MOCK TEST PAPER 7

General Instructions: **Same as Mock Test Paper 1**

PHYSICS

Section A

1. A body projected vertically from the Earth reaches a height equal to the radius of the Earth before returning to Earth. The power exerted by gravitational force is greatest
(a) at the highest position of the body.
(b) at the instant just before the body hits the earth.
(c) it remains constant all through.
(d) at the instant just after the body is projected.

2. A transformer having efficiency of 90% is working on 200 V and 3 kW power supply. If the current in the secondary coil is 6 A, the voltage across the secondary coil and the current in the primary coil respectively are
(a) 450 V, 13.5 A **(b)** 600 V, 15 A
(c) 300 V, 15 A **(d)** 450 V, 15 A

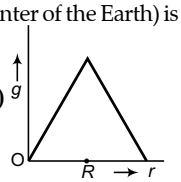
3. A converging beam of rays is incident on a diverging lens. Having passed through the lens the rays intersect at a point 15 cm from the lens on the opposite side. If the lens is removed the point where the rays meet will move 5 cm closer to the lens. The focal length of the lens is:
(a) –10 cm **(b)** 20 cm **(c)** –30 cm **(d)** 5 cm

4. Consider a system of two particles having masses m_1 and m_2. If the particle of mass m_1 is pushed towards the centre of mass of particles through a distance d, by what distance would the particle of mass m_2 move so as to keep the centre of mass of particles at the original position?
(a) $\frac{m_2}{m_1}d$ **(b)** $\frac{m_1}{m_1+m_2}d$ **(c)** $\frac{m_1}{m_2}d$ **(d)** d

5. The capacity of a parallel plate condenser is 5 μF. When a glass plate is placed between the plates of the conductor, its potential becomes $1/8^{th}$ of the original value. The value of dielectric constant will be :
(a) 1.6 **(b)** 5 **(c)** 8 **(d)** 40

6. The energy of a photon is $E = h\nu$ and the momentum of photon $p = h/\lambda$, then the velocity of photon will be:
(a) E/p **(b)** Ep **(c)** $(Ep)^2$ **(d)** 3×10^8 m/s

7. Starting from the centre of the Earth the variation of g (acceleration due to gravity) with I/F (distance from the center of the Earth) is shown by (R is the radius of the Earth):

(a)


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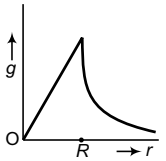

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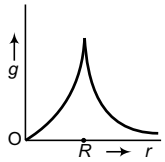

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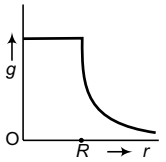
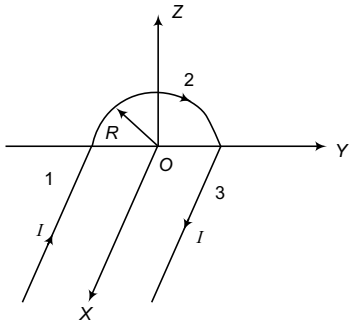


8. Two identical long conducting wires AOB and COD are placed at right angle to each other, with one above other such that 'O' is their common point. The wires carry I_1 and I_2 currents, respectively. Point 'P' is lying at distance 'd' from 'O' along a direction perpendicular to the plane containing the wires. The magnetic field at the point 'P' will be:
(a) $\frac{\mu_0}{2\pi d}\times\frac{I_1}{I_2}$ **(b)** $\frac{\mu_0}{2\pi d}(I_1+I_2)$
(c) $\frac{\mu_0}{2\pi d}(I_1^2-I_2^2)$ **(d)** $\frac{\mu_0}{2\pi d}(I_1^2+I_2^2)^{1/2}$

9. 12 V battery is applied in forward bias across a circuit having p-n junction and resistance R in series. 0.6 V potential is drop across p-n junction, and current is 2×10^{-3} A. The resistance R is:
(a) $5.7 \times 10^2\ \Omega$ **(b)** $5.7 \times 10^3\ \Omega$
(c) $5.7 \times 10^4\ \Omega$ **(d)** $5.7 \times 10^5\ \Omega$

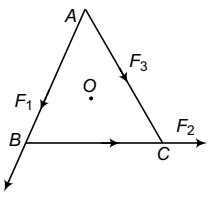
10. An electric dipole is kept in a non-uniform electric field. It experiences
(a) A force and a torque
(b) A force but not a torque
(c) A torque but not a force
(d) Neither a force nor a torque

11. A wire carrying current I has the shape as shown in adjoining figure. Linear parts of the wire are very long and parallel to X-axis while semicircular portion of radius R is lying in Y-Z plane. Magnetic field at point O is:



(a) $\vec{B} = -[\mu_0/4\pi \times I/R](\pi\hat{i} \times 2\hat{k})$
(b) $\vec{B} = -[\mu_0/4\pi \times I/R](\pi\hat{i} + 2\hat{k})$
(c) $\vec{B} = [\mu_0/4\pi \times I/R](\pi\hat{i} - 2\hat{k})$
(d) $\vec{B} = [\mu_0/4\pi \times I/R](\pi\hat{i} + 2\hat{k})$

12. O is the centre of an equilateral triangle ABC. F_1, F_2 and F_3 are three forces acting along the sides AB, BC and AC as shown here. What should be the magnitude of F_3, so that the total torque about O is zero?

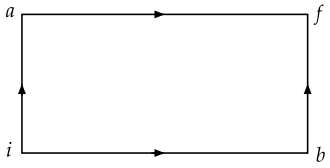


(a) $(F_1 + F_2)/2$ **(b)** $2(F_1 + F_2)$
(c) $(F_1 + F_2)$ **(d)** $(F_1 - F_2)$

13. If the distance between parallel plates of a capacitor is halved and dielectric constant is doubled then the capacitance :
(a) Decreases two times **(b)** Increases two times
(c) Increases four times **(d)** Remains the same

14. A particle of unit mass undergoes one dimensional motion such that its velocity varies according to $v(x) = \beta x^{-2n}$, where β and n are constants and x is the position of the particle. The acceleration of the particle as a function of x is given by:
(a) $-2\beta^2 x^{2n+1}$ **(b)** $-2n\beta^2 e^{-4n+1}$
(c) $-2n\beta^2 x^{2n-1}$ **(d)** $-2n\beta^2 x^{-4n-1}$

15. When a system is taken from the initial state i to final state f along the path iaf, it is found that

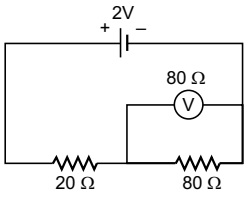


$Q = 50$ cal and $W = 20$ cal. If along the path *ibf*, $Q = 36$ cal, then W along the path *ibf* is:
(a) 6 cal **(b)** 16 cal **(c)** 66 cal **(d)** 14 cal

16. A homogeneous disc of mass 2 kg and radius 15 cm is rotating about its axis (which is fixed) with an angular velocity of 4 rad/s. The linear momentum of the disc is:
(a) 1.2 kg m/s **(b)** 1.0 kg m/s
(c) 0.6 kg m/s **(d)** none of these

17. A bullet of mass 10 g leaves a rifle at an initial velocity of 1000 m/s and strikes the target at the same level with a velocity of 500 m/s. The work done in joules overcoming the resistance of air will be:
(a) 375 **(b)** 3750 **(c)** 5000 **(d)** 500

18. In the adjoining circuit, the e.m.f. of the cell is 2 volt and the internal resistance is negligible. The resistance of the voltmeter is 80 ohm. The reading of the voltmeter will be:



(a) 0.80 volt **(b)** 1.60 volt **(c)** 1.33 volt **(d)** 2.00 volt

19. A nucleus ruptures into two nuclear parts, which have their velocity ratio equal to 2 : 1. What will be the ratio of their nuclear size (nuclear radius)?
(a) $2^{1/3} : 1$ **(b)** $1 : 2^{1/3}$ **(c)** $3^{1/2} : 1$ **(d)** $1 : 3^{1/2}$

20. A thin transparent sheet is placed in front of a Young's double slit. The fringe-width will:
(a) increase **(b)** decrease
(c) remain same **(d)** become non-uniform

21. Viscous force exerted by the liquid flowing between two plates in a streamline flow depends upon:
(a) velocity gradient in the direction perpendicular in the plates.
(b) area of plates.
(c) coefficient viscosity of the liquid.
(d) all of these.

22. A linear aperture whose width is 0.02 cm is placed in front of a lens of focal length 60 cm. The aperture is illuminated normally by a parallel beam of wavelength 5×10^{-5} cm. The distance of the first dark band of the diffraction pattern from the centre of the screen is:
(a) 0.10 cm **(b)** 0.25 cm **(c)** 0.20 cm **(d)** 0.15 cm

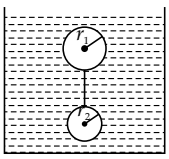
23. Mp denotes the mass of a proton and Mn that of a neutron. A given nucleus, of binding energy B, contains Z protons and N neutrons. The mass M(N, Z) of the nucleus is given by (where c is the velocity of light):
(a) $M(N, Z) = NMn + ZMp - Bc^2$
(b) $M(N, Z) = NMn + ZMp + Bc^2$
(c) $M(N, Z) = NMn + ZMp - B/c^2$
(d) $M(N, Z) = NMn + ZMp + B/c^2$

24. Which of the following is a FALSE statement?
(a) Heat is the energy transferred into or out of a system as a result of a temperature difference between the system and its surroundings.
(b) The heat added to an ideal gas during the transition from state 1 to state 2 depends only on the initial and final states, 1 and 2, and not on the path by which the gas went from one to the other.
(c) When a gas goes from one state to another, the work done depends on the path followed.
(d) It does not make sense to refer to "the amount of heat in a body".

25. A uniform force of $3\hat{i} + \hat{j}$ newton acts on a particle of mass 2 kg. Hence the particle is displaced from position $2\hat{i} + \hat{k}$ metre to position $4\hat{i} + 3\hat{j} - \hat{k}$ metre. The work done by the force on the particle is:
(a) 9 J **(b)** 6 J **(c)** 13 J **(d)** 15 J

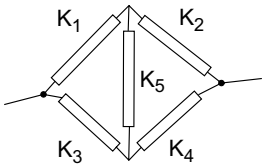
26. Energy released in the fission of a single nucleus $_{92}U^{235}$ is 200 MeV. The fission rate of a $_{92}U^{235}$ fuelled reactor operating at a power level of 5 MW is
(a) 1.56×10^{10}/s **(b)** 1.56×10^{11}/s
(c) 1.56×10^{16}/s **(d)** 1.56×10^{17}/s

27. Two solid spherical balls of radius r_1 & r_2 ($r_2 < r_1$), and density σ are tied up with a string and released in a viscous liquid of lesser density ρ and coefficient of viscosity η, with the string just taut as shown. The terminal velocity of spheres is :



(a) $\frac{2}{9}\frac{r_2^1 g}{\eta}(\sigma - \rho)$ **(b)** $\frac{2}{9}\frac{r_1^2 g}{\eta}(\sigma - \rho)$
(c) $\frac{2}{9}\frac{(r_1^3 + r_2^3)}{r_1 + r_2}\frac{(\sigma - \rho)g}{\eta}$ **(d)** $\frac{2}{9}\frac{(r_1^3 - r_2^3)}{r_1 - r_2}\frac{(\sigma - \rho)g}{\eta}$

28. Five rods of same dimensions are arranged.



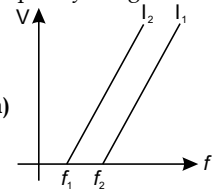
They have thermal conductivities K_1, K_2, K_3, K_4 and K_5. When the points A and B are maintained at different temperatures, no heat flows through the central rod if
(a) $K_1.K_4 = K_2.K_3$ **(b)** $K_1.K_2 = K_3.K_4$
(c) $K_1 = K_4$ **(d)** $K_3 = K_2$

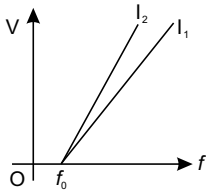
29. The depletion layer in the *p-n* junction region is caused by:
(a) drift of holes
(b) diffusion of charge carriers
(c) migration of impurity ions
(d) drift of electrons

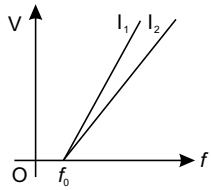
30. The ratio of diameters of two wires of same material in n : 1. The length of each wire is 4 m. On applying the same load, the increase in the length of the thin wire will be ($n > 1$):
(a) n^2 times **(b)** n times
(c) $2n$ times **(d)** $(2n + 1)$ times

31. A thin horizontal circular disc is rotating about a vertical axis passing through its centre. An insect is at a point near the rim of the disc. The insect now moves along a diameter of the disc to reach its other end. During the journey of the insect, the angular speed of the disc :
(a) Continuously decreases **(b)** Continuously increases
(c) First increases and then decreases
(d) Remains unchanged

32. A photoelectric experiment is performed at two different light intensities I_1 and I_2 ($I_2 > I_1$). Choose the correct graph showing the variation of stopping potential versus frequency of light.

(a)


(b)


(c)


(d) None of these

33. The potential energy of a particle of mass 0.5 kg moving in the X-Y plane is given by U = (5.5x – 7y) joule, x and y being in metre. If the particle starts from rest, the speed of the particle at time t = 4 s is nearly
(a) 40.5 m/s **(b)** 71.2 m/s **(c)** 54.0 m/s **(d)** 45.0 m/s

34. An object and a screen are separated by an axial distance of 40 cm. A convex lens of focal length 9 cm forms two real images on screen at two co-axial positions separated by 'd' cm. Then d is equal to
(a) $\sqrt{10}$ **(b)** $2\sqrt{10}$ **(c)** $3\sqrt{10}$ **(d)** $4\sqrt{10}$

35. A motorcycle is travelling on a curved track of radius 500 m if the coefficient of friction between road and tyres is 0.5. The speed for avoiding skidding will be:
(a) 50 m/s **(b)** 75 m/s **(c)** 25 m/s **(d)** 35 m/s

Section B

36. A certain number of spherical drops of a liquid of radius 'r' coalesce to form a single drop of radius 'R' and volume 'V'. If 'T' is the surface tension of the liquid, then:
(a) energy = 4VT (1/r – 1/R) is released
(b) energy = 3VT (1/r + 1/R) is absorbed
(c) energy = 3VT (1/r – 1/R) is released
(d) energy is neither released nor absorbed

37. In a reverse-biased p-n junction, when the applied bias voltage is equal to the breakdown voltage, then:
(a) current remains constant while voltage increases sharply.
(b) voltage remains constant while current increases sharply.
(c) current and voltage increase.
(d) current and voltage decrease.

38. Two uniform brass rods P and Q of length L and 3L and radii 3R and R respectively are heated to the same temperature. The ratio of increase in volume of P to that of Q is:
(a) 1 : 1 **(b)** 1 : 2 **(c)** 3 : 1 **(d)** 1 : 3

39. 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 natural length of the wire is
(a) $\frac{l_1 + l_2}{2}$ **(b)** $\sqrt{l_1 l_2}$
(c) $\frac{l_1T_2 - l_2T_1}{T_1 - T_2}$ **(d)** $\frac{l_1T_2 + l_2T_1}{T_1 + T_2}$

40. The magnetic flux linked with a coil, in webers, is given by the equation $\phi = 3t^2 + 4t + 9$. Then the magnitude of induced e.m.f. at t = 2 second will be:
(a) 2 volt **(b)** 4 volt **(c)** 8 volt **(d)** 16 volt

41. When 97.52 is divided by 2.54, the correct result is
(a) 38.3937 **(b)** 38.394 **(c)** 65.81 **(d)** 38.4

42. A ball is projected from ground with a speed of 20 m/s at an angle of 45° with horizontal.There is a wall of 25 m height at a distance of 10 m from the point of projection. The ball will hit the wall at a height of:
(a) 10 m **(b)** 7.5 m **(c)** 5 m **(d)** 12.5 m

43. A ball suspended by a thread swings in a vertical plane so that its acceleration in the extreme position and the lowest position are equal. The angle θ of thread at extreme position will be:
(a) $\tan^{-1}(2)$ **(b)** $\tan^{-1}(\sqrt{2})$
(c) $\tan^{-1}\left(\frac{1}{2}\right)$ **(d)** $2\tan^{-1}\left(\frac{1}{2}\right)$

44. A simple harmonic oscillator consists of a particle of mass M and a spring of force constant K. The particle oscillates with a period T. If the spring is cut into two equal parts and connected in parallel with the same block, the new time period will be:
(a) $\sqrt{2}$ T **(b)** $\frac{T}{\sqrt{2}}$ **(c)** 2 T **(d)** $\frac{T}{2}$

45. A uniform string is vibrating with a fundamental frequency f. The new frequency, if radius and length both are doubled, would be:
(a) 2f **(b)** 3f **(c)** f/4 **(d)** f/3

46. By what factor the rms velocity will change, if the temperature is raised from 27°C to 327°C?
(a) $\sqrt{2}$ **(b)** $2\sqrt{2}$ **(c)** 2 **(d)** 4

47. The ratio of speed of an electron in first Bohr orbit of hydrogen atom to the speed of light is equal to
(a) $\frac{2\pi hc}{e^2}$ **(b)** $\frac{e^2c}{2\pi h}$ **(c)** $\frac{e^2h}{2\pi c}$ **(d)** $\frac{e^2}{2\varepsilon_0 hc}$

48. The electric current in AC circuit is given by I = 3 sin ωt + 4 cos ωt. The rms value of current in the circuit is:
(a) $\frac{5}{\sqrt{2}}$ **(b)** $5\sqrt{2}$ **(c)** $2\sqrt{5}$ **(d)** $\sqrt{\frac{5}{2}}$

49. An emf of 2 V is induced in a coil by changing the current in it from 8 A to 6 A in 2 $\times 10^{-3}$ s. The coefficient of self-induction of the coil is
(a) 2×10^{-3} H **(b)** 10^{-3} H
(c) 0.5×10^{-3} H **(d)** 4×10^{-3} H

50. The rms current in an AC circuit 2 A. The wattless current be $\sqrt{3}$ A. What is the power factor of the circuit?
(a) $\frac{1}{2}$ **(b)** $\frac{1}{3}$ **(c)** $\frac{1}{\sqrt{3}}$ **(d)** $\frac{1}{\sqrt{2}}$

CHEMISTRY

Section A

51. In which of the following pairs, the two species are isostructural?
(a) SF_4 and XeF_4 **(b)** SO_3^{2-} and NO_3^-
(c) BF_3 and NF_3 **(d)** BrO_3^- and XeO_3

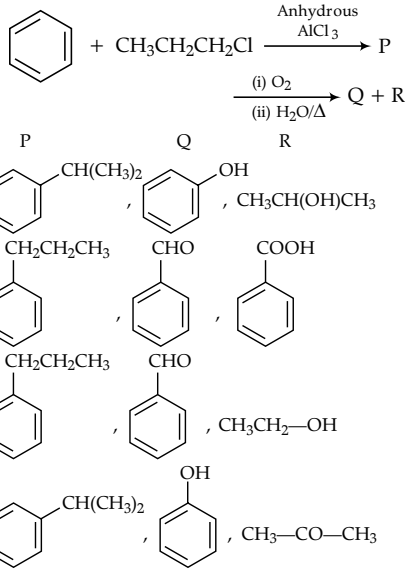
52. Which one is the correct order of acidity?
(a) $CH_2{=}CH_2 > CH_3{-}CH_3{=}CH_2 > CH_3{-}C{\equiv}CH > CH{\equiv}CH$
(b) $CH{\equiv}CH > CH_3{-}C{\equiv}CH > CH_2{=}CH_2 > CH_3{-}CH_3$
(c) $CH{\equiv}CH > CH_2{=}CH_2 > CH_3{-}C{\equiv}CH > CH_3{-}CH_3$
(d) $CH_3{-}CH_3 > CH_2{=}CH_2 > CH_3{-}C{\equiv}CH > CH{\equiv}CH$

53. 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

54. Consider the reaction:
$CH_3CH_2CH_2Br + NaCN \rightarrow CH_3CH_2CH_2CN + NaBr$
This reaction will be the fastest in
(a) Ethanol
(b) Methanol
(c) N,N'-dimethylformamide (DMF)
(d) Water

55. Which one of the following is incorrect for ideal solution?
(a) $\Delta H_{mix} = 0$
(b) $\Delta U_{mix} = 0$
(c) $\Delta P = P_{obs} - P_{calculated\ by\ Raoult's\ law} = 0$
(d) $\Delta G_{mix} = 0$

56. Identify the major products P, Q and R in the following sequence of reactions:



57. The value of Planck's constant is 6.63×10^{-34} Js. The speed of light is 3×10^{17} nms^{-1}. Which value is closest to the wavelength in nanometer of a quantum of light with frequency of 6×10^{15} s^{-1}?
(a) 10 **(b)** 25 **(c)** 50 **(d)** 75

58. The major products C and D formed in the following reaction respectively are:
$H_3C - CH_2 - CH_2 - O - C(CH_3)_3 \xrightarrow[\Delta]{\text{excess HI}} C + D$
(a) $H_3C - CH_2 - CH_2 - OH$ and $HO - C(CH_3)_3$
(b) $H_3C - CH_2 - CH_2 - I$ and $I - C(CH_3)_3$
(c) $H_3C - CH_2 - CH_2 - OH$ and $I - C(CH_3)_3$
(d) $H_3C - CH_2 - CH_2 - I$ and $HO - C(CH_3)_3$

59. Correct increasing order for the wavelengths of absorption in the visible region for the complexes of Co^{3+} is:
(a) $[Co(en)_3]^{3+}$, $[Co(NH_3)_6]^{3+}$, $[Co(H_2O)_6]^{3+}$
(b) $[Co(H_2O)_6]^{3+}$, $[Co(en)_3]^{3+}$, $[Co(NH_3)_6]^{3+}$
(c) $[Co(H_2O)_6]^{3+}$, $[Co(NH_3)_6]^{3+}$, $[Co(en)_3]^{3+}$
(d) $[Co(NH_3)_6]^{3+}$, $[Co(en)_3]^{3+}$, $[Co(H_2O)_6]^{3+}$

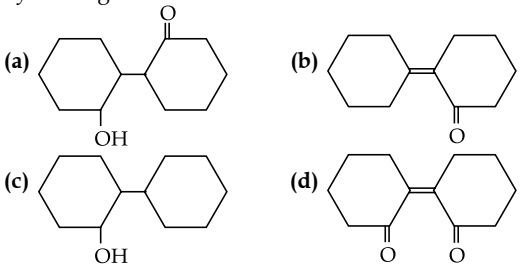
60. Suppose the elements X and Y combine to form two compounds XY_2 and X_3Y_2. When 0.1 mole of XY_2 weighs 10 g and 0.05 mole of X_3Y_2 weighs 9 g, the atomic weights of X and Y are :
(a) 40, 30 **(b)** 60, 40 **(c)** 20, 30 **(d)** 30, 20

61. The correct order of catenation is:
(a) C > Sn > Si ≈ Ge **(b)** Si > Sn > C > Ge
(c) C > Si > Ge ≈ Sn **(d)** Ge > Sn > Si > C

62. The correct increasing order of trans-effect of the following species is:
(a) $NH_3 > CN^- > Br^- > C_6H_5^-$
(b) $CN^- > C_6H_5^- > Br^- > NH_3$
(c) $Br^- > CN^- > NH_3 > C_6H_5^-$
(d) $CN^- > Br^- > C_6H_5^- > NH_3$

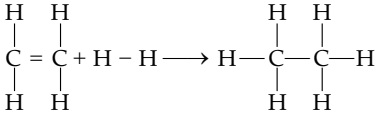
63. Decreasing order of stability of O_2, O_2^-, O_2^+ and O_2^{2-} is:
(a) $O_2^{2-} > O_2^- > O_2 > O^{2+}$ **(b)** $O_2 > O_2^+ < O_2^{2-} > O_2^-$
(c) $O_2^- > O_2^{2-} > O_2^+ > O_2$ **(d)** $O_2^+ > O_2 > O_2^- > O_2^{2-}$

64. Of the following, which is the product formed when cyclohexanone undergoes aldol condensation followed by heating?



65. Because of lanthanoid contraction, which of the following pairs of elements have nearly same atomic radii?
[Numbers in the parenthesis are atomic numbers].
(a) Ti (22) and Zr (40) **(b)** Zr (40) and Nb (41)
(c) Zr (40) and Hf (72) **(d)** Zr (40) and Ta (73)

66. From the following bond energies:
H–H bond energy : 431.37 kJ mol^{-1}
C=C bond energy : 606.10 kJ mol^{-1}
C–C bond energy : 336.49 kJ mol^{-1}
C–H bond energy : 410.50 kJ mol^{-1}
Enthalpy for the reaction,



will be :
(a) 1523.6 kJ mol^{-1} **(b)** –243.6 kJ mol^{-1}
(c) –120.0 kJ mol^{-1} **(d)** 553.0 kJ mol^{-1}

67. In S_N1 reaction, on chiral centres, there is:
(a) inversion more than retention leading to partial racemisation
(b) 100% retention
(c) 100% inversion **(d)** 100% racemisation

68. Which of the following can be used as the halide component for Friedel-Crafts reaction?
(a) Chlorobenzene **(b)** Bromobenzene
(c) Chloroethene **(d)** Isopropyl chloride

69. The freezing point depression constant for water is 1.86°C mol^{-1} kg. If 5.00 g Na_2SO_4 is dissolved in 45.0 g H_2O, the freezing point is changed by –3.82°C. Calculate the van't Hoff factor for Na_2SO_4.
(a) 2.63 **(b)** 3.11 **(c)** 0.381 **(d)** 2.05

70. In the following sequence of reactions

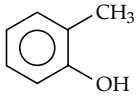
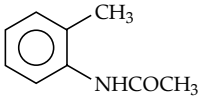
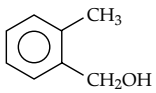
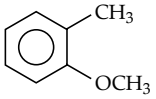
$$CH_3 - Br \xrightarrow{KCN} A \xrightarrow{H_3O^+} B \xrightarrow[ether]{LiAlH_4} C$$ the end product (C) is:
(a) acetone **(b)** methane
(c) acetaldehyde **(d)** ethyl alcohol

71. The sum of coordination number and oxidation number of the metal M in the complex $[M(en)_2(C_2O_4)]Cl$ (where en is ethylenediamine) is :
(a) 9 **(b)** 6 **(c)** 7 **(d)** 8

72. For the reaction,

$$N_2O_5(g) \rightarrow 2NO_2(g) + \frac{1}{2} O_2(g)$$

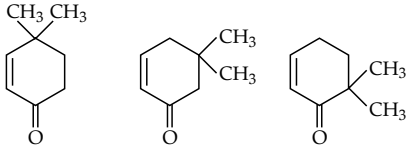
The value of rate of disappearance of N_2O_5 is given as 6.25×10^{-3} mol $L^{-1}s^{-1}$. The rate of formation of NO_2 and O_2 is given respectively as:
(a) 6.25×10^{-3} mol $L^{-1}s^{-1}$ and 6.25×10^{-3} mol $L^{-1}s^{-1}$
(b) 1.25×10^{-2} mol $L^{-1}s^{-1}$ and 3.125×10^{-3} mol $L^{-1}s^{-1}$
(c) 6.25×10^{-3} mol $L^{-1}s^{-1}$ and 3.125×10^{-3} mol $L^{-1}s^{-1}$
(d) 1.25×10^{-2} mol $L^{-1}s^{-1}$ and 6.25×10^{-3} mol $L^{-1}s^{-1}$

73. Which one of the following is most reactive towards electrophilic reagent:
(a) 
(b) 
(c) 
(d) 

74. Which of the following are not state functions?
(I) $q + W$ **(II)** q **(III)** W **(IV)** H – TS
(a) I and IV **(b)** II, III and IV
(c) I, II and III **(d)** II and III

75. In which of the following compounds, nitrogen exhibits highest oxidation state?
(a) N_2H_4 **(b)** NH_3 **(c)** N_3H **(d)** NH_2OH

76. Given,



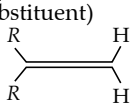
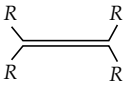
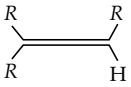
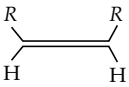
(I) (II) (III)
Which of the given compounds can exhibit tautomerism?
(a) I and II **(b)** I and III
(c) II and III **(d)** I, II and III

77. For the reduction of silver ions with copper metal the standard cell potential was found to be + 0.46 V at 25°C. The value of standard Gibbs energy, $\Delta G°$ will be : (F = 96500 C mol^{-1})
(a) –89.0 kJ **(b)** –89.0 J **(c)** –44.5 kJ **(d)** –98.0 kJ

78. The oxidation state of sulphur in the anions SO_3^{2-}, $S_2O_4^{2-}$ and $S_2O_6^{2-}$ follow the order:
(a) $S_2O_4^{2-} < SO_3^{2-} < S_2O_6^{2-}$
(b) $SO_3^{2-} < S_2O_4^{2-} < S_2O_6^{2-}$
(c) $S_2O_4^{2-} < S_2O_6^{2-} < SO_3^{2-}$
(d) $S_2O_6^{2-} < S_2O_4^{2-} < SO_3^{2-}$

79. The IUPAC name of $NC - CH_2CH_2 - COOH$ is:
(a) Butane nitrolic acid **(b)** 3-cyanopropanoic acid
(c) Carboxy propane nitrile **(d)** 4-cyanobutanoic acid

80. pH of 0.01 M $Sr(OH)_2$ at 298K will be?
(a) 2 **(b)** 1.7
(c) 12.3 **(d)** None of these

81. Which one of the following alkenes will react faster with H_2 under catalytic hydrogenation conditions? (R = alkyl substituent)
(a) 
(b) 
(c) 
(d) 

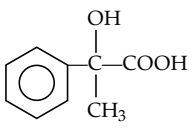
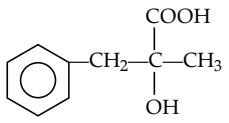
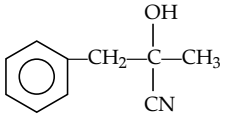
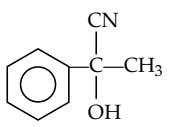
82. Which one of the following arrangements represents the correct order of electron gain enthalpy (with negative sign) of the given atomic species?
(a) Cl < F < S < O **(b)** O < S < F < Cl
(c) S < O < Cl < F **(d)** F < Cl < O < S

83. The enthalpy of fusion of water is 1.435 kcal/mole. The molar entropy change for the melting of ice at 0°C is:
(a) 10.52 cal/mol K **(b)** 21.04 cal/mol K
(c) 5.260 cal/mol K **(d)** 0.526 cal/mol K

84. Fructose reduces Tollen's reagent due to:
(a) asymmetric carbons (b) primary alcoholic group
(c) secondary alcoholic group
(d) enolisation of fructose followed by conversion to aldehyde by base.

85. In a set of reactions, acetic acid yielded a product D.

$$CH_3COOH \xrightarrow{SOCl_2} A \xrightarrow[anhy.\ AlCl_3]{Benzene} B \xrightarrow{HCN} C \xrightarrow{HOH} D$$

The structure of D would be :
(a) 
(b) 
(c) 
(d) 

Section B

86. The work done in an open vessel at 300 K, when 112 g iron reacts with dil HCl to give $FeCl_2$, is nearly
(a) 1.1 kcal **(b)** 0.6 kcal **(c)** 0.3 kcal **(d)** 0.2 kcal

87. Ammonia gas is passed into water, yielding a solution of density 0.93 g/cm^3 and containing 18.6% NH_3, by weight. The mass of NH_3, per cc of the solution is:
(a) 0.17 g/cm^3 **(b)** 0.34 g/cm^3
(c) 0.51 g/cm^3 **(d)** 0.68 g/cm^3

88. Which of the following pairs has the same size?
(a) Fe^{2+}, Ni^{2+} **(b)** Zr^{4+}, Ti^{4+}
(c) Zr^{4+}, Hf^{4+} **(d)** Zn^{2+}, Hf^{4+}

89. The correct order of acid strength is :
(a) $HClO_4 < HClO_3 < HClO_2 < HClO$
(b) $HClO < HClO_2 < HClO_3 < HClO_4$
(c) $HClO_4 < HClO < HClO_2 < HClO3$
(d) $HClO_2 < HClO3 < HClO_4 < HClO$.

90. —C(=O)—NH— (peptide bond).
Which statement is incorrect about peptide bond?
(a) C—N bond length in proteins is longer than usual bond length of N—C bond structure.
(b) Spectroscopic analysis shows planar —C(=O)—NH— group.
(c) C—N bond length in proteins is smaller than usual bond length of C—N bond.
(d) None of the above.

91. At constant pressure, the presence of argon at equilibrium of $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ will
(a) reduce the formation of NH_3.
(b) increase the formation of NH_3.
(c) reduce the formation of NH_3.
(d) increase the formation of both N_2 and H_2.

92. Given that $E°_{Ag^+/Ag} = +0.80$ V and $E°_{Zn^{2+}/Zn} = -0.76$ V. Which of the following statement is correct?
(a) Ag^+ can reduced by H_2.
(b) Zn^{2+} can reduced by H_2.
(c) Ag can oxidise H_2 into H^+.
(d) Ag can reduce Zn^{2+}.

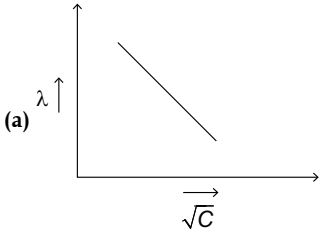
93. Two particles A and B are in motion. If the wavelength associated with particle A is 5×10^{-8} m; calculate the wavelength associated with particle B if its momentum is half of A.
(a) 5×10^{-8} m **(b)** 10^{-5} cm
(c) 10^{-7} cm **(d)** 5×10^{-8} cm

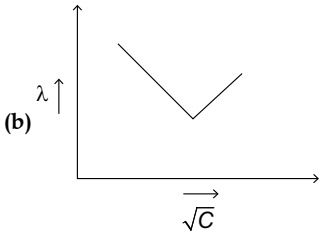
94. The correct order of basicity of amines $(CH_3)_3N$, $(CH_3)_2NH$, CH_3NH_2 and NH_3 in the gaseous phase is
(a) $(CH_3)_3N > (CH_3)_2NH > CH_3NH_2 > NH_3$
(b) $NH_3 > CH_3NH_2 > (CH_3)_2NH > (CH_3)_3N$
(c) $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N > NH_3$
(d) All these amines are equally basic.

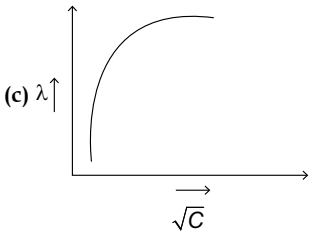
95. Which of the following alcohols will dehydrate most rapidly when treated with H_2SO_4.
(a) *n*-butyl alcohol
(b) sec-butyl alcohol
(c) Isopropylmethyl carbinol
(d) Isopropyldimethyl carbinol

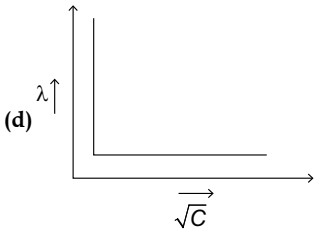
96. KCI is used as an electrolyte in salt bridge because:
(a) K^+ and Cl^- are isoelectronic
(b) Monovalent ions are required
(c) Both the ions have almost same velocity
(d) They are having similar size

97. Which of the following is the correct plot of equivalent conductance of a strong electrolyte v/s concentration.

(a)


(b)


(c)


(d)


98. Calculate the ratio of final volume to the initial volume of gases if 40% of mixture of 0.2 mol of N_2 and 0.6 moles of H_2 react to give NH_3 according to the equation $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ at constant temperature and pressure.
(a) 5 : 4 **(b)** 4 : 5 **(c)** 7 : 10 **(d)** 8 : 5

99. Which of the following statement is incorrect?
(a) The entropy of an isolated system increases in an irreversible process.
(b) The entropy of an isolated system remains unchanged in a reversible process.
(c) Entropy can never decrease.
(d) The sum of $\Delta S_{(system)}$ as well as $\Delta S_{(surrounding)}$ is always negative.

100. $\frac{1}{2}$ $F^2 + e- \rightarrow F^-$; $E° = +3.02$ V
Electrode potential for given reaction $F_2 + 2e^- \rightarrow 2F^-$
(1) 3.02 V **(2)** 6.04 V **(3)** 1.5 V (4) –3.02 V

BOTANY

Section A

101. Which one of the following statements about viruses is correct?
(a) Viruses possess their own metabolic system.
(b) Viruses contain either DNA or RNA.
(c) Viruses are facultative parasites.
(d) Viruses are readily killed by antibiotics.

102. During which phase(s) of cell cycle amount of DNA in a cell remains at 4C level if the initial amount is denoted at 2C?
(a) G_1 and S **(b)** Only G_2
(c) G_2 and M **(d)** G_0 and G_1

103. Keel is the characteristic feature of the flower of:
(a) Lily **(b)** *Trifolium* **(c)** Potato **(d)** Chilli

104. The *Taq* polymerase enzyme is obtained from:
(a) *Thiobacillus ferroxidans* **(b)** *Bacillus subtilis*
(c) *Pseudomonas putida* **(d)** *Thermus aquaticus*

105. Which of the following cell organelle help in osmoregulation in some protists?
(a) Golgi apparatus **(b)** Contractile vacuoles
(c) Mitochondrion **(d)** Sap vacuoles

106. Which of the following can be used as a biocontrol agent in the treatment of plant disease ?
(a) *Chlorella* **(b)** *Anabaena*
(c) *Lactobacillus* **(d)** *Trichoderma*

107. The frequency of recombination between gene pairs on the same chromosome as a measure of the distance between genes was explained by :
(a) Gregor J. Mendel **(b)** Alfred Sturtevant
(c) Sutton Boveri **(d)** T.H. Morgan

108. The biomolecule present in least quantity, among following, in a living cell are :
(a) Proteins **(b)** Lipids
(c) Carbohydrates **(d)** Nucleic acids

109. Closed vascular bundles lack:
(a) Cambium **(b)** Pith
(c) Ground tissue **(d)** Conjunctive tissue

110. Archegoniophore occurs in :
(a) *Chara* **(b)** *Funaria*
(c) *Adiantum* **(d)** *Marchantia*

111. In monocotyledonous seed, the plumule and radicle are enclosed in sheath which are called------A----- and ------B---- respectively.
(a) A – Coleorhiza, B – Coleoptile
(b) A – Coleoptile, B – Coleorhiza
(c) A – Coleorhiza, B – Epiblast
(d) A – Coleoptile, B – Pericarp

112. Select the substrate with least R.Q.:
(a) Glucose **(b)** Malic acid
(c) Tripalmitic acid **(d)** Oxalic acid

113. Cyclic photophosphorylation differs from non-cyclic photophosphorylation as later involves :
(i) Splitting of H_2O.
(ii) Formation of $NADPH + H^+$.
(iii) Formation of ATP.
(iv) Requirement of external electron source.
(a) Only (i) and (ii) **(b)** (i), (ii) and (iv)
(c) Only (ii) and (iii) **(d)** Only (iii)

114. The role of auxin is to
(a) Stimulate ripening of fruit.
(b) Stimulate root formation on stem cuttings.
(c) Inhibit apical dominance.
(d) Increase the size of apple.

115. The arrangement of nuclei in normal dicot embryo sac is:
(a) 3 + 3 + 2 **(b)** 2 + 4 + 2 **(c)** 3 + 2 + 3 **(d)** 2 + 3 + 3

116. Which of the following is correct about nucleolus?
(a) Larger nucleoli are present in dividing cells.
(b) It is a site for active ribosomal RNA synthesis.
(c) It takes part in spindle formation.
(d) It is a membrane-bound structure.

117. Which of the following features given below are correct for coconut fruit?
(i) Develop from monocarpellary ovary
(ii) Fibrous mesocarp
(iii) Formed from inferior ovary
(iv) Hard stony endocarp
(v) Edible mesocarp
(a) i, iii and iv **(b)** iii, iv and v
(c) ii, iii and iv **(d)** i, ii and iv

118. Select the correct statement:
(a) Leaves of gymnosperms are not well adapted to extremes of climate.
(b) Gymnosperms are both homosporous and heterosporous.
(c) *Salvinia*, *Ginkgo* and *Pinus* are all gymnosperms.
(d) *Sequoia* is one of the tallest trees.

119. Which of the following forest is known as the 'Lungs of the Planet Earth'?
(a) Taiga Forest
(b) Tundra Forest
(c) Amazon Rain Forest
(d) Rain forest of North East India

120. In which life cycle pattern the mitotic divisions occur only in diploid cells?
(a) haplontic **(b)** diplontic
(c) haplodiplontic **(d)** heterosporous

121. You design a circular ssDNA with a labeled RNA primer (alpha-P32 labeling). You add polymerase epsilon and required enzymes for replication to the fragment. What will you expect to see on autoradiography after gel electrophoresis:
(a) Two labeled band one much lower than the other with labeling at the bottom region.
(b) No band but labeling at the bottom.
(c) Two labeled band one much lower than the other with no labeling at the bottom.
(d) Single labeled band with some labeling at the bottom region.

122. Transition state structure of the substrate formed during an enzymatic reaction is:
(a) Permanent but unstable. **(b)** Transient but unstable.
(c) Permanent and stable. **(d)** Transient but stable.

123. Which one of the living organisms completely lacks a cell wall?
(a) *Mycoplasma* **(b)** *Saccharomyces*
(c) Blue-green algae **(d)** Cyanobacteria

124. Basis of DNA fingerprinting is :
(a) Relative proportion of purines and pyrimidines.
(b) Relative difference in DNA occurrence in blood, skin and saliva.
(c) Relative amounts of DNA in ridges and grooves of fingerprints.
(d) Satellite DNA occurring as highly repeated short DNA segments.

125. *Cuscuta* is an example of:
(a) Endo-parasitism **(b)** Predation
(c) Ecto-parasitism **(d)** Brood parasitism

126. The prothallus is:
(a) A structure in pteridophyte which is always dioecious.
(b) A sporophytic free living structure formed in pteridophytes.
(c) A gametophytic, free living structure formed in pteridophytes.
(d) A primitive structure formed after fertilization in Pteridophytes.

127. A particular species of plant produces light, nonsticky pollen in large numbers and its stigma is long and feathery. These modification facilitate pollination by:
(a) Insects **(b)** Water **(c)** Wind **(d)** Animals

128. The first discovered restriction endonuclease was:
(a) Eco RI **(b)** Hind II **(c)** Sal I **(d)** Sma I

129. In six kingdom classification, Monera was divided into two separate kingdoms on the basis of
(1) Cell wall composition.
(2) Lipid nature in plasma membrane.
(3) Absence of sexual reproduction.
(a) (1) only **(b)** (1) and (2) only
(c) (2) and (3) only **(d)** All (1), (2) and (3)

130. Chromosome number of a cell is almost doubled up during which phase of cell cycle?
(a) G_1 - phase **(b)** S- phase **(c)** G_2 - phase **(d)** G_0 -phase

131. Which of the following statements is correct:
(a) The hard outer layer of pollen is called intine.
(b) Sporogenous tissue is haploid.
(c) Microspores are produced by endothecium.
(d) Tapetum nourishes the developing pollen.

132. Which of the following occurs in meiosis but not in mitosis :
(a) Separation of sister chromatids at anaphase.
(b) Pairing of homologous chromosomes at metaphase plate.
(c) Replication of DNA prior to start of cell division.
(d) Attachment of spindle fibers to kinetochore.

133. Replication of plasmid DNA other than initiation is controlled by:
(a) Bacterial gene **(b)** Mitochondrial gene
(c) Plasmid DNA **(d)** None of these

134. How many of the structures given in the box are haploid, diploid and triploid, respectively.

Pollen grain, megaspore, synergid, endosperm, meiocytes, secondary nucleus, ovary, anther, egg, zygote

(a) 4, 5, 1 **(b)** 3, 5, 2 **(c)** 6, 3, 1 **(d)** 7, 3, 0

135. Which of the following pairs is wrongly matched?
(a) Polygenic inheritance : Phenylketonuria
(b) T.H. Morgan : Linkage
(c) XO type sex: Grasshopper determination
(d) ABO blood grouping : Co-dominance

Section B

136. Which one of the following is free living bacterial biofertilizer?
(a) *Azotobacter* **(b)** *Rhizobium*
(c) *Nostoc* **(d)** *Bacillus thuringiensis*

137. The first stable product of fixation of atmospheric nitrogen in leguminous plants is:
(a) NO_2^- **(b)** Ammonia
(c) NO_3^- **(d)** Glutamate

138. Which one of the following statements for pyramid of energy is incorrect, whereas the remaining three are correct?
(a) It is upright in shape.
(b) Its base is broad.
(c) Its shows energy content of different trophic level organisms.
(d) It is inverted in shape.

139. Which of the following plants shows closed vascular bundles in stem?
(a) *Helianthus annuus* **(b)** *Hibiscus rosa sinensis*
(c) *Ginkgo biloba* **(d)** *Sorghum vulgare*

140. Which compound is produced in Krebs cycle by oxidative decarboxylation?
(a) citrate **(b)** α-ketoglutarate
(c) succinate **(d)** oxaloacetate

141. DNA polymorphism forms the basis of:
(a) DNA finger printing
(b) Both genetic mapping and DNA finger printing
(c) Translation
(d) Genetic mapping

142. Which one of the following statements is incorrect about the Earth's biodiversity based on the currently available species inventories?
(a) More than 70 per cent of all the species recorded are animals.
(b) Plants comprise more than 22 per cent of the total available species.
(c) Out of every 10 animals on this planet, 6 are insects.
(d) At present no estimates give any figures for prokaryotes.

143. How many chromatids are present in Anaphase-I of Meiosis-I of a diploid cell having 10 chromosomes?
(a) 4 **(b)** 6 **(c)** 20 **(d)** 40

144. Offsets are produced by:
(a) Parthenocarpy **(b)** Mitotic divisions
(c) Meiotic divisions **(d)** Parthenogenesis

145. Match the following columns and select the correct option regarding connecting links.

Column I (Connecting links)	**Column II (Between the groups)**
A. Club moss	**(i)** Pteridophytes and Gymnosperms
B. Cycas	(ii) Gymnosperms and Angiosperms
C. Gnetum	(iii) Bryophytes and Pteridophytes
D. Hornworts	(iv) Protista and Bryophytes

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

146. Which of the following plant diseases are caused by fungus?
(1) Stripe rust **(2)** Hill bunt
(3) Leaf curl of chilli **(4)** Brown rust of wheat
(a) (1) only **(b)** (1) and (2) only
(c) (1), (2) and (3) only **(d)** (1), (2) and (4) only

147. Identify the statements regarding sexual reproduction in bacteria as True (T) or False (F) and choose the correct option.
(A) Sexual reproduction in bacteria occurs by a para-sexual process called as genetic recombination.

(B) In transformation, a bacterium takes up a piece of DNA floating in its environment.
(C) In transduction, one bacterium transfers genetic material to another through direct contact or by the formation of a bridge-like structure called sex pilus.
(D) In conjugation, the segments of DNA are transferred from one bacterium to another by the virus (bacteriophage).

	A	B	C	D
(a)	T	F	F	T
(b)	F	F	T	F
(c)	F	F	T	T
(d)	T	T	F	F

148. Choose the incorrect match:
(a) Structural genes – Codes for RNA or regulatory protein.
(b) Inducible genes – Whose expression is responsive to environmental change.
(c) Constitutive genes – Whose expression is not regulated.
(d) Multigene – Group of similar genes descended by duplication.

149. Choose option which is matched correctly with respect to enzymes, organisms from which they obtained and their uses.

	Enzymes	Organisms	Uses
(a)	Invertase	*Byssochlamys fulva*	Brewing
(b)	Lipase	*Bacillus subtilis*	Detergent formulations
(c)	Pectinase	*Aspergillus niger*	Clarifying bottled fruit juice
(d)	β-amylase	*Saccharomyces fragilis*	Meat tenderiser

150. Alcoholic fermentation is brought about by:
(a) *Lactobacillus* **(b)** *Saccharomyces*
(c) *Trichoderma* **(d)** *Streptomyces*

ZOOLOGY

Section A

151. Which of the following is not a pyrimidine ?
(a) Cytosine **(b)** Uracil **(c)** Guanine **(d)** Thymine

152. Which one of the following pairs of hormones are the examples of those that can easily pass through the cell membrane of the target cell and bind to a receptor inside it (mostly in nucleus)?
(a) Insulin, glucagon **(b)** Thyroxine, insulin
(c) Somatostatin, oxytocin **(d)** Cortisol, testosterone

153. Maximum number of existing transgenic animals is of:
(a) Pig **(b)** Fish **(c)** Mice **(d)** Cow

154. Which is the most common mechanism of genetic variation in the population of sexually reproducing organism ?
(a) Transduction
(b) Chromosomal aberrations
(b) Genetic drift
(d) Recombination

155. The posterior pituitary gland is not a true endocrine gland because:
(a) It is provided with a duct.
(b) It only stores and releases hormones.
(c) It is under the regulation of hypothalamus.
(d) It secretes enzymes.

156. Nearly all of the essential nutrients, and 70-80% of electrolytes and water are reabsorbed by:
(a) Collecting duct **(b)** DCT
(c) Henle's loop **(d)** PCT

157. Which one of the following statements is correct regarding blood pressure?
(a) 130/90 mmHg is considered high and required treatment.
(b) 100/55 mmHg is considered an ideal blood pressure.
(c) 105/50 mmHg makes one very active.
(d) 190/110 mmHg may harm vital organs like brain and kidney.

158. A chemical signal that has both endocrine and neural roles is:
(a) Melatonin **(b)** Calcitonin
(c) Epinephrine **(d)** Cortisol

159. What is common between parrot, platypus and Kangaroo?
(a) Ovoparity **(b)** Homeothermy
(c) Toothless jaws **(d)** Functional post-anal tail

160. Elbow joint is an example of:
(a) Ball and socket joint **(b)** Pivot joint
(c) Hinge joint **(d)** Gliding joint

161. Intervertebral disc consists of a shock absorber skeletal connective tissue known as:
(a) Hyaline cartilage **(b)** Elastic cartilage
(c) Fibro cartilage **(d)** Calcified cartilage

162. At which stage of HIV infection does usually show symptoms of AIDS?
(a) When the infecting retrovirus enters host cells.
(b) When viral DNA is produced by reverse transcriptase.
(c) When HIV replicates rapidly in helper T-lymphocytes and damages large number of these.
(d) Within 15 days of sexual contact with an infected person.

163. Vomiting is an emetic reflex which is regulated by:
(a) Hypothalamus
(b) Superior colliculi of midbrain
(c) Medulla oblongata
(d) Pons

164. Parturition is induced by a complex neuroendocrine mechanism involving:
(a) Cortisol, ADH, progesterone.
(b) Cortisol, estrogens and oxytocin.
(c) FSH, LH and estrogen.
(d) Prolactin, oxytocin and cortisol.

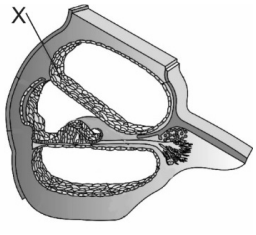
165. Which of the following can enhance breathing rate ?
(a) High pO_2, low pH of blood.
(b) High pCO_2, and high pH of blood.
(c) High pCO_2, and low pH of blood.
(d) High H^+ and high pH of blood.

166. Tendons attach----A---- and is an example of -----B---- connective tissue. Choose the option that fill the blanks A and B correctly.

	A	B
(a)	Muscles to bone	Dense regular
(b)	Bone to bone	Dense regular
(c)	Muscles to bone	Dense irregular
(d)	Muscle to muscle	Dense regular

167. Choose the incorrect statement.
(a) Basophils secrete histamine, serotonin, heparin and are involved in inflammatory reactions.
(b) Eosinophils resist infections and are associated with allergic reactions.
(c) Megakaryocytes are cell fragments responsible for immune responses of the body.
(d) Neutrophils and monocytes are phagocytic in nature.

168. Identify the structure marked as 'X' in the figure given below:



(a) Basilar membrane **(b)** Tectorial membrane
(c) Tympanic membrane **(d)** Reissner's membrane

169. Oral contraceptives do not work by:
(a) Inhibition of ovulation.
(b) Changing the consistency of cervical mucus.
(c) Antagonistic action on gonadotropins.
(d) Spermicidal action.

170. Heterogamety are produced by:
(a) Human female **(b)** Female grasshopper
(c) Female Drosophila **(d)** Female bird

171. Menstrual flow occurs due to lack of :
(a) Oxytocin **(b)** Vasopressin
(c) Progesterone **(d)** FSH

172. Which one of the following statements cannot be related to Mutualism?
(a) Mutualism confers benefits on both the interacting species.
(b) Plant-animal interactions often involve co-extinction of the mutualists.
(c) Many fig species can be pollinated only by its 'partner' wasp species and no other species.
(d) The Mediterranean orchid Ophrys employs 'sexual deceit' to get pollination done by a species of bee.

173. Myasthenia gravis is muscular disorder in which muscle becomes weak and paralysed. It is due to:
(a) Spasm in muscle due to hypocalcemia in blood plasma.
(b) Non-formation of dystrophin protein which is essential for connection between sarcolemma and actin filament.
(c) Degeneration of acetylcholine receptor on sarcolemma as it attacked by own antibodies.
(d) Resorption / dissolution of bone matrix.

174. Which one of the following kinds of animals are triploblastic ?
(a) Corals **(b)** Flatworms
(c) Sponges **(d)** Ctenophores

175. In humans, blood passes from the post-caval to the diastolic right atrium of heart due to :
(a) Pressure difference between the postcaval and atrium.
(b) Pushing open of the venous valves.
(c) Suction pull.
(d) Stimulation of the sino-atrial node.

176. Emphysema is a chronic disorder, it leads to:
(a) Loss of elasticity of walls of bronchioles and alveoli.
(b) Surface area of exchange of gases is increased.
(c) Alveolar sacs become empty even after expiration.
(d) Exhalation becomes easier during inflation of Lungs.

177. Coca alkaloid obtained from *Erythroxylum* sp.
(a) Acts as an analgesic.
(b) Interferes with the transport of dopamine.
(c) Is taken by oral ingestion.
(d) Acts as depressant to slow down body functions.

178. Pseudounipolar neuron is found in:
(a) Organ of Corti.
(b) Cerebral cortex.
(c) Dorsal root ganglia of spinal cord.
(d) Both dorsal root and ventral root ganglia of spinal cord.

179. Match the items of column I with column II and select the correct option:

Column I	Column II
(A) XX-XO method of sex determination	**(i)** Turners' syndrome
(B) XX-XY method of sex determination	(ii) Female heterogametic
(C) 45 chromosomes	(iii) Grasshopper
(D) ZW-ZZ method of sex determination	(iv) Female homogametic

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

180. Compared to blood our lymph has:
(a) More RBCs and less WBCs
(b) No plasma
(c) Plasma without proteins
(d) More WBCs and no RBCs

181. The first clinical gene therapy was given for treating:
(a) Diabetes mellitus
(b) Chicken pox
(c) Rheumatoid arthritis
(d) Adenosine deaminase deficiency

182. Choose the incorrect match regarding *Plasmodium* and type of malaria caused by it:

(a)	*Plasmodium falciparum*	Cerebral malaria
(b)	*Plasmodium ovale*	Mild tertian malaria
(c)	*Plasmodium malariae*	Quartan malaria
(d)	*Plasmodium vivax*	Malignant tertian malaria

183. Which of the following arrives earliest at the site of infection?
(a) Monocyte **(b)** Eosinophil
(c) Basophil **(d)** Neutrophil

184. Read the statements (1 to 4):
(1) Pectoral girdle consists of scapula and clavicle.
(2) Patella covers the knee ventrally.
(3) In human, six ribs are vertebrochondral.
(4) Human ribs are bicephalic.
How many of the above statements are incorrect?
(a) 1 **(b)** 3 **(c)** 2 **(d)** 0

185. Select the incorrect match:

(a) Submetacentric Chromosomes	- L-shaped chromosomes
(b) Allosomes	- Sex chromosomes
(c) Lampbrush	- Diplotene bivalents Chromosomes
(d) Polytene	- Oocytes of amphibians Chromosomes

Section B

186. How does the conversion of milk to curd improves its nutritional value?
(a) By increasing the amount of Vitamin D
(b) By decreasing the amount of Vitamin E
(c) By increasing the amount of Vitamin B12
(d) By increasing the amount of Vitamin A

187. Which gas was probably absent in free form in early atmosphere?
(a) CH_4 **(b)** O_2 **(c)** NH_3 **(d)** CO_2

188. Which of the following is the possible cause for greater biodiversity in the tropics?
(a) Higher productivity due to more solar energy.
(b) Lesser technological development.
(c) Traditional and religious practices for conservation of nature.
(d) Lesser natural calamities.

189. Grey matter of the brain shows large collection of:
(a) dendrons **(b)** cytons **(c)** axons **(d)** synapsis

190. Which of the following mixture were taken by Miller in 1953 during simulation experiment to test Oparin and Haldane theory?
(a) CH_4, H_2, NH_3 (2 : 1 : 2) and water mixture.
(b) CH_4, NH_3, H_2 (1 : 2 : 1) and H_2O vapour.
(c) CH_4, NH_3, H_2 (2 : 1 : 2) and water vapour.
(d) NH_3, CH_4, H_2 (2 : 1 : 2) and water vapour.

191. Release of polar body from human egg occurs:
(a) After formation of zygote. **(b)** Before the sperm entry.
(c) After the fertilisation. **(d)** After the entry of sperm.

192. What are protamines?
(a) Large size DNA.
(b) Sequences that are unique.
(c) Histone like protein found in fish sperm.
(d) Highly repetitive DNA.

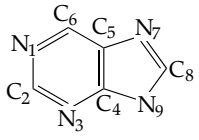
193. Which of the following is a feature of Gout, a type of disorder associated with joints?
(a) Weakening of bones due to low calcium level.
(b) Inflammation of joints due to accumulation of uric acid crystals.
(c) Weakening of bones due to decreased bone mass.
(d) Inflammation of joints due to cartilage degeneration.

194. Variation in gene frequencies within population can occur by chance rather than by natural selection. This is referred to as :
(a) Genetic flow **(b)** Genetic drift
(c) Random mating **(d)** Genetic load

195. Which one of the following pairs is mismatched?
(a) Sickel - Cell Anaemia – Chromosome 11
(b) Alpha Thalassemia – Chromosome 11
(c) Cystic Fibrosis – Chromosome 7
(d) Phenylketonuria – Chromosome 12

196. In adults where are the erythropoeitic tissue mainly found?
(a) Kidney **(b)** Liver
(c) Red bone marrow **(d)** Spleen

197. Identify the given ring structure and choose the correct option.



(a) Uracil **(b)** Cytosine
(c) Pyrimidine **(d)** Purine

198. Read the following statements and choose the correct option.
Statement A: Microevolution is the change in allele frequencies that occurs over time within a population.
Statement B: The example of microevolution is adaptive radiations, co-evolution.
(a) Both statements are correct.
(b) Both statements are incorrect.
(c) Statement A is correct but statement B is incorrect.
(d) Statement A is incorrect but statement B is correct.

199. _____ is a phenomenon of classifying organisms on the basis of overall similarity usually morphology or other observable traits, regardless of their phylogeny or evolutionary relation.
(a) Palynology **(b)** Taxonomy
(c) Cladistics **(d)** Taximetrics

200. What do you understand by the term Panspermia, an idea that is still a favourite for some astronomers?
(a) Transfer of spores as unit of life from other planets to Earth.
(b) Creation of life from dead and decaying matter.
(c) Creation of life from chemicals.
(d) Origin of sperm in human testes.