SATISH SCIENCE ACADEMY
DHANORI PUNE - 411015

NEET PAPER 4
ENTRANCE EXAM - NEET-UG

Time Allowed: 3 hours and 20 minutes

Maximum Marks : 720

General Instructions:

- The test is of 3 hours and 20 minutes and it contains 200 questions. Internal choice is given within the sections.
- For each correct response, the candidate will get 4 marks.
- For each incorrect response, one mark will be deducted from the total scores.
- The maximum marks are 720.

PHYSICS (Section-A)

1) The unit of angular momentum are: **[4]**
   a) Kg - m^2/s^2 b) J/s
   c) J - s d) Kg - ms^{-2}

2) Dimensions of the gravitational constant are: **[4]**
   a) $[M^1L^3T^{-2}]$ b) $[M^0L^3T^2]$
   c) $[M^{-1}L^3T^{-2}]$ d) $[ML^2T^2]$

3) At a metro station, a girl walks up a stationary escalator in time t_1. If she remains stationary on the escalator, then the escalator takes her up in time t_2. The time taken by her to walk upon the moving escalator will be: **[4]**
   a) $\frac{t_1t_2}{(t_2+t_1)}$
   b) T_1 - t_2
   c) $\frac{t_1t_2}{(t_2-t_1)}$
   d) $\frac{t_1+t_2}{2}$

4) Two stones are projected at the same speed but making different angles with the horizontal. Their ranges are equal. If the angle of projection of one is $\frac{\pi}{3}$ and its maximum height is h_1, then the maximum height of the other will be: **[4]**
   a) $\frac{h_1}{3}$ b) $2h_1$
   c) $\frac{h_1}{2}$ d) $3h_1$

5) A light string passing over a smooth light pulley connects two blocks of masses m_1 and m_2 (vertically).If the acceleration of system is $\frac{g}{8}$, then the ratio of masses is: **[4]**
   a) 8 : 1 b) 9 : 7
   c) 5 : 3 d) 4 : 3

6) A cannon of mass 2m located at the base of an inclined plane shoots a shell of mass m in the horizontal direction with velocity v_0. The angle of inclination of the plane is 45° and the coefficient of friction between the cannon and the plane is 0.5. The height to which cannon ascends the plane as a result of recoil is: **[4]**
   a) $\frac{v_0^2}{g}$
   b) $\frac{v_0^2}{12g}$
   c) $\frac{v_0^2}{2g}$
   d) $\frac{v_0^2}{6g}$

7) Two particles having position vectors$\vec{r_1} = (3\hat{i}+5\hat{j})$ metres and $\vec{r_2} = (-5\hat{i} - 3\hat{j})$ metres are moving with velocities $\vec{v_1} = (4\hat{i} + 3\hat{j})$ and $\vec{v_2} = (a\hat{i} + 7\hat{j})$m/s . If they collide after 2 seconds, the value of a is: **[4]**
   a) 8 b) 6
   c) 2 d) 4

8) From a disc of radius R and mass M, a circular hole of diameter R, whose rim passes through the centre is cut. What is the moment of inertia of the remaining part of the disc about a perpendicular axis, passing through the centre? **[4]**
   a) 9 $MR^2/32$ b) 11 $MR^2/32$
   c) 15 $MR^2/32$ d) 13 $MR^2/32$

9) A thin rod of length L and mass M is bent at its mid - point into two halves so that the angle between them is 90°. The moment of inertia of the bent rod about an axis passing through the bending point and perpendicular to the plane defined by the two halves of the rod is: **[4]**
   a) $\frac{\sqrt{2}ML^2}{24}$
   b) $\frac{ML^2}{6}$
   c) $\frac{ML^2}{24}$
   d) $\frac{ML^2}{12}$

10) The escape velocity on the surface of the earth is 11.2 km/s. If the mass and radius of a planet is 4 and 2 times respectively than that of the earth, what is the escape velocity from the planet? **[4]**
   a) 22.4 km/sec b) 15.8 km/sec
   c) 1.112 km/sec d) 11.2 km/sec

11) During a journey from earth to the moon and back, the greatest energy required from the space - ship rockets is to overcome: **[4]**
   a) The point where the pull of the earth and moon are equal but opposite
   b) The moon's gravity at lunar take off
   c) The moon's gravity at lunar landing
   d) The earth's gravity at take off

12) With increase in temperature the viscosity of:
   i. Both gases and liquids increases
   ii. Both gases and liquids decreases
   iii. Gases increases and liquids decreases
   iv. Gases decreases and liquids increases
   [4]
   a) Ii and iii b) I and ii
   c) Iv and i d) Only iii

13) A thin square steel plate with each side equal to 10 cm is heated by a blacksmith. The rate radiated energy by the heated plate is 1134 W. The temperature of the hot steel plate is (Stefan's constant (σ = 5.67 × 10^{-8}W/m^2 K^4, emissivity of the plate = 1) **[4]**
   a) 1000 K b) 20000 K
   c) 2378 K d) 1189 K

14) Two identical bodies are made of a material for which the heat capacity increases with temperature. One of these is at 100°C, while the other one is at 0°C. If the two bodies are brought into contact, then assuming no heat loss, the final common temperature is: **[4]**
a) 0°C
b) > 50°C but < 0°C
c) > 50°C
d) 50°C

15) In which process will the internal energy of the gas increase? **[4]**
a) Adiabatic expansion
b) Isothermal compression
c) Adiabatic compression
d) Isothermal expansion

16) When a block of iron floats in mercury at 0°C, fraction k_1 of its volume is submerged, while at the temperature 60°C, a fraction k_2 is seen to be submerged. If the coefficient of volume expansion of iron γ_{Fe} and that of mercury is γ_{Hg}, then the ratio $\frac{k_1}{k_2}$ can be expressed as **[4]**
a) $\frac{1 - 60\gamma_{Fe}}{1 + 60\gamma_{Hg}}$
b) $\frac{1 + 60\gamma_{Fe}}{1 + 60\gamma_{Hg}}$
c) $\frac{1 + 60\gamma_{Fe}}{1 - 60\gamma_{Fe}}$
d) $\frac{1 + 60\gamma_{Hg}}{1 + 60\gamma_{Fe}}$

17) Two simple harmonic motions of angular frequency 100 and 1000 rad s^{-1} have the same displacement amplitude. The ratio of their maximum acceleration is: **[4]**
a) 1 : 10^4
b) 1 : 10^2
c) 1 : 10^3
d) 1 : 10

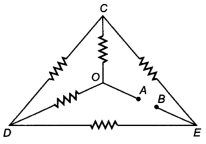
18) If the equation of a progressive wave is given by: y = 4 $\sin\pi\left[\frac{t}{5} - \frac{x}{9} + \frac{\pi}{6}\right]$. Then, which of the following is correct? **[4]**
a) A = 0.04cm
b) V = 5 cm/sec
c) F = 50 Hz
d) λ = 18m

19) A tuning fork A produces 4 beats per second with another tuning fork B of frequency 320 Hz. On filing one of the prongs of A, 4 beats per second are again heard when sounded with the same fork B. Then, the frequency of fork A before filing is: **[4]**
a) 324 Hz
b) 328 Hz
c) 320 Hz
d) 316 Hz

20) The electric field at a point on the equatorial plane at a distance r from the centre of a dipole having dipole moment $\vec{p}$ is given by (r > > separation of two charges forming the dipole, ε_0 - permittivity of free space) **[4]**
a) $\vec{E} = -\frac{\vec{P}}{4\pi\varepsilon_0 r^2}$
b) $\vec{E} = \frac{\vec{P}}{4\pi\varepsilon_0 r^3}$
c) $\vec{E} = -\frac{\vec{P}}{4\pi\varepsilon_0 r^3}$
d) $\vec{E} = \frac{2\vec{P}}{4\pi\varepsilon_0 r^3}$

21) The capacitance of a parallel plate capacitor with air as medium is 3μF . With the introduction of a dielectric medium between the plates, the capacitance becomes 15μF . The permittivity of the medium is: **[4]**
a) 15
b) $0.44 \times 10^{-10} C^2N^{-1}m^{-2}$
c) 5 $C^2N^{-1}m^{-2}$
d) 5

22) In the network shown in the figure each of resistance is equal to 2Ω . The resistance between A and B is

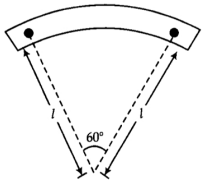


[4]
a) 1Ω
b) 2Ω
c) 3Ω
d) 4Ω

23) An electron revolves in a circle of radius $0.4\mathring{A}$ with a speed of 10^6 m/s in a hydrogen atom. The magnetic field produced at the centre of the orbit due to the motion of the electron is: (μ_0 = 4n × 10^{-7} H/m, e = 1.6 × 10^{-19} C) **[4]**
a) 10 T
b) 100 T
c) 0.1 T
d) 1.0 T

24) A magnetic needle lying parallel to a magnetic field required IT units of work to turn it through 60°. The torque required to maintain the needle in this position will be: **[4]**
a) $\frac{W}{\sqrt{3}}$
b) $\frac{W}{\sqrt{2}}$
c) W
d) $\sqrt{3}W$

25) A bar magnet of length **l** and magnetic dipole moment **M** is bent in the form of an arc as shown in figure. The new magnetic dipole moment will be:



[4]
a) $\frac{M}{2}$
b) $\frac{2M}{\pi}$
c) $\frac{3M}{\pi}$
d) M

26) When a metallic plate swings between the poles of a magnet:
i. No effect on the plate
ii. Eddy currents are set up inside the plate and the direction of the current is along with the motion of the plate
iii. Eddy currents are set up inside the plate and the direction of the current opposes the motion of the plate
iv. Eddy currents are set up inside the plate
[4]
a) I and ii
b) Iv and i
c) Only iii
d) Ii and iii

27) A series LCR circuit is connected to an ac voltage source. When L is removed from the circuit, the phase difference between current and voltage is $\frac{\pi}{3}$. If instead C is removed from the circuit, the 3 phase difference is again $\frac{\pi}{3}$ between current and voltage. The power factor of the circuit is: **[4]**
a) - 1.0
b) 1.0
c) 0.5
d) Zero

28) The reactance of a coil, when used in the domestic AC power supply (220 volt, 50 cycles per second) is 50 ohm. The inductance of the coil is nearly: **[4]**
a) 0.22 henry
b) 2.2 henry
c) 1.6 henry
d) 0.16 henry

29) In the transmission of AC power through transmission lines, when the voltage is stepped up n times, the power loss in transmission: **[4]**

a) Increases n^2 times b) Decreases n^2 times
c) Increases n times d) Decreases n times

30) Which rays contain (+ve) charged particle: **[4]**
a) β - rays b) γ - rays
c) X - rays d) α - rays

31) A concave mirror of focal length f_1 is placed at a distance d from a convex lens of focal length f_2. A beam of light coming from infinity and falling on this convex lens - concave mirror combination returns to infinity. The distance d must equal: **[4]**
a) $-2f_1 + f_2$ b) $-f_1 + f_2$
c) $F_1 + f_2$ d) $2f_1 + f_2$

32) In a double - slit experiment, the two slits are 1mm apart and the screen is placed 1 m away. A monochromatic light wavelength 500 nm is used. What will be the width of each slit for obtaining ten maxima of double - slit pattern within the central maxima of a single - slit pattern? **[4]**
a) 0.02 mm b) 0.2 mm
c) 0.1 mm d) 0.5 mm

33) Einstein's work on the photoelectric effect provided support for the equation: **[4]**
a) $E = -\frac{Rhc}{n^2}$
b) E = hv
c) $E = mc^2$
d) $KE = \frac{1}{2}\ mv^2$

34) If a is radius of the first Bohr orbit in a hydrogen atom, the radius of the third orbit is: **[4]**
a) 9a b) 27a
c) 3a d) 81a

35) The Binding energy per nucleon of ^7_3Li and ^4_2He nuclei are 5.60 MeV and 7.06 MeV, respectively. In the nuclear reaction $_3Li^7 + {}_1H^1 \rightarrow {}_2He^4 + {}_3He^4 + Q$ the value of energy Q released is: **[4]**
a) 8.4 MeV b) 19.6 MeV
c) - 2.4 MeV d) 17.3 MeV

PHYSICS (Section-B)

Attempt any 10 questions

36) If the kinetic energy of a particle is increased by 300%, the momentum of the particle will increase by: **[4]**
a) 300% b) 50%
c) 150% d) 100%

37) A spherical ball rolls on a table without slipping. Then the fraction of its total energy associated with rotation is: **[4]**
a) 2/7 b) 3/5
c) 3/7 d) 2/5

38) If the earth is one half its present distance from the sun, number of days in the year will be nearly: **[4]**
a) 129 b) 30
c) 60 d) 200

39) A black body is at a temperature of 500 K. It emits energy at a rate which is proportional to: **[4]**
a) $(500)^2$ b) $(500)^3$
c) $(500)^4$ d) 500

40) The loudness and pitch of a sound note depends on:
i. Intensity and frequency
ii. Frequency and number of harmonics
iii. Intensity and velocity
iv. Frequency and velocity
[4]
a) Iv and i b) Ii and iii
c) Iii and iv d) Only i

41) The equation of a wave is: $x = 5 \sin\left(\frac{t}{0.04} - \frac{x}{4}\right)$ cm. Find the maximum velocity of the particles of the medium. **[4]**
a) 1 m/s b) 1.5 m/s
c) 2 m/s d) 1.25 m/s

42) A wire is wound in the form of a solenoid of length l and diameter d. When a strong current is passed through the solenoid, there is tendency to:
i. Keep both l and d constant
ii. Decrease both l and d
iii. Increase both l and d
iv. Decrease l but increase d
[4]
a) Iv b) I
c) Iii d) Ii

43) Points A and B are situated perpendicular to the axis of a 2 cm long bar magnet at large distances x and 3x from its centre on opposite sides. The ratio of the magnetic fields at A and B will be approximately equal to: **[4]**
a) 1 : 9 b) 2 : 9
c) 27 : 1 d) 9 : 1

44) One conducting U - tube can slide into another U - tube, maintaining electrical contacts between them. A magnetic field B is acting perpendicular to the plane of the slide. If each tube moves at a constant speed v towards each other, then the emf induced in the circuit is: **[4]**
a) 2Blv b) - Blv
c) Blv d) $\frac{3}{2}Blv$

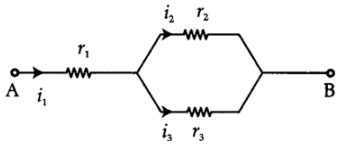
45) A 220 volt input is supplied to a transformer. The output circuit draws a current of 2.0 ampere at 440 volts. If the efficiency of the transformer is 80%, the current drawn by the primary windings of the transformer is: **[4]**
a) 5.0 ampere b) 2.5 ampere
c) 3.6 ampere d) 2.8 ampere

46) Which of the following does not change when the light goes from one medium to another? **[4]**
a) Intensity b) Frequency
c) Speed d) Wavelength

47) The threshold frequency for a metallic surface corresponds to an energy of 6.2 eV and the stopping potential for a radiation incident on this surface is 5V. The incident radiation lies in: **[4]**
a) Infrared region b) Visible region
c) X - ray region d) Ultraviolet region

48) Light rays of wavelengths $6000\overset{o}{A}$ and of photon intensity 39.6 watt/m^2 is incident on a metal surface. If only one percent of photons incident on surface emit photoelectrons then the number emitted per second per unit area from the surface will be: ($h = 6.64 \times 10^{-34}$ J - s, velocity of light = 3×10^8 m/s) **[4]**
a) 12×10^{16} b) 12×10^{18}
c) 12×10^{17} d) 10×10^{18}

49) Three resistors having resistances r_1, r_2 and r_3 are connected as shown in the given circuit. The ratio $\frac{i_3}{i_1}$ of currents in terms of resistances used in the circuit is:



[4]

a) $\frac{r_2}{r_2+r_3}$ b) $\frac{r_1}{r_2+r_3}$
c) $\frac{r_1}{r_1+r_2}$ d) $\frac{r_2}{r_1+r_3}$

50) The mass defect for the nucleus of helium is 0.0303 a.m.u. What is the binding energy per nucleon for helium in MeV: **[4]**
a) 28 b) 7
c) 4 d) 1

CHEMISTRY (Section-A)

51) 0.24 g of a volatile gas, upon vaporisation, gives 45 mL vapour at NTP. What will be the vapour density of the substance? (Density of H_2 = 0.089) **[4]**
a) 95.93 b) 95.39
c) 59.73 d) 5.993

52) Which of the following series of transition in the spectrum of hydrogen atom falls in visible region? **[4]**
a) Paschen series b) Lyman series
c) Balmer series d) Brackett series

53) In the periodic table, with the increase in atomic number, the metallic character of an element: **[4]**
a) Increases in a period and decreases in a group
b) Decreases in a period and also in the group
c) Decreases in a period and increases in a group
d) Increases in a period as well as in the group

54) Which of the following pair of ions are isoelectronic and isostructural? **[4]**
a) CO_3^{2-}, SO_3^{2-}
b) SO_3^{2-}, NO_3^-
c) ClO_3^-, CO_a^{2-}
d) ClO_3^-, SO_3^{2-}

55) The boiling point of p - nitrophenol is higher than that of o - nitrophenol because: **[4]**
a) There is intermolecular hydrogen bonding in p - nitrophenol
b) NO_2 group at p - position behave in a different way from that at o - position.
c) Intramolecular hydrogen bonding exists in p - nitrophenol
d) P - nitrophenol has a higher molecular weight

56) H_2O has a net dipole moment while BeF_2 has zero dipole moment because: **[4]**
a) Fluorine has more electronegativity than oxygen
b) H_2O molecule is linear while BeF_2 is bent
c) BeF_2 molecule is linear while H_2O is bent
d) Beryllium has more electronegativity than oxygen

57) Identify the correct statement for change of Gibbs energy for a system (ΔG_{system}) at constant temperature and pressure:
i. IfΔG_{system}= 0, the system is still moving in a particular direction
ii. IfΔG_{system}= - ve, the process is not spontaneous
iii. IfΔG_{system}= +ve, the process is spontaneous
iv. IfΔG_{system}= 0, the system has attained equilibrium

[4]
a) Option iv b) Option i
c) Option iii d) Option ii

58) A monoprotic acid in 0.1 M solution has $K_a = 1.0 \times 10^{-5}$. The degree of dissociation of acid is: **[4]**
a) 99 % b) 1.0 %
c) 99.9 % d) 0.1 %

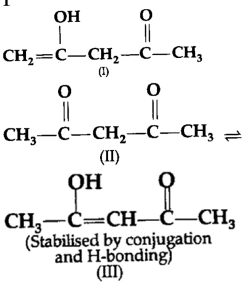
59) Oxidation no. of P in $H_4P_2O_5$, $H_4P_2O_6$, $H_4P_2O_7$ are respectively: **[4]**
a) +4, +3, +5 b) +3, +4, +5
c) +3, +5, +4 d) +5, +3, +4

60) A mixture of potassium chlorate, oxalic acid and sulphuric acid is heated. During the reaction which element undergoes maximum change in the oxidation number? **[4]**
a) CI b) H
c) C d) S

61) The correct order regarding the electronegativity of hybrid orbitals of carbon is: **[4]**
a) Sp < sp^2 < sp^3 b) Sp > sp^2 < sp^3
c) Sp < sp^2 > sp^3 d) Sp > sp^2 > sp^3

62) The basic structural unit of silicates is: **[4]**
a) SiO_4^{4-} b) SiO_3^{2-}
c) SiO^- d) SiO_4^{2-}

63) The order of stability of the following tautomeric compound is:



[4]
a) I > II > III b) II > I > III
c) II > III > I d) III > II > I

64) A compound is treated with $NaNH_2$ to give sodium salt. Identify the compound. **[4]**
a) C_6H_6 b) C_2H_2
c) C_2H_6 d) C_2H_4

65) In the reaction, $H-C\equiv CH \xrightarrow[(ii)\ CH_3CH_2Br]{(i)\ NaNH_2/liq.NH_3} X \xrightarrow[(ii)\ CH_3CH_2Br]{(i)\ NaNH_2/liq.NH_3} Y$
X and Y are: **[4]**
a) X = 2 - butyne, Y = 3 - hexyne
b) X = 1 - butyne, Y = 3 - hexyne
c) X = 1 - butyne, Y = 2 - hexyne
d) X = 2 - butyne, Y = 2 - hexyne

66) If molality of the dilute solution is doubled, the value of molal depression constant (K_f) will be: **[4]**
a) Doubled b) Tripled
c) Unchanged d) Halved

67) A solution containing components A and B follows Raoult's law: **[4]**
a) Volume of solution is different from sum of volume of solute and solvent
b) A - B attraction force is less than A - A and B - B

c) A - B attraction force remains same as A - A and B - B
d) A - B attraction force is greater than A - A and B - B

68) A hypothetical electrochemical cell is shown below;
$A|A^+(xM)||B^+(yM)|\overset{\oplus}{B}$
The e.m.f. measured is + 0.20 V. The cell reaction is: **[4]**

a) $A^+ + e^- \longrightarrow A$; $B^+ + e^- \longrightarrow B$
b) $A + B^+ \longrightarrow A^+ + B$
c) The cell reaction cannot be predicted
d) $A^+ + B \longrightarrow A + B^+$

69) The number of electrons delivered at the cathode during electrolysis by a current of 1 ampere in 60 seconds is: (Charge on electron = 1.60×10^{-19}C) **[4]**
a) 3.75×10^{20} b) 6×10^{23}
c) 6×10^{20} d) 7.48×10^{23}

70) For the chemical reaction
$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$
the correct option is: **[4]**

a) $-\frac{d[N_2]}{dt} = \frac{1}{2}\frac{d[NH_3]}{dt}$
b) $-\frac{d[N_2]}{dt} = 2\frac{d[NH_3]}{dt}$
c) $-\frac{1}{3}\frac{d[H_2]}{dt} = -\frac{1}{2}\frac{d[NH_3]}{dt}$
d) $3\frac{d[H_2]}{dt} = 2\frac{d[NH_3]}{dt}$

71) $3A \longrightarrow B + C$. It would be a zero order reaction, when: **[4]**

a) The rate remains unchanged at any concentration of B and C.
b) The rate of reaction doubles if concentration of B is increased to double.
c) The rate of reaction remains same at any concentration of A.
d) The rate of reaction is proportional to square of concentration of A.

72) The aqueous solution containing which one of the following ions will be colourless?
(Atomic number : Sc = 21, Fe = 26, Ti = 22, Mn = 25) **[4]**
a) Mn^{3+} b) Sc^{3+}
c) Ti^{3+} d) Fe^{2+}

73) Which is the strongest acid in the following? **[4]**
a) H_2SO_4 b) $HClO_4$
c) $HClO_3$ d) H_2SO_3

74) Actinides: **[4]**

a) Are all synthetic elements
b) Have any short - lived isotopes
c) Include element 104
d) Have variable valency

75) Which of the following is the correct order of increasing field strength of ligands to form coordination compounds? **[4]**

a) $CN^- < C_2O_4^{2-} < SCN^- < F^-$
b) $F^- < SCN^- < C_2O_4^{2-} < CN^-$
c) $SCN^- < F^- < CN^- < C_2O_4^{2-}$
d) $SCN^- < F^- < C_2O_4^{2-} < CN^-$

76) In which of the following octahedral complexes of Co(at. no. 27), will the magnitude ofΔ_0 be the highest? **[4]**

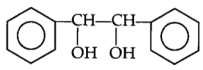
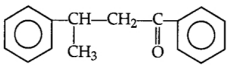
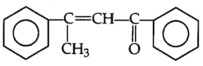
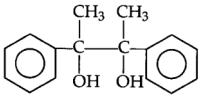
a) $[Co(NH_3)_6]^{3+}$
b) $[Co(C_2O_4)_3]^{3-}$
c) $[Co(CN)_6]^{3-}$
d) $[Co(H_2O)_6]^{3+}$

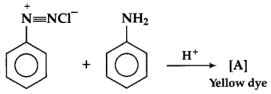
77) How many stereoisomers does this molecule have $CH_3CH{=}CHCH_2CHBrCH_3$? **[4]**
a) 4 b) 2
c) 8 d) 6

78) Which of the following is correct?
i. On reduction, any aldehyde gives secondary alcohol.
ii. Reaction of vegetable oil with H_2SO_4 gives glycerine.
iii. Alcoholic iodine with NaOH gives iodoform.
iv. Sucrose on reaction with NaCl gives invert sugar.
[4]

a) Statement (a) is correct
b) Statement (b) is correct
c) Statement (c) is correct
d) Statement (d) is correct

79) Acetophenone when reacted with a base, C_2H_5ONa, yields a stable compound which has the structure: **[4]**

a) 
b) 
c) 
d) 

80) In the following reaction, the product (A) is:

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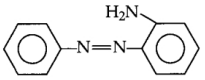
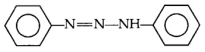
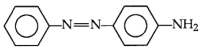
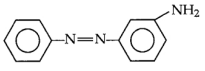
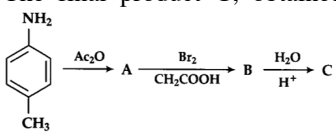
a) 
b) 
c) 
d) 

81) The final product C, obtained in this reaction:

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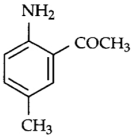
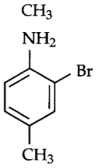
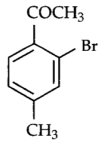
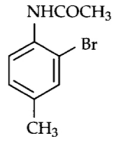
a) 
b) 

c) 

d) 

82) Which is the correct statement?
i. Starch is a polymer ofα glucose.
ii. Amylose is a component of cellulose.
iii. Proteins are composed of only one type of amino acid.
iv. In cyclic structure of fructose, there are four carbons and one oxygen atom.
[4]
a) Proteins are composed of only one type of amino acid.
b) In cyclic structure of fructose, there are four carbons and one oxygen atom.
c) Starch is a polymer ofα - glucose.
d) Amylose is a component of cellulose.

83) The difference between amylose and amylopectin is: **[4]**
a) Amylose have $1\rightarrow 4\ \alpha$ - linkage and $1\rightarrow 6\ \beta$ - linkage
b) Amylose is made up of glucose and galactose
c) Amylopectin have $1\rightarrow 4\ \alpha$ - linkage and $1\rightarrow 6\ \beta$ - linkage
d) Amylopectin have $1\rightarrow 4\ \alpha$ - linkage and $1\rightarrow 6\ \alpha$ - linkage

84) An alkene**A**on reaction with O_3 and Zn - H_2O gives propanone and ethanal in equimolar ratio Addition of HCl to alkene **A** gives **B** as the major product. The structure of product **B** is: **[4]**
a) $Cl-CH_2-CH_2-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}H$
b) $H_3C-CH_2-\underset{\underset{Cl}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_3$
c) $H_3C-CH_2-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_2Cl}{|}}{C}}H-CH_3$
d) $H_3C-\underset{\underset{Cl}{|}}{CH}-\underset{\underset{CH_3}{|}}{\overset{}{C}}H$

85) When phenol is treated with $CHCl_3$ and NaOH, the product formed is: **[4]**
a) Benzoic acid b) Salicylaldehyde
c) Salicylic acid d) Benzaldehyde

CHEMISTRY (Section-B)

Attempt any 10 questions

86) Among the following group which represents the collection of isoelectronic species? **[4]**
a) N_2, C_2^{2-}, CO, NO b) CO, NO^+, CN^-, C_2^{2-}
c) NO, CN^-, N_2, O_2^- d) NO^+, C_2^{2-}, O_2^-, CO

87) The oxidation state of I in $H_4IO_6^-$ is: **[4]**
a) - 1 b) +5
c) +7 d) +1

88) Name the type of the structure of silicate in which one oxygen atom of$[SiO_4]^{4-}$ is shared? **[4]**
a) Sheet silicate
b) Linear chain silicate
c) Pyrosilicate
d) Three dimensional

89) The correct order of decreasing second ionization enthalpy of Ti (22), V (23), Cr (24) and Mn (25) is: **[4]**
a) Mn > Cr > Ti > V b) Ti > V> Cr > Mn
c) Cr > Mn > V > Ti d) V > Mn > Cr > Ti

90) Maximum number of electrons in a sub - shell with l = 3 and n = 4 is: **[4]**
a) 14 b) 10
c) 16 d) 12

91) Which of these is not a monomer for a high molecular mass silicone polymer? **[4]**
a) Me_3SiCl b) $MeSiCl_3$
c) $PhSiCl_3$ d) Me_2SiCl_2

92) A substance A decomposes by a first order reaction starting initially with [A]= 2.00 m and after 200 min, [A]becomes 0.15 m. For this reaction$t_{\frac{1}{2}}$ is: **[4]**
a) 46.45 min b) 48.45 min
c) 53.49 min d) 50.49 min

93) For the reaction; $2N_2O_5 \longrightarrow 4NO_2 + O_2$, rate and rate constant are 1.02×10^{-4} and 3.4×10^{-5} sec^{-1} respectively, then concentration of N_2O_5, at that time will be: **[4]**
a) 1.02×10^{-4} b) 3.5×10^{5}
c) 3 d) 1.732

94) Consider the change in oxidation state of bromine corresponding to different emf values as shown in the diagram below :
$BrO_4^- \xrightarrow{1.82\,V} BrO_3^- \xrightarrow{1.5\,V} HBrO \xrightarrow{1.595\,V} Br_2 \xrightarrow{1.0652\,V} Br^-$
Then the species undergoing disproportionation is : **[4]**
a) Br_2 b) BrO_3^-
c) BrO_4^- d) HBrO

95) The molar conductivity of a 0.5 mol/dm^3 solution of $AgNO_3$ with electrolytic conductivity of 5.76×10^{-3} S cm^{-1} at 298 K is: **[4]**
a) 28.8 S cm^2/ mol b) 2.88 S cm^2/ mol
c) 11.52 S cm^2/ mol d) 0.086 S cm^2/ mol

96) Aqueous solution of ammonia consists of: **[4]**
a) OH^- b) H^+
c) NH_4^+ and OH^- d) NH_4^+

97) Match the Xenon compounds in Column - I with its structure in Column - II and assign the correct code:

Column - I	Column - II
(a) XeF_4	(i) Pyramidal
(b) XeF_6	(ii) Square planar
(c) $XeOF_4$	(iii) Distorted octahedral
(d) XeO_3	(iv) Square pyramidal

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

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

98) Which of the following exhibits only +3 oxidation state? **[4]**
a) Ac b) Pa
c) U d) Th

99) What is the correct electronic configuration of the central atom in $K_4[Fe(CN)_6]$based on crystal field theory? **[4]**
a) $t_{2g}{}^4 e_k^2$
b) $t_{2g}^6 e_g^0$
c) $e^4 t_2^2$
d) $e^3 t_2^3$

100) Amides can be converted into amines by the reaction named **[4]**
a) Carbylamine b) Hoffmann degradation
c) Ammonolysis d) Diazotisation

BOTANY (Section-A)

101) Which one of the following aspects is an exclusive characteristic of living things? **[4]**
a) Isolated metabolic reactions occur in vitro
b) Perception of events happening in the environment and their memory
c) Increase in mass from inside only
d) Increase in mass by the accumulation of material both on the surface as well as internally

102) Select the wrong statement: **[4]**
a) Mosaic disease in tobacco and AIDS in human being are caused by viruses
b) W.M. Stanley showed that viruses could be crystallized
c) The viroids were discovered by D.J. Ivanowski

103) Which one of the following organisms is not a eukaryotic? **[4]**
a) Euglena viridis b) Amoeba proteus
c) Paramecium caudatum d) Escherichia coli

104) Which one of the following is wrong for fungi? **[4]**
a) All fungi possess a purely cellulosic cell wall
b) They are heterotrophic
c) They are both unicellular and multicellular
d) They are eukaryotic

105) Which one of the following statements regarding post - fertilization development in flowering plants is incorrect? **[4]**
a) Ovary develops into fruit
b) Central cell develops into endosperm
c) Zygote develops into embryo
d) Ovules develop into embryo sac

106) Male and female gametophytes do not have an independent free living existence in **[4]**
a) Bryophytes b) Algae
c) Angiosperms d) Pteridophytes

107) Select one of the following of important features distinguising Gnetum from Cycas and Pinus and showing: **[4]**
a) Absence of resin duct and leaf venation
b) Presence of vessel elements and absence of archegonia
c) Perianth and two integuments
d) Embryo development and apical meristem

108) Wind pollinated flowers are: **[4]**
a) Small, producing large number of dry pollens
b) Small, producing nectar and dry pollen
c) Small, brightly coloured, producing large number of pollen grains
d) Large, producing abundant nectar and pollen

109) What is the fate of the male gametes discharged in the synergid? **[4]**
a) One fuses with the egg and other fuses with central cell nuclei.
b) One fuses with the egg, other(s) degenerate(s) in the synergid.
c) One fuses with the egg, other(s) fuse(s) with synergid nucleus.
d) All fuse with the egg.

110) How many plants in the list given below have marginal placentation?
Mustard, Gram, Tulip, Asparagus, Arhar, Sun hemp, Chilli, Colchicine, Onion, Moong, Pea, Tobacco, Lupin. **[4]**
a) Five b) Three
c) Six d) Four

111) The standard petal of a papilionaceous corolla is also called: **[4]**
a) Pappus b) Carina
c) Corona d) Vexillum

112) In Kranz anatomy, the bundle sheath cells have: **[4]**
a) Thick walls, no intercellular spaces and large number of chloroplasts
b) Thick walls, many intercellular spaces and few chloroplasts
c) Thin walls, no intercellular spaces and several chloroplasts
d) Thin walls, many intercellular spaces and no chloroplasts

113) Which of the following characteristics represent**Inheritance of blood groups**in humans?
i. Dominance
ii. Co - dominance
iii. Multiple allele
iv. Incomplete dominance
v. Polygenic inheritance
[4]
a) (B), (C) and (E) b) (A), (C) and (E)
c) (A), (B) and (C) d) (B), (D) and (E)

114) The best example for pleiotropy is **[4]**
a) Skin colour. b) ABO Blood group.
c) Colour blindness. d) Phenylketoneuria.

115) Which of the following statements is not true for cancer cells in relation to mutations? **[4]**
a) Mutations inhibit the production of telomerase.
b) Mutations destroy telomerase inhibitors.
c) Mutations inactive the cell control.
d) Mutations in proto - oncogenes accelerate the cell cycle.

116) The association of histone H1 with a nucleosome indicates: **[4]**

a) DNA replication is occurring
b) The DNA double helix is exposed
c) The DNA is condensed into a chromatin fibre
d) Transcription is occurring

117) Which is the important site of formation of glycoproteins and glycolipids in eukaryotic cells? **[4]**

a) Endoplasmic reticulum
b) Golgi bodies
c) Peroxisomes
d) Polysomes

118) Which one of the following cell organelles is enclosed by a single membrane? **[4]**

a) Mitochondria b) Lysosomes
c) Nucleus d) Chloroplasts

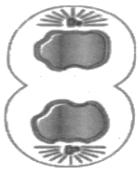
119) The infectious stage of Plasmodium that enters the human body is: **[4]**

a) Sporozoites b) Female gametocytes
c) Trophozoites d) Male gametocytes

120) In higher vertebrates, the immune system can distinguish self - cells and non - self. If this property is lost due to genetic abnormality and it attacks self cells, then it leads to: **[4]**

a) Active immunity b) Auto - immune disease
c) Allergic response d) Graft rejection

121) A stage in cell division is shown in the figure. Select the answer which gives correct identification of the stage with its characteristics.



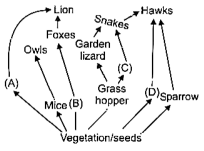
[4]

a) Telophase - E. R. and nucleous not formed yet
b) Cytokinesis - Cell plate formed, mitochondria distributed between two daughter cells
c) Telophase - Nuclear envelop reforms, Golgi complex reforms
d) Late anaphase - Chromosomes move away from equatorial plate, Golgi complex not present

122) A sedentary sea anemone gets attached to the shell lining of hermit crab. The association is: **[4]**

a) Ectoparasitism b) Amensalism
c) Commensalism d) Symbiosis

123) Identify the likely organisms (A), (B), (C) and (D) in the food web shown ahead:



[4]

a) A - Rat, B - Dog, C - Tortoise, D - Deer
b) A - Dog, B - Squirrel, C - Bat, D - Deer
c) A - Squirrel, B - Cat, C - Rat, D - Pigeon
d) A - Deer, B - Rabbit, C - Frog, D - Rat

124) Which one of the following microbes forms symbiotic association with plants and helps them in their nutrition? **[4]**

a) Trichoderma b) Azotobacter
c) Glomus d) Aspergillus

125) Sacred groves are specially useful in: **[4]**

a) Generating environmental awareness
b) Preventing soil erosion
c) Conserving rare and threatened species
d) Year - round flow of water in rivers

126) Given below is the representation of the extent of global diversity of invertebrates. What groups the four portions (A - D) represent respectively?

A	B	C	D
(a) Molluscs	Other animal groups	Crustaceans	Insects
(b) Insects	Molluscs	Crustaceans	Other anima groups
(c) Insects	Crustaceans	Other animal groups	Molluscs
(d) Crustaceans	Insects	Molluscs	Other anima groups

[4]

a) Only c b) Only b
c) Only d d) Only a

127) Alexander Von Humboldt described for the first time: **[4]**

a) Laws of limiting factor
b) Population growth equation
c) Species area relationships
d) Ecological biodiversit

128) The stage during which separation of the paired homologous chromosomes begins is: **[4]**

a) Diplotene b) Zygotene
c) Diakinesis d) Pachytene

129) Which of the following elements helps in maintaining the structure of ribosomes? **[4]**

a) Magnesium b) Copper
c) Molybdenum d) Zinc

130) In light reaction, plastoquinone facilitates the transfer of electrons from: **[4]**

a) PS - II to $Cytb_6f$ complex
b) $Cytb_6f$ complex to PS - I
c) PS - I to $NADP^+$
d) PS - I to ATP synthase

131) Phosphoenol pyruvate (PEP) is the primary CO_2 acceptor in: **[4]**

a) C_3 plants b) C_2 plans
c) C_4 plants d) $C_3$and C_4 plants

132) The C_4 plants are photosynthetically more efficient than C_3 plants because: **[4]**

a) CO_2 generated during photorespiration is trapped and recycled through PEP carboxylase
b) The CO_2 efflux is not prevented
c) They have more chloroplasts
d) The CO_2 compensation point is more

133) Which of the metabolites is common to respiration mediated breakdown of fats, carbohydrates and proteins? **[4]**

a) Glucose - 6 - phosphate
b) Fructose 1,6 - bisphosphate
c) Pyruvic acid
d) Acetyl CoA

134) In Glycine max, the product of biological nitrogen fixation is transported from the root nodules to other parts as **[4]**

a) Ureides b) Nitrates
c) Ammonia d) Glutamate

135) Which one of the following generally acts as an antagonist to gibberellins? **[4]**

a) Zeatin b) IAA
c) Ethylene d) ABA

BOTANY (Section-B)

Attempt any 10 questions

136) Viroid differ from viruses in having: **[4]**

a) DNA molecules without protein coat
b) RNA molecules with protein coat
c) RNA molecules without protein coat
d) DNA molecules without protein coat

137) After karyogamy followed by meiosis, spores are produced exogenously in: **[4]**

a) Agaricus b) Alternaria
c) Saccharomuces d) Neurospora

138) Floridean starch has structure similar to: **[4]**

a) Amylopectin and glycogen
b) Starch and cellulose
c) Mannitol and algin
d) Laminarin and cellulose

139) Even in absence of pollinating agents seed setting is assured in: **[4]**

a) Zostera b) Salvia
c) Fig d) Commelina

140) In China rose the flowers are **[4]**

a) Actinomorphic, hypogynous with twisted aestivation
b) Zygomoiphic, hypogynous with imbricate aestivation
c) Zygomoiphic, epigynous with twisted aestivation
d) Actinomorphic, epigynous with valvate aestivation

141) In a population of 1000 individuals 360 belong to genotype AA, 480 to Aa and the remaining 160 to aa. Based on this data, the frequency of allele A in the population is: **[4]**

a) 0.4 b) 0.5
c) 0.7 d) 0.6

142) Which one of the following statements about Histones is wrong? **[4]**

a) The pH of histones is slightly acidic.
b) Histones are organized to form a unit of 8 molecules.
c) Histones carry positive charge in the side chain.
d) Histones are rich in amino acids - Lysine and Arginine.

143) Mitochondria and chloroplast are:

i. Semi - autonomous organelles,
ii. Formed by the division of pre - existing organelles and they contain DNA but lack protein - synthesizing machinery.

Which one of the following options is correct? **[4]**

a) Both (A) and (B) are false
b) Both (A) and (B) are correct
c) (A) is true but (B) is false
d) (B) is true but (A) is false

144) Conversion of milk to curd improves its nutritional value by increasing the amount of: **[4]**

a) Vitamin E b) Vitamin A
c) Vitamin B_{12} d) Vitamin D

145) Cyclosporin A, used as immuno suppression agent, is produced from **[4]**

a) Trichoderma polysporum
b) Saccharomyces cerevisiae
c) Monascus purpureus
d) Penicillium notatum

146) Which statement is wrong for Kreb's cycle? **[4]**

a) There is one point in the cycle where FAD^+ is reduced to $FADH_2$
b) During conversion of succinyl CoA to succinic acid, a molecule of GTP is synthesised
c) The cycle starts with the condensation of acetyl group (Acetyl CoA) with pyruvic acid to yield citric acid
d) There are three points in the cycle where NAD^+ is reduced to $NADH + H^+$

147) The breakdown of detritus into smaller particles by earthworm is a process called: **[4]**

a) Catabolism b) Mineralisation
c) Humification d) Fragmentation

148) The plant hormone used to destroy weeds in a field **[4]**

a) NAA b) IAA
c) 2, 4 - D d) IBA

149) The typical growth curve in plants is: **[4]**

a) Stair - steps shaped b) Parabolic
c) Linear d) Sigmoid

150) Which of the following is not a product of light reaction of photosynthesis? **[4]**

a) ATP b) NADPH
c) NADH d) Oxygen

ZOOLOGY (Section-A)

151) In case of poriferan the spongocoel is lined with flagellated cells called: **[4]**

a) Ostia b) Choanocytes
c) Oscula d) Mesenchymal cells

152) Which of the following animals is correctly matched with its particular named taxonomic category? **[4]**

a) Housefly - Musca, an order
b) Humans - Primata, the family
c) Cuttlefish - Mollusca, a class
d) Tiger - tigris, the species

153) Which of the following characteristic features always holds true for the corresponding group of animals? **[4]**

a) Viviparous - Mammalia
b) Possess a mouth with an upper and a lower jaw - Chordata
c) 3 - chambered heart with one incompletely divided ventricle - Reptilia
d) Cartilaginous endoskeleton - Chondrichthyes

154) Pheretima and its close relatives derive nourishment from: **[4]**

a) Oil insects
b) Small pieces of fresh fallen leaves of maize, etc
c) Decaying fallen leaves and soil organic matter
d) Sugarcane roots

155) Uric acid is the chief nitrogenous component of the excretory products of: **[4]**

a) Frog b) Earthworm
c) Man d) Cockroach

156) What is vital capacity of our lungs? **[4]**

a) Total lungs capacity - expiratory reserve volume
b) Inspiratory reserve volume + expiratory reserve volume
c) Inspiratory reserve volume + tidal volume
d) Total lungs capacity - residual volume

157) Select the correct events that occur during inspiration.
i. Contraction of diaphragm
ii. Contraction of external intercostal muscles
iii. Pulmonary volume decreases
iv. Intra pulmonary pressure increases
[4]

a) Option (i)
b) Option (iii) and (iv)
c) Option (i), (ii) and (iv)
d) Option (i) and (ii)

158) Which of the following changes usually tends to occur in plain dwellers when they move to the high altitudes?
i. Increased breathing rate.
ii. Increased RBC production.
iii. Increased WBC Production.
iv. Increased thrombocyte count.
Choose the correct option.
[4]

a) (i) and (ii) b) (i) and (iii)
c) (i) and (iv) d) (iii) and (iv)

159) Name the chronic respiratory disorder caused mainly by cigarette smoking. **[4]**

a) Emphysema
b) Respiratory acidosis
c) Respiratory alkalosis
d) Asthma

160) The partial pressures (in mm Hg) of oxygen (O_2) and carbon dioxide (CO_2) at alveoli (the site of diffusion) are **[4]**

a) PO_2 = 159 and pCO_2 = 0.3
b) PO_2 = 104 and pCO_2 = 40
c) PO_2 = 40 and pCO_2 = 45
d) PO_2 = 95 and pCO_2 = 40

161) Which of the following secretes the hormone, relaxin, during the later phase of pregnancy? **[4]**

a) Graafian follicle b) Foetus
c) Uterus d) Corpus luteum

162) In a normal pregnant woman, the amount of total gonadotropin activity was assessed. The result expected was: **[4]**

a) High level of circulating FSH and LH in the uterus to stimulate implantation of the embryo
b) High level of circulating HCG to stimulate endometrial thickening
c) High level of FSH and LH in uterus to stimulate endometrial thickening
d) High level of circulating HCG to stimulate estrogen and progesterone synthesis

163) Menstrual flow occurs due to lack of: **[4]**

a) Oestrogen b) Progesterone
c) LH d) FSH

164) Assisted reproductive technology, IVF involves transfer of: **[4]**

a) Embryo with 16 blastomeres into the fallopian tube
b) Ovum into the fallopian tube
c) Zygote into the fallopian tube
d) Zygote into the uterus

165) Select the hormone - releasing Intra - Uterine Devices. **[4]**

a) Vaults, LNG - 20
b) Progestasert, LNG - 20
c) Multiload 375, Progestasert
d) Lippes Loop, Multiload 375

166) Variations caused by mutation, as proposed by Hugo de Vries, are: **[4]**

a) Small and directional
b) Random and directional
c) Small and direction less
d) Random and direction less

167) Match List - I with List - II

List - I	List - II
(A) Adaptive radiation	(i) Selection of resistant varieties due to excessive use of herbicides and pesticides
(B) Convergent evolution	(ii) Bones of forelimbs in Man and Whale
(C) Divergent evolution	(iii) Wings of Butterfly and Birds
(D) Evolution by anthropogenic action	(iv) Drawin Finchs

[4]

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

168) Which one of the following correctly explains the function of a specific part of the human nephron? **[4]**

a) **Afferent arteriole:** carries the blood away from the glomerulus towards renal vein
b) **Henle's loop**: most reabsorption of the major substances from the glomerular filtrate
c) **Distal convoluted tubule**: reabsorption of K+ ions into the surrounding blood capillaries
d) **Podocytes**: create minute spaces (slit pores) for the filtration of blood into the Bowman's capsule

169) Which of the following statements is correct?

i. The ascending limb of loop of Henle is impermeable to water.
ii. The descending limb of loop of Henle is impermeable to water.
iii. The ascending limb of loop of Henle is permeable to water.
iv. The descending limb of loop of Henle is permeable to electrolytes.

[4]

a) Statement d is correct
b) Statement c is correct
c) Statement b is correct
d) Statement a is correct

170) Which one of the following option gives the correct categorization of six animals according to the type of nitrogenous wastes (A, B, C) they give out?

	A AMMONOTELIC	B UREOTELIC	C URICOTELIC
A	Frog, Lizards	Aquatic Amphibia, Humans	Cockroach, Pigeon
B	Aquatic Amphibia	Frog, Humans	Pigeon, Lizards, Cockroach
C	Aquatic Amphibia	Cockroach, Humans	Frog, Pigeon, Lizards
D	Pigeon, Humans	Aquatic Amphibia, Lizards	Cockroach, Frog

[4]

a) D b) A
c) B d) C

171) The pivot joint between atlas and axis is a type of: **[4]**

a) Fibrous Joint b) Cartilaginous Joints
c) Saddle Joint d) Synovial Joints

172) Out of X pairs of ribs in humans, only one pairs is/are true ribs. Select the option that correctly represents values of X and Y and provides their explanation:

(A) X = 12, Y = 7	True ribs are attached dorsally to the vertebral column and ventrally to the sternum
(B) X = 12, Y = 5	The ribs are attached dorsally to vertebral column and sternum on the two ends
(C) X = 24, Y = 7	True ribs are dorsally attached to the vertebral column but are free on the ventral side
(D) X = 24, Y = 12	True ribs are dorsally attached to the vertebral column but are free on the ventral side

[4]

a) Only B b) Only D
c) Only A d) Only C

173) Which of the following joints would allow no movement? **[4]**

a) Synovial joint
b) Fibrous joint
c) Cartilaginous joints
d) Ball and Socket joint

174) The most abundant intracellular cation is: **[4]**

a) Na^+ b) Ca^{++}
c) K^+ d) H^+

175) Which of the following regions of the brain is incorrectly paired with its function? **[4]**

a) Cerebrum - calculation and contemplation
b) Corpus callosum - communication between the left and right cerebral cortices
c) Medulla oblongata - homeostatic control
d) Cerebellum - language comprehension

176) The human hind brain comprises three parts, one of which is: **[4]**

a) Corpus callosum b) Cerebellum
c) Hypothalamus d) Spinal

177) GnRH, a hypothalamic hormone, needed in reproduction, acts on: **[4]**

a) Anterior pituitary gland and stimulates secretion of LH and oxytocin
b) Anterior pituitary gland and stimulates secretion of LH and FSH
c) Posterior pituitary gland and stimulates secretion of oxytocin and FSH
d) Posterior pituitary gland and stimulates secretion of LH and relaxin

178) Graves' disease is caused due to: **[4]**

a) Hyposecretion of the adrenal gland
b) Hypersecretion of the adrenal gland

c) Hyposecretion of the thyroid gland
d) Hypersecretion of the thyroid gland

179) Reduction in pH of blood will: **[4]**

a) Decrease the affinity of haemoglobin with oxygen
b) Release bicarbonate ions by the liver
c) Reduce the rate of heart beat
d) Reduce the blood supply to the brain

180) Arteries are best defined as the vessels which: **[4]**

a) Break up into capillaries which reunite to form a vein.
b) Supply oxygenated blood to the different organs.
c) Carry blood away from the heart to different organs.
d) Carry blood from one visceral organ to another visceral organ.

181) Bundle of His is a part of which one of the following organs in human? **[4]**

a) Brain b) Heart
c) Muscles d) Liver

182) In genetic engineering, the antibiotics are used: **[4]**

a) As selectable markers
b) To select healthy vectors
c) As sequences from where replication starts
d) To keep the cultures free of infection

183) For transformation, micro - particles coated with DNA to be bombarded with the gene are made up of: **[4]**

a) Silicon or platinum b) Platinum or zinc
c) Silver or platinum d) Gold or Tungsten

184) Some of the characteristics of Bt cotton are: **[4]**

a) Long fibre and resistance to aphids
b) High yield and production of toxic protein crystals which kill dipteran pests
c) High yield and resistance to bollworms
d) Medium yield long fibre and resistance to beetle pests

185) Which one of the following is now being commercially produced by biotechnological procedures? **[4]**

a) Quinine b) Morphine
c) Nicotine d) Insulin

ZOOLOGY (Section-B)

Attempt any 10 questions

186) Frogs differ from humans in possessing: **[4]**

a) Nucleated red blood cells
b) Thyroid as well as parathyroid
c) Paired cerebral hemispheres
d) Hepatic portal system

187) Match the following columns with reference to cockroach and select the correct option

Column - I	Column - II
(A) Grinding of the food particles	(i) Hepatic caecal
(B) Secrete gastric juice	(ii) 10^{th} segment
(C) 10 pairs	(iii) Proventriculus
(D) Anal cerci	(iv) Spiracles
	(v) Alary muscles

[4]

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

188) Blood pressure in the pulmonary artery is : **[4]**

a) Less than that in the vena cava
b) More than that in the carotid
c) Same as that in the aorta
d) More than that in the pulmonary vein

189) Asthma may be attributed to: **[4]**

a) Accumulation of fluid in the lungs
b) Inflammation of the trachea
c) Bacterial infection of the lungs
d) Allergic reaction of the mast cells in the lungs

190) About which day in a normal human menstrual cycle does rapid secretion of LH (popularly called LH surge) normally occurs? **[4]**

a) 20^{th} day b) 11^{th} day
c) 14^{th} day d) 5^{th} day

191) Veneral diseases can spread through
i. Using sterile needles
ii. Transfusion of blood from infected person
iii. Infected mother to foetus
iv. Kissing
v. Inheritance
[4]

a) (a), (b) and (c) only
b) (a) and (c) only
c) (b), (c) and (d) only
d) (b) and (c) only

192) A Hominid fossil discovered in Java in 1891, now extinct, having cranial capacity of about 900 cc was **[4]**

a) Australopithecus b) Homo sapiens
c) Homo erectus d) Neanderthal man

193) Select the correct statement
i. Atrial Natriuretic Factor increases the blood pressure.
ii. Angiotensin II is a powerful vasodilator.
iii. Counter current pattern of blood flow is not observed in vasa recta.
iv. Reduction in Glomerular Filtration Rate activates JG cells to release renin.
[4]

a) Statement d is correct
b) Statement c is correct
c) Statement a is correct
d) Statement b is correct

194) Select the correct matching of the type of the joint with the example in the human skeletal system:

Type of Joint	Examples
(A) Hinge joint	Between humerus and pectoral girdle
(B) Gliding joint	Between carpals
(C) Cartilaginous joint	Between frontal and parental bone
(D) Pivot joint	Between third and fourth cervical vertebrae

[4]

a) Only B
b) Only C
c) Only A
d) Only D

195) The nerve centres which control the body temperature and the urge for eating are contained in **[4]**

a) Cerebellum
b) Thalamus
c) Hypothalamus
d) Pons

196) A pregnant female delivers a baby who suffers from stunted growth, mental retardation, low intelligence quotient, and abnormal skin. This is the result of: **[4]**

a) Low secretion of growth hormone
b) Deficiency of iodine in diet
c) Cancer of the thyroid gland
d) Over secretion of pars distalis

197) Which of the following is an amino acid derived hormone? **[4]**

a) Ecdysone
b) Estriol
c) Epinephrine
d) Estradiol

198) The hepatic portal vein drains blood to liver from : **[4]**

a) Intestine
b) Heart
c) Kidneys
d) Stomach

199) Which of the following is not a component of downstream processing? **[4]**

a) Preservation
b) Purification
c) Expression
d) Separation

200) In Bt cotton, the Bt toxin present in plant tissue as pro - toxin is converted into active toxin due to : **[4]**

a) Acidic pH of the insect gut
b) Alkaline pH of the insect gut
c) Presence of conversion factors in insect gut
d) Action of gut micro - organisms