



FULL SYLLABUS

[NEET-2020]

MEDICUS NEET-UG

DATE : 18 - 03 - 2020

Time : 3 hours

Maximum Marks: 720

INSTRUCTIONS

(A) General :

1. This Question Paper contains three Sections : Section-A (Physics), Section-B (Chemistry) and Section-C (Biology).
2. This Question Paper contains 20 pages, other than the OMR.
3. The Section-A contains 45 questions, Section-B contains 45 questions & Section-C contains 90 questions.
4. The Question Paper has blank spaces at the bottom of each page of rough work. No additional sheets will be provided for rough work.
5. Blank Paper, clip boards log tables, slide rule, calculators, cellular phones, pagers and electronic gadgets, in any form, are **NOT** allowed.
6. This booklet also contains the OMR answer sheet (i.e., A machine gradable Response Sheet).

(B) Answering on the OMR:

7. Each question will have **4 choices**, (A), (B), (C) & (D), out of which **only one choice is correct**.
8. Darken the bubble with **Ball Pen (Blue or Black) ONLY**.

(C) Filling – in Name and Registration No.

9. On the **OMR**, write your Name and Registration number in ink. Also, put your signature in the appropriate box in ink.

(D) Marking Scheme:

10. (a) For each question, you will be awarded **4 marks** if you have darkened only one bubble corresponding to the right answer. In all other cases, you will be **awarded –1 mark**.
(b) In case you have not darkened any bubble, you will be awarded 0 mark for that question.

Name :

Enrollment No.:

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Student Signature

Invigilators Signature

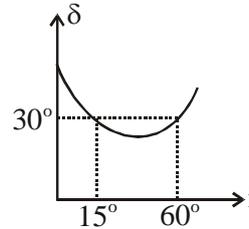
PHYSICS

1. A convex lens of focal length A and a concave lens of focal length B are placed in contact. The focal length of combination is-

(A) $A + B$ (B) $A - B$ (C) $\frac{AB}{A + B}$ (D) $\frac{AB}{(B - A)}$

2. Figure shows the graph of angle of deviation δ versus angle of incidence i for a light ray striking a prism. The prism angle is -

- (A) 30°
 (B) 45°
 (C) 60°
 (D) 75°



3. The linear width of central maxima in single slit diffraction pattern on a screen placed at a distance 'D' m from a slit plane having a slit of width 'a' m is given by -

(A) $\frac{2\lambda a}{D}$ (B) $\frac{\lambda D}{a}$ (C) $\frac{2\lambda D}{a}$ (D) $\frac{3\lambda D}{2a}$

4. In Young's double slit experiment, separation between slits is 1mm, distance of screen from slits is 2.5 m, if wavelength of incident light is 400nm. The fringe width will be-

- (A) 0.1m (B) 1mm (C) 10mm (D) 1 cm

5. A farsighted man can see clearly at a distance of 1 m. The power of the lens that would make him see clearly at a distance of 0.2m is-

- (A) 4D (B) -4D (C) 6D (D) -6D

6. Electromagnetic waves are produced by-

- (A) a static charge (B) a moving charge (C) an accelerating charge (D) chargeless particle

7. Light of two different frequencies whose photons have energies 1eV and 2.5eV successively illuminate a metal of work function 0.5eV. The ratio of the maximum speeds of the emitted electrons will be-

- (A) 1 : 5 (B) 1 : 4 (C) 1 : 2 (D) 1 : 1

8. In which of the following system will the wavelength corresponding to $n = 2$ to $n = 1$ be

- (A) ${}_1\text{H}^1$ (B) ${}^2\text{H}_1$ (C) He^+ (D) He^{++}

9. The correct formula for distance of closest approach is given by -

(A) $\frac{(z_1 e)(z_2 e)}{4\pi\epsilon_0 \left(\frac{1}{2}mv^2\right)}$ (B) $\frac{(z_1 e)(z_2 e) \times \frac{1}{2}mv^2}{4\pi\epsilon_0}$ (C) $\frac{(z_1 e)^2(z_2 e)^2}{4\pi\epsilon_0 \left(\frac{1}{2}mv^2\right)}$ (D) $\frac{1}{2}mv^2 \left(\frac{z_1 z_2 e^2}{4\pi\epsilon_0}\right)^2$

10. A radioactive nucleus undergoes a series of decay according to the scheme -



If the mass number and atomic number of A are 180 and 72 respectively, what are these numbers for A_4

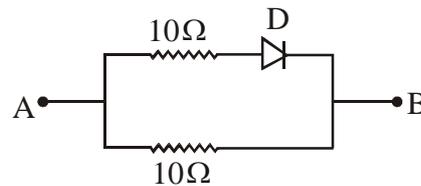
- (A) 176,71 (B) 176,70 (C) 172,69 (D) 170,70

11. Control rods in nuclear reactor are made up of -

- (A) Cadmium (B) Neutron (C) Graphite (D) Uranium

12. The Equivalent resistance of the network shown in the figure between points A and B is -
(Diode is ideal)

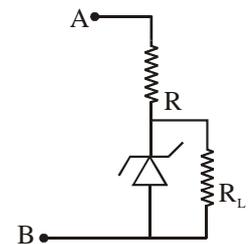
- (A) 5Ω when $V_A > V_B$
(B) 10Ω when $V_A < V_B$
(C) Both A and B
(D) 5Ω always



13. In the CB mode of a transistor, when the collector voltage is changed by 0.5 volt. The collector current changes by 0.05 mA. The output resistance will be -
(A) 10 k Ω (B) 20 k Ω (C) 5 k Ω (D) 2.5 k Ω

14. If the voltage between the terminals A and B is 17 volt and zener breakdown voltage is 9V, then the potential across R is -

- (A) 6V
(B) 8V
(C) 9V
(D) 17V



15. The rms value of the emf given by $E = 8\sin \omega t + 6\sin 2\omega t$

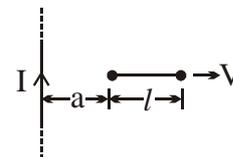
- (A) $5\sqrt{2}$ V (B) $7\sqrt{2}$ V (C) 10 V (D) $10\sqrt{2}$ V

16. When the current in a coil changes from 8A to 2A in 3×10^{-2} S, the emf induced in the coil is 2V. The self induction of coil in mH is -

- (A) 10 (B) 20 (C) 30 (D) 46

17. A wire of length ' ℓ ' moves towards left as shown in figure. The emf induced in the wire will be -

- (A) $\frac{\mu_0 I V}{2\pi} \ln\left(\frac{a+\ell}{a}\right)$ (B) $\left(\frac{\mu_0 I}{2\pi a}\right) \ell v$
(C) $\frac{\mu_0 I}{2r} \ell v \left[\frac{1}{a} - \frac{1}{a+\ell}\right]$ (D) zero

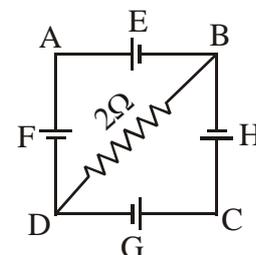


18. The susceptibility of a diamagnetic material is -

- (A) small and negative (B) small and positive (C) large and negative (D) large and positive

19. In the circuit shown in figure E, F, G, H are cells of emf 2, 1, 3 and 1 Volt respectively and their internal resistances are 2, 1, 3 and 1 Ω respectively, the potential difference between B and D is -

- (A) $\frac{1}{13}$ V (B) $\frac{2}{13}$ V
(C) $\frac{3}{13}$ V (D) 0 V



20. A carbon resistance have a following color code. What is the value of the resistance -

- (A) 5.3 M $\Omega \pm 5\%$ (B) 64 K $\Omega \pm 10\%$
(C) 6.4 M $\Omega \pm 5\%$ (D) 530 K $\Omega \pm 5\%$

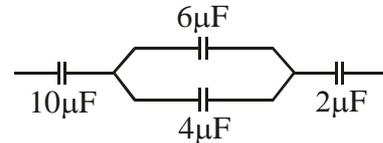


21. A parallel plate capacitor has $1 \mu\text{F}$ capacitance. One of its two plates is given $+2 \mu\text{C}$ charge and other plate $+4 \mu\text{C}$ charge. The potential difference developed across the capacitor is -

- (A) 1 volt (B) 5 volt (C) 2 volt (D) 3 volt

22. In the figure shown below, the charge on the left plate of the $10 \mu\text{F}$ capacitor $-30 \mu\text{C}$. The charge on the right plate of the $6 \mu\text{F}$ capacitor is -

- (A) $+12 \mu\text{C}$ (B) $+18 \mu\text{C}$
(C) $-12 \mu\text{C}$ (D) $-18 \mu\text{C}$



23. Find the number of possible natural oscillations of air column in a pipe frequencies of which lie below 1250 Hz if the pipe is closed from one end. The length of the pipe is $\ell = 85 \text{ cm}$. The velocity of sound is $v = 340 \text{ ms}^{-1}$.

- (A) 5 (B) 6 (C) 7 (D) 8

24. Write the dimensions of $a \times b$ in the relation $E = \frac{b - x^2}{at}$, where E is the energy, x is the displacement, and t is the time.

- (A) ML^2T (B) $\text{M}^{-1}\text{L}^2\text{T}^1$ (C) ML^2T^{-2} (D) MLT^{-2}

25. A particle is moving with speed $V = b\sqrt{x}$ along positive x -axis. Calculate the speed of the particle at time $t = \delta$ (assume that the particle is at origin at $t = 0$)

- (A) $\frac{b^2\delta}{4}$ (B) $\frac{b^2\delta}{2}$ (C) $b^2\delta$ (D) $\frac{b^2\delta}{\sqrt{2}}$

26. The stream of a river is flowing with a speed of 2 km/h . A swimmer can swim at a speed of 4 kmh^{-1} . What should be the direction of the swimmer with respect to the flow of the river to cross the river straight?

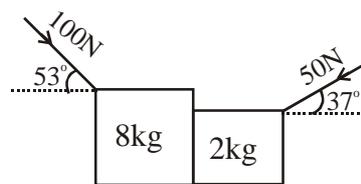
- (A) 60° (B) 120° (C) 90° (D) 150°

27. The correct relationship between horizontal range (R) and time of flight (T) is given by -

- (A) $\frac{R}{T} = u \sec \theta$ (B) $\frac{R}{T} = u^2 \tan \theta$ (C) $\frac{R}{T} = u \cos \theta$ (D) $T = R(u \cos \theta)$

28. The contact force between the both blocks will be

- (A) 20 N
(B) 36 N
(C) 44 N
(D) None of these



29. The minimum force required to move the block up on a rough inclined plane of inclination θ and co-efficient of friction μ .

- (A) $mg \sin \theta - \mu mg \cos \theta$ (B) $\mu mg \cos \theta - mg \sin \theta$
(C) $g \tan \theta$ (D) $mg \sin \theta + \mu mg \cos \theta$

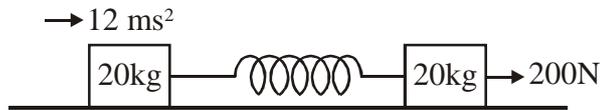
30. A force $\vec{F} = 6x\hat{i} + 2y\hat{j}$ displaces a body from $\vec{r}_1 = 3\hat{i} + 8\hat{j}$ to $\vec{r}_2 = 5\hat{i} - 4\hat{j}$. The work done by the force is -

- (A) 0 J (B) 16 J (C) 10 J (D) 15 J

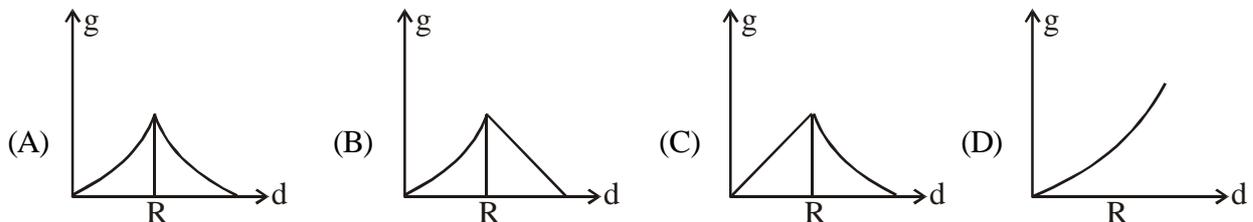
31. An automobile of mass m accelerate starting from rest, while the engine supplies constant power P , its position, S changes with time as-(assuming the automobile starts from rest)

- (A) $S \propto t^{1/2}$ (B) $S \propto t^{3/2}$ (C) $S \propto t^{-1/2}$ (D) $tS \propto t^{-3/2}$

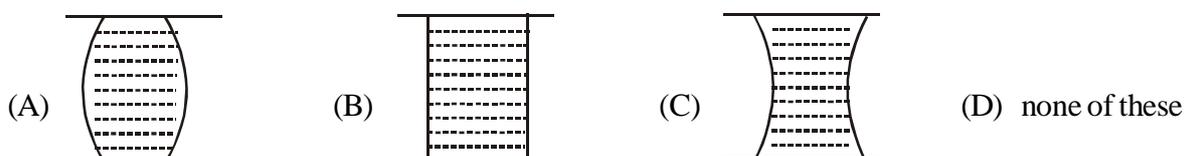
32. The masses of 10 kg and 20 kg respectively are connected by a massless spring as shown in figure. A force of 200 N acts on the 20 kg mass. At the instant shown, the 10 kg mass has acceleration 12 ms^{-2} . What is the acceleration of 20 kg mass?



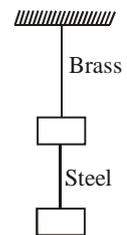
- (A) 12 ms^{-2} (B) 4 ms^{-2} (C) 10 ms^{-2} (D) zero
33. The centre of mass of given system will be at
- (A) $\left(\frac{3a}{2}, \frac{3a}{2}\right)$ (B) $\left(\frac{3a}{2}, \frac{3a}{4}\right)$
 (C) $\left(\frac{3a}{4}, \frac{3a}{2}\right)$ (D) $\left(\frac{3a}{4}, \frac{3a}{4}\right)$
34. The moment of inertia of the uniform ring about a point passing through p, perpendicular to plane of paper
- (A) MR^2 (B) $\frac{MR^2}{2}$
 (C) $2MR^2$ (D) $\frac{MR^2}{4}$
35. A string is wound around a hollow cylinder of mass 5 kg and radius 0.5 m. If the string is now pulled with a horizontal force of 40 N and the cylinder is rolling without slipping on a horizontal surface (see figure), then the angular acceleration of the cylinder will be (Neglect the mass and thickness of the string)
- (A) 10 rad/s^2 (B) 16 rad/s^2 (C) 20 rad/s^2 (D) 12 rad/s^2
36. The variation of acceleration due to gravity 'g' with distance d from centre of Earth is best represented by (R = Earth's radius)–



37. The potential energy of a particle of mass m is given by $U(x) = U_0(1 - \cos cx)$ where U_0 and c are constant. The period of small oscillations of the particle will be –
- (A) $2\pi\sqrt{\frac{mc^2}{U_0}}$ (B) $2\pi\sqrt{\frac{mU_0}{c^2}}$ (C) $2\pi\sqrt{\frac{m}{c^2U_0}}$ (D) Can't be determined
38. The working of an atomizer depends upon –
- (A) Bernoulli's theorem (B) Boyle's law
 (C) Archimedes principle (D) Pascal's law
39. If a water drop is kept between the two glass plates, then its shape is–



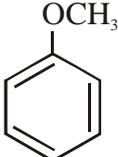
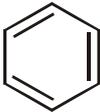
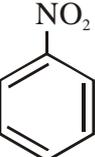
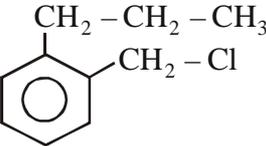
40. A tuning fork produces 4 beats per second with another tuning fork of frequency 256 Hz. The first one is now loaded with a little wax and the beat frequency is increased to 6 per second. The original frequency of tuning fork will be-
- (A) 260 Hz (B) 250 Hz (C) 252 Hz (D) None of these
41. A copper ball of mass 100g is at temperature T. It is dropped in a copper calorimeter of mass 100g, filled with 170 gm of water at room temperature subsequently, the temperature of the system is found to be 75°C. T is (given, room temperature = 30°C, specific heat of copper = 0.1 cal/g°C.
- (A) 885°C (B) 1250°C (C) 825°C (D) 800°C
42. In which of the following processes, convection doesn't take place primarily?
- (A) sea and land breeze (B) boiling of water
(C) warming of glass of bulb due to filament (D) heating air around a furnace
43. Two spherical stars A and B emit black body radiation. The radius of A is 400 times that B and A emits 10^4 times the power emitted from B. The ratio $\left(\frac{\lambda_A}{\lambda_B}\right)$ of their wavelenths λ_A and λ_B at which the peaks occur in their respective radiation curves
- (A) 1 : 2 (B) 2 : 1 (C) 1 : 4 (D) 1 : 1
44. A carnot engine has an efficiency of 1/6. When the temperature of the sink is reduced by 62°C, its efficiency is doubled. The temperatures of the source and the sink are respectively
- (A) 62°C, 129°C (B) 99°C, 37°C (C) 124°C, 62°C (D) 37°C, 99°C
45. If the ratio of lengths, radii and young's modulus of steel and brass wires shown in the figure are a, b and c, respectively. The ratio between the increase in lengths of brass and steel wires would be
- (A) $\frac{b^2 a}{2c}$ (B) $\frac{bc}{2a^2}$
(C) $\frac{3b^2 c}{2a}$ (D) $\frac{a}{2b^2 c}$

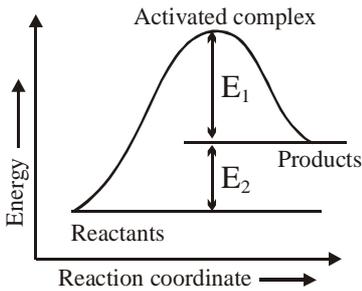


SPACE FOR ROUGH WORK

CHEMISTRY

46. Which of the following statement is incorrect regarding dehydrohalogenation of alkenes?
- (A) During the reaction hydrogen atom is eliminated from the β -carbon atom.
 (B) Rate of reaction for same alkyl group; Iodine > Bromine > Chlorine
 (C) Rate of reaction; $(\text{CH}_3)_3\text{C}- > (\text{CH}_3)_2\text{CH}- > \text{CH}_3\text{CH}_2-$
 (D) Only nature of halogen atom determine rate of the reaction.
47. Which of the following pairs of compounds are positional isomers?
- (A) $\text{CH}_3-\text{CH}_2-\text{CH}_2-\underset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{CH}_3$ and $\text{CH}_3-\text{CH}_2-\underset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{CH}_2-\text{CH}_3$
 (B) $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CHO}$ and $\text{CH}_3-\text{CH}_2-\text{CH}_2-\overset{\text{O}}{\overset{\parallel}{\text{C}}}-\text{CH}_3$
 (C) $\text{CH}_3-\text{CH}_2-\text{CH}_2-\underset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{CH}_3$ and $\text{CH}_3-\underset{\text{CH}_3}{\underset{|}{\text{CH}}}-\text{CH}_2-\text{CHO}$
 (D) $\text{CH}_3-\text{CH}_2-\underset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{CH}_2-\text{CH}_3$ and $\begin{matrix} \text{CH}_3 \\ \text{CH}_3 \end{matrix} \rangle \text{CH}-\text{CH}_2-\text{CHO}$
48. Which of the molecules act as a lewis acid ?
- (A) $(\text{CH}_3)_3\text{B}$ (B) $(\text{CH}_3)_2\text{O}$ (C) $(\text{CH}_3)_3\text{P}$ (D) $(\text{CH}_3)_3\text{N}$
49. Which of the following statements is incorrect ?
- (A) Pure sodium metal dissovses in liquid amonia to give blue solution
 (B) NaOH reacts with glass to give sodium silicate
 (C) Aluminium, reacts with excess NaOH to give $\text{Al}(\text{oH})_3$
 (D) NaHCO_3 on heating gives Na_2CO_3
50. Match the columns
- | Column - I | Column - II |
|--|--|
| (a) $\begin{matrix} \text{R} \\ \text{R} \end{matrix} \rangle \text{C} = \text{NH}$ | (p) Oxime |
| (b) $\begin{matrix} \text{R} \\ \text{R} \end{matrix} \rangle \text{C} = \text{NOH}$ | (q) Semicarbazone |
| (c) $\begin{matrix} \text{R} \\ \text{R} \end{matrix} \rangle \text{C} = \text{N} - \text{NH}_2$ | (r) Imine |
| (d) $\begin{matrix} \text{R} \\ \text{R} \end{matrix} \rangle \text{C} = \text{N} - \text{NH} - \overset{\text{O}}{\overset{\parallel}{\text{C}}} - \text{NH}_2$ | (s) Hydrazone |
| (A) A - (q), B - (s), C - (p), D - (r) | (B) A - (r), B - (p), C - (s), D - (q) |
| (C) A - (r), B - (s), C - (p), D - (q) | (D) A - (s), B - (r), C - (q), D - (p) |
51. An organic compound X (molecular formula $\text{C}_6\text{H}_7\text{O}_2\text{N}$) has six carbon atoms in a ring system, two double bonds and a nitro group as substituent, X is :
- (A) Homocyclic but not aromatic (B) Aromatic but not homocyclic
 (C) Homocyclic and aromatic (D) Heterocyclic and aromatic

52. The solubility product of a sparingly soluble salt AX_2 is 3.2×10^{-11} . Its solubility (in mol/L) is
 (A) 5.6×10^{-6} (B) 3.1×10^{-4} (C) 2×10^{-4} (D) 4×10^{-4}
53. The electrolytic method of reduction is employed for the preparation of metals that
 (A) are weakly electropositive (B) are moderately electropositive
 (C) are strongly electropositive (D) form oxides
54. The chemical system that is non-aromatic is
 (A)  (B)  (C)  (D) 
55. Among the following compounds (I–III), the case of their reaction with electrophiles is,
 (I)  (II)  (III) 
 (A) II > III > I (B) III > II > I (C) II > I > III (D) I > II > III
56. Zinc can be coated on Iron to produce galvanized iron but the reverse is not possible. It is because
 (A) Zinc has higher negative electrode potential than iron
 (B) Zinc is lighter than iron
 (C) Zinc has lower melting point than iron
 (D) Zinc has lower negative electrode potential than iron
57. Caustic soda solution is an adsorbent for
 (A) NH_3 (B) CO_2 (C) CO (D) N_2O
58. The reagent (s) which can be used to distinguish acetophenone from benzophenone is (are) :
 (A) 2, 4- Dinitrophenylhydrazine (B) Aqueous solution of $NaHSO_3$
 (C) Benedict reagent (D) I_2 and NaOH.
59. A compound A with molecular formula $C_{10}H_{13}Cl$ gives a white precipitate on adding silver nitrate solution. A on reacting with alcoholic KOH gives compound B as the main product. B on ozonolysis gives C and D. C gives Cannizzaro reaction but not aldol condensation. D gives aldol condensation but not Cannizzaro reaction. A is :
 (A) $C_6H_5 - CH_2 - CH_2 - CH_2 - CH_2 - Cl$ (B) $C_6H_5 - CH_2 - CH_2 - \underset{\substack{| \\ Cl}}{CH} - CH_3$
 (C) $C_6H_5 - CH_2 - \underset{\substack{| \\ Cl}}{C} \begin{matrix} / CH_3 \\ \backslash CH_3 \end{matrix}$ (D) 
60. Which of the following is a broad spectrum drug?
 (A) Plasmoquine (B) Chloroquine (C) Chloramphenicol (D) D.D.T
61. A compound on treatment with NaOH followed by addition of $AgNO_3$ produces white precipitate at room temperature. The precipitate is soluble in NH_4OH . The compound is identified as
 (A) vinyl chloride (B) benzyl chloride (C) chlorobenzene (D) ethyl bromide
62. The isoelectronic pair is
 (A) Cl_2O, ICl_2^- (B) ICl_2^-, ClO_2 (C) IF_2^+, I_3^- (D) ClO_2^-, ClF_2^+

63. AB crystallizes in a body centered cubic lattice with edge length "a" equal to 387 pm. The distance between two oppositely charged ions in the lattice is
 (A) 300 pm (B) 335 pm (C) 250 pm (D) 200 pm
64. Which of the two ions from the list given below that have geometry that is explained by the same hybridization of orbitals
 NO_2^- , NO_3^- , NH_2^- , NH_4^+ , SCN^-
 (A) NO_2^- and NO_3^- (B) NH_4^+ and NO_3^- (C) SCN^- and NH_2^- (D) NO_2^- and NH_2^-
65. Which one is correct according to this figure.
 (A) Activation energy of forward reaction is $E_1 + E_2$ and product is less stable than reactant.
 (B) Activation energy of forward reaction is $E_1 + E_2$ and product is more stable than reactant.
 (C) Activation energy of both forward & backward reaction is $E_1 + E_2$ and reactant is more stable than product.
 (D) Activation energy of backward reaction is E_1 and product is more stable than reactant.
- 
66. In which of the following is there a consistent decrease in atomic radius as the atomic number increases?
 (A) halogens (B) representative elements
 (C) transition elements (D) lanthanides
67. The basicity of aniline is less than that of cyclohexylamine. This is due to
 (A) +R effect of $-\text{NH}_2$ group (B) -I effect of $-\text{NH}_2$ group
 (C) -R effect of $-\text{NH}_2$ group (D) hyperconjugation effect
68. The Van't Hoff factor (i) for a dilute aqueous solution of the strong electrolyte barium hydroxide is
 (A) 3 (B) 0 (C) 1 (D) 2
69. The dissociation constant for acetic acid and HCN at 25°C are 1.5×10^{-5} and 4.5×10^{-10} respectively. The equilibrium constant for the equilibrium.
 $\text{CN}^- + \text{CH}_3\text{COOH} \longrightarrow \text{HCN} + \text{CH}_3\text{COO}^-$ Would be
 (A) 3.0×10^5 (B) 3.0×10^{-5} (C) 3.0×10^{-4} (D) 3.0×10^4
70. The ortho/para directing group among the following is :
 (A) COOH (B) CN (C) COCH_3 (D) NHCONH_2
71. Benzoic acid gives benzene on being heated with X and phenol gives benzene on being heated with Y. Therefore X and Y are respectively
 (A) Soda-lime and copper (B) Zn dust and NaOH
 (C) Zn dust and soda-lime (D) Soda-lime and zinc dust.
72. BeF_2 is soluble in water whereas fluorides of other alkaline earth metals are insoluble because of
 (A) Ionic nature of BeF_2
 (B) Covalent nature of BeF_2
 (C) Greater hydration energy of Be^{+2} ion as compared to its lattice energy
 (D) None of these
73. Which of the following compound is tribasic acid ?
 (A) H_3PO_2 (B) H_3PO_3 (C) H_3PO_4 (D) $\text{H}_4\text{P}_2\text{O}_7$

74. The shape of IF_7 molecule is
 (A) Octahedral (B) Pentagonal bipyramidal
 (C) Trigonal bipyramidal (D) Tetrahedral
75. A device that converts energy of combustion of fuels like hydrogen and methane, directly into electrical energy is known as
 (A) Electrolytic cell (B) Dynaino (C) Ni-Cd cell (D) Fuel cell
76. A mixture of gasses contains H_2 and O_2 gasses in the ratio of 1 : 8. What is the molar ratio of the two gasses in the mixture?
 (A) 4 : 1 (B) 16 : 1 (C) 2 : 1 (D) 1 : 4
77. Which of the following statements are correct for a reversible process in a state of equilibrium.
 (A) $\Delta G = 2.303 RT \log K$ (B) $\Delta G^\circ = -2.303 RT \log K$
 (C) $\Delta G^\circ = 2.303 RT \log K$ (D) $\Delta G = -2.303 RT \log K$
78. The angular momentum of electron in p orbital is equal to
 (A) $2\sqrt{3} h$ (B) $\sqrt{2} h$ (C) $0 h$ (D) $\sqrt{6} h$
79. The boiling point of 0.3 mol kg^{-1} solution of "X" in water greater than equimolal solution of Y in water. Which one of the following statements is true in this case ?
 (A) Molecular mass of X is greater than the molecular mass of Y.
 (B) Molecular mass of X is less than the molecular mass of Y.
 (C) Y is undergoing dissociation in water while "X" undergoes no change.
 (D) X is undergoing dissociation in water.
80. Given
 $\text{Fe}^{3+}(\text{aq}) + \text{e}^- \rightarrow \text{Fe}^{2+}(\text{aq}); E^\circ = +0.77 \text{ V}$
 $\text{Al}^{3+}(\text{aq}) + 3\text{e}^- \rightarrow \text{Al}(\text{s}); E^\circ = -1.66 \text{ V}$
 $\text{Br}_2(\text{aq}) + 2\text{e}^- \rightarrow 2\text{Br}^-; E^\circ = +1.09 \text{ V}$
 Considering the electrode potentials, which of the following represents the correct order of reducing power?
 (A) $\text{Fe}^{2+} < \text{Al} < \text{Br}^-$ (B) $\text{Br}^- < \text{Fe}^{2+} < \text{Al}$ (C) $\text{Al} < \text{Br} < \text{Fe}^{2+}$ (D) $\text{Al} < \text{Fe}^{2+} < \text{Br}^-$
81. In an octahedral structure, the pair of d-orbitals involved in d^2sp^3 hybridisation is
 (A) d_{x^2}, d_{x^2} (B) d_{xy}, d_{yz} (C) $d_{x^2-y^2}, dz^2$ (D) $d_{xz}, d_{x^2-y^2}$
82. which of the following is not a correct statement ?
 (A) Every AB_5 molecule does in fact have square pyramid structure
 (B) Multiple bonds are always shorter than corresponding single bonds
 (C) The electron-deficient molecules can act as Lewis acid
 (D) The canonical structures have no real existence
83. The lanthanoid contraction is responsible for the fact that
 (A) Zr and Y have about the same radius (B) Zr and Nb have similar oxidation state
 (C) Zr and Hf have about the same radius (D) Zr and Zn have the same oxidation state
84. If the rate of the reaction is equal to the rate constant, the order of the reaction is
 (A) 2 (B) 3 (C) 0 (D) 1

85. Which of the following forms cationic micelles above certain concentration ?
(A) Sodium ethyl sulphate (B) Sodium acetate
(C) Urea (D) Trimethyl ammonium bromide
86. Formation of a solution from two component can be considered as
(i) pure solvent \rightarrow separated solvent molecules, ΔH_1
(ii) Pure solute \rightarrow separated solute molecules, ΔH_2
(iii) Separated solvent and solute molecules \rightarrow solution, ΔH_3
(A) $\Delta H_{\text{soln}} = \Delta H_1 - \Delta H_2 - \Delta H_3$ (B) $\Delta H_{\text{soln}} = \Delta H_3 - \Delta H_1 - \Delta H_2$
(C) $\Delta H_{\text{soln}} = \Delta H_1 + \Delta H_2 + \Delta H_3$ (D) $\Delta H_{\text{soln}} = \Delta H_1 + \Delta H_2 - \Delta H_3$
87. Which one of the following ionic species has the greatest proton affinity to form stable compound ?
(A) HS^- (B) NH_2^- (C) F^- (D) I^-
88. Copper sulphate dissolves in excess of KCN to give
(A) CuCN (B) $[\text{Cu}(\text{CN})_4]^{3-}$
(C) $[\text{Cu}(\text{CN})_4]^{2-}$ (D) $\text{Cu}(\text{CN})_2$
89. Among the following which species has same number of σ and π -bonds
(A) C_7H_8 (B) $\text{C}_2(\text{CN})_4$ (C) C_2H_4 (D) $\text{HC} \equiv \text{CH}$
90. Among $[\text{Ni}(\text{CO})_4]$, $[\text{Ni}(\text{CN})_4]^{2-}$, $[\text{NiCl}_4]^{2-}$ species, the hybridisation states at the Ni atom are, respectively :
(A) sp^3, sp^3, dsp^2 (B) dsp^2, sp^3, sp^3
(C) sp^3, dsp^2, dsp^2 (D) sp^3, dsp^2, sp^3

SPACE FOR ROUGH WORK

BIOLOGY

91. Which one of the following biomolecules is correctly characterised ?
 (A) Alanine amino acid – Contains an amino group and an acidic group anywhere in the molecule
 (B) Licithin – a phosphorylated glyceride found in cell membrane
 (C) Palmitic acid – an unsaturated fatty acid with 18 carbon atoms
 (D) Adenylic acid – adenosine with a glucose phosphate molecule
92. Green revolution in India occurred during
 (A) 1950's (B) 1960's (C) 1970's (D) 1980's
93. *Cuscuta* is an example of
 (A) Endoparasitism (B) Ecotoparasitism (C) Brood parasitism (D) Predation
94. Consider the following four statements (a – d) and select the option which includes all the correct ones only
 (A) Single cell *Spirulina* can produce large quantities of food rich in protein, minerals, vitamins etc
 (B) Body weight-wise the microorganism *Methylophilus methylotrophus* may be able to produce several times more proteins than the cows per day
 (C) Common button mushrooms are a very rich source of vitamin C
 (D) A rice variety has been developed which is very rich in calcium

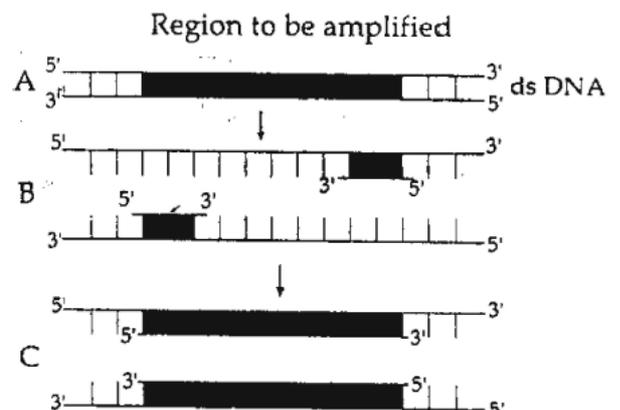
Options :

- (A) Statements (a), (b) (B) Statements (c), (d)
 (C) Statements (a), (c) and (d) (D) Statements (b), (c) and (d)

95. How many organisms in the list given below are *autotrophs* ?
Lactobacillus, Nostoc, Chara, Nitrosomonas, Nitrobacter, Streptomyces, Saccharomyces, Trypanosoma, Porphyra, Walfia
 (A) Three (B) Four (C) Five (D) Six
96. Which one of the following categories of animals, is correctly described with no single exception in it ?
 (A) All mammals are viviparous and possess diaphragm for breathing
 (B) All reptiles possess scales, have a three chambered heart and are cold blooded (poikilothermal)
 (C) All bony fishes have four pairs of gills and an operculum on each side
 (D) All sponges are marine and have collared cells
97. Sacred groves are specially useful in
 (A) Conserving rare and threatened species (B) Generating environmental awareness
 (C) Preventing soil erosion (D) Year-round flow of water in rivers
98. The figure below shows three steps (A, B, C) of Polymerase Chain Reaction (PCR). Select the option giving correct identification together with what it represents ?

Options :

- (A) A – Annealing with two sets of primers
 (B) B – Denaturation at a temperature of about 98°C separating the two DNA strands
 (C) A – Denaturation at a temperature of about 50°C
 (D) C – Extension in the presence of heat stable DNA polymerase



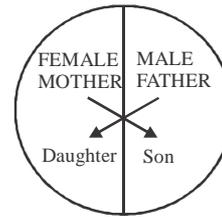
99. The rate of formation of new organic matter by rabbit in a grassland, is called
 (A) Gross primary productivity (B) Net productivity
 (C) Secondary productivity (D) Net primary productivity
100. Which one of the following organisms is scientifically correctly named, correctly printed according to the International Rules of Nomenclature and correctly described ?
 (A) *E.coli* – Full name *Entamoeba coli*, a commonly occurring bacterium in human intestine
 (B) *Musca domestica* – The common house lizard, a reptile
 (C) *Plasmodium falciparum* – A protozoan pathogen causing the most serious type of malaria
 (D) *Felis tigris* – The Indian tiger, well protected in Gir forests
101. Which one of the following palindromic sequence in DNA ?
 (A) 5'–GATACC–3' 3'–CCTAAG–5' (B) 5'–GAATTC–3' 3'–CTTAAG–5'
 (C) 5'–CCAATG–3' 3'–GAATCC–5' (D) 5'–CATTAG–3' 3'–GATAAC–5'
102. Vernalisation stimulates flowering in
 (A) Ginger (B) Zamikand (C) Turmeric (D) Carrot
103. Which one of the following sets of items in the options 1–4 are correctly categorised with one exception in it?

	ITEMS	CATEGORY	EXCEPTION
(a)	Typhoid, Pneumonia, Diphtheria	Bacterial diseases	Diphtheria
(b)	UAA, UAG, UGA	Stop codons	UAG
(c)	Kangaroo, Koala, Wombat	Australian marsupials	Wombat
(d)	<i>Plasmodium</i> , <i>Cuscuta</i> , <i>Trypanosoma</i>	Protozoan parasites	<i>Cuscuta</i>

104. Which one of the following pairs is wrongly matched ?
 (A) Mustard – Synergids (B) *Ginkgo* – Archegonia
 (C) *Salvinia* – Prothallus (D) Viroids – RNA
105. Arrange the following events of meiosis in correct sequence :-
 (1) Disappearance of nuclear membrane (2) Terminalisation of chiasmata
 (3) Synaptonemal complex formed (4) Uses of Recombinase enzyme
 (A) c → b → a → d (B) c → b → d → a (C) c → d → b → a (D) d → c → b → a
106. Where do certain symbiotic microorganisms normally occur in human body ?
 (A) Duodenum (B) Caecum
 (C) Oral lining and tongue surface (D) Vermiform appendix and rectum
107. The secretory phase in the human menstrual cycle is also called
 (A) follicular phase and lasts for about 13 days (B) luteal phase and lasts for about 6 days
 (C) follicular phase lasting for about 6 days (D) luteal phase and lasts for about 13 days
108. Biolistics (gene-gun) is suitable for
 (A) DNA finger printing (B) Disarming pathogen vectors
 (C) Transformation of plant cells (D) Constructing recombination DNA by joining with vectors
109. A fall in glomerular filtration rate (GFR) activates
 (A) Posterior pituitary to release vasopressin (B) Juxta glomerular cells to release renin
 (C) Adrenal cortex to release aldosterone (D) Adrenal medulla to release adrenaline

110. Represented below is the inheritance pattern of a certain type of traits in humans. Which one of the following conditions could be an example of this pattern ?

- (A) Thalassemia
 (B) Phenylketonuria
 (C) Sickle cell anaemia
 (D) Haemophilia



111. Which one of the following cellular parts is correctly described ?

- (A) Lysosomes – optimally active at a pH of about 8.5
 (B) Thylakoids – flattened membranous sacs forming
 (C) Centrioles – Sites for active RNA synthesis
 (D) Ribosomes – those on chloroplasts are larger (80s) while those in the cytoplasm are smaller (70s)

112. Which one of the following options gives the correct categorisation of six animals according to the type of nitrogenous wastes (A, B,C), they give out ?

- | A AMMONOTELIC | B UREOTELIC | C URICOTELIC |
|----------------------|---------------------------|----------------------------|
| (A) Aquatic Amphibia | Cockroach, humans | Frog, Pigeon, Lizards |
| (B) Pigeon, Humans | Aquatic Amphibia, Lizards | Cockroach, Frog |
| (C) Frog, Lizards | Aquatic Amphibia, Humans | Cockroach, Pigeon |
| (D) Aquatic Amphibia | Frog, Humans | Pigeon, Lizards, Cockroach |

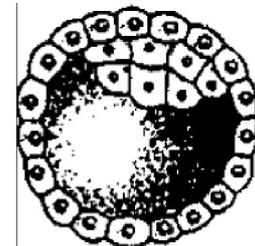
113. Which one of the following characteristics is common both in humans and adult frogs?

- (A) Ureotelic mode of excretion
 (B) Four - chambered heart
 (C) Internal fertilisation
 (D) Nucleated RBCs

114. Identify human developmental stage shown below as well as the related ritght palce of its occurrence in a normal pregnant woman, and select the right option for the two together.

Options :

- | Developmental stage | Site of occurrence |
|-----------------------|----------------------------------|
| (A) 8 - celled morula | Starting point of Fallopian tube |
| (B) Late morula | Middle part of fallopian tube |
| (C) Blastula | End part of Fallopian tube |
| (D) Blastocyst | Uterine wall |



115. What is the function of germ pore?

- (A) Release of male gametes
 (B) Emergence of radicle
 (C) Absorption of water for seed germination
 (D) Initiation of pollen tube

116. For its action, nitrogenase requires

- (A) Super oxygen redicals
 (B) High input of energy
 (C) Light
 (D) Mn^{2+}

117. In genetic engineering, the anitbiotics are used

- (A) To keep the cultures free of infection
 (B) As selectable markers
 (C) To select healthy vectors
 (D) As sequences from where replicaton starts

118. Through their effect on plant growth regulators, what do the temperature and light control in the plants?

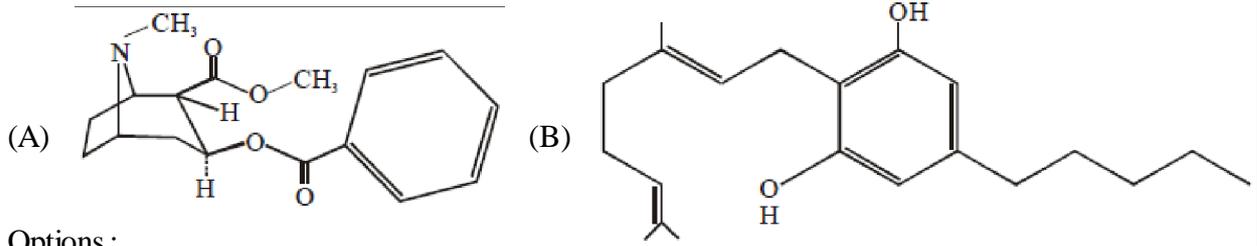
- (A) Fruit elongation
 (B) Apical dominance
 (C) Flowering
 (D) Closure of stomata

119. What is it that forms the basis of DNA fingerprinting?

- (A) Satellite DNA occuring as highly repeated short DNA segments
 (B) The relative proportions of purines and pyrimidines in DNA
 (C) The relative difference in the DNA occurrence in blood, skin and saliva
 (D) The relative amount of DNA in the ridges and grooves of the fingerprints

120. Select the correct statements about biodiversity
- (A) Conservation of biodiversity is just a fad pursued by the developed countries
 - (B) The desert areas of Rajasthan and Gujarat have a very high level of desert animal species as well as numerous rare animals
 - (C) Large scale planting of Bt cotton has no adverse effect on biodiversity
 - (D) Western Ghats have a very high degree of species richness and endemism
121. The domestic sewage in large cities
- (A) Have very high amounts of suspended solids and dissolved salts
 - (B) Has high BOD as it contains both aerobic and anaerobic bacteria
 - (C) Is processed by aerobic and then anaerobic bacteria in the secondary treatment in Sewage Treatment Plants (STPs)
 - (D) When treated in STPs does not really require the aeration step as the sewage contains adequate oxygen
122. Planst with ovaries having only one or a few ovules, are generally pollinated by
- (A) Wind
 - (B) Bees
 - (C) Butterflies
 - (D) Birds
123. Read the following four statements (A - D)
- (A) Colostrum is recommended for the new born because it is rich in antigens
 - (B) Chikengunya is caused by a Gram negative bacterium
 - (C) Tissue culture has proved useful in obtaining virus - free plants
 - (D) Beer is manufactured by distillation of fermented grape juice
- How many of the above statement are wrong?
- (A) One
 - (B) Two
 - (C) Three
 - (D) Four
124. The supportive skeletal structures in the human external ears and in the nose tip are examples of
- (A) Cartilage
 - (B) Ligament
 - (C) Areolar tissue
 - (D) Bone
125. As compared to a dicot root, a monocot root has
- (A) Relatively thicker periderm
 - (B) More abundant secondary xylem
 - (C) Many xylem bundles
 - (D) Inconspicuous annual rings
126. Which one of the following organisms is correctly matched with its three characteristics?
- (A) Maize : C_3 pathway, Closed vascular bundles, Scutellum
 - (B) Pea : C_3 pathway, Endospermic seed, Vexillary aestivation
 - (C) Tomato : Twisted aestivation, Axile placentation, Berry
 - (D) Onion : Bulb, Imbricate aestivation, Axile placentation
127. Which one of the following pairs of chemical substances, is correctly categorised?
- (A) Secretin and rhodopsin - Polypeptide hormones
 - (B) Calcitonin and thymosin - Thyroid hormones
 - (C) Pepsin and prolactin - Two digestive enzymes secreted in stomach
 - (D) Troponin and myosin - Complex proteins in striated muscles
128. Which one of the following pairs of animals are similar to each other pertaining to the feature stated against them ?
- (A) Sea horse and Flying fish - Cold blooded (Poikilothermal)
 - (B) *Pteropus* and *Ornithorhyncus* - Viviparity
 - (C) Garden lizard and Crocodile - Three chambered heart
 - (D) *Ascaris* and *Ancylostoma* - Metameric segmentation

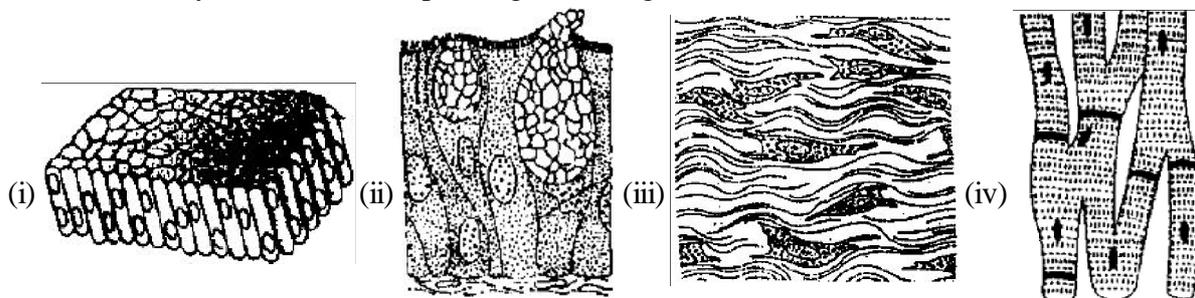
129. Identify the molecules (a) and (b) shown below and select the right option giving their source and use



Options :

	Molecule	Source	Use
(A)	(a) Morphine	<i>Papaver somniferum</i>	Sedative and pain killer
(B)	(b) Cocaine	<i>Erythroxylum coca</i>	Accelerates the transport of dopamine
(C)	(c) Heroin	<i>Cannabis sativa</i>	Depressant and slows down body functions
(D)	(d) Cannabinoid	<i>Atropa belladonna</i>	Produces hallucinations

130. The four sketches (i, ii, iii and iv) given below, represent four different types of animal tissues. Which one of these is correctly identified in the options given, along with its correct location and function ?



	Tissue	Location	Function
(A)	(i) Columnar epithelium	Nephron	Secretion and absorption
(B)	(ii) Glandular epithelium	Intestine	Secretion
(C)	(iii) Collagen fibres	Cartilage	Attach skeletal muscles to bones
(D)	(iv) Smooth muscle tissue	Heart	Heart contraction

131. The technique called gamete intrafallopian transfer (GIFT) is recommended for those females :

- (A) who cannot produce and ovum
 (B) who cannot retain the foetus inside uterus.
 (C) whose cervical canal is too narrow to allow passage for the sperms
 (D) who cannot provide suitable environment for fertilisation

132. Which one of the following is a possibility for most of us in regard to breathing, by making a *conscious effort*?

- (A) One can breathe out air totally without oxygen.
 (B) One can breathe out air through eustachian tubes by closing both the nose and the mouth.
 (C) One can consciously breathe in and breathe out by moving the diaphragm alone, without moving the ribs at all.
 (D) The lungs can be made fully empty by forcefully breathing out all air from them

133. Which one of the following pairs is *wrongly* matched while the remaining three are correct?

- (A) Penicillium – Conidia
 (B) Water hyacinth – Runner
 (C) Bryophyllum – Leaf buds
 (D) Agave – Bulbils

134. The cells lining the blood vessels belong to the category of :

- (A) Smooth muscle tissue
 (B) Squamous epithelium
 (C) Columnar epithelium
 (D) Connective tissue

135. Which one of the following statements is totally wrong about the occurrence of notochord, while the other three are correct?
- (A) It is present only in larval tail in Ascidians
 (B) It is replaced by a vertebral column in adult frog
 (C) It is absent throughout life in humans from the very beginning
 (D) It is present throughout life in Amphioxus
136. The pathogen *Microsporium* responsible for ringworm disease in humans belongs to the same kingdom of organisms as that of:
- (A) *Taenia*, a tapeworm
 (B) *Wuchereria*, a filarial worm
 (C) *Rhizopus*, a mould
 (D) *Ascaris*, a round worm
137. The figure below shows the structure of a mitochondrion with its four parts labelled (A), (B), (C) and (D). Select the part correctly matched with its function.
- (A) Part (D) : Outer membrane – gives rise to inner membrane by splitting
 (B) Part (B) : Inner membrane – forms infoldings called cristae
 (C) Part (C) : Cristae – possess single circular DNA molecule and ribosomes
 (D) Part (A) : Matrix – major site for respiratory chain enzymes
-
138. Read the following statement having two blanks (A and B): “A drug used for -----(A)----- patients is obtained from a species of the organism -----(B)-----.” The one correct option for the two blanks is
- | | |
|------------------------|-------------|
| Blank - A | Blank - B |
| (A) Heart | Penicillium |
| (B) Organ - transplant | Trichoderma |
| (C) Swine flu | Monascus |
| (D) AIDS | Pseudomonas |
139. One of the constituents of the pancreatic juice while poured into the duodenum in humans, is :
- (A) Trypsinogen (B) Chymotrypsin (C) Trypsin (D) Enterokinase
140. At metaphase, chromosomes are attached to the spindle fibres by their :-
- (A) Satellites (B) Secondary constrictions
 (C) Kinetochores (D) Centromere
141. Which one of the following option gives the correct matching of a disease with its causative organism and mode of infection.
- | | | |
|-------------------|--------------------------------|---------------------------------|
| Disease | Causative Organisms | Mode of Infection |
| (A) Typhoid | <i>Salmonella typhi</i> | With inspirad air |
| (B) Pneumonia | <i>Sreptococcus pneumoniae</i> | Droplet Infection |
| (C) Elephantiasis | <i>Wuchereria bancrofti</i> | Infected water and food |
| (D) Malaria | <i>Plasmodium vivax</i> | Bite of male anopheles mosquito |
142. Some vascular bundles are described as open because these
- (A) are surrounded by pericycle but to endodermis
 (B) are capable of producing secondary xylem & phloem
 (C) possess conjunctive tissue between xylem and phloem
 (D) are not surrounded by pericycle
143. In mitochondria, protons accumulate in the
- (A) Outer membrane (B) Inner membrane (C) Intermembrane space (D) Matrix
144. The breakdown of detritus into smaller particles by earthworm is a process called
- (A) Humification (B) Fragmentation (C) Mineralisation (D) Catabolism

145. Whorled, simple leaves with reticulate venation are present in
 (A) Calotropis (B) Neem (C) China Rose (D) Alstonia
146. Sweet potato is homologous to
 (A) Potato (B) Colocasia (C) Ginger (D) Turnip
147. The unequivocal proof of DNA as the genetic material came from the studies on a
 (A) Bacterium (B) Fungus (C) Viroid (D) Bacterial virus
148. Match Column I with Column II and choose the correct option :-

Column-I Column-II

- A. PCR (i) AIDS
 B. Widal Test (ii) Cancer
 C. ELISA (iii) Dengue
 D. Platelets count (iv) Typhoid

- (A) A = (ii), B = (iv), C = (i), D = (iii) (B) A = (i), B = (iv), C = (ii), D = (iii)
 (C) A = (ii), B = (iv), C = (iii), D = (i) (D) A = (iii), B = (i), C = (iv), D = (ii)

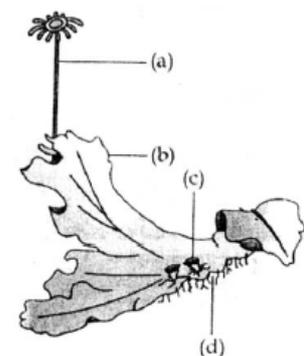
149. In Kranz anatomy, the bundle sheath cells have
 (A) Thin walls, many intercellular spaces and no chloroplasts
 (B) Thick walls, no intercellular spaces and large number of chloroplasts
 (C) Thin walls, no intercellular spaces and several chloroplasts
 (D) Thick walls, many intercellular spaces and few chloroplasts
150. Given below is the ECG of a normal human. Which one of its components is human, which one of its components is correctly interpreted below
 (A) Complex QRS - One complete Pulse
 (B) Peak T - Initiation of total cardiac contraction
 (C) Peak P and Peak R together - systolic and diastolic blood pressures
 (D) Peak P - Initiation of left atrial contraction only
151. Which one of the following is not an essential mineral element for plants while the remaining three are
 (A) Iron (B) Manganese (C) Cadmium (D) Phosphorus
152. Bulk of carbon dioxide (CO₂) released from body tissues into the blood is present as
 (A) bicarbonate in blood plasma and RBCs
 (B) Free CO₂ in blood plasma
 (C) 70% carbamino- haemoglobin and 30% as bicarbonate
 (D) Carbamino- haemoglobin in RBCs



153. Consider the following statements (a) - (d) each with one or two blanks.
 (a) Bears go into (1) during winter to (2) cold weather
 (b) A conical age pyramid with a broad base represents (3) human population
 (c) A wasp pollinating a fig flower is an example of (4)
 (d) An area with high levels of species richness is known as (5)
 Which one of the following options give the correct fill ups the respective blank numbers from (1) to (5) in the statements
 (A) (2) - stable (4) commensalism, (5) marsh
 (B) (1) - aestivation, (5) - escape, (3) - stable, (4) - mutualism
 (C) (3) - expanding, (4) - commensalism, (5) - biodiversity park
 (D) (1) - hibernation, (2) - escape, (3) - expanding, (5) - hot spot

154. What is common between vegetative reproduction and Apomixis
 (A) Both are applicable to only dicot plants (B) Both bypass the flowering phase
 (C) Both occur round the year (D) Both produces progeny identical to the parent
155. Biodiversity of a geographical region represents
 (A) Endangered species found in the region.
 (B) The diversity in the organisms living in the region.
 (C) Genetic diversity present in the dominant species of the region.
 (D) Species endemic to the region.
156. Which one of the following is not considered as a part of the endomembrane system?
 (A) Golgi complex (B) Peroxisome (C) Vacuole (D) Lysosome
157. Which one of the following correctly represents the normal adult human dental formula?
 (A) $\frac{3}{3}, \frac{1}{1}, \frac{3}{2}, \frac{1}{1}$ (B) $\frac{2}{2}, \frac{1}{1}, \frac{3}{2}, \frac{3}{3}$ (C) $\frac{2}{2}, \frac{1}{1}, \frac{2}{2}, \frac{3}{3}$ (D) $\frac{3}{3}, \frac{1}{1}, \frac{3}{3}, \frac{3}{3}$
158. Select the correct statement with respect to diseases and immunisation :
 (A) If due to some reason B-and T-lymphocytes are damaged, the body will not produce antibodies against a pathogen
 (B) Injection of dead/inactivated pathogens causes passive immunity
 (C) Certain protozoans have been used to mass produce hepatitis B vaccine.
 (D) Injection of snake antivenom against snake bite is an example of active immunisation
159. Which one of the following conditions of the zygotic cell would lead to the birth of a normal human female child?
 (A) two X chromosomes (B) only one Y chromosome
 (C) only one X chromosome (D) one X and one Y chromosome
160. Which one of the following is essential for photolysis of water?
 (A) Manganese (B) zinc (C) copper (D) Boron
161. The type of muscles present in our
 (A) heart are involuntary and unstriated smooth muscles
 (B) intestine are striated and involuntary
 (C) thigh are striated and voluntary
 (D) upper arm are smooth muscle fibres fusiform in shape
162. The 24 hour (diurnal) rhythm of our body such as the sleep-wake cycle is regulated by the hormone :
 (A) calcitonin (B) prolactin (C) adrenaline (D) melatonin
163. Guttation is the result of :
 (A) Diffusion (B) Transpiration (C) Osmosis (D) Root pressure

164. Examine the figure given below and select the right option giving all the four parts (a, b, c and d) correctly identified.



- | (a) | (b) | (c) | (d) |
|---------------------|-----------------|------------------|----------|
| (A) Archegoniophore | Female' thallus | GemmacupRhizoids | |
| (B) Archegoniophore | Female' thallus | Bud | Foot |
| (C) Seta | Sporophyte | Protonema | Rhizoids |
| (D) Antheridiophore | Male thallus | Globule | Roots |

165. Three of the following pairs of the human skeletal parts are correctly matched with their respective inclusive skeletal category and one pair is not matched. Identify the non-matching pair.

Pairs of skeletal parts	Category
(A) Sternum and Ribs	Axial skeleton
(B) Clavicle and Glenoid cavity	Pelvic girdle
(C) Humerus and ulna	Appendicular skeleton
(D) Malleus and stapes	Ear ossicles

166. Which one of the following aspects is an exclusive characteristic of living things?

- (A) Isolated metabolic reactions occur in vitro
 (B) Increases in mass from inside only
 (C) Perception of events happening in the environment and their memory
 (D) Increases in mass by accumulation of material both on surface as well as internally

167. "Good ozone" is found in the :

- (A) Mesosphere (B) Troposphere (C) Stratosphere (D) Ionosphere

168. The logistic population growth is expressed by the equation :

- (A) $dt / dN = Nr \left(\frac{K - N}{K} \right)$ (B) $dN / dt = rN \left(\frac{K - N}{K} \right)$
 (C) $dN / dt = rN$ (D) $dN / dt = rN \left(\frac{N - K}{N} \right)$

169. In the five-kingdom classification, *Chlamydomonas* and *Chlorella* have been included in

- (A) Monera (B) Protista (C) Algae (D) Plantae

170. After industrialisation i.e. in 1920, the proportion of moths were

- (A) more white-winged moths than dark winged
 (B) more dark winged moths than white winged
 (C) white winged moths equal in no. to dark winged moths
 (D) only white-winged moths were there

171. Which one of the following human organs is often called the "graveyard" of RBCs ?

- (A) Liver (B) Gall bladder (C) Kidney (D) Spleen

172. Which one of the following generally acts as an antagonist to gibberellins ?

- (A) IAA (B) Zeatin (C) Ethylene (D) ABA

173. A test cross is carried out to

- (A) determine whether two species or varieties will breed successfully
 (B) determine the genotype of a plant at F_2
 (C) predict whether two traits are linked
 (D) assess the number of alleles of a gene

174. Tobacco plants resistant to a nematode have been developed by the introduction of DNA that produced (in the host cells).

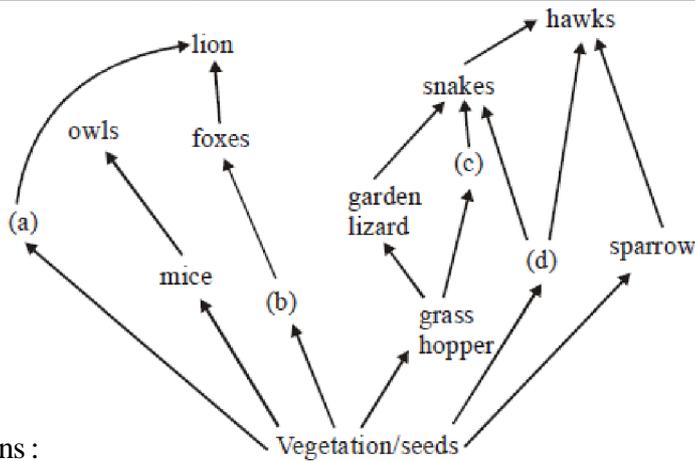
- (A) A toxic protein (B) Both sense and anti-sense RNA
 (C) A particular hormone (D) An antifeedant

175. 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

- (A) Three (B) Four (C) Five (D) Six

176. Identify the likely organisms (a), (b), (c) and (d) in the food web shown below



Options :

	(a)	(b)	(c)	(d)
1	squirrel	cat	rat	pigeon
2	deer	rabbit	frog	rat
3	dog	squirrel	bat	deer
4	rat	dog	tortoise	crow

177. For its activity, carboxypeptidase requires

- (A) Copper (B) Zinc (C) Iron (D) Niacin

178. Which one of the following structures is an organelle within an organelle ?

- (A) Mesosome (B) Ribosome (C) Peroxisome (D) ER

179. In gobar gas, the maximum amount is that of

- (A) Carbon dioxide (B) Butane (C) Methane (D) Propane

180. The first clinical gene therapy was given for treating

- (A) Adenosine deaminase deficiency (B) Diabetes mellitus
(C) Chicken pox (D) Rheumatoid arthritis

