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MM : 720

Final Test Series(P2)-2024-25_Test-01D

Time : 180 Min.

Topics Covered:**Physics:** Dual Nature of Radiation and Matter, Atoms, Nuclei, Semiconductor Devices, Experimental Skills**Chemistry:** Some Basic Concepts of Chemistry, Structure of Atom, Classification of Elements and Periodicity in Properties, Chemical Bonding and Molecular Structure**Botany:** The Living World, Biological Classification, Plant Kingdom**Zoology:** Human Reproduction, Reproductive Health, Evolution**General Instructions :**

Duration of Test is 3 hrs.

The Test consists of 180 questions. The maximum marks are 720.

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

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.

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.

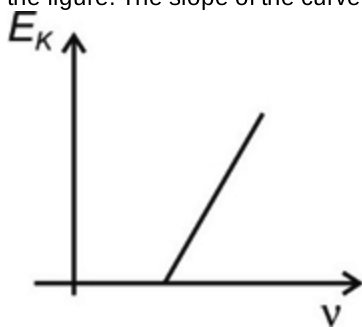
Dark the circle in the space provided only.

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

- Which of the following can be the angular momentum of an electron orbiting in a hydrogen atom?
 - $\frac{h}{\pi}$
 - $\frac{h}{3\pi}$
 - $\frac{h}{4\pi}$
 - $\frac{3h}{4\pi}$
- Circumference of orbit of 2nd excited state of electron in H like atom is C. The de-Broglie wavelength associated with the orbit is
 - C
 - $\frac{C}{2}$
 - $\frac{C}{3}$
 - $\frac{C}{4}$
- If 200 MeV energy is released in the fission of a single nucleus of $^{235}_{92}\text{U}$, the fissions which are required per second to produce a power of 1 kW is
 - 1.25×10^{11}
 - 3.125×10^{13}
 - 2.25×10^{14}
 - 6.25×10^{13}

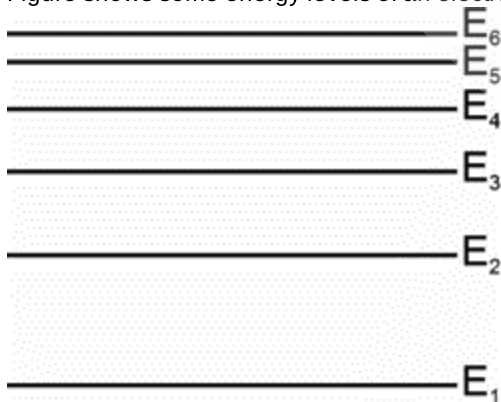
4. In an experiment of photoelectric effect, the maximum kinetic energy E_K of the emitted photoelectron is plotted against the frequency ν of the incident photon as shown in the figure. The slope of the curve gives



- (1) Charge of the electron
(2) Work function of the metal
(3) Planck's constant
(4) Ratio of the Planck's constant to electronic charge
5. The de-Broglie wavelength of an atom of mass m at absolute temperature T K will be (K is Boltzmann constant)

- (1) $\frac{h}{mKT}$
(2) $\frac{h}{\sqrt{3mKT}}$
(3) $\frac{\sqrt{3mKT}}{h}$
(4) $\sqrt{3mKT}$

6. Figure shows some energy levels of an electron in H-atom



Which among the following transitions produces photon of wavelength in visible region of electromagnetic spectrum?

- (1) $E_2 - E_1$
(2) $E_3 - E_2$
(3) $E_5 - E_4$
(4) $E_6 - E_5$

7. The radius of a spherical nucleus as measured by electron scattering is 3.6 fm. What is the likely mass number of the nucleus? (use $R = R_0 A^{1/3}$, where $R_0 = 1.2$ fermi)

- (1) 27
(2) 40
(3) 56
(4) 120

8. In a full wave rectifier circuit operating from 50 Hz mains frequency, the ripple frequency in output would be

- (1) 50 Hz
(2) 25 Hz
(3) 100 Hz
(4) 707 Hz

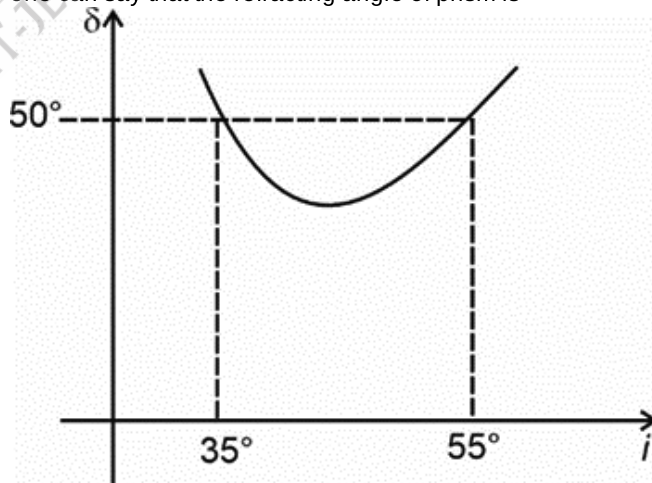
9. Read following statements **A** and **B** carefully and choose the **correct** option

Statement A: In Thomson's model, an atom is a spherical cloud of positive charges with electrons embedded in it.

Statement B: In Rutherford's model, most of the mass of the atom and all its positive charges are concentrated in a tiny nucleus (typically one by ten thousand the size of an atom), and the electrons revolve around it.

- (1) Only statement A is correct
(2) Only statement B is correct
(3) Both the statements A and B are correct
(4) Neither statement A nor B is correct

10. A plot between the angle of deviation and angle of incidence for a prism is shown in the figure. From the graph one can say that the refracting angle of prism is

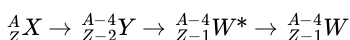


- (1) 40°
(2) 46°
(3) 48°
(4) 50°

11. In an experiment to measure diameter of a wire, a vernier calliper is used in which 9 main scale divisions of the calliper coincide with 10 vernier scale divisions. One main scale division is 2 mm. When nothing is in between the jaws, it is found that zero of vernier lies slightly to the left of zero of main scale and 5th division of vernier scale coincides with some division of main scale. The zero error has a magnitude of

- (1) 1 mm
- (2) 1.2 mm
- (3) 1.4 mm
- (4) 0.8 mm

12. The radioactive radiations are emitted in the reaction given below. The correct sequence is

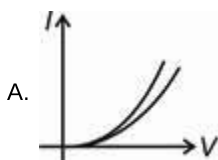


- (1) γ , α , β^-
- (2) β^- , α , γ
- (3) α , γ , β^-
- (4) α , β^- , γ

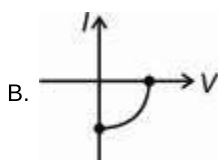
13. Some V - I characteristics of special purpose diodes are given in column-I and the name of the diodes are given in column-II. Match the column-I with column-II.

Column-I

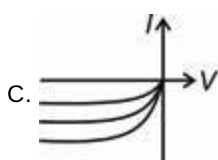
Column-II



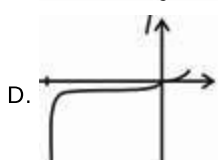
P. Zener diode



Q. Solar cell



R. LED



S. Photodiode

- (1) A \rightarrow R, B \rightarrow P, C \rightarrow Q, D \rightarrow S
- (2) A \rightarrow S, B \rightarrow R, C \rightarrow Q, D \rightarrow P
- (3) A \rightarrow P, B \rightarrow Q, C \rightarrow R, D \rightarrow S
- (4) A \rightarrow R, B \rightarrow Q, C \rightarrow S, D \rightarrow P

14. Three α -particles fuse to form a carbon (${}^{12}_6\text{C}$) nucleus. If $m({}^4_2\text{He}) = 4.002603$ amu, then the energy released in this reaction is nearly

- (1) 16.52 MeV
- (2) 7.27 MeV
- (3) 0.73 MeV
- (4) 1.27 MeV

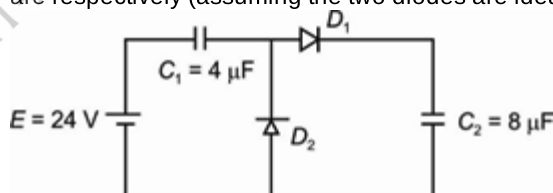
15. Which of the following option is incorrect?

- (1) Pure silicon doped with trivalent impurity gives p -type semiconductor
- (2) Majority charge carriers in p -type semiconductor are holes
- (3) Minority charge carriers in n -type semiconductor are holes
- (4) The resistance of intrinsic semiconductor increases with increase of temperature

16. When the momentum of a proton is increased by an amount P_0 , the corresponding change in de-Broglie wavelength is found to be 10%. Then the original momentum of the proton was

- (1) $3P_0$
- (2) $9P_0$
- (3) $10P_0$
- (4) $5P_0$

17. In the circuit shown, the potential drop across C_1 and C_2 are respectively (assuming the two diodes are ideal)



- (1) 2 V, 1 V
- (2) 3 V, 9 V
- (3) 16 V, 8 V
- (4) 2 V, 8 V

18. **Assertion (A):** In the Lyman series, the ratio of minimum and maximum wavelength is $3/4$.

Reason (R): Lyman series constitute spectral lines corresponding to the transition from higher energy to first excited state of hydrogen atom.

- (1) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
- (2) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
- (3) Assertion is correct, but reason is wrong statement.
- (4) Both assertion and reason are wrong statements.

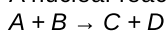
19. A semiconductor with a energy band gap of 2.48 eV is used to fabricate a $p-n$ junction photodiode. It cannot detect the signal of

(1) 4800 Å
(2) 6000 Å
(3) 2400 Å
(4) 4500 Å

20. In Rutherford α -particle scattering experiment if impact parameter becomes minimum, the angle of scattering is

(1) Zero
(2) $\frac{\pi}{2}$
(3) $\frac{2\pi}{3}$
(4) π

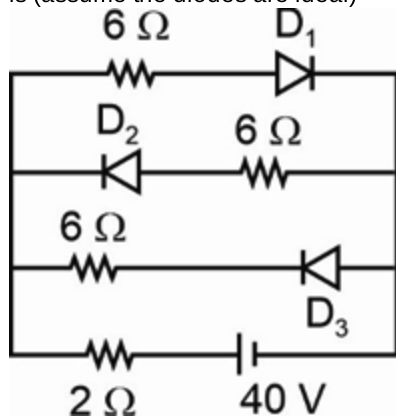
21. A nuclear reaction is given as



If binding energies of A , B , C and D are given as B_1 , B_2 , B_3 and B_4 respectively, then the energy released in the reaction will be

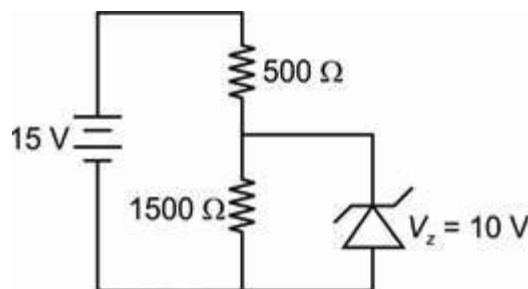
(1) $B_1 + B_2 - B_3 - B_4$
(2) $B_1 + B_2 + B_3 + B_4$
(3) $B_3 + B_4 - B_1 - B_2$
(4) $B_1 + B_2 + B_3 - B_4$

22. The current flowing through the battery as shown in figure, is (assume the diodes are ideal)



(1) 4 A
(2) 5 A
(3) 8 A
(4) 10 A

23. In the given circuit, the current through the Zener diode is



(1) 3.33 mA
(2) 5 mA
(3) 6.67 mA
(4) 10 mA

24. A 13.056 eV radiation is used to bombard gaseous hydrogen at room temperature. Highest energy level upto which hydrogen atoms would be excited, is

(1) $n = 3$
(2) $n = 4$
(3) $n = 5$
(4) $n = 6$

25. The correct statements about Bohr's postulate among the following are :

A. Electron can revolve in certain stable orbits without the emission of radiant energy.
B. Each atom has certain definite stable states in which it can exist.
C. Each stationary state of atom has definite total energy.
D. It proves the predictions of electromagnetic theory.
Choose the correct answer from the options given below :

(1) A only
(2) A and B only
(3) A, B and C only
(4) A, B, C and D

26. The ratio of the speed of electron in 2nd to 4th orbit of hydrogen atom is

(1) 1 : 1
(2) 2 : 1
(3) 1 : 2
(4) 1 : 4

27. For intensity I of a light of wavelength 8000 Å, the photoelectron saturation current is 0.8 μ A and work function (W_0) of metal is 0.19 eV. The stopping potential (V_0) will be

(1) 0.25 V
(2) 1.36 V
(3) 2.55 V
(4) 2.74 V

28. A point source of monochromatic light is at a distance of 0.6 m away from a photoelectric cell. If the same source were to be placed much closer to the cell, then

- (1) Stopping potential will increase
- (2) Saturation current will increase
- (3) Stopping potential will decrease
- (4) Both (1) and (2)

29. Electrons in a hydrogen sample make transition from fifth excited state to orbit with principal quantum number 3. Maximum number of spectral lines emitted in the process is

- (1) 6
- (2) 12
- (3) 16
- (4) 8

30. When a uranium isotope ${}_{92}^{235}\text{U}$ is bombarded with a neutron, it generates ${}_{54}^{140}\text{Xe}$, two neutrons and

- (1) ${}_{36}^{89}\text{Kr}$
- (2) ${}_{41}^{99}\text{Nb}$
- (3) ${}_{38}^{94}\text{Sr}$
- (4) ${}_{56}^{144}\text{Ba}$

31. The radius of first stationary orbit in Bohr's atomic model of hydrogen atom is R . The radius of the third orbit will be

- (1) $3R$
- (2) $4.5R$
- (3) $9R$
- (4) $\frac{R}{3}$

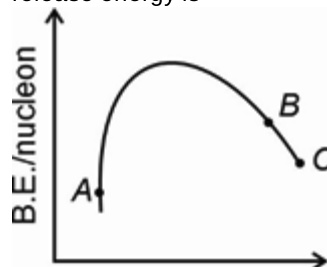
32. Match list-I with list-II.

	List-I (Nuclei)		List-II (Corresponding property)
A.	${}_{11}^{23}\text{Na}$, ${}_{12}^{24}\text{Mg}$	(I)	Isobars
B.	${}_{11}^{23}\text{Na}$, ${}_{11}^{24}\text{Na}$	(II)	Isotones
C.	${}_{11}^{24}\text{Na}$, ${}_{12}^{24}\text{Mg}$	(III)	Isotopes

Choose the correct answer from the options given below.

- (1) A – (I), B – (II), C – (III)
- (2) A – (II), B – (III), C – (I)
- (3) A – (II), B – (I), C – (III)
- (4) A – (III), B – (II), C – (I)

33. Binding energy (B.E.) per nucleon versus mass number curve for nuclei is shown in the figure below. A, B and C are three nuclei indicated on the curve. The process that will not release energy is



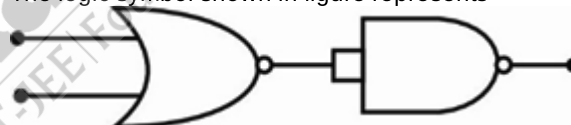
- (1) $2A \rightarrow B$
- (2) $C \rightarrow 2A$
- (3) $B \rightarrow A + C$
- (4) Both (2) and (3)

34. The correct statements about photon picture of electromagnetic radiation among the following are:

- A. During interaction with matter, radiation behaves as if it is made up of photons.
- B. Photon energy is proportional to intensity of radiation.
- C. Photons are not deflected by electric and magnetic fields.

- (1) A and C only
- (2) B only
- (3) B and C only
- (4) A, B and C

35. The logic symbol shown in figure represents



- (1) OR gate
- (2) AND gate
- (3) NOR gate
- (4) NAND gate

36. In resonance tube experiment if the second and third resonating length are l_2 and l_3 respectively, then end correction for the tube is

- (1) $\frac{l_3 - l_2}{2}$
- (2) $\frac{l_3 - 2l_2}{2}$
- (3) $\frac{l_3 - 3l_2}{2}$
- (4) $\frac{3l_3 - 5l_2}{2}$

37. When p-n junction diode is reverse biased, then
- The depletion region is reduced and barrier height is increased
 - The depletion region is widened and barrier height is reduced
 - Both the depletion region and barrier height are reduced
 - Both the depletion region and barrier height are increased
38. In an intrinsic semiconductor, the intrinsic carrier concentration is $10^{18}/\text{m}^3$. On doping with phosphorus, the electron concentration becomes $2 \times 10^{22}/\text{m}^3$. Then the hole concentration in the doped semiconductor is
- $2 \times 10^4/\text{m}^3$
 - $5 \times 10^{14}/\text{m}^3$
 - $5 \times 10^{13}/\text{m}^3$
 - $4 \times 10^{26}/\text{m}^3$
39. At 0 K, all the electrons of semiconductor will reside in the
- Forbidden band
 - Valence band
 - Conduction band
 - Both (1) and (3)
40. Consider, two very light nuclei ($A \leq 10$) joining to form a heavier nucleus in an exothermic reaction. Then correct statement is
- The final system is more tightly bound than the initial system
 - This process is called fusion
 - The binding energy per nucleon of the product nuclei is more than of reactant nuclei
 - All of these
41. Two nucleons are at a separation of 0.7 fm, 0.9 fm and 1.2 fm corresponding to which, the respective nuclear force between the nucleons is
- Attractive, attractive, attractive
 - Repulsive, attractive, attractive
 - Repulsive, repulsive, attractive
 - Repulsive, repulsive, repulsive
42. A nucleus ruptures into two nuclear parts which have their velocities in the ratio of 2 : 1. What will be the ratio of their nuclear sizes (radii)?
- 2 : 1
 - $1 : 2^{1/3}$
 - $3^{1/2} : 1$
 - $1 : 3^{1/2}$
43. The ratio of the de-Broglie wavelength associated with an electron in second excited state to the first excited state of a hydrogen atom is
- $\frac{9}{4}$
 - $\frac{2}{3}$
 - $\frac{3}{2}$
 - $\frac{4}{9}$
44. Ratio of angular momentum to angular speed of electron in n^{th} orbit of hydrogen atom is directly proportional to
- $\frac{1}{n^4}$
 - n^4
 - $\frac{1}{n}$
 - n
45. For a proton accelerated through V volts, de Broglie wavelength is given as
- $\frac{12.27}{\sqrt{V}} \text{ \AA}$
 - $\frac{0.286}{\sqrt{V}} \text{ \AA}$
 - $\frac{0.101}{\sqrt{V}} \text{ \AA}$
 - $\frac{0.202}{\sqrt{V}} \text{ \AA}$

46. Maximum number of atoms are present in

- (1) 1 g H₂ gas
- (2) 2 g He gas
- (3) 8 g O₂ gas
- (4) 6 g NH₃ gas

47. Law of multiple proportions is applicable to

- (1) H₂S and H₂O
- (2) CS₂ and CO₂
- (3) NH₃ and NO₂
- (4) CO and CO₂

48. One mole sample of FeO is heated in air until it is completely converted into Fe₂O₃. The percentage increase in weight of sample is [Given: Atomic mass of Fe = 56]

- (1) 10.58%
- (2) 20.28%
- (3) 35.35%
- (4) 11.11%

49. 56 g of N₂ gas is reacted with 18 g of H₂ gas. Mole of ammonia produced in the process is

- (1) 6
- (2) 4
- (3) 5
- (4) 3

50. The de-Broglie wavelength for an electron moving with kinetic energy of 4.55×10^{-23} J is

($h = 6.626 \times 10^{-34}$ Js, $m_e = 9.1 \times 10^{-31}$ kg)

- (1) 65.25 nm
- (2) 79.41 nm
- (3) 72.81 nm
- (4) 53.84 nm

51. The total number of electrons in chromium atom with $n + l = 3$, is

- (1) 8
- (2) 2
- (3) 10
- (4) 6

52. Which of the following pairs of orbitals will have electron density along the axes?

- (1) p_x, d_{xy}
- (2) p_y, d_{yz}
- (3) p_z, d_{zx}
- (4) p_x, d_{x²-y²}

53. If the wavelength of an electromagnetic radiation is 300 nm then the energy of a photon (in joule) will be ($h = 6.63 \times 10^{-34}$ Js, speed of light ($c = 3 \times 10^8$ ms⁻¹))

- (1) 6.63×10^{-18}
- (2) 6.63×10^{-17}
- (3) 6.63×10^{-19}
- (4) 6.63×10^{-16}

54. Given below are the two statements

Statement I: Magnetic quantum number gives information about the spatial orientation of the orbital with respect to standard set of co-ordinate axes.

Statement II: For $l = 0$, the only permitted value of $m_l = 0$

In light of above statements, choose the correct answer.

- (1) Statement I is correct but statement II is incorrect
- (2) Both statement I and statement II are correct
- (3) Both statement I and statement II are incorrect
- (4) Statement I is incorrect but statement II is correct

55. Match List-I with List-II.

List-I			List-II	
	n 1	n 2		Series
(a)	1	2, 3...	(i)	Brackett
(b)	4	5, 6...	(ii)	Paschen
(c)	3	4, 5...	(iii)	Pfund
(d)	5	6, 7...	(iv)	Lyman

The correct match is

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

56. Consider the following statements

- (a) Gallium is called Eka-aluminium
- (b) Sodium is more electropositive than potassium
- (c) Electron gain enthalpy of helium is positive

The correct statements are

- (1) (a) and (b) only
- (2) (a) and (c) only
- (3) (b) and (c) only
- (4) (a), (b) and (c)

57. Incorrect order of electron affinity is

- (1) $\text{Cl} > \text{Si} > \text{Na} > \text{Ar}$
- (2) $\text{Cl} > \text{F} > \text{Br} > \text{I}$
- (3) $\text{Cl} > \text{F} > \text{S} > \text{O}$
- (4) $\text{S} > \text{O} > \text{Se} > \text{Te}$

58. Match the compounds given in List-I with their chemical nature given in List-II

	List-I		List-II
(a)	Al_2O_3	(i)	Basic
(b)	N_2O	(ii)	Amphoteric
(c)	NO_2	(iii)	Neutral
(d)	CaO	(iv)	Acidic

Choose the correct answer from the options given below.

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

59. Which of the following statements are true regarding modern periodic table?

- (a) s-block elements of the same group have similar valence shell electronic configuration.
- (b) Metals comprise higher percentage than non-metals of the known elements.
- (c) The physical and chemical properties of elements vary periodically with their atomic numbers.

Choose the **correct** answer from the options given below.

- (1) (a) and (b) only
- (2) (a) and (c) only
- (3) (b) and (c) only
- (4) (a), (b) and (c)

60. Match column I with column II and choose the correct answer.

	Column I		Column II
a.	Palladium	(i)	Lanthanoid
b.	Chlorine	(ii)	Transition metal
c.	Thorium	(iii)	Halogen
d.	Samarium	(iv)	Actinoid

Choose the correct answer from the options given below.

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

61. Match the atomic number given in List-I with their IUPAC official name given in List-II.

	List-I		List-II
a.	106	(i)	Rutherfordium
b.	102	(ii)	Seaborgium
c.	101	(iii)	Nobelium
d.	104	(iv)	Mendelevium

Choose the correct answer from the options given below.

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

62. Which among the following molecule has longest covalent bond length?

- (1) $\text{C} = \text{C}$
- (2) $\text{C} \equiv \text{C}$
- (3) $\text{C} \equiv \text{N}$
- (4) $\text{C} = \text{O}$

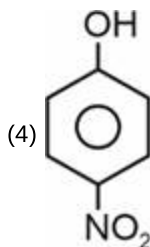
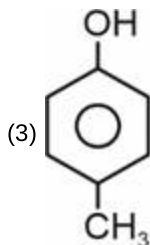
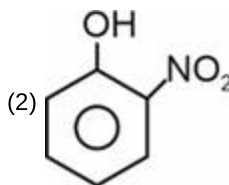
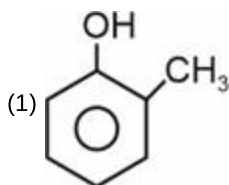
63. Hybridization of central atoms in the molecules $\text{N}(\text{CH}_3)_3$ and $\text{N}(\text{SiH}_3)_3$ respectively are

- (1) sp^2 and sp^2
- (2) sp^3 and sp^3
- (3) sp^2 and sp^3
- (4) sp^3 and sp^2

64. The hybridisation of Xe in XeF_4 , XeOF_4 and XeF_6 respectively are

- (1) sp^3 , sp^3d^2 , sp^3d^2
- (2) sp^3d^2 , sp^3d^2 , sp^3d^3
- (3) dsp^2 , sp^3d^2 , sp^3d^2
- (4) sp^3d , sp^3d , sp^3d^3

65. Intramolecular hydrogen bonding is observed in



66. Find out the incorrect match

- (1) O_2 molecule – 2 unpaired electrons
- (2) PBr_5 – Two different types of bond lengths
- (3) ClO_3 – Odd electron molecule
- (4) SF_4 – Bent T-shape

67. In which of the following processes, the stability increases and the magnetic behaviour changes?

- (1) $Li_2 \rightarrow Li_2^+$
- (2) $O_2 \rightarrow O_2^+$
- (3) $N_2^+ \rightarrow N_2$
- (4) $H_2 \rightarrow H_2^+$

68. Planar and non-polar species among the following is

- (1) $SiCl_4$
- (2) XeF_4
- (3) NH_4^+
- (4) PCl_3

69. Given below are two statements

Statement-I: The magnitude of hydrogen bonding is maximum in solid state and minimum in the gaseous state.

Statement-II: Intramolecular hydrogen bonding exists in p-nitrophenol.

In the light of above statements, identify the correct answer from the options given below.

- (1) Both statement I and statement II are incorrect
- (2) Both statement I and statement II are correct
- (3) Statement I is correct but statement II is incorrect
- (4) Statement I is incorrect but statement II is correct

70. The mole fraction of methanol when equal masses of methanol and ethanol are mixed together is

- (1) 39/23
- (2) 12/17
- (3) 23/39
- (4) 17/12

71. Number of mole of ethane required to produce 22 g of CO_2 gas after the complete combustion is excess of oxygen is

- (1) 0.5
- (2) 0.25
- (3) 0.75
- (4) 1

72. Number of hydrogen atoms per molecule of a hydrocarbon "X" having 85.8% carbon is (Given : Molar mass of X = 84 g mol^{-1})

- (1) 6
- (2) 12
- (3) 8
- (4) 10

73. Which of the following have same number of significant figure?

- (a) 0.00253
- (b) 1.0003
- (c) 11.0
- (d) 153

Choose the correct answer from the option given below.

- (1) (b) and (c) only
- (2) (a), (b) and (c) only
- (3) (a), (c) and (d) only
- (4) (c) and (d) only

74. Match List-I with List-II

	List-I		List-II
a.	30 g of $C_2H_6(g)$	(i)	Weight 28 g
b.	1 g of $H_2(g)$	(ii)	1.08×10^{25} electrons
c.	1 mole of $N_2(g)$	(iii)	Weight 32 g
d.	0.5 mole of $SO_2(g)$	(iv)	Occupies 11.2 L volume at STP

Choose the correct answer from the option given below.

- (1) a-(ii), b-(iv), c-(iii), d-(i)
 (2) a-(ii), b-(iv), c-(i), d-(iii)
 (3) a-(ii), b-(i), c-(iv), d-(iii)
 (4) a-(ii), b-(iii), c-(i), d-(iv)
75. 20 g nitrogen combine with 5g of hydrogen to form ammonia then the limiting reagent of the reaction and the number of moles of ammonia formed respectively are
 (1) H_2 , 1.42 moles
 (2) H_2 , 0.71 mole
 (3) N_2 , 1.42 moles
 (4) N_2 , 0.71 mole
76. Which of the following electronic configuration would be associated with least number of unpaired electrons?
 (1) $[Ar]3d^3$
 (2) $[Ar]3d^6$
 (3) $[Ar]3d^7$
 (4) $[Ar]3d^8$
77. The four quantum numbers of the electron in the outer most orbital of rubidium (atomic number 37) are
 (1) $n = 5, l = 2, m = -1, s = +\frac{1}{2}$
 (2) $n = 5, l = 0, m = 0, s = +\frac{1}{2}$
 (3) $n = 4, l = 0, m = 0, s = +\frac{1}{2}$
 (4) $n = 4, l = 1, m = 0, s = +\frac{1}{2}$
78. If wavelength of the first line of the Paschen series of hydrogen atom is 720 nm, then the wavelength of the second line of this series is
 (1) 492 nm
 (2) 380 nm
 (3) 750 nm
 (4) 420 nm

79. Energy required to ionise a H atom if the electron occupies $n = 4$ orbit is

- (1) $5.45 \times 10^{-19} J$
 (2) $1.36 \times 10^{-19} J$
 (3) $4.36 \times 10^{-18} J$
 (4) $3.5 \times 10^{-17} J$

80. The pair, in which ions are isoelectronic with Al^{3+} is

- (1) Br^- and Be^{2+}
 (2) Cl^- and Li^{2+}
 (3) S^{2-} and K^+
 (4) O^{2-} and Mg^{2+}

81. Given below are two statements one is labelled as Assertion (A) and the other is labelled as Reason (R)

Assertion (A): For a multielectron system, energy of 4s orbital is greater than 3d orbital.

Reason (R): For multielectron system, an orbital with lower value of $(n + l)$ has lower energy than the orbital with higher value of $(n + l)$.

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

- (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 correct but (R) is incorrect
 (4) (A) is incorrect but (R) is correct

82. The IUPAC symbol for the element with atomic number 119 would be

- (1) uue
 (2) une
 (3) uuh
 (4) uun

83. The element having greatest difference its first and second ionization energies is

- (1) Sc
 (2) Ba
 (3) Ca
 (4) K

84. The ionic radii (in Å) of F^- , O^{2-} , N^{3-} are respectively

- (1) 1.71, 1.36 and 1.40
 (2) 1.36, 1.40 and 1.71
 (3) 1.71, 1.40 and 1.36
 (4) 1.36, 1.71 and 1.40

85. In the long form of the modern periodic table, the valence shell electronic configuration of $4s^2, 4p^4$ corresponds to the element present in

- (1) Group 16 and period 4
- (2) Group 17 and period 4
- (3) Group 16 and period 5
- (4) Group 17 and period 5

86. Identify the **incorrect** statement for PCl_5 from the following.

- (1) Orbitals of phosphorous are assumed to undergo sp^3d hybridization
- (2) PCl_5 has two axial bonds stronger than three equatorial bonds
- (3) The three equatorial bonds of PCl_5 lie in a plane
- (4) The geometry of PCl_5 is trigonal bipyramidal

87. Number of lone pair(s) of electrons on central atom and the shape of ClF_3 molecule respectively, are

- (1) 0, triangular planar
- (2) 1, pyramidal
- (3) 2, bent T-shape
- (4) 1, bent T-shape

88. Match List-I with List-II

	List-I (Molecule)		List-II (Bond order)
a.	He_2	(i)	1
b.	N_2	(ii)	1.5
c.	F_2	(iii)	0
d.	O_2^-	(iv)	3

Choose the correct answer from the options given below.

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

89. Arrange the following in increasing order of their covalent character

- (a) MgF_2
- (b) $MgCl_2$
- (c) $MgBr_2$
- (d) MgI_2

Choose the correct answer from the options given below

- (1) (b) < (a) < (c) < (d)
- (2) (a) < (b) < (c) < (d)
- (3) (a) < (b) < (d) < (c)
- (4) (a) < (c) < (b) < (d)

90. The dipole moments of CCl_4 , $CHCl_3$ and CH_4 are in the order of

- (1) $CCl_4 < CH_4 < CHCl_3$
- (2) $CH_4 < CCl_4 < CHCl_3$
- (3) $CH_4 = CCl_4 < CHCl_3$
- (4) $CHCl_3 < CH_4 = CCl_4$

BOTANY

91. Which of the following taxonomic categories occupy the same rank or level?

- (1) Poales and Sapindales
- (2) Muscidae and Insecta
- (3) Poaceae and Diptera
- (4) Primata and Mammalia

92. Pteridophytes differ from gymnosperms in

- (1) Being archegoniates
- (2) Having independent gametophyte
- (3) Having sporophyte as main dominant stage
- (4) Being tracheophyte

93. The parasitic member of kingdom plantae is

- (1) Venus fly trap
- (2) Bladderwort
- (3) *Cuscuta*
- (4) Mango

94. Which of the given features is shown by all members of protozoa?

- (1) Unicellular
- (2) Autotrophic nutrition
- (3) Presence of flagella
- (4) Silica shells on body

95. State **true (T)** or **false(F)** for the following statements and select the **correct** option.

(A) Dmitri Ivanowsky recognised certain microbes as causal organism of the mosaic disease of tobacco.

(B) W.M. Stanley showed that viruses could be crystallised and crystals consist largely of lipids.

(C) Few members of the kingdom plantae are partially heterotrophic.

(D) *Contagium vivum fluidum* was coined by Beijerinck.

	A	B	C	D
(1)	F	T	T	F
(2)	T	T	F	T
(3)	T	F	T	T
(4)	F	F	T	T

- (1) (1)
- (2) (2)
- (3) (3)
- (4) (4)

96. Select the disease which is caused by an infectious agent that is found to be free RNA without protein coat.

- (1) Mad cow disease in cattle
- (2) Cr-Jacob disease in humans
- (3) Potato spindle tuber disease
- (4) Yellowing, mosaic formation and vein clearing in plants

97. Sleeping sickness is caused by

- (1) *Paramoecium*
- (2) *Amoeba*
- (3) *Entamoeba*
- (4) *Trypanosoma*

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

Statement-I: The bacterial structure is very simple, but they are very complex in behaviour.

Statement-II: Nitrogen fixation takes place in heterocysts of all the unicellular cyanobacteria.

- (1) Statement-I is correct but statement-II is incorrect.
- (2) Statement-I is incorrect but statement-II is correct.
- (3) Both the statements I and II are correct.
- (4) Both the statements I and II are incorrect.

99. Read the given assertion (A) and reason (R) and choose the **correct** option.

Assertion (A) : In slime moulds, during unfavourable conditions, the plasmodium differentiates and forms fruiting bodies bearing spores at their tips.

Reason (R) : In slime moulds, the spores are extremely resistant and lack walls but survive for many years even under adverse conditions.

- (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

100. Smut and rust disease respectively are caused by

- (1) *Trichoderma* and *Puccinia*
- (2) *Colletotrichum* and *Ustilago*
- (3) *Ustilago* and *Puccinia*
- (4) *Agaricus* and *Albugo*

101. Cell wall of diatoms is

- (1) Easily destructible and has deposition of sulphur
- (2) Nearly indestructible and has deposition of silica
- (3) Nearly indestructible and has deposition of sulphur
- (4) Easily destructible and has deposition of silica

102. Which one of the following statements is **incorrect** w.r.t. basidiomycetes?

- (1) Karyogamy and meiosis occurs in basidium
- (2) Sexual reproduction does not involve sex-organs
- (3) Mycelium is branched and septate
- (4) Secondary mycelium is short lived but dominant phase of life cycle

103. Read the following statements and select the correct the option.

Statement A: The predominant stage of life cycle a moss is gametophyte which consists of two stages.

Statement B: The protonema stage of moss bears the sex organ.

- (1) Only statement B is correct
- (2) Only statement A is correct
- (3) Both statements A and B are correct
- (4) Both statements A and B are incorrect

104. In pteridophytes the sporophylls are borne on

- (1) Gametophytes
- (2) Sporophytes
- (3) Prothallus
- (4) Rhizoids

105. Prothallus in pteridophytes is multicellular and

- (1) Thalloid sporophyte
- (2) Mostly photosynthetic
- (3) Large and non-green
- (4) Small but conspicuous

106. Read the characteristics given below:

- (a) Presence of carrageen
- (b) Reproduce vegetatively by fragmentation
- (c) Gametes are non-flagellated
- (d) Majority of them are found in marine habitat
- (e) Cell wall is made up of cellulose, pectin and polysulphate esters

How many of the above characteristics are true for the class of algae to which *Gelidium* belongs?

- (1) Four only
- (2) Two only
- (3) Three only
- (4) All five

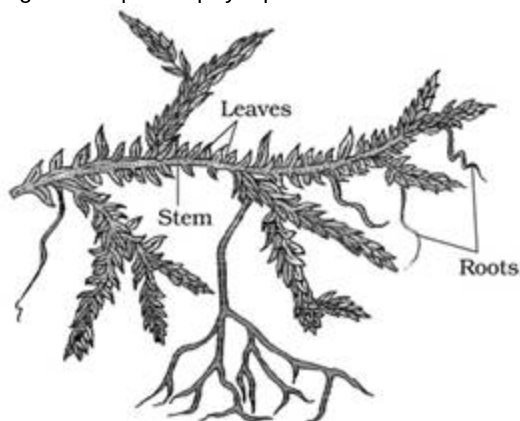
107. Mycorrhizal association are commonly found in the roots of

- (1) *Pinus*
- (2) *Marchantia*
- (3) *Equisetum*
- (4) *Salvinia*

108. Thallus is dorsiventral and closely appressed to the substrate in

- (1) *Funaria*
- (2) *Sphagnum*
- (3) *Polytrichum*
- (4) *Marchantia*

109. Figure of a pteridophyte plant is shown below.



To which class does this plant belong?

- (1) Pteropsida
- (2) Psilopsida
- (3) Sphenopsida
- (4) Lycopsida

110. Read the following Assertion (A) and Reason (R) and select the **correct** option.

Assertion (A): Diatoms, Dinoflagellates and ciliated protozoans are actively moving organisms.

Reason (R): These organisms possess special locomotory structures.

- (1) Both (A) and (R) are true and (R) is correct explanation of (A)
- (2) Both (A) and (R) are true but (R) is not correct explanation of (A)
- (3) Both (A) and (R) are false
- (4) Only (A) is true but (R) is false

111. Choose the **correct** statements w.r.t. binomial nomenclature.

- A. Name of author appears after specific epithet
- B. Names are generally in Latin language
- C. When handwritten, both generic and specific names are underlined together
- D. Genus name starts with small letter and specific epithet starts with capital letter

- (1) A and B
- (2) B and C
- (3) C and D
- (4) A and D

112. Plasmogamy, dikaryophase, karyogamy, meiosis

All the above given events can be seen in the sexual life cycle of

- (1) Smut fungi and bracket fungi
- (2) Morels and bread mould
- (3) Rust fungi and Dung mould
- (4) Sac fungi and Algal fungi

113. Select the option that is **not** depicting the characteristic feature of *Nostoc*.

- (1) It is a filamentous blue green algae
- (2) It lacks chlorophyll a
- (3) It can fix atmospheric nitrogen
- (4) It is not dependent on other organism for its nutrition

114. Which of the following statements is **not** true?

- (1) All cellular organisms grow by cell division
- (2) In higher plants, growth and reproduction are mutually inclusive events
- (3) Growth can be seen in the non-living objects
- (4) Growth cannot be taken as a defining property of living organisms

115. Identify the **incorrect** match from the following.

- (1) *Amoeba* – Binary fission
- (2) *Hydra* – Budding
- (3) Algae – Fragmentation
- (4) *Planaria* – Multiple fission

116. ICNB sets rules for the scientific naming of

- (1) Plants
- (2) Bacteria
- (3) Animals
- (4) Virus

117. Which taxonomic category falls between genus and order?

- (1) Class
- (2) Family
- (3) Division
- (4) Species

118. Family Convolvulaceae belongs to the order

- (1) Poales
- (2) Polymoniales
- (3) Sapindales
- (4) Dicotyledonae

119. According to the five kingdom classification system by R.H. Whittaker in which pair of kingdom, both autotrophic as well as heterotrophic mode of nutrition is found?

- (1) Protista and fungi
- (2) Fungi and Monera
- (3) Animalia and Protista
- (4) Monera and Protista

120. Which among the following characteristics is not true for the members of kingdom Monera?

- (1) Membrane bound cell organelles are absent
- (2) They are unicellular, prokaryotic organisms with nuclear membrane
- (3) Ribosomes are of 70S type
- (4) DNA is circular and double stranded

121. Which of the following is a photosynthetic free-living nitrogen fixing bacterium?

- (1) *Rhizobium*
- (2) *Frankia*
- (3) *Xanthomonas*
- (4) *Anabaena*

122. Match the **list-I** with **list-II** and choose the **correct** option.

	List-I		List-II
a.	Methanogens	(i)	Photoautotroph
b.	<i>Anabaena</i>	(ii)	Found in marshy areas
c.	<i>Lactobacillus</i>	(iii)	Found in hot springs
d.	Thermoacidophiles	(iv)	Heterotrophic mode of nutrition

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

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

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

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

123. Read the following statements.

(a) Oogamous type of sexual reproduction is present.

(b) Male gametes are motile.

(c) Habitat is both, fresh water and marine.

Which of the following options should be **incorrect** w.r.t. above statements?

(1) Statement (a) is true for green algae, brown algae as well as red algae

(2) Both the statements (a) and (b) are true for green algae

(3) Only statement (b) is correct for green algae

(4) All the statements are correct for green algae

124. The organisms which are known as the 'chief producers' in the ocean

(1) Have cell walls that form two thin overlapping shells

(2) Are microscopic and flagellated

(3) Are multicellular and possess various coloured pigments

(4) Act as photosynthetic in presence of sunlight and heterotrophic in dark environment

125. Members of Deuteromycetes are called imperfect fungi because

(1) Their mycelium is aseptate

(2) Some of its members are parasitic

(3) They are the decomposers of litter and help in mineral cycling

(4) Only asexual or vegetative phases of these fungi are known

126. Read the following statements.

Statement A : Gametes of brown algae are pyriform

Statement B : Gametes of *Ulothrix* are non-flagellated but similar in size.

On the basis of the above statements, choose the **correct** option.

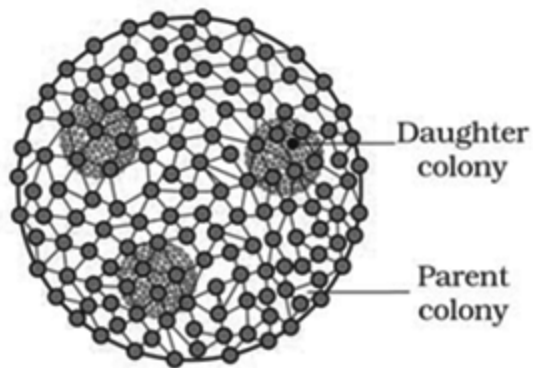
(1) Both the statements A and B are true

(2) Both the statements A and B are false

(3) Statement A is true but statement B is false

(4) Statement A is false but statement B is true

127. Observe the figure given below and choose the **correct** option for the same.



- (1) It belongs to the class Rhodophyceae
 (2) Major pigments in them are chlorophyll *a* and *b*
 (3) Inner layer of rigid cell wall is made up of pectose
 (4) It stores food in the form of laminarin
128. Choose the **odd** one w.r.t. numerical taxonomy.
- (1) Numbers and codes are assigned to the characters
 (2) Very less number of possible characters of the organisms can be considered at a time
 (3) Organisation and analysis of data forms the core of this taxonomy
 (4) It involves the use of computers
129. Select the option containing all the fungi that lack coenocytic mycelia as well as sex organs.
- (1) *Trichoderma*, Puffball, *Ustilago*
 (2) *Claviceps*, *Agaricus*, *Alternaria*
 (3) *Albugo*, *Colletotrichum*, *Puccinia*
 (4) *Penicillium*, Morels, *Alternaria*
130. Read the statements given below
Statement A: In bryophytes, an antherozoid fuses with the egg to produce the zygote which undergoes reduction division immediately.
Statement B: Mosses are of great ecological importance.
- On the basis of the above statements, pick the **correct** options.
- (1) Both the statements are true
 (2) Both the statements are false
 (3) Statement A is true but statement B is false
 (4) Statement A is false but statement B is true

131. Plant body is differentiated in frond, stipe and hold fast in
- (1) *Porphyra*
 (2) *Laminaria*
 (3) *Ulothrix*
 (4) *Chlamydomonas*

132. Which of the following options is **false** w.r.t. liverworts?
- (1) Usually grow in moist and shady habitats
 (2) Plant body is thalloid
 (3) Asexual reproduction occurs by fragmentation
 (4) Sex organs are absent

133. Gemmae are
- (1) Haploid asexual structures
 (2) Unicellular
 (3) Found only on female thallus
 (4) Green and required in sexual reproduction

134. In gymnosperms
- (1) Male and female gametophytes have an independent existence
 (2) Wind pollination can be observed
 (3) Zygote develops into an embryo and ovules develop into covered seeds
 (4) Multicellular female gametophyte is retained within the microsporangium
135. *Spirogyra* differs from *Fucus* as the former lacks
- (1) Chlorophyll 'a'
 (2) Flagellated male gametes
 (3) Non-flagellated male gametes
 (4) Thalloid gametophyte

136. Select the option which represents the correct arrangement of structures involved in sperm transport starting from the site of production to outside in a healthy adult human male.

- (1) Epididymis, vasa efferentia, rete testis, vas deferens, urethra
- (2) Seminiferous tubules, rete testis, vasa efferentia, epididymis, vas deferens, ejaculatory duct, urethra
- (3) Vas deferens, epididymis, vasa efferentia, ejaculatory duct, urethra
- (4) Vasa efferentia, epididymis, rete testis, vas deferens, urethra

137. Choose the incorrect statement w.r.t. ovaries in a healthy adult human female.

- (1) They are the primary sex organs and produce several steroid hormones.
- (2) Each of them is 6-7 cm in length and is covered by a thin epithelium which encloses the ovarian stroma.
- (3) The ovarian stroma is divided into an inner medulla and a peripheral cortex.
- (4) Each of them is connected to the pelvic wall and uterus by ligaments.

138. Menstrual cycle involves certain events. Which of the following can be observed in the ovulatory phase in a healthy human female?

- (a) Release of ovum
- (b) LH surge
- (c) Decrease in the progesterone level
- (d) Increase in the FSH level

Select the **correct** option.

- (1) (a), (b), (c) and (d)
- (2) (a), (b) and (c)
- (3) (a), (b) and (d)
- (4) (b), (c) and (d)

139. How many of the plant forms mentioned in the box below evolved directly from Psilophyton?

Conifers, Seed ferns, Progymnosperms, Zosterophyllum, Cycads, Ginkgos, Ferns

Choose the **correct** option.

- (1) Six
- (2) Four
- (3) Seven
- (4) Five

140. According to the MTP (Amendment) act, 2017, opinion of how many registered medical practitioner(s) is/are required for legal abortion, if the pregnancy has lasted for more than 94 days but less than 126 days?

- (1) One
- (2) Two
- (3) Three
- (4) Abortion cannot be done at this time

141. Which of the following contraceptives prevents conception by inhibiting ovulation as well as implantation?

- (a) Steroidal oral contraceptive pills
- (b) Saheli
- (c) Implants
- (d) Vaults

Choose the **correct** option.

- (1) (a) and (b)
- (2) (b) and (c)
- (3) (c) and (d)
- (4) (a) and (c)

142. Consider the following symptoms w.r.t. genital region.

- (a) Fluid discharge
- (b) Itching
- (c) Slight pain
- (d) Swelling

Which of the above symptoms is/are true for most of the STIs?

- (1) (a), (b), (c) and (d)
- (2) (b), (c) and (d) only
- (3) (c) only
- (4) (d) only

143. Which of the following is **incorrectly** matched w.r.t. type of fertilisation involved in the stated technique?

- (1) GIFT – *In-vivo* fertilisation
- (2) ZIFT – *In-vitro* fertilisation
- (3) ICSI – *In-vivo* fertilisation
- (4) AI – *In-vivo* fertilisation

144. Charles Darwin was influenced by a population essay written by

- (1) Thomas Malthus
- (2) Hugo de Vries
- (3) Alfred Wallace
- (4) Herbert Spencer

145. Select the **incorrect** statement among the following w.r.t. theories of evolution.

- (1) Early Greek thinkers thought units of life called spores were transferred to different planets.
- (2) Formation of first life on Earth was first demonstrated by Louis Pasteur.
- (3) The idea of chemical evolution was proposed by Oparin and Haldane.
- (4) According to theory of spontaneous generation, the life came out of decaying matter.

146. Which of the following is not true w.r.t the theory of special creation?

- (1) Earth is 4000 years old
- (2) The diversity was always the same since creation
- (3) First cellular life form did not possibly originate till about 2000 mya
- (4) All living organisms that we see today were created as such

147. The idea of embryological support for evolution was disapproved on careful study performed by

- (1) Ernst Heckel
- (2) Karl Ernst von Baer
- (3) Thomas Malthus
- (4) Alfred Wallace

148. The wall of the uterus has three layers of tissues. Which of the following layers do/does not exhibit strong contractions during parturition?

- (a) Endometrium
 - (b) Perimetrium
 - (c) Myometrium
- Select the **correct** option.

- (1) (a), (b)
- (2) (b), (c)
- (3) (a), (c)
- (4) (c) Only

149. In a 34 days menstrual cycle, the peak level of progesterone will be observed

- (1) Between 18th to 20th day
- (2) Between 24th to 30th day
- (3) Between 19th to 21st day
- (4) Between 10th to 17th day

150. Match column I with column II and select the **correct** option w.r.t. human females.

	Column I		Column II
a.	Mons pubis	(i)	Partially covers the opening of vagina
b.	Hymen	(ii)	Fleshy folds of tissue that surround the vaginal opening
c.	Labia majora	(iii)	Covered by skin and pubic hair
d.	Clitoris	(iv)	Located above the urethral opening

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

151. Read the given statements A and B and select the **correct** option.

Statement A: To provide right information to young about sex related aspects, introduction of sex education in schools should not be encouraged.

Statement B: Creating awareness among people about various reproduction related aspects is one of the major tasks under RCH programmes.

- (1) Both statements A and B are correct
- (2) Both statements A and B are incorrect
- (3) Only statement A is incorrect
- (4) Only statement B is incorrect

152. Assertion (A) : Due to the continental drift, pouched mammals of Australia survived but North American fauna did not.

Reason (R) : There was lack of competition from any other mammal in North America but Australian fauna faced huge competition.

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

- (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

153. Listed below are few information.

- (a) Hunted with stone weapons
- (b) Essentially ate fruit
- (c) Existed two mya and probably lived in East African grasslands

All of the information mentioned above hold true for

- (1) *Homo sapiens*
- (2) *Homo erectus*
- (3) Neanderthal man
- (4) *Australopithecines*

154. In human males, the interstitial spaces in the testes do not contain

- (a) Sertoli cells
 - (b) Spermatogonia
 - (c) Immunocompetent cells
- Choose the **correct** option.

- (1) (a) and (c)
- (2) (b) and (c)
- (3) (a) and (b)
- (4) (a), (b) and (c)

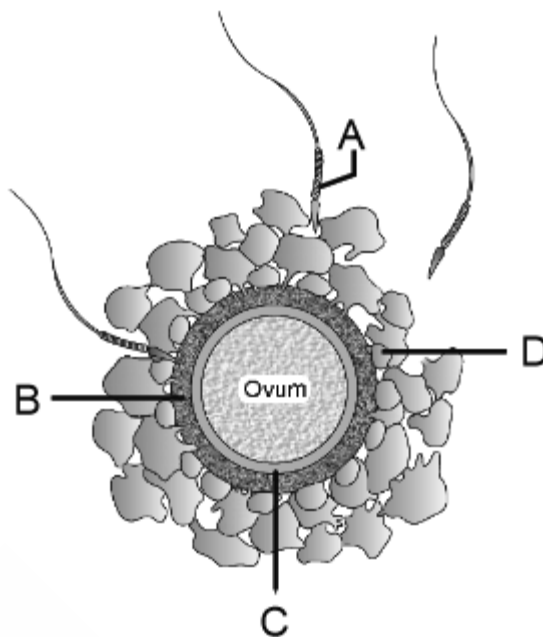
155. Read the following statement (A) and statement (B) w.r.t. morula and choose the **correct** option.

Statement (A) : The embryo with 8-16 blastomeres is called morula.

Statement (B) : The size of morula in human is smaller than a fertilized egg.

- (1) Both the statements are correct
- (2) Both the statements are incorrect
- (3) Statement (B) is correct
- (4) Statement (A) is correct

156. Observe the figure given below and select the correct option.



- (1) A = Cells of corona radiata, B = Perivitelline space
- (2) C = Perivitelline space, D = Cells of corona radiata
- (3) B = Zona pellucida, C = Corona radiata
- (4) A = Sperm, B = Perivitelline space

157. In humans, by the end of the _____ of pregnancy the foetus develops _____.

Select the option to fill the blanks **correctly**.

- (1) 4 weeks; major organ systems
- (2) 2nd month; limbs and digits
- (3) 12 weeks; fine hair on the body
- (4) 3rd month; separated eye-lids

158. Choose the correct path of milk transport in a lactating mother.

- (1) Mammary alveoli → Lactiferous ducts → Mammary ampullae → Mammary ducts
- (2) Mammary alveoli → Mammary ampullae → Mammary ducts → Lactiferous ducts
- (3) Mammary alveoli → Mammary tubules → Mammary ducts → Mammary ampullae → Lactiferous ducts
- (4) Mammary alveoli → Mammary ducts → Mammary tubules → Mammary ampullae → Lactiferous ducts

159. According to Darwin, the process in which heritable variations enabling better survival are enabled to reproduce and leave greater number of progeny, is called

- (1) Genetic drift
- (2) Mutation
- (3) Natural selection
- (4) Founder's effect

160. Suppose in a population of 1600 individuals which is in Hardy-Weinberg equilibrium, 256 are recessive then calculate the difference between the frequencies of dominant and recessive allele and select the correct option.

- (1) 0.2
- (2) 0.8
- (3) 0.6
- (4) 0.34

161. In human sperm, spirally arranged mitochondria are present in

- (1) Head portion
- (2) Middle piece
- (3) Neck
- (4) Tail

162. The male sex accessory ducts include

- (1) Rete testis and vasa efferentia only
- (2) Rete testis, vasa efferentia, seminiferous tubule and vas deferens
- (3) Rete testis, vasa efferentia, epididymis and vas deferens
- (4) Epididymis, seminiferous tubule and vas deferens

163. The shedding of endometrium during menstruation occurs due to decline in concentration of

- (1) Estrogen
- (2) Progesterone
- (3) Oxytocin
- (4) FSH

164. Select the correct match w.r.t humans.

- (1) Spermiogenesis – Spermatozoa are transformed into spermatids
- (2) Spermiation – Release of spermatozoa into the seminiferous tubules
- (3) Parturition – Initiated by decrease in estrogen and progesterone ratio
- (4) Menstruation – Middle layer of uterus undergoes maximum changes

165. Foetal ejection reflex triggers the release of

- (1) Androgens from foetal pituitary
- (2) Oxytocin from maternal pituitary
- (3) Relaxin from foetal ovary
- (4) Oxytocin from maternal adrenal glands

166. In human male, the ejaculatory duct is formed by the fusion of

- (1) Duct of seminal vesicle + Vas deferens
- (2) Rete testis + Vasa efferentia
- (3) Epididymis + Vas deferens
- (4) Duct of prostate gland + Vasa efferentia

167. Assertion (A): In humans, male gamete possesses locomotory structure whereas female gamete does not.

Reason (R): The sperms have to swim rapidly and pass through cervix, enter into uterus and finally reach the fimbriae regions of oviducts for fertilisation.

In the light of above statements, choose 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.

168. Read the following statements A and B and choose the correct option.

Statement A: Evolution is a stochastic process based on chance events in nature and chance mutations in the organisms.

Statement B: When more than one adaptive radiations appeared to have occurred in an isolated geographical area, one can call this convergent evolution.

- (1) Both statements A and B are incorrect
- (2) Only statement A is correct
- (3) Only statement B is correct
- (4) Both statements A and B are correct

169. The biggest reptile with huge fearsome dagger-like teeth was

- (1) *Brachiosaurus*
- (2) *Tyrannosaurus rex*
- (3) *Triceratops*
- (4) *Stegosaurus*

170. In a hypothetical scenario, birds with average-sized wings survived more successfully in a severe storm than birds with longer or shorter wings. It is an example of

- (1) Diversifying selection
- (2) Stabilising selection
- (3) Directional selection
- (4) Co-evolution

171. Around 200 mya, some of the land reptiles went back into water and evolved into fish like reptiles called

- (1) Ichthyosaurs
- (2) Amphibians
- (3) Birds
- (4) Mammals

172. Thorns of *Bougainvillea* and tendrils of *Cucurbita* represent all, **except**

- (1) Divergent evolution
- (2) Common ancestry
- (3) Convergent evolution
- (4) Homology

173. Match the following w.r.t. convergent evolution.

	Column I		Column II
a.	Bobcat	(i)	Tasmanian wolf
b.	Wolf	(ii)	Tasmanian tiger cat
c.	Anteater	(iii)	Marsupial mole
d.	Mole	(iv)	Numbat

Choose the **correct** option.

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

174. Neanderthal man differs from modern *Homo sapiens* in

- (1) Having higher cranial capacity
- (2) Having lower cranial capacity
- (3) Having erect posture
- (4) Being a hominid

175. Which of the following is the **correct** sequence of embryonic development stages?

- (1) Zygote → Morula → Blastocyst → Gastrula
- (2) Morula → Zygote → Blastocyst → Gastrula
- (3) Blastocyst → Zygote → Gastrula → Morula
- (4) Gastrula → Zygote → Blastocyst → Morula

176. Which of the following contraceptive devices provide an additional benefit of protecting the users from contracting STIs like AIDS?

- (1) Diaphragms
- (2) Condoms
- (3) Vaults
- (4) Cervical caps

177. The contraceptive devices inserted mainly by the doctors or expert nurses in the uterus through vagina in human females are

- (1) Implants
- (2) IUDs
- (3) Cervical caps
- (4) Diaphragms

178. Infertility cases either due to inability of the male partner to inseminate the female or due to very low sperm counts in the ejaculate are mostly **corrected** by

- (1) AI
- (2) ZIFT
- (3) GIFT
- (4) IUT

179. Choose the STI among the following which can be cured if detected early and treated properly.

- (1) Hepatitis-B
- (2) Genital herpes
- (3) Genital warts
- (4) HIV infections

180. At the time of our independence, India's population was A and crossed B in May 2011.

Choose the option that **correctly** fills the blanks (A) and (B).

	A	B
(1)	350 million	35 billion
(2)	35 million	1.2 billion
(3)	350 million	1.2 billion
(4)	35 million	35 billion

- (1) (1)
- (2) (2)
- (3) (3)
- (4) (4)



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