycinate ion   (d) Dien

69. The geometry and magnetic behaviour of the complex $[Ni(CO)_4]$ are
(a) square planar geometry and paramagnetic
(b) tetrahedral geometry and diamagnetic
(c) square planar geometry and diamagnetic
(d) tetrahedral geometry and paramagnetic

70. The spin only magnetic moment of $[MnBr_4]^{2-}$ is 5.9 BM. The geometry of this complex ion is
(a) tetrahedral   (b) octahedral
(c) trigonal pyramidal   (d) square planar

71. Which of the following is not expected to show paramagnetism ?
(a) $[Ni(H_2O)]^{2+}$ (b) $Ni(CO)_4$
(c) $[Ni(NH_3)_4]^{2+}$ (d) $[Co(NH_3)_6]^{2+}$

72. Pick out the correct statement with respect to $[Mn(CN)_6]^{3-}$.
(a) It is sp^3d^2 hybridised and octahedral
(b) It is sp^3d^2 hybridised and tetrahedral
(c) It is d^2sp^3 hybridised and octahedral
(d) It is dsp^2 hybridised and square planar

73. Which of these statements about $[Co(CN)_6]^{3-}$ is true ?
(a) $[Co(CN)_6]^{3-}$ has no unpaired electrons and will be in a low-spin configuration
(b) $[Co(CN)_6]^{3-}$ has four unpaired electrons and will be in a low-spin configuration
(c) $[Co(CN)_6]^{3-}$ has four unpaired electrons and will be in a high-spin configuration
(d) $[Co(CN)_6]^{3-}$ has no unpaired electrons and will be in a high-spin configuration

74. The hybridisation of central metal ion in $K_2[Ni(CN)_4]$ and $K_2[NiCl_4]$ are respectively
(a) dsp^2, sp^3 (b) sp^3, sp^3
(c) dsp^2, dsp^3 (d) sp^3, sp^3d^2

75. A magnetic moment of 1.73 BM will be shown by one among the following.
(a) $[Cu(NH_3)_4]^{2+}$ (b) $[Ni(CN)_4]^{2-}$
(c) $TiCl_4$ (d) $[CoCl_6]^{4-}$

76. Which one of the following is an outer orbital complex and exhibits paramagnetic behaviour?
(a) $[Ni(NH_3)_6]^{2+}$ (b) $[Zn(NH_3)_6]^{2+}$
(c) $[Cr(NH_3)_6]^{3+}$ (d) $[Co(NH_3)_6]^{3+}$

77. Which of the following complex ions is diamagnetic in nature?
(a) $[CoF_6]^{3-}$ (b) $[NiCl_4]^{2-}$
(c) $[Ni(CN)_4]^{2-}$ (d) $[CuCl_2]^{2-}$

78. Assertion (A) $K_4[Fe(CN)_6]$ is diamagnetic and $[Fe(H_2O)_6]Cl_3$ is paramagnetic.
Reason (R) Hybridisation of central metal in $K_4[Fe(CN)_6]$ is sp^3d^2, while in $[Fe(H_2O)_6]Cl_3$ is d^2sp^3.
(a) Both A and R are correct and R is the correct explanation of A
(b) Both A and R are correct and R is not the correct explanation of A
(c) A is correct but R is incorrect
(d) Both A and R are incorrect

79. The crystal field splitting energy for octahedral (Δ_0) and tetrahedral (Δ_t) complexes is related as
(a) $\Delta_t = -\dfrac{1}{2}\Delta_0$ (b) $\Delta_t = -\dfrac{4}{9}\Delta_0$
(c) $\Delta_t = -\dfrac{3}{5}\Delta_0$ (d) $\Delta_t = -\dfrac{2}{5}\Delta_0$

80. Which one of the following complex ions has the highest magnetic moment ?
(a) $[Cr(NH_3)_6]^{3+}$ (b) $[Fe(CN)_6]^{3-}$
(c) $[Fe(CN)_6]^{4-}$ (d) $[Zn(NH_3)_6]^{2+}$

81. The increasing order of the crystal field splitting power of some common ligands is
(a) $H_2O < OH^- < Cl^- < F^- < CN^-$
(b) $H_2O < Cl^- < OH^- < CN^- < F^-$
(c) $CN^- < H_2O < OH^- < F^- < Cl^-$
(d) $Cl^- < F^- < OH^- < H_2O < CN^-$

82. Assertion (A) A compound with delocalised electron is more stable than that compound would be if all its electrons were localised.
Reason (R) The extra stability, a compound gains as a result of having delocalised electrons, is called delocalisation energy.
(a) Both A and R are correct and R is the correct explanation of A
(b) Both A and R are correct but R is not the correct explanation of A
(c) A is correct but is incorrect
(d) Both A and R are incorrect

83. Hyperconjugation effect is also known as
(a) Baker-Nathan effect   (b) no bond resonance
(c) Both (a) and (b)   (d) None of the above

84. Which among the following statements are true with respect to electronic displacement in a covalent bond ?
    I. Inductive effect operates through π-bond.
    II. Resonacne effect operates through σ-bond.
    III. Inductive effect operates through σ-bond.
    IV. Resonance effect operates through π-bond.
    V. Resonance and inductive effects operate through σ-bond.
    (a) III and IV　　　　(b) I and II
    (c) II and IV　　　　(d) I and III

85. Which of the following represents the correct order of the acidity in the given compounds ?
    (a) $CH_3COOH > BrCH_2COOH > ClCH_2COOH > FCH_2COOH$
    (b) $FCH_2COOH > CH_3COOH > BrCH_2COOH > ClCH_2COOH$
    (c) $BrCH_2COOH > ClCH_2COOH > FCH_2COOH > CH_3COOH$
    (d) $FCH_2COOH > ClCH_2COOH > BrCH_2COOH > CH_3COOH$

SECTION – B
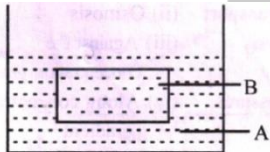
86. The most stable carbocation, among the following is
    (a) $(CH_3)_3C - \overset{\oplus}{C}H - CH_3$
    (b) $CH_3 - CH_2 - \overset{\oplus}{C}H - CH_2 - CH_3$
    (c) $CH_3 - \overset{\oplus}{C}H - CH_2 - CH_2 - CH_3$
    (d) $CH_3 - CH_2 - \overset{\oplus}{C}H_2$

87. The most stable carbocation is

    (a) 　(b) 　(c) 　(d)

88. **Assertion (A)** Allyl and benzyl carbonium ions are more stable than proyl carbonium ions.
    Reason (R) Electron releasing group stabilises carbonium ion.
    (a) Both A and R are correct and R is the correct explanation of the A
    (b) Both A and R are correct but R is not the correct explanation of A
    (c) A is correct but R is incorrect
    (d) Both A and R are incorrect

89. Which one of the nitrogen atoms in

    $H_2N-NH-\overset{\overset{O}{\|}}{C}-NH_2$ Is the most nucleophilic?
    (a) III

(b) I
(c) II
(d) All three nitrogen atoms are equally storng nucleophilic centres.

90. Tautorism is shown by compound
    (a) $CH_3 - CHO$　　　(b) $(CH_3)_3 - C - CHO$
    (c) KCN　　　　　　(d) All of these

91. Which of the following is an electrophile ?
    (a) H_2O　(b) SO_3　(c) NH_3　(d) R-O-R

92. Geometrical isomerism is shown by
    (a) $-C - C -$　　　　(b) $>C = C<$
    (c) $-C \equiv C -$　　　(d) None of these

93. **Assertion (A)** Boiling points of cis-isomers are higher than trans-isomers.
    Reason (R) Dipole moments of cis-isomers are higher than trans –isomers.
    (a) Both A and R are correct and the R is the correct explanation of the A
    (b) Both A and R are correct but R is not the correct explanation of the A
    (c) A is correct but R is incorrect
    (d) Both A and R are incorrect

94. The number of isomeric alkenes with molecular formula C_6H_{12} are
    (a) 8　　(b) 10　　(c) 11　　(d) 13

95. Which of the following is optically active ?

    (a) 　　　(b) $CH_3 – CHOH-CH_3$

    (c) 　　　(d)

96. Optical isomerism arises from the presence of
    (a) a centre of symmetry
    (b) a line of symmetry
    (c) an asymmetric carbon atom
    (d) All of the above

97. Magnetic moment 2.83 BM is given by which one of the following ions ?
    (Atomic number of Ti = 22, Cr = 24, Mn =25, Ni = 28)
    (a) Ti^{3+}　(b) Ni^{2+}　(c) Cr^{3+}　(d) Mn^{2+}

98. The total number of electrons present in all the p-orbitals of bromine is
    (a) 5　　(b) 15　　(c) 17　　(d) 35

99. The correct set of four quantum numbers for the valence electron of rubidium atom (Z=37) is
    (a) $5,1,1,+\frac{1}{2}$ (b) $6,0,0,+\frac{1}{2}$
    (c) $5,0,0,+\frac{1}{2}$ (d) $5,1,0,+\frac{1}{2}$

100. The number of unpaired electrons in ferrous ion is
    (a) 3   (b) 2   (c) 4   (d) 5

BOTANY

SECTION – A

101. The innermost layer of cortex, "Endodermis" is present in:
    (A) Monocot stem   (B) Monocot root
    (C) Dicot root   (D) Dicot stem
    (E) Monocot leaf   (F) Dicot leaf
    (a) A, B, C and D   (b) B, C and D
    (c) C and D   (d) B, C, D and F

102. Complex tissues are:
    (a) Xylem and phloem (b) Heterogenous
    (c) Conducting tissue   (d) All of the above

103. Bulliform cells:
    (a) Are found in grasses
    (b) Has no role in rolling of leaves
    (c) Are absent in monocots
    (d) Are present in dicot leaves

104. As compared to a dicot root, a monocot root has
    (a) More abundant secondary xylem
    (b) Many xylem bundles
    (c) Inconspicuous annual rings
    (d) Relatively thicker periderm

105. Medullary rays are made up of
    (a) Fibres
    (b) Trachieds
    (c) Sclerenchyma cells
    (d) Parenchymatous cells

106. What differences a dicot leaf from monocot leaf?
    (a) Stomata only on the upper side
    (b) Differentiation of palisade & spongy parenchyma
    (c) Parallel venation
    (d) Stomata on the upper and lower sides

107. In an annual ring, the light – colored part is
    (a) Heart wood   (b) Sap wood
    (c) Early wood   (d) Late wood

108. The length of petiole increases by the activity of:
    (a) Apical meristem
    (b) Lateral meristem
    (c) Intercalary meristem
    (d) All the above

109. A closed collateral bundle is one where
    (a) Xylem and phloem occur on different radii
    (b) Collateral bundle occurs without cambium
    (c) Xylem and phloem are separated by cambium
    (d) Collateral bundle occurs with cambium

110. Tissue cells commonly found in the fruit walls of nuts and pulp of some fruits like guava are called
    (a) Fibers   (b) Sclereids
    (c) Trachieds   (d) Vessels

111. Vaishali observed a slide under microscope and she recorded following observations.
    Statement A: Some cells in the epidermis are large, empty and colourless.
    Statement B: Ground tissue consisted of thin-walled chloroplast containing cells.
    Which of the following did she observe?
    (a) Dicot stem   (b) Monocot stem
    (c) Dicot root   (d) Monocot leaf

112. Trichomes in shoot system are
    (a) Always multicellular
    (b) Branched only
    (c) Responsible to increase transpiration
    (d) Sometimes secretory

113. Epidermal tissue system comprises
    A. Epidermal cells   B. Stomata
    C. Trichomes   D. Hairs
    E. Guard cells
    (a) A only   (b) A, B and E only
    (c) All A, B, C, D and E   (d) A, B, C and D only

114. Choose the correct match
    (a) Metaxylem – First formed primary xylem
    (b) Protoxylem – Has vessels of broad diameter
    (c) Dicot stem – Endarch xylem
    (d) Monocot root – Metaxylem lies towards the periphery

115. Match the following columns and select the correct options

	Column - I		Column - II
A.	Tracheids	i.	Obliterated central lumen
B.	Vessels	ii.	Living and thin walled
C.	Xylem fibres	iii.	Tube like with tapering ends
D.	Xylem parenchyma	iv.	Absent in gymnosperms

    (a) A – iii, B – i, C – ii, D – iv
    (b) A – iii, B – iv, C – i, D – ii
    (c) A – iii, B – ii, C – i, D – iv
    (d) A – i, B – iii, C – ii, D – iv

116. Bark consists of
    (a) Primary xylem and primary phloem
    (b) Secondary phloem only
    (c) All the tissues excluding pith
    (d) All the tissues outside the vascular cambium

117. Choose the incorrect match.
    (a) Early wood – Vessels with wider cavities
    (b) Autumn wood – Narrow vessels
    (c) Spring wood – Lighter in colour
    (d) Late wood – Lower density

118. Two solutions A and B, with different concentration of solute and solvent are separated through membrane, after some time it was observed that both A and B have same concentration of solute & solvent means they separated via:
    (a) Semi-permeable membrane
    (b) Impermeable membrane
    (c) Permeable membrane
    (d) Parchment membrane

119. Which of the following statements does not apply to reverse osmosis?
    (a) It is used for water purification
    (b) In this technique, pressure greater than osmotic pressure is applied to the system
    (c) It is a passive process
    (d) It is an active process

120.

    A = Hypertonic solution
    B = Living cell
    Which one of the following is correct for above given diagram?
    (a) Solute potential of B is higher than A
    (b) Solute potential value is more negative for A than B
    (c) Water potential value is more negative for A than B
    (d) All of these

121. (i)   Uphill transport
    (ii) Against the concentration gradient
    (iii) ATP independent
    (iv) Transport saturates
    (v)   Independent from living system
    (vi) Net transport of molecules takes place according to concentration gradient
    Which of the above given features is/are concerned with the process that is only means of gaseous exchange in plants?
    (a) i, ii & iii   (b) ii, iv & vi
    (c) vi only   (d) iii, v and vi

122. Select the correct statement regarding diffusion:
    (i)   Movement by diffusion is passive over short distances
    (ii) No energy expenditure takes place
    (iii) Molecules move in a random fashion
    (iv) It is slow process and move from higher concentration to the lower concentration
    (a) Only i, ii and iv are correct
    (b) Only ii, iii and iv are correct
    (c) i, ii, iii and iv all are correct
    (d) Only i and iv are correct

123. The special proteins that help to move substances across the membrane without the expenditure of ATP energy and can not cause net transport of molecules from a low to a high concentration. This would require input of energy and known as:
    (a) Facilitated diffusion
    (b) Simple diffusion
    (c) Imbibition
    (d) Osmosis and suction pressure

124. Porins are:
    (a) Protein that form pores in outer membran of plastid
    (b) Fat that form pores in inner membrane of plastid
    (c) Carbohydrate that form pores in inner membrane of plastid
    (d) Lipid that form pores in the inner membrane of plastid

125. Which is incorrect:
    (a) Pure water has greatest water potential
    (b) Water molecule possess kinetic energy
    (c) Pressure potential is usually positive
    (d) Water potential is denoted by Latin symbol ε

126. Which of the following is not a similarty between facilitated diffusion & active transport?
    (a) Transport saturation
    (b) Sensitivity towards protein inhibitors
    (c) Selectivity
    (d) Uphill transport

127. Transport over longer distances proceeds through the vascular system is known as:
    (a) Transportation   (b) Translocation
    (c) Transfusion   (d) Transformation

128. Substances that have hydrophilic moiety are transported through:
    (a) Simple diffusion
    (b) Facilitated diffusion
    (c) Imbibition
    (d) All of these

129. Regarding facilitated diffusion, select the incorrect statement:
    (a) If follows concentration gradient
    (b) Special proteins are required for facilitated diffusion
    (c) It does not obey saturation
    (d) Facilitated diffusion is specific

130. On application of inhibitor, facilitated diffusion get stopped due to:
    (a) Alteration of concentration gradient
    (b) Inhibition of protein side chains
    (c) Unavailability of ATP
    (d) Due to saturation of carrier proteins

131. When water flows into the cell and out of the cell and are in equilibrium, the cell are said to be?
    (a) Flaccid   (b) Plasmolysed
    (c) Fully Turgid   (d) All the above

132. Regarding to plasmolysis, which of the following statements is incorrect?
    (a) It occurs in hypertonic solution
    (b) Plasma membrane shrinks
    (c) Water moves out first from vacuole, then from cytoplasm
    (d) Water moves from high Ψw to low

133. The net direction of water movement and rate of osmosis depend on?
    (a) Pressure gradient
    (b) Concentration gradient
    (c) Presence or absence of cell wall
    (d) Both (a) and (b)

134. Water potential of a solution at standard temperature, which is not under any pressure is:
    (a) Zero   (b) More than zero
    (c) Less than zero   (d) Any of the above

135. Magnitude of lowering of water poteintial due to dissolution of solute is called?
    (a) Solute pressure
    (b) Solute potential
    (c) Pressure potential
    (d) Water potential

SECTION - B

136. Monocot root differes from dicot root in having
    (a) Open vascular bundles
    (b) Scattered vascular bundles
    (c) Well developed pith
    (d) Radially arranged vascular bundles

137. What is true about heartwood?
    (A) It does not help in water conduction
    (B) It is also called alburnum
    (C) It is dark in color but is very soft
    (D) It has tracheary elements which are filled with tannins, resins, etc.
    (a) B, C, D   (b) A, B, C
    (c) B, D   (d) A, D

138. The vascular cambium of stem is
    (a) Primary meristem
    (b) Secondary meristem
    (c) Partly primary and partly secondary
    (d) Intercalary meristem

139. Parenchymatous tissue is characterised by the
    (a) Presence of uniform thickening
    (b) Presence of thickening in the corners
    (c) Presence of intercellular spaces
    (d) Presence of lignified walls

140. Palisade parenchyma is absent in leaves of
    (a) Gram   (b) Maize
    (c) Mustard   (d) Soyabean

141. Anatomically fairly old dicotyledonous root is distinguished from the old dicotyledonous stem by
    (a) Position of protoxylem
    (b) Absence of secondary xylem
    (c) Absence of secondary phloem
    (d) Presence of cortex

142. During secondary growth in root, cambium ring arise from
    (a) Tissues located below phloem bundles
    (b) Portion of pericycle tissue above protoxylem
    (c) Endodermis
    (d) Both (a) and (b)

143. Whan water is absorbed by solids – colloids causing enormously increase in volume is called:
    (a) Saturation   (b) Evaporation
    (c) Transpiration   (d) Imbibition

144. In which type of transport – all of the proteins are being used i.e., saturation, specificity, sensitive to inhibitor, controlled properties are present:
    (a) Simple diffusion
    (b) Facilitated diffusion
    (c) Active transport
    (d) Both (b) and (c)

145. Which of the following is ultimately responsible for enlargement & extension growth of cells?
    (a) Osmotic pressure (b) Turgor pressure
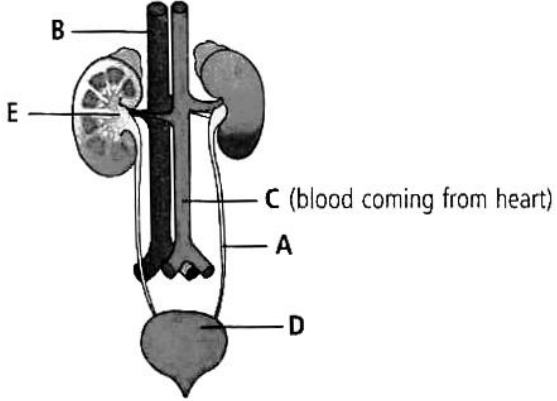   (c) Wall pressure   (d) Osmotic potential

146. Beside water potential gradient, which of the following is also prerequisite for imbibitions?
    (a) Permeable membrane
    (b) Impermeable membrane
    (c) Affinity between adsorbent & liquid
    (d) Difference of free energy

147. On application of inhibitor, facilitated diffusion get stopped due to:
    (a) Alteration of concentration gradient
    (b) Inhibition of protein side chains
    (c) Unavailability of ATP
    (d) Due to saturation of carrier proteins

148. In cell membrane water channels are made up of how many types of aquaporines?
    (a) Two   (b) Four
    (c) Eight   (d) Eighty

149. Movement of molecules across a membrane independent of other molecules is known as:
    (a) Coport   (b) Uniport
    (c) Antiport   (d) Symport

150. Regarding to plasmolysis, which of the following statements is incorrect?
    (a) It occurs in hypertonic solution
    (b) Plasma membrane shrinks
    (c) Water moves out first from vacuole, then from cytoplasm
    (d) Water moves from high Ψw to low

ZOOLOGY

SECTION - A

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

	Column – I		Column – II
A.	Nephridia	(i)	Crustaceans
B.	Malpighian tubules	(ii)	Annelids
C.	Antennal gland or green glands	(iii)	Insects

    (a) A – (i), B – (ii), C – (iii)
    (b) A – (iii), B – (ii), C – (i)
    (c) A – (ii), B – (iii), C – (i)
    (d) A – (ii), B – (i), C – (iii)

152. Which of the following statements is correct?
    (a) Malpighian corpuscles and glomerulus constitute the Bowman's capsule.
    (b) Renal corpuscle and glomerulus constitute Malpighian corpuscle
    (c) Bowan's corpuscles and Malpiphian tubules constitute the glomerulus.
    (d) Bowman's capsule and glomerulus together constitute renal corpuscle

153. Refer to the given figure of human urinary system and select the option that correctly identifies the labelled parts A to E.

	A	B	C	D	E
(a)	Superior vena cava	Inferior vena cava	Dorsal aorta	Urethra	Pelvis
(b)	Inferior vena cava	Superior vena cava	Dorsal aorta	Urinary bladder	Cortex
(c)	Ureter	Inferior vena cav	Dorsal aorta	Urinary bladder	Pelvis
(d)	Dorsal aorta	Inferior vena cava	Superior vena cava	Urinary bladder	Cortex

154. Which of the following is the correct pathway for passage of urine in human?
    (a) Collecting tubule → Ureter → Bladder → urethra
    (b) Renal vein → Renal ureter → Bladder → Urethra
    (c) Pelvis → Medula → Bladder → Urethra
    (d) Cortex → Medulla → Bladder → Ureter

155. Read the given statements and select the correct option.
    Statement 1: Kidney are situated between last thoracic and third lumbar vertebra
    Statement 2: Ureter, blood vessels and nerves fenter kidney through hilum
    (a) Both statement 1 and 2 are correct
    (b) Statement 1 is correct but statement 2 is incorrect
    (c) Statement 1 is incorrect but statement 2 is correct
    (d) Both statement 1 and 2 are incorrect

156. Which of the following is not a part of renal pyramid?
    (a) Petitubular capillaries
    (b) Convoluted tubules
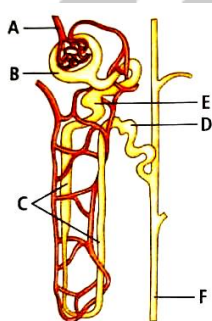   (c) Collecting ducts
    (d) Loop of Henle

157. Consider the following each with one or two blank
    (i) Towards the centre of the inner concave surface of the kidney is a notch called (1) through which ureters, blood vessels and nerves enter.
    (ii) The medulla of kidney is divided into a few conical masses called (2) projecting into the (3)
    (iii) Glomerulus is a tuft of capillaries formed by the (4) artery. Blood from the glomerulus is carried away by an (5) artery

    Which one of the following option correctly fills the blank in any two of the statements?
    (a) (1) – renal pelvis, (2) – calyces, (3) medullary pyramids
    (b) (2) – medullary pyramids, (3) – calyces, (4) - afferent, (5) – efferent
    (c) (2) – columns of Bertin, (3) – chordae tendinae, (4) – efferent, (5) – afferent
    (d) (1) – hilum, (4) – efferent, (5) – afferent

158. Select the option that correctly idenitifies the parts labelled from A to F in the given figure of nephron.

	A	B	C	D	E	F
(a)	Afferent arteriole	PCT	Henle's loop	DCT	Collecting duct	Vasa recta
(b)	Efferent arteriole	PCT	Henle's loop	DCT	Collecting duct	Vasa recta
(c)	Afferent arteriole	Bowman's capsule	Henle's loop	DCT	PCT	Collecting duct
(d)	Afferent arteriole	Peritubular capillaries	Henle's loop	Collecting duct	PCT	DCT

159. Select the incorrect statement regarding mechanism of urine formation in man.
    (a) The glomerular filtration rate is about 125 mL per minute
    (b) Henle's loop and vasa recta play signification role in concentrating the urine
    (c) Human kidney produce four times concentrated urine than the initial filtrate formed
    (d) The counter current system contributes in diluting the urine

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

	Column – I		Column – II
A.	Delivers blood to glomerulus	(i)	Ascending and descending limbs
B.	Carries urine to pelvis	(ii)	Renal artery
C.	Collects filtrates from Bowman's capsule	(iii)	Collecting duct
D.	Loop of Henle	(iv)	PCT

    (a) A – (ii), B – (iii), C – (iv), D – (i)
    (b) A – (i), B – (iii), C – (ii), D – (iv)
    (c) A – (ii), B – (iv), C – (i), D – (iii)
    (d) A – (iv), B – (iii), C – (ii), D – (i)

161. Vasa recta fefers to.
    (a) Juxtaglomerular complex of nephrons
    (b) Blood capillaries in invertebrates
    (c) A fine blood capillary network of afferent arteriole
    (d) A fine capillary which runs parallel to Henle's loop

162. In juxtamedullary nephrons, which part of nephron runs deep into medulla?
    (a) Henle's loop　　　(b) PCT
    (c) DCT　　　(d) glomerulus

163. GFR of a healthy human being is
    (a) 125 L/day　　　(b) 125 mL/min
    (c) 180 L/day　　　(d) both (b) and (c)

164. Complete the following paragraph by selecting the option that correctly fills the blanks (i) – (iv). The kidenys, have bullt – in mechanisms for the regulation of glomerular filtration rate. One such efficient mechanism is carries out by (i). It is a special sensitive region formed by cellular modifications in the (ii) and the (iii) at the location of their contact. A fall in GFR can activate the JG cells to release (iv) which can stimulate the glomerular blood flow and thereby brings GFR back to normal.

	(i)	(ii)	(iii)	(iv)
(a)	ANF	PCT	Efferent arteriole	Angiotensin
(b)	ANF	DCT	Afferent arteriole	Renin
(c)	JGA	PCT	Efferent arteriole	Angiotensinogen
(d)	JGA	DCT	Afferent arteriole	Renin

165. _____is a special region formed by close placement and cellular modification in afferent arteriole and distal convoluted tubule
    (a) Juxtaglomerular apparatus
    (b) Renal corpuscle
    (c) Column of Bertini
    (d) Renal pelvin

166. A large quantity of fluid is filtered everyday by nephrons in the kidney but only about 1% of it is excreted as urine. The remaining 99% of the filtrate
    (a) Is stored in the urinary bladder
    (b) Is reabsorbed into the blood
    (c) Gets collected in the renal pelvis
    (d) Is lost as sweat

167. The maximum amount of electrolytes are reabsorbed in
    (a) Ascending limb of loop of Henle
    (b) Distal convoluted tubule
    (c) Proximal convoluted tubule
    (d) Descending limb of loop of Henle

168. Read the given statements and identify the structure referred here.
    (i) Reabsorption in this region is minimum
    (ii) This region plays a significant role in the maintenance of high osmolarity of interstitial fluid.
    (iii) Its descending limb is permeable to water but almost imperable to electroltyes.
    (iv) Its ascending limb is imperable to water but allows transport of electrolytes actively or passively.
    (a) PCT　　　　　　(b) Loop of Henle
    (c) DCT　　　　　　(d) Bowman's capsule

169. Select the option that correctly identifies the parts of nephron that respectively absorb glucose (i), amino acids (ii), inorganic ions (Na⁺, K⁺, Cl^-) (iii) and urea (iv) in maximum.

|	(i)	(ii)	(iii)	(iv)
(a)	DCT	Descending limb of loop of Henle	DCT	DCT
(b)	DCT	Descending limb	PCT	DCT
(c)	PCT	PCT	PCT	Ascending limb of loop of Henle
(d)	PCT	DCT	DCT	Ascending limb of loop of Henle

170. Which of the following statements is/are incorrect regarding the collecting duct?
    (i) It extends from the cortex to medulla
    (ii) Large amount of water could be reabsorbed by it to produce concentrated urine
    (iii) Small amount of urea diffuses into it from the medulla to keep up the osmolarity
    (iv) It palys a role in maintaining pH and ionic balance of blood by the selective secretion of H⁺ and K⁺ ions.
    (a) Only (i)　　　　　(b) Only (iii)
    (c) (ii) and (iii)　　　(d) (i) and (iv)

171. The ability of producing concentrated (hypertonic) urine in vertebrates generally depends on
    (a) Area of Bowman's capsule epithelium
    (b) Length of the proximal convoluted tubule
    (c) Length of Henle's loop
    (d) Capillary network forming glomerulus

172. Pick the odd ones in each of the following groups and select the correct option
    (i) Renal pelvis, Medullary pyramid, Renal cortex, Renal papilla
    (ii) Afferent arteriole, Henle's loop, Vasa recta, Efferent arteriole
    (iii) Glomerular filtration, Antidiuretic hormone, Hypertonic urine, Collecting duct
    (iv) Proximal convoluted tubules, Distal convoluted tubule, Henle's loop, Renal corpuscle

	(i)	(ii)	(iii)	(iv)
(a)	Renal pelvis	Henle's loop	Collecting duct	Distal convoluted tubule
(b)	Renal papilla	Afferent arteriole	Antidiuretic hormone	Henle's loop
(c)	Medullary pyramid	Efferent arteriole	Hypertonic urine	Proximal convoluted tubule
(d)	Renal cortex	Vasa recta	Glomerular filtration	Renal corpuscle

173. Which one the following is correct with reference to haemodialysis ?
    (a) Absorbs and resends excess of ions.
    (b) The dialysing unit has a coiled cellophane tube.
    (c) Blood is pumped back through a suitable artery after haemodialysis.
    (d) This process is useful in removing glucose.

174. Dialysing unit (artificial kidney) contains a fluid which is almost same as plasma except that it has
    (a) high glucose　　　(b) high urea
    (c) no urea　　　　　(d) high uric acid

175. Which of the following sequences is correct regarding regulation of kidney function?
    (a) An excess loss of water from body → Hypothalamus → Osmoreceptors → Neurohypophysis → ADH → increases water permeability of DCT and CT →Prevention of diuresis
    (b) An excess loss of fluid from body → Osmoreceptors → Hypothalamus → Neurohypophysis → ADH → increases water permeability of DCT and CT → Prevention of diuresis
    (c) An excess loss of fluid from body → Osmoreceptors → Hypothalamus → Neurohypophysis → Aldosterone → Water permeability of DCT and CT increases → Prevention of diuresis
    (d) An excess loss of fluid from body → Osmoreceptors → Hypothalamus → Adenohypophysis → ADH → Increases water permeability of DCT and CT → Prevention of diuresis

176. Consider the following statements each with one or two blanks.
    (i) The ascending limb of loop of Henle is impermeable to (1) but allows transport of (2).
    (ii) (3) and (4) play a significant role in producing a concentrated urine
    (iii) A fall in glomerular blood flow/glomerular blood pressure/GFR can activate the JG cells to release (5)
    Which one of the following options correctly fills the blanks in any two of the statements?
    (a) (1) – water, (2) – electrolytes, (5) – renin
    (b) (3) – Henle's loop, (4) – vasa recta, (5) – angiotensin
    (c) (1) – electrolytes, (2) – water, (3) – PCT, (4) – DCT
    (d) (3) – Henle's loop, (4) – vasa recta,(5) – angiotensinogen

177. The function of renin is
    (a) Stimulation of corpus luteum
    (b) Vasodilation
    (c) To reduce blood pressure
    (d) Conversion of angiotensinogen to angiotensin – I

178. Which of the following statements is correct?
    (a) ADH – Prevents conversion of angiotensinogen in blood in angiotensin
    (b) Aldosterone – Facilitates water reabsorption
    (c) ANF –Enhances sodium reabsorption
    (d) Renin-Causes vasodilation

179. Consider the following statements each with two blanks.
    (i) Annelids have (1) and insect have (2) for excretion
    (ii) Blood enters the glomerulus via (3) arteriole and leave via (4) arteriole
    (iii) During micturition, the urinary bladder (5) and the urethral sphincters (6)
    Which one of the following option correctly fills the blanks in any two of the above statements?
    (a) (1) – Malpighian tubules, (2) – flame cells, (5) – contracts, (6) – relax
    (b) (3) – afferent, (4) – efferent, (5) – contracts, (6) – relax
    (c) (1) – nephridia, (2) – Malpighian tubules, (5) – relaxes, (6) – contract
    (d) (3) – efferent, (4) – afferent, (5) – relaxes, (6) – contract

180. The outline of principal events of urination is given below in random manner.
    (i) Stretch receptors on the wall of urinary bladder send signals to the CNS.
    (ii) The bladder fills with urine and becomes distended.
    (iii) Micturition
    (iv) CNS passes on motor messages to intiate the contration of smooth muscles of bladder and simultaneous relaxation of urethal sphincter.
    The correct sequence of the events is
    (a) (i) →(ii) →(iii) →(iv)
    (b) (iv) →(iii) →(ii) →(i)
    (c) (ii)→(i) →(iv) →(iii)
    (d) (iii)→(ii)→(i)→(iv)

181. Consider the following four statements (i-iv) and select the option that correctly identifies the true (T) and false (F) ones.
    (i) Atrial natriuretic factor can cause vasodilation (dilation of blood vessels) and thereby decreases the blood pressure.
    (ii) On an average, 60-70 gm of urea is excreted out per day.
    (iii) Sebaceous glands eliminate certain substances like NaCl, urea and lactic acid through sebum.
    (iv) PCT is line by simple cuboidal brush border epithelim which increases the surface area for reabsorption.

	(i)	(ii)	(iii)	(iv)
(a)	F	F	T	T
(b)	F	T	T	T
(c)	T	F	F	T
(d)	T	T	F	T

182. Renal calculi refers to the condition in which
     (a) tumour is present in renal pelvis
     (b) stone is formed in kidney
     (c) infection occurs in the pelvis region
     (d) urea accumulates in the blood.

183. A large quantity of one of the following is removed from our body by lungs.
     (a) CO_2 only   (b) H_2O only
     (c) CO_2 and H_2O (d) Ammonia

184. The pH of human urine is approximately
     (a) 6.5   (b) 7   (c) 6   (d) 7.5.

185. Recognise the given figure and find out the correct labels.
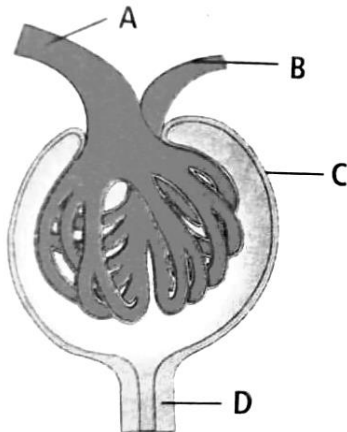
     (i) 'A' is the fine branch of renal vein.
     (ii) 'B' carries blood towards the glomerulus.
     (iii) 'C' is the tuft of capillaries formed by the 'A'.
     (iv) 'D' is the highly coiled network of renal tubule.
     Which of the above statement is correct ?
     (a) (i) and (ii)   (b) (ii) and (iii)
   (c) (iii) and (iv)   (d) (iv) only

SECTION - B

186. The given figure represents a single nephron from a mammalian kidney. Identify the labelled parts, match them with the functions (i-iv) and select the correct option.
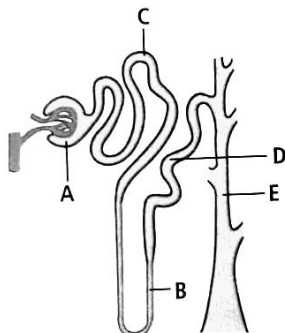
     (i) The site of ultrafiltration.
     (ii) Particularly sensitive to ADH.

(iii) The main site for the reabsorption of glucose and amino acids.
(iv) Largely responsible for the maintenance of blood pH.
(a) (i)-A, (ii)-E (iii)-C, (iv)-D
(b) (i)-(A), (ii)-B (iii)-C, (iv)-D
(c) (i)-B, (ii)-A, (iii)-C, (iv)-E
(d) (i)-E (ii)-B, (iii)-D, (iv)-A

187. The given figure shows reabsorption and secretion of major substances at different parts of the nephron. The movement of which of the following substances is wrongly depicted ?
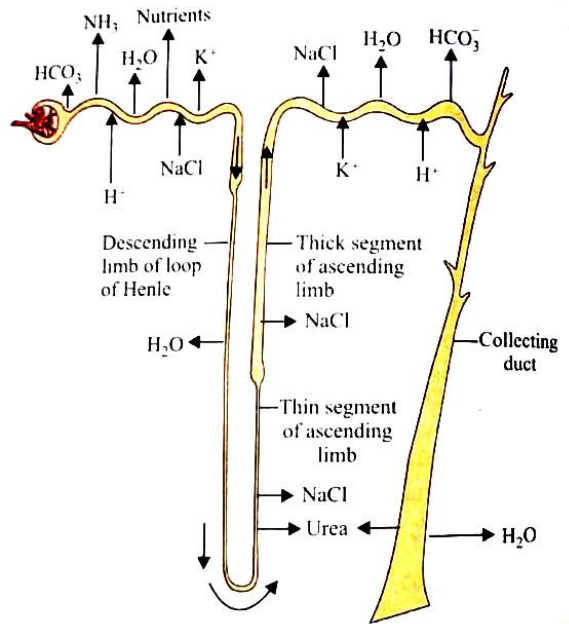
(a) NaCl and K^+ at DCT
(b) NaCl and NH_3 at PCT
(c) NaCl at ascending limb of loop of Henle
(d) H_2O at descending limb to loop of Henle

188. Read the given statements and select the correct option.
     Statement 1 : The final reabsorption of water from the urine into the blood occurs through the collecting duct of a mammalian nephron resulting in the production of hyperosmotic urine.
     Statement 2 : the loop of Henle creates a sodium gradient in the interstitial fluid.
     (a) Both Statements 1 and 2 are correct.
     (b) Statement 1 is correct but statement 2 is incorrect.
     (c) Statement 1 is incorrect but statement 2 is correct.
     (d) Both statement 1 and 2 are incorrect.

189. Which one of the following statement is incorrect?
     (a) Birds and land snails are uricotelic animals.
     (b) Mammals and frogs are ureotelic animals.
     (c) Aquatic amphibians and aquatic insects are ammonotelic animals.
     (d) Birds and reptiles are ureotelic.

190. Refer to the given figure and select the correct option representing the osmolarity at P, Q, R and S.

Vasa recta   Nephron
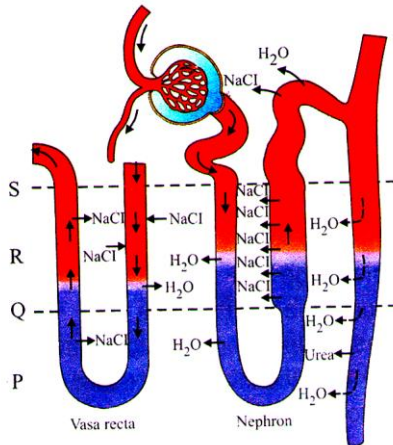
	P (mOsmolL⁻¹)	Q (mOsmolL⁻¹)	R (mOsmolL⁻¹)	S (mOsmolL⁻¹)
(a)	1200	900	600	300
(b)	900	1200	300	600
(c)	300	600	900	1200
(d)	1200	300	900	600

191. Which one of the following statement is correct with respect to kidney function regulation ?
    (a) When someone drinks lot of water, ADH release is suppressed.
    (b) Exposure to cold temperature stimulates ADH release.
    (c) An increase in glomerular blood flow stimulates formation of angiotensin II.
    (d) During summer, when body loses lot of water by evaporation, the release of ADH is suppressed.

192. What will happen if the stretch receptors of the urinary bladder wall are totally removed?
    (a) There will be no voluntary control over micturition.
    (b) Urine will continue to collect normally in the bladder.
    (c) There will be no micturition.
    (d) Urine will collect in urethra.

193. Which of the following statements are correct?
    (i) Nitrogenous wastes are absent in dialysing fluid.
    (ii) Urine is concentrated in Henle's loop.
    (iii) Haemodialyser removes urea, uric, acid, glucose and plasma proteins.
    (iv) In glomerulus, urea, uric acid, water, glucose and plasma proteins are filtered out.
    (a) (i), (iii) and (iv)   (b) (ii), (iii) and (iv)
    (c) (i) and (ii)   (d) (i) and (iii)

194. Glomerulonephritis is
    (a) Inflammation of glomeruli of kidney
    (b) inflammation of liver
    (c) presence of stone in glomeruli of kidney
    (d) tumour in glomeruli of kidney.

195. The following substances are the excretory products in animals. Choose the least toxic from among them.
    (a) Urea   (b) Uric acid
    (c) Ammonia   (d) Carbon dioxide

196. **Assertion :** Nephrons are of two types : cortical and juxtamedullary according to their relative position in the cortex.
    Reason : Juxtamedullary nephrons have short loop of Henle while cortical nephrons have long loop of Henle.
    (a) If both assertion and reason are true and reason is the correct explanation of assertion.
    (b) If both assertion and reason are true but reason is not the correct explanation of assertion.
    (c) If assertion is true but reason is false.
    (d) If assertion is false but reason is true.

197. **Assertion :** Vasa recta is absent or highly reduced in cortical nephrons.
    Reason : Cortical nephrons are mainly concerned with concentration of urine.
    (a) If both assertion and reason are true and reason is the correct explanation of assertion.
    (b) If both assertion and reason are true but reason is not the correct explanation of assertion.
    (c) If assertion is true but reason is false.
    (d) If assertion is false but reason is true.

198. **Assertion:** The Henle's loop and vasa recta play a significant role in producing a concentrated urine.
    Reason: The counter current arrangement of Henle's loop and vasa recta helps in this.
    (a) If both assertion and reason are true and reason is the correct explanation of assertion.
    (b) If both assertion and reason are true but reason is not the correct explanation of assertion.
    (c) If assertion is true but reason is false.
    (d) If assertion is false but reason is true.

199. Human urine is usually acidic because
    (a) postassium and sodium exchange generates acidity
    (b) hydrogen ions are actively secreted into the filtrate
    (c) the sodium transporter exchanges one hydrogen ion for each sodium ion, in peritubular capillaries ion for each sodium ion, in peritubular capillaries
    (d) excreted plasma proteins are acidic.

200. Which of the following factors is responsible for the formation of concentrated urine ?
    (a) Hydrostatic pressure during glomerular filtration
    (b) Low levels of antidiuretic hormone
    (c) Maintaining hyperosmolarity towards the medullary interstitium in the kidneys
    (d) Secretion of erythropoietin by Juxtaglomerular complex

TEST ASSESMENT AND ANALYSIS SHEET

Name………….….…….….……….Test topic - ………….….……….….……………….Date …….…….…

Physics	Marks per question	Total Ques.	Attempted	Unattempted	Correct	Incorrect	Net score
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Chemistry	Marks per question	Total Ques.	Attempted	Unattempted	Correct	Incorrect	Net score
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Biology	Marks per question	Total Ques.	Attempted	Unattempted	Correct	Incorrect	Net score
Multiple choice questions							
Q. No. (Incorrect)							
Q. No. (Unattempted)							
Total net score							