

NEET

National Eligibility Entrance Test

Test Series

Full Test - 4

Time : - 3 Hours

Max. Marks:- 720

INSTRUCTIONS

1. Immediately fill in the particulars on this page of the Test Booklet with Blue/Black Ball Point Pen. Use of pencil is strictly prohibited.
2. Answers are to be given on Response Sheet provided at the end of this paper. You can tear this Response Sheet along the cut marks provided. Fill in the particulars carefully in the Response Sheet provided.
3. The test is of 3 hours duration.
4. The Test Booklet consists of **180** questions. The maximum marks are **720**.
5. There are four section in the question paper.

The distribution of marks subjectwise in each part is as under for each correct response.

Section 1 – Physics (180 Marks) – 45 Questions

Section 2 – Chemistry (180 Marks) – 45 Questions

Section 3 – Botany (180 Marks) – 45 Questions

Section 4 – Zoology (180 Marks) – 45 Questions

6. You will be awarded 4 Marks if you have darkened only the bubble corresponding to the correct answer and zero mark if no bubble is darkened. In all other cases, minus one (– 1) mark will be awarded.
7. Use Blue/Black Ball Point Pen only for writing particulars/marking responses on Side-1 and Side-2 of the Response Sheet.
Use of pencil is strictly prohibited.
8. You are advised to create an actual examination hall simulation.
9. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
10. Do not fold or make any stray marks on the Response Sheet.
11. Once you have evaluated the test, you should assess it thoroughly.

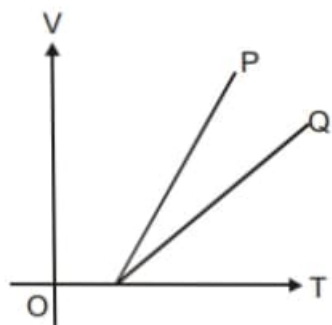
SECTION 1 - PHYSICS

1. The resistance R of a wire is given by the relation

$$R = \frac{\rho \ell}{\pi r^2}. \text{ Percentage error in the measurement}$$

of r , ℓ and r is 1%, 2% and 3% respectively. Then the percentage error in the measurement of R is

- (a) 6 (b) 9
(c) 8 (d) 10
2. Figure shows the v - t graph for two particles P and Q . Which of the following statements regarding their relative motion is true?
Their relative velocity

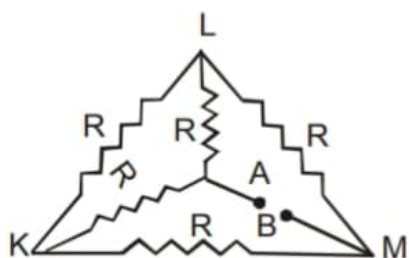


- (a) is zero
(b) is non-zero but constant
(c) continuously decreases
(d) continuously increases
3. Time required to boil 2 litres of water initially at 20°C by a heater coil which works at 80% efficiency spending 500 joule/s is
- (a) 82 minutes (b) 50 minutes
(c) 28 minutes (d) 37 minutes
4. A mass is tied to a string and rotated in a vertical circle, the minimum velocity of the body at the top is

- (a) \sqrt{gr} (b) g/r
(c) $\left(\frac{g}{r}\right)^{3/2}$ (d) gr

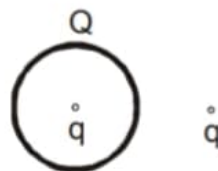
5. A man projects a coin upwards from the gate of a uniformly moving train. The path of coin for the man will be
- (a) parabolic
(b) inclined straight line
(c) vertical straight line
(d) horizontal straight line
6. What is the disintegration constant of radon, if the number of its atoms diminishes by 18% in 24 h?
- (a) $2.1 \times 10^{-3} \text{ s}^{-1}$ (b) $2.1 \times 10^{-4} \text{ s}^{-1}$
(c) $2.1 \times 10^{-5} \text{ s}^{-1}$ (d) $2.1 \times 10^{-6} \text{ s}^{-1}$
7. The frequencies of X-rays, γ -rays and ultraviolet rays are respectively a , b , and c . Then
- (a) $a < b, b < c$ (b) $a < b, b > c$
(c) $a > b, b > c$ (d) $a > b, b < c$
8. A galvanometer can be changed into an ammeter by using
- (a) low resistance shunt in series
(b) low resistance shunt in parallel
(c) high resistance shunt in series
(d) high resistance shunt in parallel
9. Which of the following statements is **FALSE** for a particle moving in a circle with a constant angular speed?
- (a) The acceleration vector points to the centre of the circle
(b) The acceleration vector is tangent to the circle
(c) The velocity vector is tangent to the circle
(d) The velocity and acceleration vectors are perpendicular to each other.
10. A monoatomic gas at 27°C is compressed adiabatically to $\frac{8}{27}$ of its original volume. The rise in temperature will be
- (a) 300°C (b) 350°C
(c) 375°C (d) 400°C

11. Each of the resistance in the network shown is equal to R . The resistance between the terminals A and B is



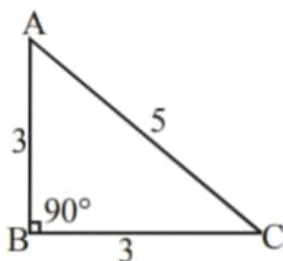
- (a) R (b) $5R$
(c) $3R$ (d) $6R$
12. The energy of hydrogen atom in the n^{th} orbit is E_n , then the energy in the n^{th} orbit of single ionised helium atom is
- (a) $\frac{E_n}{2}$ (b) $2E_n$
(c) $4E_n$ (d) $\frac{E_n}{4}$
13. Two identical particles move towards each other with velocity $2v$ and v respectively. The velocity of centre of mass is
- (a) v (b) $v/3$
(c) $v/2$ (d) zero.
14. The mass number of He is 4 and that for sulphur is 32. The radius of sulphur nuclei is larger than that of helium by
- (a) $\sqrt{8}$ (b) 4
(c) 2 (d) 8
15. According to Newton's law of cooling, the rate of cooling of a body is proportional to $(\Delta\theta)^n$, where $\Delta\theta$ is the difference of the temperature of the body and the surroundings, then n is equal to
- (a) two (b) three
(c) four (d) one

16. A body having initial velocity of 10 m/s moving on a rough surface comes to rest after moving 50 m . What is coefficient of friction between the body and surface? ($g = 10 \text{ m/s}^2$)
- (a) 0.5 (b) 0.2
(c) 0.3 (d) 0.1
17. The separation between successive fringes in a double slit arrangement is x . If the whole arrangement is dipped under water what will be the new fringe separation? [The wavelength of light being used is 5000 \AA]
- (a) $1.5x$ (b) x
(c) $0.75x$ (d) $2x$
18. A thin, metallic spherical shell contains a charge Q on it. A point charge q is placed at the centre of the shell and another charge q_1 is placed outside it as shown in figure. All the three charges are positive. The force on the charge at the centre is



- (a) towards left (b) towards right
(c) upward (d) zero
19. A charge q is moving with a velocity v parallel to a magnetic field B . Force on the charge due to magnetic field is
- (a) $q v B$ (b) $q B/v$
(c) zero (d) $B v/q$
20. A bucket full of hot water is kept in a room and it cools from 75°C to 70°C in T_1 minutes, from 70°C to 65°C in T_2 minutes and from 65°C to 60°C in T_3 minutes. Then
- (a) $T_1 = T_2 = T_3$ (b) $T_1 < T_2 < T_3$
(c) $T_1 > T_2 > T_3$ (d) $T_1 < T_2 > T_3$
21. In uniform circular motion, the velocity vector and acceleration vector are
- (a) perpendicular to each other
(b) in same direction
(c) in opposite direction
(d) not related to each other

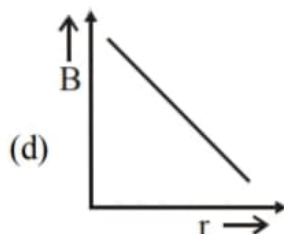
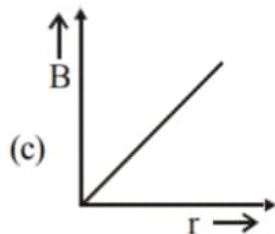
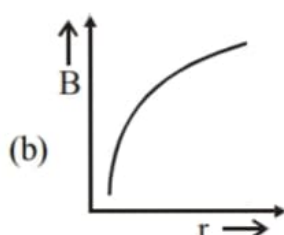
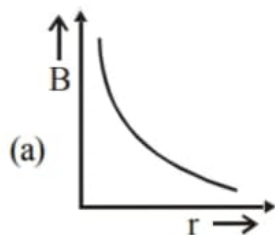
22. The current in a coil of $L = 40$ mH is to be increased uniformly from 1 A to 11 A in 4 milli sec. The induced e.m.f. will be
 (a) 100 V (b) 0.4 V
 (c) 440 V (d) 40 V
23. Two capacitors when connected in series have a capacitance of $3 \mu\text{F}$, and when connected in parallel have a capacitance of $16 \mu\text{F}$. Their individual capacities are
 (a) $1 \mu\text{F}, 2 \mu\text{F}$ (b) $6 \mu\text{F}, 2 \mu\text{F}$
 (c) $12 \mu\text{F}, 4 \mu\text{F}$ (d) $3 \mu\text{F}, 16 \mu\text{F}$
24. The weight of a body will be the least at
 (a) poles
 (b) equator
 (c) at height equal to R
 (d) centre of the earth
25. When a tuning fork produces sound waves in air, which one of the following is same in the material of tuning fork as well as in air?
 (a) Wavelength (b) Frequency
 (c) Velocity (d) Amplitude
26. The fermi energy for a substance is
 (a) independent of T
 (b) directly proportional to \sqrt{T}
 (c) directly proportional to T
 (d) directly proportional to T^2
27. ABC is a triangular plate of uniform thickness. The sides are in the ratio shown in the figure. I_{AB} , I_{BC} and I_{CA} are the moments of inertia of the plate about AB, BC and CA as axes respectively. Which one of the following relations is correct?



- (a) $I_{AB} > I_{BC}$ (b) $I_{BC} > I_{AB}$
 (c) $I_{AB} + I_{BC} = I_{CA}$ (d) I_{CA} is maximum
28. Consider the following statement:
 When jumping from some height, you should

bend your knees as you come to rest, instead of keeping your legs stiff. Which of the following relations can be useful in explaining the statement? Where symbols have their usual meanings.

- (a) $\Delta \vec{p}_1 = -\Delta \vec{p}_2$ (b) $\Delta E = \Delta(PE + KE) = 0$
 (c) $\vec{F}\Delta t = m\Delta \vec{v}$ (d) $\Delta x \propto \Delta F$
29. The amplitude of magnetic field of an electromagnetic wave is $2 \times 10^{-7} \text{ T}$. It's electric field amplitude if the wave is travelling in free space is
 (a) 6 Vm^{-1} (b) 60 Vm^{-1}
 (c) $10/6 \text{ Vm}^{-1}$ (d) None of these
30. The magnetic flux density B at a distance r from a long straight wire carrying a steady current varies with distance r as



31. A metal piece is heated upto T° abs. The temperature of the surrounding is t° abs. The heat in the surrounding due to radiation is proportional to
 (a) $(T - t)^4$ (b) $T^4 - t^4$
 (c) $(T - t)^{1/4}$ (d) $T^2 - t^2$
32. Given, ${}^a\mu_g = \frac{3}{2}$, ${}^a\mu_w = \frac{4}{3}$, if a convex lens of focal length 10 cm is placed in water, then its focal length in water is
 (a) equal to 40 cm (b) equal to 20 cm
 (c) equal to 10 cm (d) None of these

33. If an alternating current is flowing in a spring, then the spring will be changing

- (a) in a straight line (b) periodically
(c) elliptically (d) first (c) then (a)

34. The unit vector along $2\mathbf{i} - 3\mathbf{j} + \mathbf{k}$ is

- (a) $\frac{2\mathbf{i} - 3\mathbf{j} + \mathbf{k}}{\sqrt{14}}$ (b) $\frac{2\mathbf{i} - 3\mathbf{j} + \mathbf{k}}{5}$
(c) $\frac{2\mathbf{i} - 3\mathbf{j} + \mathbf{k}}{\sqrt{15}}$ (d) None of these

35. An iron rod of length 2m and cross-sectional area of 50 mm^2 is stretched by 0.5 mm, when a mass of 250 kg is hung from its lower end. Young's modulus of iron rod is

- (a) $19.6 \times 10^{20} \text{ N/m}^2$ (b) $19.6 \times 10^{18} \text{ N/m}^2$
(c) $19.6 \times 10^{10} \text{ N/m}^2$ (d) $19.6 \times 10^{15} \text{ N/m}^2$

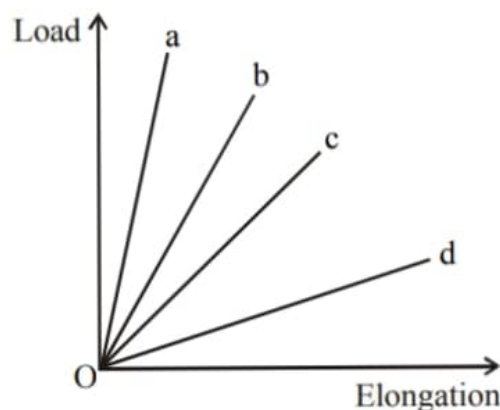
36. A particle of mass 1 kg is moving in S.H.M. with an amplitude 0.02 and a frequency of 60 Hz. The maximum force acting on the particle is

- (a) $144 \pi^2$ (b) $188 \pi^2$
(c) $288 \pi^2$ (d) None of these

37. According to Maxwell's hypothesis, a changing electric field gives rise to

- (a) an e.m.f (b) magnetic field
(c) electric current (d) pressure gradient.

38. The load versus elongation graph for four wires has been shown in the figure. The thinnest wire is



- (a) a (b) b
(c) c (d) d

39. A ray of light is incident on the surface of separation of a medium with the velocity of light at an angle 45° and is refracted in the medium at an angle 30° . Velocity of light in the medium will be (velocity of light in air = $3 \times 10^8 \text{ m/s}$)

- (a) $3.8 \times 10^8 \text{ m/s}$ (b) $3.38 \times 10^8 \text{ m/s}$
(c) $2.12 \times 10^8 \text{ m/s}$ (d) $1.56 \times 10^8 \text{ m/s}$

40. The rain drops are in spherical shape due to

- (a) residual pressure (b) thrust on drop
(c) surface tension (d) viscosity

41. A dip circle is so set that its needle moves freely in the magnetic meridian. In this position, the angle of dip is 40° . Now the dip circle is rotated so that the plane in which the needle moves makes an angle of 30° with the magnetic meridian. In this position, the needle will dip by an angle

- (a) 40° (b) 30°
(c) more than 40° (d) less than 40°

42. If the critical angle for total internal reflection from a medium to vacuum is 30° . Then velocity of light in the medium is

- (a) $1.5 \times 10^8 \text{ m/s}$ (b) $2 \times 10^8 \text{ m/s}$
(c) $3 \times 10^8 \text{ m/s}$ (d) $0.75 \times 10^8 \text{ m/s}$

43. An oscillator is nothing but an amplifier with

- (a) positive feedback
(b) large gain
(c) no feedback
(d) negative feedback

44. For an AM-system the total power of modulated signal is 600 W and that of carrier is 400 W, the modulation index is

- (a) 0.25 (b) 0.36
(c) 0.54 (d) 1

45. The drift current in a p-n junction is
- (a) from the n-side to the p-side
 - (b) from the p-side to the n-side
 - (c) from the n-side to the p-side if the junction is forward-biased and in the opposite direction if it is reverse biased
 - (d) from the p-side to the n-side if the junction is forward-biased and in the opposite direction if it is reverse-biased

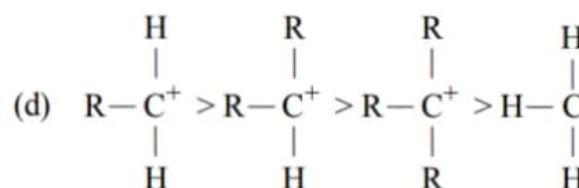
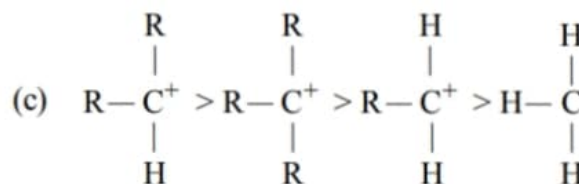
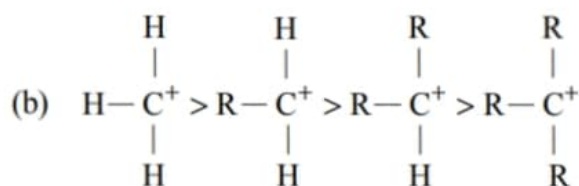
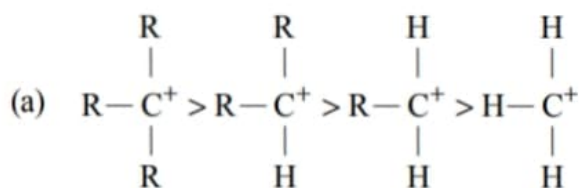
SECTION 2 - CHEMISTRY

46. An acidic solution of 'X' does not give precipitate on passing H_2S through it. 'X' gives white precipitate when NH_4OH is added to it. The white precipitate dissolves in excess of NaOH solution. Pure 'X' fumes in air and dense white fumes are obtained when a glass rod dipped in NH_4OH is put in the fumes. Compound 'X' can be
- (a) ZnCl_2
 - (b) FeCl_3
 - (c) AlCl_3
 - (d) SnCl_2
47. CN^- is a strong field ligand. This is due to the fact that
- (a) it carries negative charge
 - (b) it is a pseudohalide
 - (c) it can accept electrons from metal species
 - (d) it forms high spin complexes with metal species
48. The weight of NaCl decomposed by 4.9 g of H_2SO_4 , if 6 g of sodium hydrogen sulphate and 1.825 g of HCl , were produced in the reaction is:
- (a) 6.921 g
 - (b) 4.65 g
 - (c) 2.925 g
 - (d) 1.4 g
49. Which one of the following statement is **not** true?
- (a) pH of drinking water should be between 5.5–9.5.
 - (b) Concentration of DO below 6 ppm is good for the growth of fish.
 - (c) Clean water would have a BOD value of less than 5 ppm.
 - (d) Oxides of sulphur, nitrogen and carbon are the most widespread air pollutant.
50. Which of the following statements is not correct for nitrogen?
- (a) Its electronegativity is very high
 - (b) d-orbitals are available for bonding
 - (c) It is a typical non-metal
 - (d) Its molecular size is small
51. Heat of dissociation of CH_3COOH is 0.005 kcal g^{-1} , hence enthalpy change when 1 mol of $\text{Ca}(\text{OH})_2$ is completely neutralised by CH_3COOH is
- (a) –27.4 kcal
 - (b) –13.6 kcal
 - (c) –26.8 kcal
 - (d) –27.1 kcal
52. 0.4 moles of HCl and 0.2 moles of CaCl_2 were dissolved in water to have 500 mL of solution, the molarity of Cl^- ion is:
- (a) 0.8 M
 - (b) 1.6 M
 - (c) 1.2 M
 - (d) 10.0 M
53. In sodium fusion test of organic compounds, the nitrogen of the organic compound is converted into
- (a) Sodamide
 - (b) Sodium cyanide
 - (c) Sodium nitrite
 - (d) Sodium nitrate
54. Specific volume of cylindrical virus particle is 6.02×10^{-2} cc/gm. whose radius and length 7 Å & 10 Å respectively. If $N_A = 6.02 \times 10^{23}$, find molecular weight of virus
- (a) 3.08×10^3 kg/mol
 - (b) 3.08×10^4 kg/mol
 - (c) 1.54×10^4 kg/mol
 - (d) 15.4 kg/mol
55. Inductive effect involves
- (a) displacement of σ -electrons
 - (b) delocalisation of π -electrons
 - (c) delocalisation of σ -electrons
 - (d) displacement of π -electrons

56. The energy of a photon is 3×10^{-12} erg. What is its wavelength in nm ?

($h = 6.62 \times 10^{-27}$ erg-sec; $c = 3 \times 10^{10}$ cm/s)

- (a) 662 (b) 1324
(c) 66.2 (d) 6.62
57. The decreasing order of stability of alkyl carbonium ion is in the order of:



58. Aluminium vessels should not be washed with materials containing washing soda since

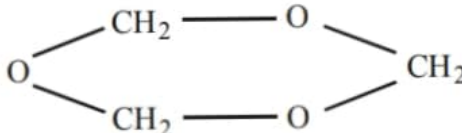
- (a) washing soda is expensive
(b) washing soda is easily decomposed
(c) washing soda reacts with Al to form soluble aluminate
(d) washing soda reacts with Al to form insoluble aluminium oxide
59. The following data are for the decomposition of ammonium nitrite in aqueous solution :

Vol. of N_2 in cc	Time (min)
6.25	10
9.00	15
11.40	20
13.65	25
35.65	Infinity

The order of reaction is :

- (a) Zero (b) One
(c) Two (d) Three
60. Which of the following reagents convert propene to 1-propanol?
(a) $\text{H}_2\text{O}, \text{H}_2\text{SO}_4$
(b) aqueous KOH
(c) $\text{MgSO}_4, \text{NaBH}_4/\text{H}_2\text{O}$
(d) $\text{B}_2\text{H}_6, \text{H}_2\text{O}_2, \text{OH}^-$
61. A closed container contains equal number of oxygen and hydrogen molecules at a total pressure of 740 mm. If oxygen is removed from the system then pressure will
(a) Become double of 740 mm
(b) Become half of 740 mm
(c) Become 1/9 of 740 mm
(d) Remains unchanged
62. Compound X of molecular formula C_4H_6 takes up one equivalent of hydrogen in presence of Pt to form another compound Y which on ozonolysis gives only ethanoic acid. The compound X can be
(a) $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$
(b) $\text{CH}_2 = \text{C} = \text{CHCH}_3$
(c) $\text{CH}_3\text{C} \equiv \text{CCH}_3$
(d) All the three
63. 1 M solution of CH_3COOH should be diluted to times so that pH is doubled.
(a) four times (b) 5.55×10^4 times
(c) 5.55×10^6 times (d) 10^{-2} times
64. The following reactions take place in the blast furnace in the preparation of impure iron. Identify the reaction pertaining to the formation of the slag.
(a) $\text{Fe}_2\text{O}_3(\text{s}) + 3 \text{CO}(\text{g}) \rightarrow 2 \text{Fe}(\text{l}) + 3 \text{CO}_2(\text{g})$
(b) $\text{CaCO}_3(\text{s}) \rightarrow \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
(c) $\text{CaO}(\text{s}) + \text{SiO}_2(\text{s}) \rightarrow \text{CaSiO}_3(\text{s})$
(d) $2\text{C}(\text{s}) + \text{O}_2(\text{g}) \rightarrow 2 \text{CO}(\text{g})$

65. Which one of the following is NOT a buffer solution?
- 0.8 M H_2S + 0.8 M KHS
 - $2\text{MC}_6\text{H}_5\text{NH}_2 + 2\text{MC}_6\text{H}_5\text{N}^+\text{H}_3\text{Br}^-$
 - $3\text{MH}_2\text{CO}_3 + 3\text{MKHCO}_3$
 - 0.05 M KClO_4 + 0.05 M HClO_4
66. Which of the following statements is false?
- Radon is obtained from the decay of radium
 - Helium is inert gas
 - Xenon is the most reactive among the rare gases
 - The most abundant rare gas found in the atmosphere is helium
67. Which one of the following is expected to exhibit optical isomerism?
- (en = ethylenediamine)
- cis- $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
 - trans- $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
 - cis- $[\text{Co}(\text{en})_2\text{Cl}_2]$
 - trans- $[\text{Co}(\text{en})_2\text{Cl}_2]$
68. For the reaction,
- $$2\text{N}_2\text{O}_5 \longrightarrow 4\text{NO}_2 + \text{O}_2$$
- the rate of reaction is :
- $\frac{1}{2} \frac{d}{dt} [\text{N}_2\text{O}_5]$
 - $2 \frac{d}{dt} [\text{N}_2\text{O}_5]$
 - $\frac{1}{4} \frac{d}{dt} [\text{NO}_2]$
 - $4 \frac{d}{dt} [\text{NO}_2]$
69. Four successive members of the first row transition elements are listed below with their atomic numbers. Which one of them is expected to have the highest third ionization enthalpy?
- Vanadium ($Z = 23$)
 - Chromium ($Z = 24$)
 - Manganese ($Z = 25$)
 - Iron ($Z = 26$)
70. $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$ (at no. of Cr = 24) has a magnetic moment of 3.83 B. M. The correct distribution of 3d electrons in the Chromium of the complex is
- $3d_{xy}^1, (3d_{x^2-y^2})^1, 3d_{yz}^1$
 - $3d_{xy}^1, 3d_{yz}^1, 3d_{xz}^1$
 - $3d_{xy}^1, 3d_{yz}^1, 3d_{dz^2}^1$
 - $(3d_{x^2-y^2})^1, 3d_{z^2}^1, 3d_{xz}^1$
71. In the balanced chemical reaction
- $$\text{IO}_3^- + \text{aI}^- + \text{bH}^+ \longrightarrow \text{cH}_2\text{O} + \text{dI}_2$$
- a, b, c and d respectively corresponds to
- 5, 6, 3, 3
 - 5, 3, 6, 3
 - 3, 5, 3, 6
 - 5, 6, 5, 5
72. Which of the following statements is true?
- Silicon exhibits 4 coordination number in its compound
 - Bond energy of F_2 is less than Cl_2
 - Mn(III) oxidation state is more stable than Mn(II) in aqueous state
 - Elements of 15th group shows only +3 and +5 oxidation states
73. Which of the following compounds has the highest boiling point?
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$
 - $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$
 - $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{Cl}$
 - $(\text{CH}_3)_3\text{CCl}$
74. Which one of the following statements is not correct?
- Nickel forms $\text{Ni}(\text{CO})_4$
 - All the transition metals form monometallic carbonyls
 - Carbonyls are formed by transition metals
 - Transition metals form complexes
75. Hydrogen has an ionisation energy of 1311 kJ mol^{-1} and for chlorine it is 1256 kJ mol^{-1} . Hydrogen forms H^+ (aq) ions but chlorine does not form Cl^+ (aq) ions because
- H^+ has lower hydration enthalpy
 - Cl^+ has lower hydration enthalpy
 - Cl has high electron affinity
 - Cl has high electronegativity

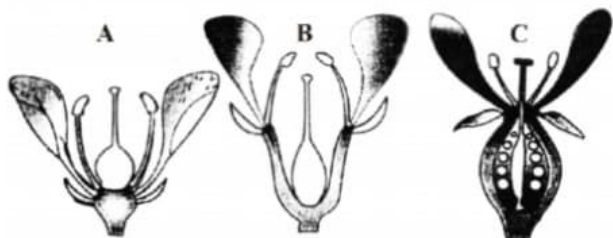
76. The number of enantiomers of the compound $\text{CH}_3\text{CHBrCHBrCOOH}$ is :
 (a) 2 (b) 3
 (c) 4 (d) 6
77. Equivalent weights of KMnO_4 acidic medium, neutral medium and concentrated alkaline medium respectively are $\frac{M}{5}$, $\frac{M}{1}$, $\frac{M}{3}$. Reduced products can be
 (a) MnO_2 , MnO_4^{2-} , Mn^{2+}
 (b) MnO_2 , Mn^{2+} , MnO_4^{2-}
 (c) Mn^{2+} , MnO_4^{2-} , MnO_2
 (d) Mn^{2+} , MnO_2 , MnO_4^{2-}
78. Which of these have no unit?
 (a) Electronegativity
 (b) Electron affinity
 (c) Ionisation energy
 (d) Excitation potential
79. Which of the following statements is not correct for sigma and pi-bonds formed between two carbon atoms?
 (a) Sigma-bond determines the direction between carbon atoms but a pi-bond has no primary effect in this regard
 (b) Sigma-bond is stronger than a pi-bond
 (c) Bond energies of sigma- and pi-bonds are of the order of 264 kJ/mol and 347 kJ/mol, respectively
 (d) Free rotation of atoms about a sigma-bond is allowed but not in case of a pi-bond
80. The reactivity of metals with water is in the order of
 (a) $\text{Na} > \text{Mg} > \text{Zn} > \text{Fe} > \text{Cu}$
 (b) $\text{Cu} > \text{Fe} > \text{Zn} > \text{Mg} > \text{Na}$
 (c) $\text{Mg} > \text{Zn} > \text{Na} > \text{Fe} > \text{Cu}$
 (d) $\text{Zn} > \text{Na} > \text{Mg} > \text{Fe} > \text{Cu}$
81. The emf of Daniell cell at 298 K is E_1
 $\text{Zn} | \text{ZnSO}_4 (0.01 \text{ M}) || \text{CuSO}_4 (1.0 \text{ M}) | \text{Cu}$
 When the concentration of ZnSO_4 is 1.0 M and that of CuSO_4 is 0.01 M, the emf changed to E_2
 What is the relation between E_1 and E_2 ?
 (a) $E_1 = E_2$ (b) $E_2 = 0 \neq E_1$
 (c) $E_1 > E_2$ (d) $E_1 < E_2$
82. 
 The above shown polymer is obtained when a carbonyl compound is allowed to stand. It is a white solid. The polymer is
 (a) Trioxane (b) Formose
 (c) Paraformaldehyde (d) Metaldehyde.
83. The correct order of atomic/ionic sizes is
 (a) $\text{N} < \text{Li} < \text{B}$
 (b) $\text{F}^- < \text{O}^{2-} < \text{N}^{3-}$
 (c) $\text{Ca}^{2+} < \text{S}^{2-} < \text{Cl}^-$
 (d) $\text{Na}^+ < \text{Mg}^{2+} < \text{Cl}^-$
84. The rapid change of pH near the stoichiometric point of an acid-base titration is the basis of indicator detection. pH of the solution is related to ratio of the concentrations of the conjugate acid (HIn) and base (In^-) forms of the indicator by the expression
 (a) $\log \frac{[\text{In}^-]}{[\text{HIn}]} = \text{pK}_{\text{In}} - \text{pH}$
 (b) $\log \frac{[\text{HIn}]}{[\text{In}^-]} = \text{pK}_{\text{In}} - \text{pH}$
 (c) $\log \frac{[\text{HIn}]}{[\text{In}^-]} = \text{pH} - \text{pK}_{\text{In}}$
 (d) $\log \frac{[\text{In}^-]}{[\text{HIn}]} = \text{pH} - \text{pK}_{\text{In}}$
85. In the diazotization of arylamines with sodium nitrite and hydrochloric acid, an excess of hydrochloric acid is used primarily to
 (a) Suppress the concentration of free aniline available for coupling
 (b) Suppress hydrolysis of phenol
 (c) Ensure a stoichiometric amount of nitrous acid
 (d) Neutralise the base liberated

86. In lake test of Al^{3+} ion, there is formation of coloured floating lake. It is due to
 (a) adsorption of litmus by H_2O
 (b) adsorption of litmus by $\text{Al}(\text{OH})_3$
 (c) adsorption of litmus by $\text{Al}(\text{OH})_4^-$
 (d) none of these
87. An ideal gas expands in volume from 1×10^{-3} to $1 \times 10^{-2} \text{ m}^3$ at 300 K against a constant pressure of $1 \times 10^5 \text{ Nm}^{-2}$. The work done is
 (a) 270 kJ (b) -900 kJ
 (c) -900 kJ (d) 900 kJ
88. Ethanol and dimethyl ether form a pair of functional isomers. The boiling point of ethanol is higher than that of dimethyl ether, due to the presence of
 (a) H-bonding in ethanol
 (b) H-bonding in dimethyl ether
 (c) CH_3 group in ethanol
 (d) CH_3 group in dimethyl ether
89. Which of the following reactions will not result in the formation of anisole?
 (a) Phenol + dimethyl sulphate in presence of a base
 (b) Sodium phenoxide is treated with methyl iodide
 (c) Reaction of diazomethane with phenol
 (d) Reaction of methylmagnesium iodide with phenol
90. What will be the heat of formation of methane, if the heat of combustion of carbon is '-x' kJ, heat of formation of water is '-y' kJ and heat of combustion of methane is 'z' kJ?
 (a) $(-x - y + z)$ kJ (b) $(-z - x + 2y)$ kJ
 (c) $(-x - 2y - z)$ kJ (d) $(-x - 2y + z)$ kJ
92. Peat moss is another name of
 (a) *Sphagnum* (b) *Marchantia*
 (c) *Riccia* (d) *Dryopteris*
93. In fern, spores are formed in
 (a) sporangium (b) oogonium
 (c) archegonium (d) stomium
94. Which one of the following is a true fruit?
 (a) Apple (b) Pear
 (c) Cashew nut (d) Coconut
95. The cork cambium, cork and secondary cortex are collectively called
 (a) phelloderm (b) phellogen
 (c) periderm (d) phellem
96. Which of the following algae are suitable for human consumption?
 (a) *Laminaria* and *Fucus*
 (b) *Gracilaria* and *Chondrus*
 (c) *Porphyra* and *Spirogyra*
 (d) *Rhodymania* and *Porphyra*
97. Choose the correct option.
 (i) Lysosomes are double membranous vesicles budded off from Golgi apparatus and contain digestive enzymes.
 (ii) Endoplasmic reticulum consists of a network of membranous tubule and helps in transport, synthesis and secretion.
 (iii) Leucoplasts are bound by two membranes, lack pigment but contain their own DNA and protein synthesising machinery.
 (iv) Sphaerosomes are single membrane bound organelle which are associated with synthesis and storage of lipids.
 (a) (i) only (b) (i) and (ii)
 (c) (ii), (iii) and (iv) (d) All of these

SECTION 3 - BOTANY

91. A taxon is
 (a) a group of related families
 (b) a group of related species
 (c) a type of living organisms
 (d) a taxonomic group of any ranking

98. Chosse the correct combinations.



I. Hypogynous flower

II. Perigynous flower

III. Epigynous flower

(a) A - I, B - II, C - III (b) A - I, B - III, C - II

(c) A - III, B - II, C - I (d) A - III, B - I, C - II

99. Which one of the following is not a method of vegetative propagation?

- (a) Budding (b) Layering
(c) Sowing (d) Tissue culture

100. Entry of pollen tube through micropyle is

- (a) Chalazogamy (b) Mesogamy
(c) Porogamy (d) Pseudogamy

101. Competition for light, nutrients and space is most severe between

- (a) closely related organism growing in different habitats
(b) closely related organisms growing in the same habitat
(c) distantly related organisms growing in the same habitat
(d) distantly related organisms growing in different habitats

102. In oogamy, fertilization involves

- (a) a small non-motile female gamete and a large motile male gamete
(b) a large non-motile female gamete and a small motile male gamete
(c) a large non-motile female gamete and a small nonmotile male gamete
(d) a large motile female gamete and a small nonmotile male gamete

103. Photochemical smog formed in congested metropolitan cities mainly consists of

- (a) Ozone, peroxyacetyl nitrate and NO_x
(b) Smoke, peroxyacetyl nitrate and SO_2
(c) Hydrocarbon, SO_2 and CO_2
(d) Hydrocarbon, ozone and SO_x

104. The electrostatic precipitator is used for removing particulate matter from

- (a) Exhaust of the thermal power plant
(b) Exhaust from the automobiles
(c) Industrial effluents
(d) Kitchen waste

105. Keystone species in an ecosystem are those

- (a) present in maximum number
(b) that are most frequent
(c) attaining a large biomass
(d) contributing to ecosystem properties

106. Initiation codon of protein synthesis (in eukaryotes) is

- (a) GUA (b) GCA
(c) CCA (d) AUG

107. What is the best pH of soil for cultivation of plants ?

- (a) 3.4–5.4 (b) 6.5–7.5
(c) 4.5–8.5 (d) 5.6–6.5

108. Telomerase is an enzyme which is a

- (a) simple protein (b) RNA
(c) ribonucleoprotein (d) repetitive DNA

109. Mass of living matter at a trophic level in an area at any time is called

- (a) standing crop (b) detritus
(c) humus (d) standing state

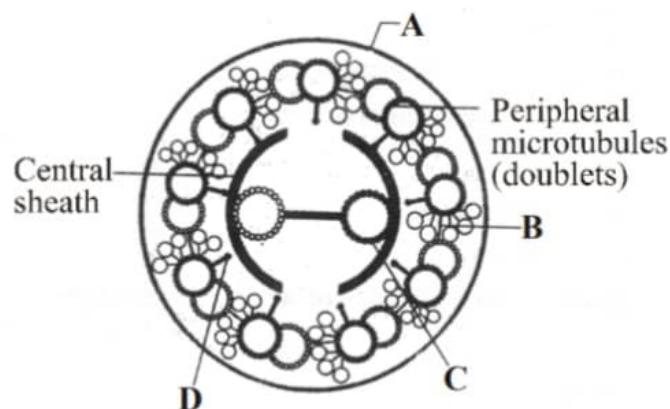
110. The *Triticale* is an intergeneric hybrid between :

- (a) wheat and maize (b) maize and rye
(c) wheat and rye (d) bajra and wheat

111. Which one is a neem product used as insect repellent?

- (a) Azadirachtin (b) Rotenone
(c) Parathione (d) Endrin

112. Choose the correct option.



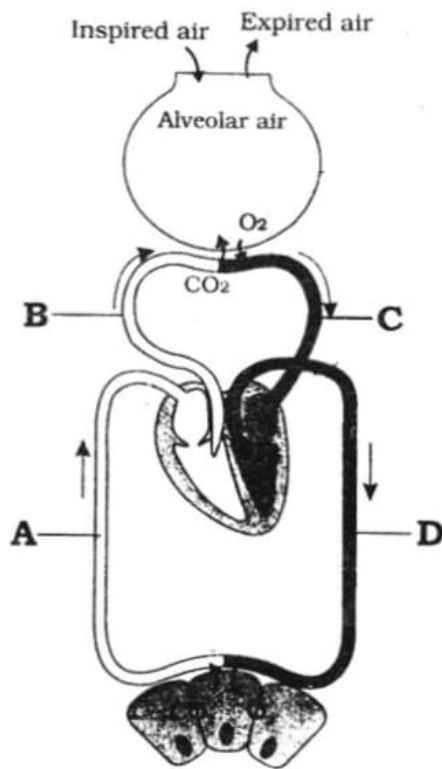
- (a) A – Plasma membrane, B – Interdoublet bridge, C – Central microtubule, D – Radial spoke
 (b) A – Plasma membrane, B – Arm, C – Central microtubule, D – Radial spoke
 (c) A – Plasma membrane, B – Interdoublet bridge, C – Hub, D – Radial spoke
 (d) A – Plasma membrane, B – Interdoublet bridge, C – Hub, D – Arm
113. An ecosystem which can be easily damaged but can recover after some time if damaging effect stops will be having
 (a) low stability and high resilience
 (b) high stability and low resilience
 (c) low stability and low resilience
 (d) high stability and high resilience
114. The mode of catching insects in *Drosera* plants is by means of
 (a) sensitive glandular hairs which secrete a sweet, viscous, shining substance.
 (b) specially sensitive trigger hairs.
 (c) leaves which are modified into pitcher.
 (d) leaf segments modified into bladder.
115. Quantasomes are present in
 (a) chloroplast (b) mitochondria
 (c) golgi body (d) lysosome
116. The water potential and osmotic potential of pure water are
 (a) zero and zero (b) 100 and 100
 (c) zero and 100 (d) 100 and zero
117. Photorespiration is favoured by
 (a) high O_2 and low CO_2
 (b) low light and high O_2
 (c) low temperature and high O_2
 (d) low O_2 and high CO_2
118. A free living nitrogen-fixing cyanobacterium which can also form symbiotic association with the water fern *Azolla* is
 (a) *Tolypothrix* (b) *Chlorella*
 (c) *Nostoc* (d) *Anabaena*
119. Hydroponics is
 (a) nutrient less culture
 (b) water less culture
 (c) soilless culture
 (d) None of these
120. Krebs cycle occurs in
 (a) mitochondria (b) cytoplasm
 (c) chloroplasts (d) ribosomes
121. Most abundant organic compound on earth is
 (a) Protein (b) Cellulose
 (c) Lipids (d) Steroids
122. Terminal cytochrome of respiratory chain which donates electrons to oxygen is
 (a) Cyt. b (b) Cyt. c
 (c) Cyt. a_1 (d) Cyt. a_3
123. To avoid excessive water loss during severe drought stress, the closure of stomata is signalled by the production of
 (a) IAA (b) NAA
 (c) ABA (d) IBA
124. In short day plants, flowering is induced by
 (a) photoperiod less than 12 hours.
 (b) photoperiod below a critical length and uninterrupted long night.
 (c) long night.
 (d) short photoperiod and interrupted long night.

125. The major reason that glycolysis is not as energy productive as respiration is that
 (a) NAD^+ is regenerated by alcohol or lactate production, without the high-energy electrons passing through the electron transport chain.
 (b) it is the pathway common to fermentation and respiration.
 (c) it does not take place in a specialized membrane-bound organelle.
 (d) pyruvate is more reduced than CO_2 ; it still contains much of the energy from glucose.
126. The catalytic efficiency of two different enzymes can be compared by the
 (a) formation of the product
 (b) pH optimum value
 (c) K_m value
 (d) molecular size of the enzyme
127. Biodiversity Act of India was passed by the parliament in the year
 (a) 1992 (b) 1996
 (c) 2000 (d) 2002
128. 'Axenic culture' is
 (a) culture of tissue
 (b) growing of shrubs
 (c) growing of tall trees
 (d) culture of tissue free from contamination
129. Which one thing is not true about antibiotics?
 (a) The term "antibiotic" was coined by Selman Waksman in 1942
 (b) First antibiotic was discovered by Alexander Flemming
 (c) Each antibiotic is effective only against one particular kind of germ
 (d) Some persons can be allergic to a particular antibiotic
130. Main objective of production/use of herbicide resistant GM crops is to
 (a) eliminate weeds from the field without the use of manual labour
 (b) eliminate weeds from the field without the use of herbicides
 (c) encourage eco-friendly herbicides
 (d) reduce herbicide accumulation in food articles for health safety
131. The common nitrogen fixer in paddy fields is
 (a) *Rhizobium* (b) *Azospirillum*
 (c) *Oscillatoria* (d) *Frankia*
132. In order to obtain virus-free plants through tissue culture, the best method is
 (a) protoplast culture (b) embryo rescue
 (c) anther culture (d) meristem culture
133. Which one of the following is a wrong matching?
 (a) Somatic hybridization - Fusion of two diverse cells
 (b) Vector DNA - Site for t-RNA synthesis
 (c) Micropropagation - *in vitro* production of plants in large numbers
 (d) Callus - Unorganised mass of cell produced in tissue culture
134.
$$\begin{array}{ccc} \text{R} & & \text{R} \\ | & & | \\ \text{H}_3\text{N}^+ - \text{CH} - \text{COOH} & \rightleftharpoons & \text{H}_3\text{N}^+ - \text{CH} - \text{COO}^- \\ \text{(A)} & & \text{(B)} \\ & & | \\ & & \text{R} \\ & & | \\ & & \text{H}_2\text{N} - \text{CH} - \text{COO}^- \\ & & \text{(C)} \end{array}$$
- Which of the above is Zwitterionic form?
 (a) A (b) C
 (c) B (d) All of these
135. Restriction endonucleases are enzymes which
 (a) make cuts at specific positions within the DNA molecule
 (b) recognize a specific nucleotide sequence for binding of DNA ligase
 (c) restrict the action of the enzyme DNA polymerase
 (d) remove nucleotides from the ends of the DNA molecule

SECTION 4 - ZOOLOGY

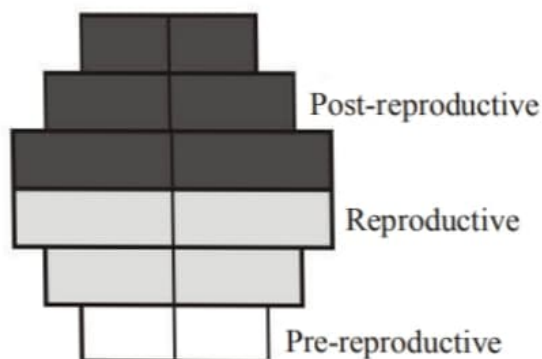
136. Sex factor in bacteria is
 (a) Chromosomal replicon
 (b) F-replicon
 (c) RNA
 (d) Sex-pilus

137. Animals/organisms floating on the surface of water are
 (a) plankton (b) pelagic
 (c) benthos (d) neritic
138. The cell junctions called tight, adhering and gap junctions are found in
 (a) connective tissue (b) epithelial tissue
 (c) neural tissue (d) muscular tissue
139. Spleen is referred to as
 (a) temporary endocrine gland
 (b) graveyard of RBC
 (c) largest gland
 (d) store house of WBC
140. Given below are four matchings of an animal and its kind of respiratory organ :
 (i) Silver fish – trachea
 (ii) Scorpion – book lung
 (iii) Sea squirt – pharyngeal gills
 (iv) Dolphin – skin
 The correct matchings are
 (a) (iii) and (iv) (b) (i) and (iv)
 (c) (i), (ii) and (iii) (d) (ii) and (iv)
141. In the mouthparts of the cockroach, the organ of mastication is
 (a) labium (b) maxillae
 (c) mandibles (d) labrum
142. Which one of the following characters is not typical of the class Mammalia?
 (a) Thecodont dentition
 (b) Alveolar lungs
 (c) Ten pairs of cranial nerves
 (d) Seven cervical vertebrae
143. Natural parthenogenesis occurs in:
 (a) Protozoans (b) Earthworm
 (c) All insects (d) Honeybee
144. Consider the statements given below regarding contraception and answer as directed thereafter:
 (i) Medical Termination of Pregnancy (MTP) during first trimester is generally safe
 (ii) Generally chances of conception are nil until mother breast-feeds the infant upto two years
 (iii) Intrauterine devices like copper-T are effective contraceptives
 (iv) Contraception pills may be taken upto one week after coitus to prevent conception
 Which two of the above statements are correct?
 (a) ii and iii (b) iii and iv
 (c) i and iii (d) i and ii
145. Identify the blood vessels A to D.



- (a) A- Systemic vein, B-Pulmonary artery, C-Pulmonary vein, D-Systemic artery
 (b) A-Systemic artery, B-Pulmonary artery, C- Pulmonary vein, D- Systemic vein
 (c) A-Pulmonary artery, B-Systemic vein, C-Pulmonary vein, D- Systemic artery
 (d) A-Systemic vein, B-Pulmonary vein, C- Pulmonary artery, D- Systemic artery

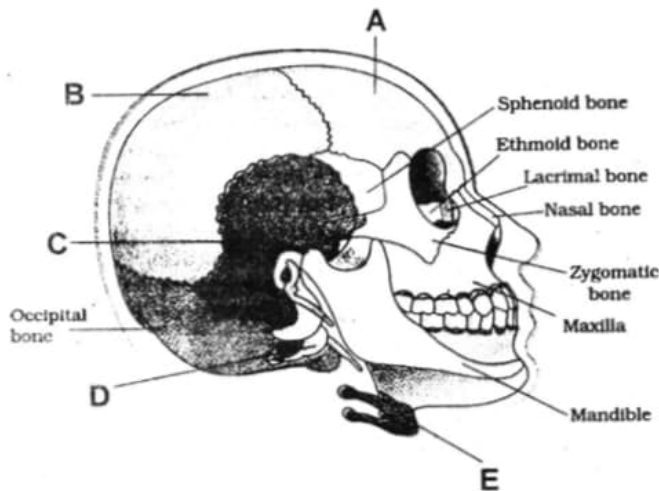
146. Which pathway of the male reproductive system is correct for the sperms transportation?
 (a) Vas efferentia → Vas deferens → Epididymis
 (b) Vas deferens → Epididymis → Seminal vesicle
 (c) Epididymis → Vas deferens → Urethra
 (d) Rete testis → Epididymis → Vas efferentia
147. The second maturation division of the mammalian ovum occurs:
 (a) in the Graafian follicle following the first maturation division
 (b) Shortly after ovulation before the ovum makes entry into the fallopian tube
 (c) Until after the ovum has been penetrated by a sperm
 (d) Until the nucleus of the sperm has fused with that of the ovum
148. A force acting against achievement of highest possible level of population growth is
 (a) Carrying capacity
 (b) Environment resistance
 (c) Population pressure
 (d) Saturation level
149. The phase of menstrual cycle in humans that lasts for 7-8 days, is
 (a) follicular phase (b) ovulatory phase
 (c) luteal phase (d) menstruation
150. What type of human population is represented by the following age pyramid?



- (a) Vanishing population
 (b) Stable population

- (c) Declining population
 (d) Expanding population
151. The 'Mule' is the result of
 (a) Inbreeding depression
 (b) Out breeding
 (c) Cross breeding
 (d) Inter-specific hybridization
152. Haemophilia is more common in males because it is a
 (a) Recessive character carried by Y-chromosome
 (b) Dominant character carried by Y-chromosome
 (c) Dominant trait carried by X-chromosome
 (d) Recessive trait carried by X-chromosome
153. Theory of inheritance of acquired characters was given by
 (a) Wallace (b) Lamarck
 (c) Darwin (d) De Vries
154. The animal husbandry deals with the care, breeding and management of
 (a) Domesticated animals
 (b) Fishes
 (c) Honey bees and silk worms
 (d) All of these
155. 'Inland fishery' refers to
 (a) Culturing fish in fresh water
 (b) Trapping and capturing fishes from sea coast
 (c) Deep sea fishing
 (d) Extraction of oil from fishes
156. The most popular breed of fowl in India is
 (a) White leg horn (b) Aseel
 (c) Plymouth (d) Langshan
157. Which of following teeth are lophodont?
 (a) Incisor and canine
 (b) Premolar and molar
 (c) Canine and premolar
 (d) Premolar and incisor
158. Pacemaker of heart is
 (a) AV node (b) Bundle of His
 (c) SA node (d) Purkinje fibres

159. Uricotelism is found in
 (a) Frogs and toads
 (b) Mammals and birds
 (c) Birds, reptiles and insects
 (d) Fishes and fresh water protozoans
160. A large proportion of oxygen is left unused in the human blood even after its uptake by the body tissues. This O_2
 (a) acts as a reserve during muscular exercise
 (b) raise the pCO_2 of blood to 75 mm of Hg.
 (c) is enough to keep oxyhaemoglobin saturation at 96%
 (d) helps in releasing more O_2 to the epithelial tissues.
161. The basic functional unit of the human kidney is
 (a) nephron (b) nephridia
 (c) pyramid (d) Henle's loop
162. Urea from the blood can be removed by
 (a) Uremia (b) Diuresis
 (c) Dialysis (d) Micturition
163. Which one of the following correctly explains the function of a specific part of a human nephron ?
 (a) Podocytes : create minute spaces (slit pores) for the filtration of blood into the Bowman's capsule.
 (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) Afferent arteriole : carries the blood away from the glomerular towards renal vein.
164. The nerve centres which control the body temperature and the urge for eating are contained in:
 (a) hypothalamus (b) pons
 (c) cerebellum (d) thalamus
165. Rods and cones of eyes are modified
 (a) multipolar neuron
 (b) unipolar neuron
 (c) bipolar neuron
 (d) None of these
166. Which of the following is both exocrine and endocrine gland ?
 (a) Liver (b) Pancreas
 (c) Thyroid (d) Adrenal
167. The sensation of fatigue in the muscles after prolonged strenuous physical work, is caused by
 (a) a decrease in the supply of oxygen
 (b) minor wear and tear of muscle fibres
 (c) the depletion of glucose
 (d) the accumulation of lactic acid
168. Consider the diagram given below



Identify the labelled parts as A, B, C, D and E respectively.

- (a) Frontal bone, Parietal bone, Temporal bone, Occipital condyle and Hyoid bone
 (b) Frontal bone, Temporal bone, Parietal bone, Occipital condyle and Hyoid bone
 (c) Frontal bone, Parietal bone, Temporal bone, Hyoid bone and Occipital condyle
 (d) Parietal bone, Frontal bone, Temporal bone, Occipital condyle and Hyoid bone

169. Which one of the following statements is incorrect?
- The presence of non-respiratory air sacs, increases the efficiency of respiration in birds.
 - In insects, circulating body fluids serve to distribute oxygen to tissues.
 - The principle of countercurrent flow facilitates efficient respiration in gills of fishes.
 - The residual air in lungs slightly decreases the efficiency of respiration in mammals.
170. Which one of the following does not act as a neurotransmitter?
- Epinephrine
 - Norepinephrine
 - Cortisone
 - Acetylcholine
171. Which one of the following statements is correct?
- Neurons regulate endocrine activity, but not *vice versa*.
 - Endocrine glands regulate neural activity and nervous system regulates endocrine glands.
 - Neither hormones control neural activity nor the neurons control endocrine activity.
 - Endocrine glands regulate neural activity but not *vice versa*.
172. 'Cloning' is meant for/to
- production of hGH gene in *E. coli*
 - preserve the genotype of organism
 - replace the original gene
 - All of the above
173. A cell coded protein formed in response to infection with most animal viruses is
- Antigen
 - Antibody
 - Interferon
 - Histone
174. Which one of the following is not used in organic farming?
- Glomus*
 - Earthworm
 - Oscillatoria*
 - Snail
175. ELISA is used to detect viruses where the key reagent is
- RNase
 - alkaline phosphatase
 - catalase
 - DNA probe
176. Vitamin B₁₂ is formed during fermentation of
- Ashloia gossipii*
 - Rhizopus stolonifer*
 - Propionibacteria*
 - Saccharomyces cerevisiae*
177. Which one is a correctly match sexually transmitted disease with its pathogen?
- Syphilis – *Leishmania donovani*
 - AIDS – *Bacillus anthracis*
 - Urethritis – *Entamoeba gingivalis*
 - Gonorrhoea – *Neisseria gonorrhoeae*
178. Which one of the following depresses brain activity and produced feelings of calmness, relaxation and drowsiness?
- Morphine
 - Valium
 - Amphetamines
 - Hashish
179. Which one of the following is correctly matched pair of the given secretion and its primary role in human physiology?
- Sebum — Sexual attraction
 - Sweat — Thermoregulation
 - Saliva — Tasting food
 - Tears — Excretion of salts
180. Consider the following four statements (i-iv) and select the option which includes all the correct ones only.
- Single cell *Spirulina* can produce large quantities of food rich in protein, minerals, vitamins etc.
 - Body weight-wise the micro-organism *Methylophilus methylotrophus* may be able to produce several times more proteins than the cows per day.
 - Common button mushrooms are a very rich source of vitamin C.
 - A rice variety has been developed which is very rich in calcium.
- Statements (ii) and (iv)
 - Statements (i), (iii) and (iv)
 - Statements (ii), (iii) and (iv)
 - Statements (i) and (ii)