13/02/2025

CODE-B

Aakash
Medical | IIT-JEE | Foundations

Corporate Office : AESL, 3rd Floor, Incuspaze Campus-2, Plot-13, Sector-18, Udyog Vihar, Gurugram, Haryana-122018

MOCK TEST for NEET-2025

MM : 720 **Test-4** **Time : 3 Hrs.**

Complete Syllabus of class XI & XII

Instructions :

(i) Duration of Test is **3** hrs.

(ii) The Test consists of **180** questions. The maximum marks are **720**.

(iii) There are four parts in the question paper consisting of Physics, Chemistry, Botany and Zoology having **45** questions in each part of equal weightage.

(iv) Each question carries **+4 marks**. For every wrong response, **–1 mark** shall be deducted from the total score. Unanswered/unattempted questions will be given no marks.

(v) Use blue/black ballpoint pen only to darken the appropriate circle. Mark should be dark and completely fill the circle. Dark only one circle for each entry. Dark the circle in the space provided only.

(vi) Dark the circle in the space provided only.

(vii) Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet.

PHYSICS

1. A 100 V battery is connected across a 10 Ω resistor and current of 5 A flows. The internal resistance of the battery is

   (1) 5 Ω (2) 10 Ω

   (3) 20 Ω (4) 2.5 Ω

2. The main objective of taking mean of several observations in an experiment is

   (1) To avoid zero error in the instrument

   (2) To increase the precision of measurement

   (3) To take observations keenly

   (4) To minimize random errors in an experiment

3. A truck 24 m long moving on a road at 20 m/s starts chasing a 100 m long train running on a track parallel to road at 72 km/h. If the truck is 200 m behind, and starts accelerating at 0.5 m/s^2 then the time taken by truck to overtake the train is

   (1) $\sqrt{28}$ seconds (2) $\sqrt{18}$ seconds

   (3) 36 seconds (4) $\sqrt{40}$ seconds

4. A particle projected obliquely from ground at an angle of 30° from vertical. If it strikes the ground at a speed of 20 m/s then its speed at highest point would have been

   (1) 10 m/s (2) $10\sqrt{3}$ m/s

   (3) $20\sqrt{3}$ m/s (4) 5 m/s

5. A particle in circular motion has angular acceleration 4 rad/s^2. If radius of its circular path is 2 m and angular speed at t = 2 second is 12 rad/s, then choose the correct statement:

   (1) Angular speed of particle at t = 0 is 6 rad/s

   (2) Angular speed of particle remains constant

   (3) Magnitude of centripetal acceleration is variable

   (4) Tangential acceleration of particle is zero

6. The centripetal force on a bicycle bending to maneuver a circular turn is provided by

   (1) Friction

   (2) Normal reaction

   (3) Weight

   (4) Resultant of normal force and weight

7. Two smooth spheres of mass 4 kg and 2 kg moving in same direction at a speed of 20 m/s and 10 m/s respectively, collide elastically. The ratio of their speed after collision is

(1) 1 : 2 (2) 2 : 3

(3) 3 : 4 (4) 7 : 4

8. A plank of mass 40 kg and length 8 m rests on a frictionless surface with a person of mass 80 kg standing at one of its end. If the person moves towards the other end then centre of mass of system

(1) Moves backwards

(2) Remains at rest

(3) Moves forwards

(4) Moves backwards initially then moves forwards

9. The SI unit of angular impulse is

(1) kg m s^{-1} (2) kg m^2 s^{-1}

(3) g cm s^{-1} (4) g cm^3 s^{-1}

10. The number of photons emitted per second by 60 W source of monochromatic light of wavelength 5000 Å are

(1) 1.5×10^{20} (2) 1.5×10^{-18}

(3) 3×10^{22} (4) 3.5×10^{-18}

11. A plank is balanced when two small blocks of 4 kg each are kept at its end (fulcrum at centre). Length of plank is 8 m and its mass is 18 kg. If one of the mass is removed then the initial angular acceleration of the plank is [g = 10 m/s^2]

(1) 1 rad/s^2 (2) 5 rad/s^2

(3) 0.5 rad/s^2 (4) 2 rad/s^2

12. A hydraulic pressure of 2 GPa is subjected to a sphere in which fractional change of volume is observed to be unity. The Bulk modulus of material of sphere is

(1) 2 GPa (2) 0.2 GPa

(3) $\frac{1}{2}$ GPa (4) 2×10^5 Pa

13. Electric potential in a region varies as $V(x,y) = x^2y - y^2$ (in SI units), the electric field at (1,2) m is

(1) $\left(-4\hat{i}+3\hat{j}\right)$ V/m (2) $\left(\frac{3}{5}\hat{i}-\frac{2}{5}\hat{j}\right)$ V/m

(3) $\left(\hat{i}-\hat{j}\right)$ V/m (4) $\left(2\hat{i}-3\hat{j}\right)$ V/m

14. Kirchoff's current law is a based on

(1) Law of conservation of charge

(2) Law of conservation of mass

(3) Law of conservation of energy

(4) Law of conservation of momentum

15. The resistance of an ideal ammeter is

(1) Zero

(2) 10 Ω to 100 Ω

(3) 10 kΩ to 100 kΩ

(4) Infinite

16. The magnetic moment associated with an electron in first orbit of H-atom is known as

(1) Bohr magneton

(2) Bohr angular momentum

(3) Bohr quantisation condition

(4) Fermi angular momentum

17. A coil of resistance 10 Ω and area 20 cm^2 is subjected to a magnetic field varying from 4 T to 0 in one second. The charge flown through coil in this time interval is

(1) 20 mC (2) 2 mC

(3) 0.8 mC (4) 12.33 mC

18. Average value of an alternating current I = 4 sin ($100\pi t$) A in half cycle is

(1) $4\sqrt{2}$ A (2) $\frac{4}{\sqrt{2}}$ A

(3) $\frac{4}{\pi}$ A (4) $\frac{8}{\pi}$ A

19. The frequencies of x–rays, γ–rays and ultraviolet rays are respectively a, b and c. Then chose the correct option.

(1) $a < b, b < c$ (2) $a < b, b > c$

(3) $a > b, b > c$ (4) $a > b, b < c$

20. A convex lens made of a material having refractive index 1.5 has focal length 2 cm in air. Its focal length when immersed in a liquid of refractive index 1.25 becomes

(1) 2 cm (2) 5 cm

(3) 2.5 cm (4) 10 cm

21. The wavefront associated with a point source of light at finite distance is

(1) Spherical (2) Cylindrical

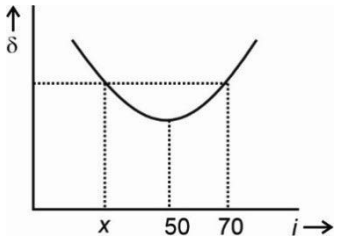
(3) Elliptical (4) Plane

22. Energy of a photon of wavelength 'λ' is

(1) $\frac{hc^2}{\lambda}$ (2) $\frac{\lambda c}{h}$

(3) λhc (4) $\frac{hc}{\lambda}$

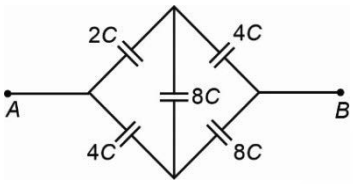
23. The variation of angle of deviation and angle of incidence for a triangular prism is shown below. The value of 'x' is



(1) 30° (2) 28°

(3) 20° (4) 35°

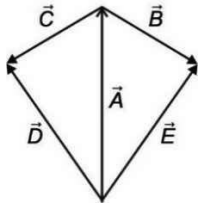
24. The effective capacitance between points *A* and *B* is



(1) $2C$ (2) $\frac{4}{3}C$

(3) $4C$ (4) $\frac{8}{3}C$

25. In the figure, $\vec{E}-\vec{D}+\vec{C}$ equals to



(1) $\vec{A}$ (2) $\vec{B}$

(3) $-\vec{A}$ (4) $-\vec{B}$

26. If R and h represent the horizontal range and maximum height respectively of an oblique projectile, then $\frac{R^2}{8h}+2h$ is equal to (speed of projection is u)

(1) $\frac{2u}{g}$ (2) $\frac{u^2}{g}$

(3) $\frac{u}{g}$ (4) $\frac{2u^2}{g}$

27. A uniform rod *AB* of mass m and length $2a$ is allowed to fall under gravity with *AB* in horizontal position. When the speed of rod is 'v' suddenly the end '*A*' is fixed. The angular velocity of rod with which it begins to rotate will be

(1) $\frac{3v}{2a}$ (2) $\frac{5v}{3a}$

(3) $\frac{3v}{4a}$ (4) $\frac{5v}{2a}$

28. A particle performing SHM with frequency 10 Hz and amplitude 5 cm is initially at negative extreme position. The equation of its displacement will be (x is in metre)

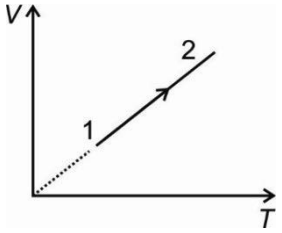
(1) $x=0.05\sin\left(20\pi t+\frac{3\pi}{2}\right)$

(2) $x=0.05\sin\left(20\pi t+\frac{\pi}{2}\right)$

(3) $x=0.05\sin(10\pi t)$

(4) $x=0.05\sin(20\pi t+\pi)$

29. Volume versus temperature graph of two moles of helium gas is as shown in figure. The ratio of change in internal energy and the work done by the gas in process 1-2 is



(1) $\frac{5}{2}$ (2) $\frac{3}{2}$

(3) $\frac{7}{2}$ (4) $\frac{7}{3}$

30. Consider the following statements and select the correct option.

(i) The density of water is minimum at 4ºC

(ii) The density of water increases with increase in temperature above 4°C

(iii) The density of water increases with increase in temperature from 0°C to 4°C

(1) (iii) only (2) (i) and (ii) only

(3) (i) and (iii) only (4) (i), (ii) and (iii)

31. Charge Q is distributed on two metallic spheres having radii R and $3R$. If both spheres have equal charge densities, then the charge on smaller sphere will be

(1) $\frac{Q}{10}$ (2) $\frac{Q}{9}$

(3) $\frac{9Q}{10}$ (4) $\frac{10Q}{11}$

32. A ray of light passes normally through a slab $(\mu = 1.5)$ of thickness 50 mm. If speed of light in vacuum be 3×10^8 m/s, then time taken by the ray to cross the slab will be

(1) 250 ps (2) 5 ps

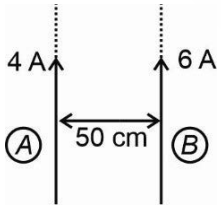
(3) 250 ns (4) 5 ns

33. The wavelength of light used in two Young's double slit experiments are 400 nm and 500 nm. The fringe width are equal when the screen are placed at 1.2 m and 1.6 m respectively. The ratio of the distance between the slits in them is

(1) $\frac{4}{5}$ (2) $\frac{3}{4}$

(3) $\frac{1}{2}$ (4) $\frac{3}{5}$

34. Two long parallel straight wires A and B carrying currents of 4 A and 6 A respectively in same direction are kept 50 cm apart. Magnetic field will be zero at a point



(1) 20 cm from wire A

(2) 20 cm from wire B

(3) 30 cm from wire A

(4) 40 cm from wire A

35. In a moderately doped p-type semiconductor, the fermi energy level lies

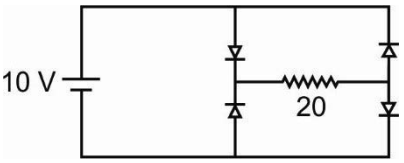
(1) In the forbidden energy gap nearer to the conduction band

(2) In the forbidden energy gap nearer to the valence band

(3) In the middle of forbidden energy gap

(4) Outside the forbidden energy gap

36. Four ideal diodes are connected as shown in circuit. The current through $20\,\Omega$ resistor will be



(1) 0.2 A

(2) 0.3 A

(3) 0.5 A

(4) Zero

37. A particle of mass m, is projected horizontally from a height h above earth's surface with speed v where v_0 is the optimum orbital velocity. Column I contains the speed of projection and column II contains the respective trajectory followed by the particle. Match the columns and choose the correct option (v_e = escape speed)

	Column-I		Column-II
A.	$v = v_0$	P.	Parabolic
B.	$v_0 < v < v_e$	Q.	Circular
C.	$v = v_e$	R.	Elliptical
D.	$v > v_e$	S.	Hyperbolic

(1) A $\rightarrow$ Q; B $\rightarrow$ R; C $\rightarrow$ P; D $\rightarrow$ S

(2) A $\rightarrow$ Q; B $\rightarrow$ S; C $\rightarrow$ P; D $\rightarrow$ R

(3) A $\rightarrow$ Q; B $\rightarrow$ P; C $\rightarrow$ R; D $\rightarrow$ S

(4) A $\rightarrow$ Q; B $\rightarrow$ R; C $\rightarrow$ S; D $\rightarrow$ P

38. A concave mirror of focal length 20 cm (in air) is immersed in liquid (μ = 2). The focal length of the mirror in liquid will be

(1) 10 cm (2) $\frac{40}{3}$ cm

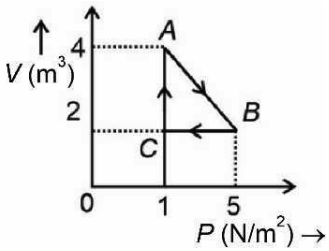
(3) 40 cm (4) 20 cm

39. A body is projected up from surface of the earth with velocity $\left(\frac{3}{4}\right)^{th}$ of its escape velocity. If R be the radius of earth, then the height it reaches is

(1) $\frac{3R}{10}$ (2) $\frac{9R}{7}$

(3) $\frac{8R}{5}$ (4) $\frac{9R}{5}$

40. An ideal gas is taken through the cyclic process $A \rightarrow B \rightarrow C \rightarrow A$, as shown in figure. The work done by the gas in the process $A \rightarrow B \rightarrow C \rightarrow A$ is



(1) –2 J (2) –3 J

(3) –4 J (4) –5 J

41. Susceptibility is positive and large for

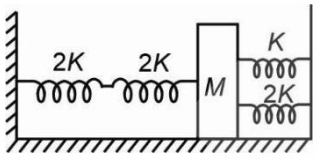
(1) Paramagnetic substance

(2) Ferromagnetic substance

(3) Diamagnetic substance

(4) Non-magnetic substance

42. Four massless springs whose force constants are $2K$, $2K$, K and $2K$ respectively are attached to mass M kept on a frictionless plane as shown in figure. If the mass M is displaced in the horizontal, then the frequency of the system is



(1) $\frac{1}{2\pi}\sqrt{\frac{K}{4M}}$ (2) $\frac{1}{2\pi}\sqrt{\frac{4K}{M}}$

(3) $\frac{1}{2\pi}\sqrt{\frac{K}{7M}}$ (4) $\frac{1}{2\pi}\sqrt{\frac{7K}{M}}$

43. **Assertion (A):** The kinetic energy of charge particle moving in a uniform magnetic field does not change.

Reason (R): Work done by the magnetic field on the charge is zero.

In the light of above statements, select the correct option.

(1) Both (A) and (R) are true and (R) is the correct explanation of (A)

(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

44. Current i is carried in a wire of length L. If the wire is turned into a circular coil, the maximum magnitude of torque acting on it, (when placed in a uniform magnetic field B) will be

(1) $\frac{LiB^2}{2}$ (2) $\frac{Li^2B}{2}$

(3) $\frac{L^2iB}{4\pi}$ (4) $\frac{Li^2B}{4\pi}$

45. Two masses of 1 kg and 4 kg are moving with equal kinetic energies. The ratio of the magnitudes of their linear momentum is

(1) 1 : 2

(2) $1 : \sqrt{2}$

(3) 1 : 4

(4) 2 : 3

CHEMISTRY

46. Number of angular and radial nodes present in $5p$ orbital are respectively

(1) 2 and 1 (2) 1 and 2

(3) 1 and 3 (4) 3 and 1

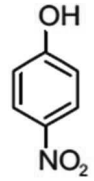
47. $\Delta G°$ for the following cell reaction will be $Ni(s) + 2Ag^+(aq) \rightarrow Ni^{2+}(aq) + 2Ag(s)$

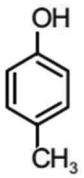
[Given, $E°_{Ni^{2+}/Ni} = -0.25$ V, $E°_{Ag^+/Ag} = 0.80$ V]

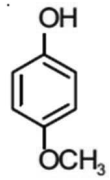
(1) – 106.15 kJ (2) – 101.32 kJ

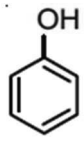
(3) – 202.65 kJ (4) – 53.07 kJ

48. The most acidic compound among the following is

(1) 

(2) 

(3) 

(4) 

49. Consider the following statements.

a. Actinoids are highly reactive metals, especially when finely divided.

b. Actinoid contraction is greater for element to element than lanthanoid contraction.

c. Trivalent lanthanoid ions are colourless in the solid state.

d. Lanthanoids are good conductors of heat and electricity.

Which of the above statements are correct?

(1) a, b and c only (2) b, c and d only

(3) a, b and d only (4) a, b, c and d

50. P–P–P bond angle in white P_4 molecule is

(1) 90° (2) 85°

(3) 75° (4) 60°

51. Which of the following ions gives brown ring test?

(1) Cl^- (2) SO_3^{2-}

(3) NO_3^- (4) NH_2^-

52. Incorrect statement among the following is

(1) Sucrose is a non-reducing sugar

(2) Maltose is a reducing sugar

(3) β-D- (–) fructofuranose contains four chiral centers

(4) D-glucose has 6 chiral centers

53. Which of the following halides has highest Lewis acidity?

(1) BI_3 (2) BCl_3

(3) BBr_3 (4) BF_3

54. Which among the following is a planar molecule?

(1) $(CH_3)_3N$ (2) XeF_4

(3) SF_4 (4) H_2SO_3

55. For which of the following aqueous salt solutions, the pH is independent of its concentration?

(1) NH_4Cl (2) CH_3COONa

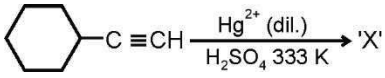
(3) NH_4CN (4) NaCN

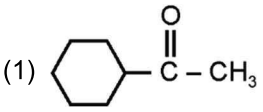
56. One mole of a perfect gas expands isothermally to ten times its original volume. The change in entropy is

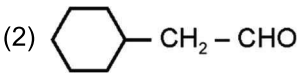
(1) 0.1R (2) 2.303R

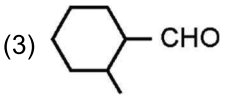
(3) 10.5R (4) 10R

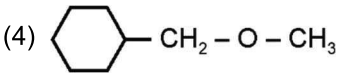
57. Major product 'X' in the following reaction is



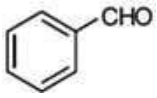
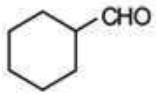
(1) 

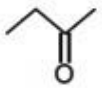
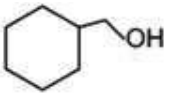
(2) 

(3) 

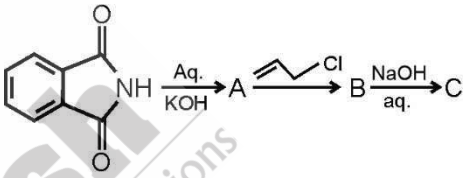
(4) 

58. The compound which will not give addition product with $NaHSO_3$ is

(1)  (2) 

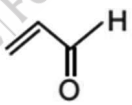
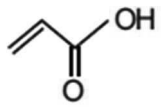
(3)  (4) 

59. Consider the following reaction



Product C is

(1)  (2) 

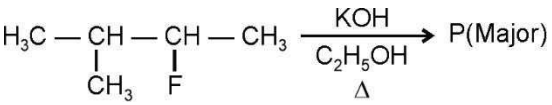
(3)  (4) 

60. Number of Cr—O—Cr bond(s) present in dichromate ion is

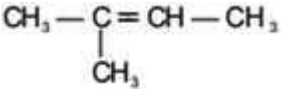
(1) 6 (2) 1

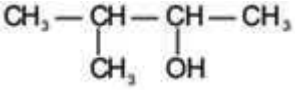
(3) 4 (4) 0

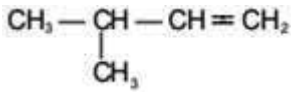
61. Major product of the given reaction is

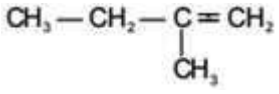


Major product P is

(1) 

(2) 

(3) 

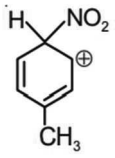
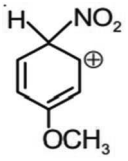
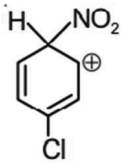
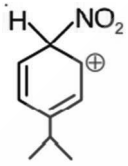
(4) 

62. Match the compounds given in List-I with their names in List-II and choose the correct option.

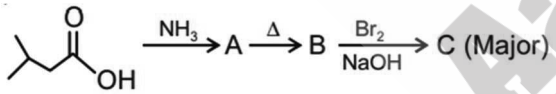
	List-I		List-II
a.	$H_2S_2O_8$	(i)	Sulphurous acid
b.	H_2SO_3	(ii)	Pyrosulphuric acid
c.	H_2SO_4	(iii)	Peroxodisulphuric acid
d.	$H_2S_2O_7$	(iv)	Sulphuric acid

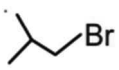
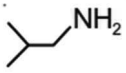
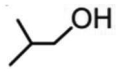
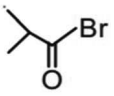
(1) a(i), b(ii), c(iv), d(iii) (2) a(ii), b(iii), c(iv), d(i)
(3) a(iv), b(iii), c(ii), d(i) (4) a(iii), b(i), c(iv), d(ii)

63. Which of the following ions, has the highest limiting molar conductivity in water at 298 K?
(1) H^+ (2) OH^-
(3) K^+ (4) Mg^{2+}

64. Most stable carbocation among the following is
(1) 
(2) 
(3) 
(4) 

65. Consider the following reactions sequence.

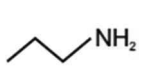
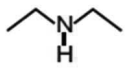


The major product C is
(1) 
(2) 
(3) 
(4) 

66. The reductive ozonolysis of isoprene will give
(1) Acetone and ethanal
(2) Methylglyoxal and methanal
(3) Acetone and propanal
(4) Glyoxal and methanal

67. If the half-life of first order reaction is 25 minutes then the time required for the completion of 20% of reaction is
(1) 12.5 minutes (2) 8.0 minutes
(3) 10.2 minutes (4) 6.2 minutes

68. If $E^{o}_{MnO_4^-/Mn^{2+}} = 1.51\ V$ and $E^{o}_{MnO_2/Mn^{2+}} = 1.23\ V$, then standard electrode potential of $E^{o}_{MnO_4^{\ominus}/MnO_2}$ is
(1) 0.28 V (2) 1.70 V
(3) 1.85 V (4) 2.74 V

69. The compound which will not react with Hinsberg's reagent is
(1) 
(2) 
(3) 
(4) 

70. The pair of elements which does not show diagonal relationship is
(1) Li and Mg (2) Be and Al
(3) Mg and B (4) B and Si

71. Consider the reaction

$$CO(g) + \frac{1}{2}O_2(g) \rightarrow CO_2(g)$$

Find the value of $\Delta H - \Delta U$ for the reaction.
(1) $-RT$ (2) $-\frac{RT}{2}$
(3) $-\frac{RT}{3}$ (4) $\frac{1}{RT}$

72. Which among the following complex has highest value of spin only magnetic moment?
(1) $Ni(CO)_4$
(2) $[PtCl_4]^{2-}$
(3) $[NiCl_4]^{2-}$
(4) $[CuCl_4]^{2-}$

73. The pK_b of ammonium hydroxide and pK_a of acetic acid are 4.75 and 4.77 respectively at T(K). The correct option for the pH of ammonium acetate solution is
(1) 6.99 (2) 7.01
(3) 6.98 (4) 7.02

74. 6.02×10^{21} molecules of urea are present in 100 mL of its solution. The concentration of solution is
(1) 1 M (2) 0.1 M
(3) 0.01 M (4) 0.02 M

75. Consider the following two statements.

Statement I: Aurous chloride and auric chloride are written as Au(I)Cl and Au(III)Cl_3 in stock notation.

Statement II: A reagent which lowers the oxidation number of an element in given substances is called reductant.

In the light of above two statements choose the **correct** option.

(1) Both statement I and statement II are correct

(2) Both statement I and statement II are incorrect

(3) Statement I is incorrect and statement II is correct

(4) Statement I is correct and statement II is incorrect

76. The correct set of four quantum numbers of the valence electron of K [Z = 19] atom is

	n	ℓ	m	s
(1)	4	2	0	$+\frac{1}{2}$
(2)	4	2	1	$-\frac{1}{2}$
(3)	4	0	0	$+\frac{1}{2}$
(4)	4	1	0	$-\frac{1}{2}$

77. Select correct statement about boric acid (H_3BO_3).

(1) It is a Bronsted acid

(2) It is a Lewis acid

(3) It is an Arrhenius acid

(4) It is as stronger acid as chloric acid

78. Which of the following will react with NaOH most readily?

(1) 

(2) 

(3) 

(4) 

79. Two liquids A and B are mixed in a molar ratio of 2 : 3. If $P_A^o = 100$ mmHg and $P_B^o = 300$ mmHg, then the mole fraction of A in vapour phase is

(1) $\frac{2}{11}$ (2) $\frac{2}{5}$

(3) $\frac{3}{5}$ (4) $\frac{10}{11}$

80. Structure of XeO_2F_2 is

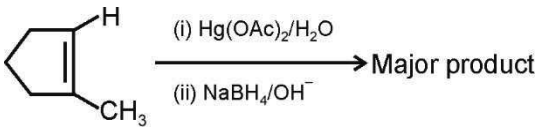
(1) Tetrahedral

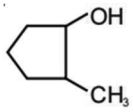
(2) Square pyramidal

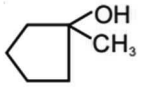
(3) See-saw

(4) T-shaped

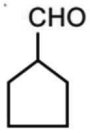
81. Major product in the given reaction is



(1) 

(2) 

(3) 

(4) 

82. Match cations given in List-I with their colour of flame observed by naked eye in List-II and choose correct option.

	List-I (Cations)		**List-II (Colour of flame observed by naked eye)**
(a)	Cu^{2+}	(i)	Green flame with blue centre
(b)	Sr^{2+}	(ii)	Brick red
(c)	Ba^{2+}	(iii)	Crimson red
(d)	Ca^{2+}	(iv)	Apple green

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

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

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

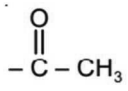
(4) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

83. The mole of $K_2Cr_2O_7$ required to oxidise one mole of ferrous sulphate in acidic medium is

(1) $\frac{1}{7}$ (2) $\frac{1}{3}$

(3) $\frac{1}{6}$ (4) $\frac{1}{2}$

84. Which of the following group is ortho/para directing when attached with benzene ring?

(1) – CHO (2) 

(3) – $NHCOCH_3$ (4) – NO_2

85. A 5% (w/v) solution of sucrose (M.W. = 342 g) is isotonic with 1% (w/v) of a solution having an unknown non-electrolytic/non-associating solute at same temperature. The molar mass of unknown solute (in g/mol) is

(1) 34.2 (2) 136.2

(3) 171.2 (4) 68.4

86. Given below are two statement: one is labelled as Assertion (A) and other is labelled as Reason (R).

Assertion (A): Aromatic primary amines cannot be prepared by Gabriel phthalimide synthesis.

Reason (R): Aryl halides do not undergo nucleophilic substitution with anion formed by phthalimide.

In light of above statement, choose the most appropriate answer from the options given below.

(1) Both assertion and reason are true and reason is the correct explanation of the assertion

(2) Both assertion and reason are true but reason is not the correct explanation of the assertion

(3) Assertion is true but reason is false

(4) Both assertion and reason are false statements

87. Consider the following statements.

Statement I : ΔH_f° of graphite is zero.

Statement II : Reference state of carbon is graphite.

In the light of above statements, choose the **correct** option.

(1) Statement I is correct and statement II is incorrect

(2) Statement I is incorrect and statement II is correct

(3) Both statement I and statement II are correct

(4) Both statement I and statement II are incorrect

88. Number of electrons present in 10 g of D_2O is

(1) $10N_A$ (2) N_A

(3) $5N_A$ (4) $20N_A$

89. A first order reaction has a specific reaction rate of $2 \times 10^{-2}\ s^{-1}$. Time taken by 80 g of the reactant to reduce to 20 g is

(1) 277.2 s

(2) 138.6 s

(3) 104.32 s

(4) 69.3 s

90. Consider the following statements.

a. Chloroform is slowly oxidised by air in presence of light to form phosgene.

b. The chlorofluorocarbon compounds of methane and ethane are collectively known as freons.

c. DDT is used as insecticide.

In the light of above statements, choose the correct option.

(1) a and b only

(2) a and c only

(3) b and c only

(4) a, b and c

BOTANY

91. Read the following statements and select the **correct** option.

Assertion (A): Both DNA and RNA have the ability to direct their duplications.

Reason (R): Both DNA and RNA follows the rule of base pairing and complementarity.

(1) Both (A) and (R) are true and (R) is the correct explanation of (A)

(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false

(4) (A) is false but (R) is true

92. Which among the following characteristics of plant is **not** found in the members of Fabaceae?

(1) Vexillary aestivation of corolla

(2) Unilocular ovary with many ovules

(3) Actinomorphic flower

(4) Papilionaceous corolla

93. Which of the following is **not** a functional aspect of an ecosystem?

(1) Stratification (2) Productivity

(3) Decomposition (4) Nutrient cycling

94. Select the **odd** one out w.r.t. role of predators in an ecosystem.
(1) They act as conduits for energy transfer across trophic levels
(2) They help in maintaining species diversity in a community
(3) They keep prey populations under control
(4) They enhance the intensity of competition among competing prey species

95. According to Species-Area relationship proposed by Alexander von Humboldt,
(1) Within a region species richness always increases with increasing explored area
(2) The relation between species richness and area for a wide variety of taxa turns out to be a rectangular hyperbola
(3) The relationship is a hyperbola on a logarithmic scale
(4) The slope of the line becomes steeper for smaller areas

96. Which of the following organisms got extinct from Australia?
(1) Quagga
(2) Thylacine
(3) Dodo
(4) Steller's Sea Cow

97. Select the property that is **incorrect** w.r.t. humus.
(1) Dark coloured
(2) Amorphous
(3) Undergoes decomposition at an extremely slow rate
(4) Highly susceptible to microbial action

98. *Trichoderma* is used as a biocontrol agent against
(1) Several plant pathogens
(2) Aphids
(3) Mosquitoes
(4) Butterfly caterpillars

99. Which of the following chromosomes in humans have least number of genes?
(1) Chromosome 1
(2) Chromosome Y
(3) Chromosome X
(4) Chromosome 2

100. Which of the following codon does have a specific tRNA?
(1) AUG (2) UAA
(3) UAG (4) UGA

101. Read the following statements and select the **correct** one(s) w.r.t. sickle-cell anaemia.
(a) Disease is transmitted to the offspring when one of the parent is sickle cell anaemic, and the other one is normal (homozygous).
(b) The defect is caused by the deletion of nucleotide from codon that codes for glutamic acid.
(c) Heterozygous individual, has 50% probability of transmission of the mutant gene to progeny.
(1) (a) and (b) only
(2) (b) only
(3) (c) only
(4) All (a), (b) and (c)

102. Read the following characteristics
(a) They form an aggregation, which may grow and spread over several feet, under favourable conditions.
(b) They have spores with true walls.
(c) They have heterotrophic mode of nutrition.
Identify the **correct** group based on the above characteristics.
(1) Protozoans
(2) Dinoflagellates
(3) Slime moulds
(4) Euglenoids

103. How many of the given statements is/are **correct**?
(a) Bryophytes are homosporous plants.
(b) Gymnosperms are first plants to show events precursor to seed habit.
(c) Heterospory is present in *Selaginella*.
(d) Prothallus is formed in the life cycle of *Dryopteris*.
(1) Two (2) Three
(3) Four (4) One

104. Monocot root differs from dicot root as the former is
(1) Having sclerenchymatous hypodermis
(2) Lacking secondary growth
(3) Having casparian strips in endodermis
(4) Lacking radial vascular bundles

105. Find the **incorrect** statement regarding the structure of plasma membrane.
(1) Non-polar tails of phospholipids are composed of saturated hydrocarbons
(2) Membrane of human RBC approximately has 52 percent proteins and 40 percent lipids
(3) Polar head of phospholipids are arranged towards outer side of membrane and interact with water
(4) Peripheral proteins run throughout the lipid bilayer and their removal requires crude methods of treatment like detergents

106. Match the column A and column B and select the **correct** option.

	Column A		Column B
a.	Bivalent formation	(i)	Pachytene
b.	Dissolution of synaptonemal complex	(ii)	Diakinesis
c.	Terminalisation of chiasmata	(iii)	Zygotene
d.	Crossing over	(iv)	Diplotene

(1) a-(ii), b-(iii), c-(iv), d-(i)
(2) a-(iii), b-(ii), c-(i), d-(iv)
(3) a-(iii), b-(iv), c-(ii), d-(i)
(4) a-(ii), b-(iv), c-(iii), d-(i)

107. Read the following statements and choose the **correct** set of statement(s) w.r.t. ovule of angiosperms.
a. Megasporangia are commonly called as ovule
b. Hilum is the region where body of the ovule fuses with funicle.
c. Each ovule is surround by more than two integuments
d. Chalaza represents the basal part of ovule
(1) a and b only (2) a and d only
(3) b and c only (4) a, b and d only

108. Read the given reasons for choosing *Drosophila melanogaster* as an experimental model to study genetics, and select the **incorrect** ones.
(a) A single mating produces very few offspring.
(b) It shows many types of hereditary variations.
(c) It has a short life span of about two days.
(d) It has four morphologically distinct chromosomes.
(1) a and b only (2) a, c and d only
(3) c and d only (4) a and c only

109. Select a population interaction from the following, in which neither of the interacting species gets harmed.
(1) Goats and Abingdon tortoise of Galapagos islands
(2) *Cuscuta* growing on hedge plants
(3) Orchid growing on the mango branch
(4) Plants and herbivorous animals

110. The taxonomic category to which wheat belongs is
(1) Poaceae (2) *Solanum*
(3) Sapindales (4) Anacardiaceae

111. Read the following statements and select the **correct** option.
Assertion (A): Chasmogamous flowers are invariably autogamous.
Reason (R): In chasmogamous flowers, there is no chance of cross-pollen landing on the stigma.
(1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

112. Which of the following trait exhibit incomplete dominance?
(1) Pod colour in pea
(2) ABO blood group in humans
(3) Starch grain size in pea seeds
(4) Eye colour in *Drosophila*

113. Which of the following organisms is used as an experimental organism by T.H. Morgan to verify chromosomal theory of inheritance?
(1) *Drosophila melanogaster*
(2) *E.coli*
(3) *Streptococcus pneumoniae*
(4) Mice

114. In the grass family, the cotyledon of seed is called
(1) Epicotyl (2) Radicle
(3) Coleoptile (4) Scutellum

115. Which of the following function is **not** related to gibberellins?
(1) It improves the shape of apples
(2) It promotes female flowering in pineapples
(3) It speed up the malting process in brewing industry
(4) It promotes bolting in beet

116. Which of the following is the **correct** mathematical expression for arithmetic growth?
(1) $L_t = L_o + rt$ (2) $L_t = L_o - rt$
(3) $L_t = L_o \times rt$ (4) $L_t = L_o / rt$

117. Complex IV of mitochondrial ETS is
(1) NADH dehydrogenase
(2) Cytochrome c oxidase complex
(3) Succinate dehydrogenase
(4) Cytochrome bc_1 complex

118. The most crucial step of Calvin cycle is
(1) Aminoacylation (2) Carboxylation
(3) Reduction (4) Regeneration

119. In animal cells, centriole duplication occurs during
(1) G_0-phase (2) G_1-phase
(3) S-phase (4) G_2-phase

120. Splitting of centromere takes place during
(1) Telophase (2) Anaphase
(3) Metaphase (4) Prophase

121. If a bacterium whose doubling time is 30 mins, first allow to grow in a medium containing $^{14}NH_4Cl$ for many generations and then transferred to a medium with heavy nitrogen, what will be the proportion of light, hybrid and heavy DNA after 90 mins of transfer?
(1) 0%, 25%, 75% (2) 0%, 50%, 50%
(3) 25%, 25%, 50% (4) 75%, 25%, 0%

122. If in a dsDNA 'T' content is 30%, then what is the content of A and C, respectively?
(1) 30% and 40% (2) 30% and 20%
(3) 20% and 30% (4) 40% and 20%

123. How many of the given is/are autosomal disorder(s)?
Haemophilia, Phenylketonuria, Sickle cell anaemia, Myotonic dystrophy, colourblindness, Thalassemia
(1) Four (2) Two
(3) Six (4) Three

124. A normal woman whose father was haemophilic, marries a normal man. What will be the probability of their son to be haemophilic?
(1) 50% (2) 0%
(3) 100% (4) 25%

125. An immunosuppressive agent used in organ transplant patients is A and it is produced by B .

	A	B
(1)	Statins	*Monascus purpureus*
(2)	Lipase	*Candida lipolytica*
(3)	Cyclosporin A	*Trichoderma polysporum*
(4)	Streptokinase	*Streptococcus*

126. Terminal centromere is observed in
(1) Metacentric chromosomes
(2) Telocentric chromosomes
(3) Acrocentric chromosomes
(4) Sub-metacentric chromosomes

127. All of the following constitute stele, **except**
(1) Pericycle
(2) Endodermis
(3) Vascular bundles
(4) Pith

128. Whorled phyllotaxy is seen in
(1) China rose
(2) Mustard
(3) Sunflower
(4) *Alstonia*

129. Which of the following does not has root, stem and leaf like structure?
(1) *Funaria*
(2) *Polytrichum*
(3) *Marchantia*
(4) *Sphagnum*

130. Sleeping sickness is caused by
(1) *Trypanosoma* (2) *Paramoecium*
(3) *Amoeba* (4) *Plasmodium*

131. Choose the **correct** option w.r.t *Alternaria*
(1) Have aseptate mycelium
(2) Lack sexual reproduction
(3) Have short lived dikaryophase
(4) Have endogenously produced asexual spores

132. Find the **correct** one about brown algae
(1) Phycoerythrin imparts brown colour
(2) Cell wall contains agar
(3) Asexual spores are biflagellate pyriform structures
(4) Reserve food material is floridean starch

133. Select the **correct** match.
(1) Offset – *Oxalis*
(2) Rhizome – Ginger
(3) Sucker – Mint
(4) Stolon – *Eichhornia*

134. In cymose inflorescence
(1) Peduncle has unlimited growth
(2) The main axis terminates into a flower
(3) The flowers are borne in acropetal order
(4) Younger flowers are present towards the apex

135. Dicot stem and monocot stem cannot be differentiated on the basis of presence of
(1) Pith
(2) Endodermis
(3) Endarch xylem
(4) Scattered vascular bundles

ZOOLOGY

136. Simple epithelium is not present in the
(1) Walls of blood vessels
(2) Air sacs of lungs
(3) Tubular parts of nephrons
(4) Inner lining of ducts of salivary glands

137. In the members of the class Chondrichthyes,
(1) Gill slits are separate and are without operculum
(2) Fertilization is always external
(3) Sexes are not separate
(4) Teeth are modified cycloid scales

138. Which of the following pairs of connective tissues lack fibres of structural proteins?
(1) Bone and blood
(2) Blood and cartilage
(3) Blood and lymph
(4) Cartilage and adipose tissue

139. Which among the following is not a STI?
(1) Hepatitis-B (2) Chikungunya
(3) Genital herpes (4) Genital warts

140. In case of common Indian male frog, all of the following structures are associated with cloaca, **except**
(1) Vasa efferentia
(2) Urinary bladder
(3) Rectum
(4) Urinogenital duct

141. Which of the following is **true** w.r.t. DNA fragments during gel electrophoresis?
(1) Larger the DNA fragment, the faster it moves towards the anode
(2) It is used for separation of positively charged DNA fragments
(3) Negatively charged DNA fragments move towards the anode
(4) Ethidium bromide is commonly used as a matrix

142. Choose the **incorrect** statement among the following w.r.t. the respiratory system of *Periplaneta*.
(1) The respiratory system consists of a network of trachea.
(2) Tracheae open through 10 spiracles present on the lateral side of the body.
(3) The opening of the spiracles are regulated by the sphincters.
(4) Exchange of gases takes place at the tracheoles by diffusion.

143. In *Periplaneta americana*, a ring of 6-8 blind tubules, which secrete digestive juice is present
(1) At the junction of midgut and hindgut
(2) In the hindgut
(3) Between gizzard and mesenteron
(4) Between crop and gizzard

144. Select the **correct** sequence from the following w.r.t evolution of plants through geological periods.

(1) Tracheophyte ancestors → Chlorophyte ancestors → Progymnosperms → *Psilophyton*

(2) *Rhynia*-type plants → Chlorophyte ancestors → Tracheophyte ancestors → *Psilophyton*

(3) Chlorophyte ancestors → Tracheophyte ancestors → *Psilophyton* → *Rhynia*-type plants

(4) Chlorophyte ancestors → Tracheophyte ancestors → *Rhynia*-type plants → *Psilophyton*

145. Arrange the given steps of muscle contraction in their chronological order and select the correct option.

(a) Release of Ca^{2+} into sarcoplasm

(b) Actin – myosin complex formation

(c) Sliding of actin filaments over myosin filaments

(d) Release of acetylcholine at neuromuscular junction

(1) a → d → c → b (2) d → c → b → a

(3) d → a → b → c (4) b → c → d → a

146. Select the **odd** one w.r.t. nucleosides.

(1) Guanosine

(2) Cytosine

(3) Adenosine

(4) Uridine

147. Which of the given functions is not associated with glucocorticoids?

(1) Immuno-suppressive function

(2) Produce anti inflammatory reactions

(3) Stimulate glycogenesis

(4) Stimulate RBC formation

148. All of the following diseases spread by the female members of the largest phylum of the kingdom Animalia, **except**

(1) Dengue

(2) Chikungunya

(3) Ascariasis

(4) Filariasis

149. Choose the **incorrect** match from the following w.r.t zoological name of the given organisms.

(1)	*Pennatula*	–	Sea-pen
(2)	*Gorgonia*	–	Sea-fan
(3)	*Adamsia*	–	Sea anemone
(4)	*Antedon*	–	Sea urchin

150. Select the **incorrect** statement w.r.t. different types of respiratory organs found in animals.

(1) Lower invertebrates like sponges, flatworms *etc.*, exchange O_2 and CO_2 by simple diffusion over their entire body surface.

(2) Most of the aquatic arthropods perform branchial respiration.

(3) All fishes, amphibians and reptiles respire through lungs.

(4) Frogs can respire through their moist skin.

151. All of the following contraceptive methods belong to the same category, **except**

(1) Coitus interruptus

(2) Cervical caps

(3) Periodic abstinence

(4) Lactational amenorrhea

152. Which of the following statements is **incorrect** w.r.t. regulation of respiration in humans under normal physiological conditions?

(1) Respiratory rhythm centre is present in the medulla region of the hindbrain.

(2) Pneumotaxic centre present in the pons region of midbrain can moderate the functions of respiratory rhythm centre.

(3) Chemosensitive area is highly sensitive to CO_2 and hydrogen ions concentration.

(4) Neural signal from pneumotaxic centre can reduce the duration of inspiration.

153. Comprehend the given statements.

(a) LH surge is responsible for causing menstrual phase.

(b) LH acts at the Leydig cells and stimulates the synthesis and secretion of androgens.

(c) Oogenesis starts at puberty due to significant increase in GnRH.

Select the option with **incorrect** statements only.

(1) (a) and (c) only (2) (b) and (c) only

(3) (a) and (b) only (4) (a), (b) and (c)

154. How many of the below given features are not true for human heart?

a. Atria are two relatively large upper chambers w.r.t. ventricles.

b. Inter-atrial septum is a thick fibrous wall.

c. Atrio-ventricular septum is a thin muscular tissue

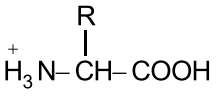
d. Mitral valve is formed of two muscular flaps.

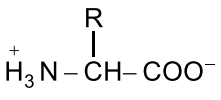
Select the **correct** option.

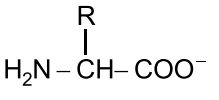
(1) Two (2) One

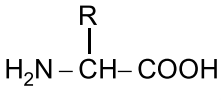
(3) Three (4) Four

155. Which of the following is a zwitterionic form?

(1) 

(2) 

(3) 

(4) 

156. Which of the following correctly defines spermiogenesis?

(1) The release of sperms from the seminiferous tubules

(2) The transformation of spermatids into spermatozoa

(3) The formation of secondary spermatocytes

(4) Transformation of spermatogonium into primary spermatocytes

157. Which of the following features is **not** true for *Rana*?

(1) Can live in aquatic as well as in terrestrial habitat

(2) Body is covered by dry and cornified skin

(3) The eyes have eyelids

(4) They are cold-blooded animals

158. Choose the **odd** one w.r.t. paired facial bones in humans.

(1) Maxilla (2) Mandible

(3) Nasal (4) Lacrimal

159. Opening of the wind pipe in pharynx through the larynx is known as

(1) Epiglottis

(2) Primary bronchi

(3) Glottis

(4) Trachea

160. Which of the following does not hold true for hypothalamus in humans?

(1) It lies at the base of thalamus in the forebrain.

(2) The hypothalamus contains a number of centres which control body temperature, urge for eating and drinking.

(3) Adenohypophyseal hormones are secreted by several groups of neurosecretory cells, present in hypothalamus.

(4) It is also involved in the regulation of sexual behaviour.

161. **Assertion (A):** Cardiac output is a variable quantity in mammals.

Reason (R): Mammals have the ability to alter the stroke volume as well as the heart rate.

In the light of above statements choose the **correct** answer from the options given below.

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A)

(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

(3) (A) is correct, (R) is incorrect

(4) Both (A) and (R) are incorrect

162. The medulla oblongata contains centres which control all of the following functions, **except**

(1) Gastric secretions

(2) Expression of emotional reactions

(3) Cardiovascular reflexes

(4) Respiration

163. Choose the **incorrect** match w.r.t. a normal human.

(1)	Amount of urea excreted	-	25-30 gm/day
(2)	Urine output	-	1.5 litres/day
(3)	GFR	-	235 mL/minute
(4)	Amount of CO_2 removed by lungs	-	200 mL/minute

164. Choose the **correct** statement.

(1) Tobacco has been used by human beings for not more than 40 years.

(2) Tobacco contains nicotine which is an opioid.

(3) Nicotine stimulates adrenal cortex to release adrenaline and nor adrenaline.

(4) Tobacco chewing is associated with increased risk of cancer of the oral cavity.

165. Substances like sterols, hydrocarbons and waxes are removed from the human body through
(1) Expired air
(2) Sweat
(3) Sebum
(4) Saliva

166. Choose the incorrect statement w.r.t. a thyroid hormone which is chemically non-proteinaceous.
(1) It supports the process of red blood cell formation.
(2) It influences the maintenance of water and electrolyte balance.
(3) It interacts with membrane-bound receptors.
(4) It controls the metabolism of carbohydrates, proteins and fats.

167. Clavicle bone of human articulates with **'A'**. Below **'A'** is a depression called the **'B'** which articulates with the head of the humerus.
Identify A and B. Choose the **correct** option.

	A	**B**
(1)	Spine	Glenoid cavity
(2)	Scapula	Acetabulum
(3)	Acromion process	Glenoid cavity
(4)	Radius	Socket of vertebra

168. Which of the following is not **true** for insulin and glucagon?
(1) Both are chemically peptides
(2) Both play a major role in the regulation of glucose homeostasis
(3) Both act mainly on hepatocytes
(4) Both reduce the cellular glucose uptake and utilisation

169. In humans, the cerebral cortex contains large regions that are neither clearly sensory nor motor in function. These regions are called
(1) Appetite centre
(2) Neurosecretory areas
(3) Pneumotaxic centre
(4) Association areas

170. All of the following are paired structures w.r.t. human male reproductive system, **except**
(1) Bulbourethral gland
(2) Prostate gland
(3) Seminal vesicle
(4) Vas deferens

171. If more than one adaptive radiations appeared to have occurred in an isolated geographical area, one can call this
(1) Disruptive selection
(2) Genetic drift
(3) Co-evolution
(4) Convergent evolution

172. In humans, heart failure can be defined as the state of heart when
(1) The heart muscle is suddenly damaged by an inadequate blood supply
(2) The heart stops beating
(3) The heart is not pumping blood effectively enough to meet the needs of the body
(4) The lumen of coronary arteries become narrower due to deposits of fat, cholesterol, *etc*.

173. In a plasmid, the specific region of DNA responsible for initiating the replication is
(1) Antibiotic resistance gene
(2) Recognition site
(3) *ori*
(4) Recombinant site

174. A rapid decline in which of the following factors cannot be considered as probable reason for increase in population growth rate of humans?
(1) Death rate
(2) Maternal mortality rate
(3) Infant mortality rate
(4) Number of people in reproducible age

175. Read the following statements w.r.t. gestation in a human female and choose the **correct** option.
Statement A: During 5th month of gestation, foetus starts to move within the uterus.
Statement B: Foetal ejection reflex triggers the release of oxytocin from foetal pituitary gland to induce labor pain.
(1) Both statements A and B are correct
(2) Both statements A and B are incorrect
(3) Statement A is correct and B is incorrect
(4) Statement A is incorrect and B is correct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