Jupiter Academy

Subjects : PHYSICS , CHEMISTRY , MATHS , BIOLOGY

CUET PYQ PAPER 02

Total Marks : 885

PHYSICS - Section A (MCQ)

1. Two charged particles, placed at a distance d apart in vacuum, exert a force F on each other. Now, each of the charges is doubled. To keep the force unchanged, the distance between the charges should be changed to :

A) 4d **B)** 2d **C)** d **D)** d/2

2. Ferromagnetic material in transformers should have :

A) Low permeability, High Hysteresis loss
B) High permeability, Low Hysteresis loss
C) High permeability, High Hysteresis loss
D) Low permeability, Low Hysteresis loss

3. Magnetic moment of a thin bar magnet is 'M'. If it is bent into a semicircular form, its new magnetic moment will be :

A) M/π **B)** M/2 **C)** M **D)** $2M/\pi$

4. P, Q, R and S are four wires of resistances 3, 3, 3 and 4 Ω respectively. They are connected to form the four arms of a wheatstone bridge circuit. The resistance with which S must be shunted in order that the bridge may be balanced is :

A) 14 Ω **B)** 12 Ω
C) 15 Ω **D)** 7 Ω

5. A cell of emf 1.1 V and internal resistance 0.5 Ω is connected to a 0.5 Ω wire. Another cell of same emf is added in series, but current remains unchanged. The second cell's internal resistance is :

A) 1 Ω **B)** 2.5 Ω
C) 1.5 Ω **D)** 2 Ω

6. A metal wire under constant potential difference, when heated, shows that the drift velocity of the electron :

A) increases, thermal velocity decreases
B) decreases, thermal velocity decreases
C) increases, thermal velocity increases
D) decreases, thermal velocity increases

7. A copper ball of density 8 g/cc and 1 cm diameter, immersed in oil of density 0.8 g/cc, remains suspended in an electric field of 600π V/m. The charge on the ball is :

A) 2×10^{-6} C **B)** 2×10^{-5} C
C) 1×10^{-5} C **D)** 1×10^{-6} C

8. When a slab of insulating material 4 mm thick is introduced between the plates of a parallel plate capacitor of separation 4 mm, it is found that the distance between the plates has to be increased by 3.2 mm to restore the capacity to its original value. The dielectric constant of the material is :

A) 2 **B)** 5 **C)** 3 **D)** 7

9. The transfer of integral number of _____ is one of the evidence of quantization of electric charge.

A) photons **B)** nuclei **C)** electrons **D)** neutrons

10. A conducting ring of radius r in a magnetic field varying at rate x has electric field intensity at any ring point as :

A) rx **B)** rx/2 **C)** 2rx **D)** 4rx

11. A 50 Hz AC current of crest 1 A flows through a transformer primary. With mutual inductance 0.5 H, the crest voltage induced in secondary is :

A) 75 V **B)** 150 V **C)** 100 V **D)** 200 V

12. A solenoid with 2×10^4 turns per meter, diameter 0.1 m, has a coil of 100 turns and 0.01 m radius placed inside. If solenoid current decreases from 4 A to 0 in 0.05 s, total charge through coil is :

A) 16 μC **B)** 32 μC
C) 16π μC **D)** 32π μC

13. Lower half of a convex lens is opaque. The image of an object placed in front will :

A) No change in image
B) Show only half of the object
C) Intensity reduced
D) Show half of object and reduced intensity

14. Two slits 0.1 mm apart with screen 2 m away produce fringe separation with 500 nm light. The separation is :

A) 1 cm **B)** 0.15 cm **C)** 1.5 cm **D)** 0.1 cm

15. For an astronomical telescope with 10 m focal length objective and 10 cm eyepiece, tube length and magnification are:

A) 20 cm, 1 **B)** 1000 cm, 1
C) 1010 cm, 1 **D)** 1010 cm, 100

16. According to Bohr's Model :
(A) The radius is directly proportional to 'n'.
(B) The speed is directly proportional to $\frac{1}{n}$.
(C) The magnitude of total energy is directly proportional to $\frac{1}{n^2}$.
(D) The radius is directly proportional to n^2

A) (A), (B), (C) **B)** (A), (B), (D)
C) (A), (B), (C), (D) **D)** (B), (C), (D)

17. For a full wave rectifier, if the input frequency is 50 Hz, the output frequency will be:

A) 50 Hz **B)** 100 Hz **C)** 25 Hz **D)** 0 Hz

18. For an electric dipole in a non-uniform electric field with dipole moment parallel to the field, force F and torque T are:

A) $F = 0, T = 0$ **B)** $F \neq 0$,T=0
C) F=0,$T \neq 0$ **D)** F $\neq 0$, $\tau \neq 0$

19. The refractive index of the material of an equilateral prism is $\sqrt{2}$. The angle of minimum deviation of that prism is :

A) 60° **B)** 75°
C) 30° **D)** 90°

20. Silicon can be doped to get an n-type semiconductor by using :
(A) Arsenic (As),
(B) Phosphorus (P),
(C) Boron (B),
(D) Antimony (Sb).

A) (A) and (C) only **B)** (B) and (C) only
C) (A), (B) and (D) **D)** (C) and (D) only

21. The shortest wavelengths in the hydrogen spectrum, in decreasing order, for spectral series Pfund, Balmer, Brackett, and Lyman are :

A) (A), (B), (C), (D) **B)** (A), (C), (B), (D)
C) (B), (A), (D), (C) **D)** (A), (C), (D), (B)

22. Two nuclei with mass numbers A and B have density ratios of :

A) A : B **B)** $\sqrt{A} : \sqrt{B}$ **C)** $A^2 : B^2$ **D)** 1 : 1

23. The kinetic energy of an electron in the ground state of a hydrogen atom is K. The values of its potential energy and total energy respectively are :

A) -2K, -K **B)** +2K, -K **C)** -K, +2K **D)** +K, +2K

24. A proton accelerated through potential difference V has de Broglie wavelength λ. On doubling the potential, the de Broglie wavelength of the proton :

A) remains unchanged **B)** becomes double
C) becomes four times **D)** decreases

25. Radiation of frequency $2v_0$ incident on a metal with threshold frequency v_0 results in maximum kinetic energy of photoelectrons as :

A) No photoelectrons emitted
B) All have kinetic energy equal to hv_0
C) Maximum kinetic energy can be hv_0
D) Maximum kinetic energy will be 2hv_0

26. Using monochromatic light for diffraction in a single slit of width 0.1 mm, with a central maximum of 5 mm width on a screen 50 cm away, the wavelength of light used is :

A) 2.5 $\times 10^{-7}$ m **B)** 4 $\times 10^{-7}$ m
C) 5 $\times 10^{-7}$ m **D)** 7.5 $\times 10^{-7}$ m

27. For fixed radii of curvature of a lens, power is proportional to :

A) P $\propto (\mu - 1)$
B) P $\propto \mu^2$
C) P $\propto 1/\mu$
D) P $\propto \mu^{-2}$

28. Match the electromagnetic waves in Column-I with production methods in Column-II

List-I (Electromagnetic Waves)	List-II (Production Methods)
(A) Microwaves	(I) LC oscillator
(B) Infrared	(II) Magnetron
(C) X-rays	(III) Vibration of atoms/molecules
(D) Radio waves	(IV) Bombarding large atomic number metal target with fast-moving electrons

Choose the correct answer from the options given below :

A) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
B) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
C) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)
D) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

29. The correct arrangement of electromagnetic spectrum in decreasing order of wavelength is :

A) Radio waves, X-rays, Infrared waves, microwaves, visible waves
B) Infrared waves, microwaves, Radio waves, X-rays, visible waves
C) Radio waves, microwaves, Infrared waves, visible waves, X-rays
D) X-rays, visible waves, Infrared waves, microwaves, Radio waves

30. In an electromagnetic wave, the ratio of energy densities of electric and magnetic fields is :

A) 1 : 1 **B)** 1 : c **C)** c : 1 **D)** $1 : c^2$

31. In a pair of adjacent coils, if current in one coil changes from 0 A to 10 A in 0.25 s, causing a magnetic flux change of 15 Wb in the adjacent coil, the mutual inductance of the coils is :

A) 120 H **B)** 12 H **C)** 1.5 H **D)** 0.75 H

32. In an AC circuit, the current leads the voltage by $\pi/2$. The circuit is :

A) purely resistive
B) should have resistance equal to reactance
C) purely inductive
D) purely capacitive

33. In a circuit where current 3I enters at A, with semicircular sections ABC and ADC of equal radii r, resistances 2R and R respectively, the magnetic field at the center is :

A) $\frac{\mu_0 I}{4r}$ out of the plane
B) $\frac{\mu_0 I}{4r}$ into the plane
C) $\frac{\mu_0 3I}{4r}$ out of the plane
D) $\frac{\mu_0 3I}{4r}$ into the plane

34. Two infinitely long parallel conductors carrying currents I_1 and I_2 are at distance d apart. The force F on length L of one conductor due to the other is :

A) proportional to L but independent of $I_1 \times I_2$
B) proportional to $I_1 \times I_2$ but independent of L
C) proportional to $I_1 \times I_2 \times L$
D) proportional to L / $I_1 \times I_2$

35. Three magnetic materials: (A) Paramagnetic, (B) Diamagnetic, (C) Ferromagnetic. The correct order of increasing magnetic susceptibility is :

A) (A), (B), (C) **B)** (C), (A), (B)
C) (B), (A), (C) **D)** (B), (C), (A)

36. A metallic wire of uniform area of cross section has a resistance R, resistivity ρ and power rating P at V volts. The wire is uniformly stretched to reduce the radius to half the original radius. The values of resistance, resistivity and power rating at V volts are now denoted by R', and P' respectively. The corresponding values are correctly related as _____ . Fill in the blank with the correct answer from the options given below

A) $\rho' = 2\rho, R' = 2R, P' = 2P$
B) $\rho' = 1/2\rho, R' = 1/2R, P' = 1/2P$
C) $\rho' = \rho, R' = 16R, P' = 1/16P$
D) $\rho' = \rho, R' = 1/16R, P' = 16P$

37. The current through a 4/3 Ω external resistance connected to a parallel combination of two cells with emfs of 2 V and 1 V, internal resistances 1 Ω and 2 Ω respectively, is :

A) 1 A **B)** 2/3 A **C)** 3/4 A **D)** 5/6 A

38. Two large plane parallel sheets with equal but opposite surface charge densities +σ and -σ. A point charge q placed at points $P_1, P_2,$ and P_3 experiences forces $F_1, F_2,$ and F_3 respectively. Then :

A) $F_1 = 0, F_2 = 0, F_3 = 0$
B) $F_1 = 0, F_2 \neq 0, F_3 = 0$
C) $F_1 \neq 0, F_2 \neq 0, F_3 \neq 0$
D) $F_1 = 0, F_3 \neq 0, F_2 = 0$

39. Two parallel plate capacitors of capacitances $2\ \mu\text{F}$ and $3\ \mu\text{F}$ are joined in series and connected to a battery of V volts. The values of potential across the two capacitors V_1 and V_2 and energy stored in them U_1 and U_2 are related as :

A) $\frac{V_2}{V_1} = \frac{U_2}{U_1} = \frac{2}{3}$
B) $\frac{V_2}{V_1} = \frac{U_2}{U_1} = \frac{3}{2}$
C) $\frac{V_2}{V_1} = \frac{2}{3}, \frac{U_2}{U_1} = \frac{3}{2}$
D) $\frac{V_2}{V_1} = \frac{3}{2}, \frac{U_2}{U_1} = \frac{2}{3}$

CHEMISTRY - Section A (MCQ)

40. If the entire current produced is used for the electrodeposition of silver (atomic weight $= 108g/mol$), the amount of silver deposited will be:

A) $324g$ **B)** $648g$
C) $108g$ **D)** $216g$

41. For a complex reaction, the order of reaction is equal to:

A) Sum of stoichiometric coefficients in the balanced chemical reaction
B) The molecularity of overall reaction
C) Order of the fastest step of the reaction
D) The molecularity of the slowest step of the reaction

42. Identify the order of reaction if its rate constant is $k = 2 \times 10^{-2}s^{-1}$:

A) Zero order **B)** First order
C) Second order **D)** Half order

43. In the electrolysis of alumina to obtain aluminum metal, cryolite is added mainly to:

A) Lower the melting point of alumina
B) Dissolve the alumina in the molten cryolite
C) Remove the impurities of alumina
D) Increase the electrical conductivity

44. The total number of sigma bonds present in P_4O_{10} are:

A) 6 **B)** 7 **C)** 16 **D)** 17

45. For the reaction: $2A_2(g) + 1/4X(g) \rightarrow 2A_2X(g)$, if the volume is increased to double its value by decreasing the pressure, and the reaction is first order with respect to X and second order with respect to A_2, the rate of reaction will:

A) Decrease by eight times of its initial value
B) Increase by eight times of its initial value
C) Increase by four times of its initial value
D) Remain unchanged

46. Vapour pressures of pure liquids A and D at $50^{\circ}C$ are 500 mmHg and 800 mmHg respectively.
The binary solution of A and D boils at $50^{\circ}C$ and 700 mmHg pressure.
The mole percentage of D in the solution is:

A) 33.33 mole percent **B)** 66.67 mole percent
C) 25.75 mole percent **D)** 75.25 mole percent

47. Consider the following statements regarding osmotic pressure:
(A) Molar mass of a protein can be determined using the osmotic pressure method.
(B) The osmotic pressure is proportional to the molarity.
(C) Reverse osmosis occurs when a pressure larger than osmotic pressure is applied to the concentrated solution side.
(D) Edema occurs due to retention of water in tissue cells as a result of osmosis.
Choose the correct statements with reference to osmotic pressure:

A) (A), (B) and (D) only
B) (A), (B) and (C) only
C) (A), (B), (C) and (D)
D) (B), (C) and (D) only

48. Identify the correct order of organic compounds in the following chemical reaction: ? + Mg → ? → ? → ?
(A) CH 3 MgBr
(B) CH 3 B
(B) CH 3 B
(D) CH 4
Choose the correct answer from the options given below :

A) (B), (A), (D), (C) **B)** (A), (C), (B), (D)
C) (B), (A), (C), (D) **D)** (C), (B), (D), (A)

49. Camphor in nitrogen gas is a type of solution:

A) Gas-Gas **B)** Solid-Gas
C) Liquid-Gas **D)** Solid-Liquid

50. Why do the actinoids exhibit a higher number of oxidation states than lanthanoids?

A) $4f$ orbitals are more diffused than the $5f$ orbitals.
B) Energy difference between $5f$ and 6d is less with respect to the energy difference between $4f$ and $5d$.
C) Energy difference between $5f$ and $6d$ is more with respect to the energy difference between $4f$ and $5d$.
D) Actinoids are more reactive in nature than lanthanoids

51. Which metal has the highest oxidation state in the first row transition series?

A) Cr **B)** Fe **C)** Mn **D)** V

52. Which of the following pair of compounds exhibits the same color in aqueous solution?

A) $FeCl_2, CuCl_2$
B) $VOCl_2, FeCl_2$
C) $VOCl_2, CuCl_2$
D) $VOCl_2^-, MnCl_2^-$

53. Which of the following is the correct order of second ionization enthalpy?

A) $V > Cr > Mn$ **B)** $V < Cr < Mn$
C) $V < Cr > Mn$ **D)** $V > Cr < Mn$

54. Identify the incorrect statement:

A) Second ionization enthalpy of Ag is greater than that of Pd.
B) Zr and Hf share almost identical nuclear properties.
C) Melting point of Mn is lower than that of Cr.
D) Interstitial compounds are non-stoichiometric and neither ionic nor covalent in nature.

55. The source of electrical energy on the Apollo moon flight was:

A) Lead storage battery **B)** A generator set
C) Ni -Cd cells **D)** $H_2 - O_2$ fuel cell

56. In the Etard reaction, the final product is:

A) Aromatic aldehyde **B)** Aromatic chloride
C) Aromatic amine **D)** Aromatic alcohol

57. Although chlorine is an electron-withdrawing group, it is ortho- and para-directing in electrophilic aromatic substitution because:
(A) Chlorine withdraws electrons through inductive effect.
(B) Chlorine stabilizes the intermediate carbocation formed during electrophilic substitution via resonance.
(C) Chlorine donates electrons through resonance.
(D) Chlorine is a deactivating group due to its -1 effect.
Choose the correct answer from the options below:

A) (A), (B), and (C) only
B) (A), (C), and (D) only
C) (B), (C), and (D) only
D) (A), (B), (C), and (D)

58. Aniline does not undergo the Friedel-Crafts reaction because:
(A) It forms salt with the Lewis acid catalyst, AICI3.
(B) Nitrogen of aniline acquires negative charge.
(C) Nitrogen of aniline acquires positive charge.
(D) Nitrogen acts as a strong deactivating group in the further reaction.
Choose the correct answer from the options given below :

A) (A), (C), and (D) only
B) (A), (B), and (C) only
C) (A), (C), and (D) only
D) (B), (C), and (D) only

59. In the reaction $(CH_3)_3C - O - CH_3 + HI \rightarrow$ Products, CH_3OH and $(CH_3)_3CCl$ are the products and not CH_3I and $(CH_3)_3COH$. It is because:
(A) In step 2 of the reaction, the departure of leaving group ($HO_3 - CH_3$) creates less stable carbocation.
(B) In step 2 of the reaction, the departure of leaving group ($HO_3 - CH_3$) creates more stable carbocation.
(C) The reaction follows an SN1 mechanism.
(D) The reaction follows SN2 mechanism.
Choose the correct answer from the options given below :

A) (A) and (B) only **B)** (B) and (C) only
C) (A) and (D) only **D)** (A) and(C) only

60. Formaldehyde undergoes the Cannizzaro reaction because:
(A) It has alpha-hydrogen atom.
(B) It does not have alpha-hydrogen atom.
(C) It does not undergo self-oxidation and reduction on heating with concentrated alkali.
(D) It undergoes self-oxidation and reduction on heating with concentrated alkali.
Choose the correct answer from the options given below :

A) (B) and (D) only **B)** (A) and (C) only
C) (B) and (C) only **D)** (A) and (D) only

61. The Gattermann-Koch reaction is used in the industrial preparation of benzaldehyde.
The electrophile involved in this reaction is:

A) CO^+
B) $HCl + CO_2 +$ anhydrous $AlCl_3$
C) HCO^+
D) CO + anhydrous $AlCl_3$

62. In the following compounds, what is the increasing order of their reactivity towards nucleophilic addition reactions?
Benzaldehyde, p-Tolualdehyde, p-Nitrobenzaldehyde, Acetophenone

A) Benzaldehyde < p-Tolualdehyde < p-Nitrobenzaldehyde < Acetophenone
B) Acetophenone < Benzaldehyde < p-Tolualdehyde < p-Nitrobenzaldehyde
C) Acetophenone < p-Tolualdehyde < Benzaldehyde < p-Nitrobenzaldehyde
D) Benzaldehyde < Acetophenone < p-Tolualdehyde < p-Nitrobenzaldehyde

63. Arrange the following acids in increasing order of their acidic strengths: $HCOOH, FCH_2COOH, NO_2CH_2COOH, ClCH_2COOH$

A) $HCOOH < FCH_2COOH^2 < NO_2CH_2COOH^2 < ClCH_2COOH$
B) $HCOOH < NO_2CH_2COOH < ClCH_2^2COOH < FCH_2^2COOH$
C) $NO_2CH_2COOH^2 < HCOOH^2 < ClCH_2^2COOH < FCH_2^2COOH$
D) $HCOOH^2HClCH_2COOH < FCH_2COOH^2OH < NO_2CH_2^2COOH$

64. Which of the following compounds will give the Hell-Volhard-Zelinsky reaction?

A) $R-CH-COOH$ **B)** R_3C-CHO
C) R_2CO **D)** $H-COOH$

65. What will be the increasing order of basic strength of the following compounds?
$C_2H_5NH_2, (C_2H_5)_2NH, (C_2H_5)_3N, C_6H_5NH_2$

A) $C_2H_5NH_2 < (C_2H_5)_2NH < (C_2H_5)_3N < C_6H_5NH_2$
B) $C_6H_5NH_2 < C_2H_5NH_2 < (C_2H_5)_3N < (C_2H_5)_2NH$
C) $(C_2H_5)_3N < (C_2H_5)_2NH < C_6H_5NH_2 < C_2H_5NH_2$
D) $(C_2H_5)_2NH < (C_2H_5)_3N < C_2H_5NH_2 < C_6H_5NH_2$

66. Reaction of aniline with conc. HNO_3 and conc. H_2SO_4 at 298 K will produce 47% of:

A) p-Nitroaniline **B)** o-Nitroaniline
C) m-Nitroaniline **D)** 2,4-Dinitroaniline

67. The gold number range of some of the lyophilic colloids is given below:
A: 0.005-0.01, B: 0.15-0.25, C: 0.04-1.0, D: 15-25
Which among these can be used as a better protective colloid?

A) A **B)** B **C)** C **D)** D

68. In the following reaction, identify the product D:
$C_6H_5OH + Zn \xrightarrow{\Delta} C_6H_6(A) + ZnO$
$C_6H_6 + CH_3Cl \xrightarrow{\text{anhy. } AlCl_3} C_6H_5CH_3(B) + HCl$
$C_6H_5CH_3 \xrightarrow{K_2Cr_2O_7+H_2SO_4} C_6H_5COOH(C)$
$C_6H_5COOH \xrightarrow{HNO_3+H_2SO_4} m \quad -NO_2C_6H_4COOH$ (D)

A) o-Nitrobenzoic acid
B) p-Nitrobenzoic acid
C) o,p -Dinitrobenzoic acid
D) m-Nitrobenzoic acid

69. The correct order of increasing boiling points of the following compounds is: Pentan-1-ol, n-Butane, Pentanal, Ethoxyethane:

A) Ethoxyethane, Pentanal, n-Butane, Pentan-1-ol
B) Pentanal, n-Butane, Ethoxyethane, Pentan-1-ol
C) n-Butane, Pentanal, Ethoxyethane, Pentan-1-ol
D) n-Butane, Ethoxyethane, Pentanal, Pentan-1-ol

70. The spin-only magnetic moment of the Hexacyanomanganate(II) ion is _____ BM.

A) 5.90 **B)** 1.73 **C)** 4.90 **D)** 3.87

71. Which of the following compounds will be repelled when placed in an external magnetic field?

A) $Na_2[CuCl_4]$ **B)** $Na_2[CdCl_4]$
C) $K_4[Fe(CN)_6]$ **D)** $K_3[Fe(CN)_6]$

72. If 75% of a first-order reaction gets completed in 32 minutes, the time taken for 50% completion of this reaction is:

A) 16 minutes **B)** 78 minutes
C) 8 minutes **D)** 4 minutes

73. The Cu metal crystallizes into an FCC lattice with a unit cell edge length of 361 pm. The radius of the Cu atom is:

A) $127pm$ **B)** $181pm$
C) $157pm$ **D)** $108pm$

74. The correct structure of the dipeptide Gly-Ala (glycyl alanine) is:

A) $H_2N-CH_2-CO-NH-CH(CH_3)-COOH$
B) $HOOC-CH_2-NH-CO-CH(CH_3)-NH_2$
C) $HOOC-CH(CH_3)-NH-CO-CH_2-NH_2$
D) $H_2N-CH(CH_3)-CO-NH-CH_2-COOH$

75. The oxidation number of Co in the complex $[Co(H_2NCH_2CH_2NH_2)_3]_2(SO_4)_3$ is:

A) 3 **B)** 4 **C)** 2 **D)** 5

76. A molecule X associates in a given solvent as per the following equation: $X \rightleftharpoons (X)n$. For a given concentration of X, the van't Hoff factor was found to be 0.80, and the fraction of associated molecules was 0.3. The correct value of ' n ' is:

A) 2 **B)** 3 **C)** 1 **D)** 5

77. The quantity of electricity produced in the oxidation of 67.2 L of $H2$ at STP is:

A) 96500 C **B)** 579000 C **C)** 193000 C **D)** 48250 C

78. The number of moles of electrons produced in the oxidation of 67.2 L of H 2 at STP is:

A) 2 moles **B)** 4 moles **C)** 1 mole **D)** 6 moles

79. The number of moles of hydrogen oxidized in the oxidation of 67.2 L of H 2 at STP is:

A) 0.33 moles **B)** 33.3 moles
C) 3.0 moles **D)** 1.33 moles

80. For SN_2 reaction, the increasing order of the reactivity of the following alkyl halides is:
(A) $CH_3CH_2CH_2CH_2Br$
(B) $CH3CH2CH(Br)CH3$
(C) $(CH3)3CBr$
(D) $(CH3)2CHCH2Br$

A) $(A) < (B) < (C) < (D)$ **B)** (A) < (C) < (B) < (D)
C) (B) < (A) < (D) < © **D)** $(C) < (B) < (D) < (A)$

81. The increasing order of acidity of the following compounds based on pKa values is:
(A) $BrCH_2COOH$
(B) $CICH_2COOH$
(C) FCH_2COOH
(D) $HCOOH$

A) $(D) < (A) < (B) < (C)$ **B)** $(A) < (D) < (C) < (B)$ **C)** $(B < (A) < (D) < (C)$ **D)** $(C) < (B) < (D) < (A))$

82. Which among the following is not an Analgesic?

A) Morphene **B)** Heroin **C)** Codeine **D)** Ranitidine

83.

List-I (Biomolecule)	List-II (Function/Diseases)
(A) Vitamin A	(I) Menstrual cycle
(B) Thiamine	(II) Xerophthalmia
(C) Glucocorticoids	(III) Beri-Beri
(D) Estradiol	(IV) Addison's disease

Choose the correct match:

A) (A) - (III), (B) - (II), (C) - (I), (D) - (IV)
B) (A) - (II), (B) - (III), (C) - (I), (D) - (IV)
C) (A) - (III), (B) - (II), (C) - (IV), (D) - (I)
D) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)

84.

List-I	List-II
(A) Swarts Reaction	(I) $C_6H_8NH_2 + NaNO_2 + HX + Cu_2X_2 \rightarrow C_6H_8X + N_2$
(B) Finkelstein Reaction	(II) $2RX + 2Na \rightarrow R - R + 2NaX$
(C) Sandmeyer Reaction	(III) $RX + AgF \rightarrow R - F + AgX$
(D) Wurtz Reaction	(IV) $RX + NaI \rightarrow R - I + NaX$

Choose the correct match:

A) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
B) (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
C) (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
D) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

85.

List-I	List-II
(A) Tollen's reagent	(I) Rochelle salt
(B) Jones reagent	(II) Conc. HCl and $ZnCl_2$
(C) Lucas reagent	(III) Ammoniacal silver nitrate
(D) Fehling solution	(IV) Chromium trioxide-sulfuric acid

Choose the correct match:

A) (A) - (III), (B) - (IV), (C) - (II), (D) - (I)
B) (A) - (IV), (B) - (III), (C) - (I), (D) - (II)
C) (A) - (I), (B) - (IV), (C) - (II), (D) - (III)
D) (A) - (III), (B) - (I), (C) - (IV), (D) - (II)

86.

List-I	List-II
(A) Amino acids linked in a specific sequence.	(I) Primary structure of proteins.
(B) Regular folding of a specific sequence of amino acids due to H-bonding.	(II) Secondary structure of proteins.
(C) Fibrous proteins.	(III) Quaternary structure of proteins.
(D) Spatial arrangement of two or more polypeptide chains.	(IV) Tertiary structure of proteins.

Choose the correct answer from the options given below :

A) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
B) (A)-(I), (B)-(III), (C)-(II), (D)-(IV)
C) (A)-(I), (B)-(II), (C)-(IV), (D)-(III)
D) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

87. The total number of ions produced from the compound $[Cr(NH_3)_6]Cl_3$ in aqueous solution will be:

A) 2 **B)** 3 **C)** 4 **D)** 5

88. Arrange the following in decreasing order of the number of molecules contained in:
(A) $16\ g$ of O_2
(B) $16\ g$ of CO_2
(C) $16\ g$ of CO^-
(D) $16gofH_2$
Choose the correct order:

A) $(A),(B),(C),(D)$
B) $(D),(C),(A),(B)$
C) $(B),(A),(D),(C)$
D) $(C),(B),(D),(A)$

MATHS - Section A (MCQ)

89. The correct arrangement of electromagnetic spectrum in decreasing order of wavelength is :

A) Radio waves, X-rays, Infrared waves, microwaves, visible waves
B) Infrared waves, microwaves, Radio waves, X-rays, visible waves
C) Radio waves, microwaves, Infrared waves, visible waves, X-rays
D) X-rays, visible waves, Infrared waves, microwaves, Radio waves

90. In a pair of adjacent coils, if current in one coil changes from 0 A to 10 A in 0.25 s , causing a magnetic flux change of 15 Wb in the adjacent coil, the mutual inductance of the coils is :

A) 120 H **B)** 12 H **C)** 1.5 H **D)** 0.75 H

91. In an AC circuit, the current leads the voltage by $\pi/2$. The circuit is :

A) purely resistive
B) should have resistance equal to reactance
C) purely inductive
D) purely capacitive

92. In a circuit where current 31 enters at A, with semicircular sections ABC and ADC of equal radii r , resistances 2 R and R respectively, the magnetic field at the center is :

A) $\frac{\mu_0 I}{4r}$ out of the plane **B)** $\frac{\mu_0 I}{4r}$ into the plane
C) $\frac{\mu_0 3I}{4r}$ out of the plane **D)** $\frac{\mu_0 3I}{4r}$ into the plane

93. Two infinitely long parallel conductors carrying currents I 1 and I 2 are at distance d apart. The force F on length L of one conductor due to the other is :

A) proportional to L but independent of $I1 \times I2$
B) proportional to $I1 \times I2$ but independent of L
C) proportional to $I1 \times I2 \times L$
D) proportional to $L/I1 \times I2$

94. Three magnetic materials : (A) Paramagnetic, (B) Diamagnetic, (C) Ferromagnetic. The correct order of increasing magnetic susceptibility is :

A) (A), (B), (C) **B)** (C), (A), (B)
C) (B), (A), (C) **D)** (B), (C), (A)

95. A metallic wire of uniform area of cross section has a resistance R, resistivity ρ and power rating P at V volts. The wire is uniformly stretched to reduce the radius to half the original radius. The values of resistance, resistivity and power rating at V volts are now denoted by $R', \square$ ' and P' respectively. The corresponding values are correctly related as _____ . Fill in the blank with the correct answer from the options given below

A) $\rho' = 2\rho, R' = 2R, P' = 2P$
B) $\rho' = 1/2\rho, R' = 1/2R, P' = 1/2P$
C) $\rho' = \rho, R' = 16R, P' = 1/16P$
D) $\rho' = \rho, R' = 1/16R, P' = 16P$

96. The current through a $4/3\Omega$ external resistance connected to a parallel combination of two cells with emfs of 2 V and 1 V , internal resistances 1Ω and 2Ω respectively, is :

A) 1 A **B)** $2/3A$
C) $3/4A$ **D)** $5/6A$

97. Two large plane parallel sheets with equal but opposite surface charge densities $+\sigma$ and $-\sigma$. A point charge q placed at points P1, P2, and P3 experiences forces F1, F2, and F3 respectively. Then :

A) $F1 = 0, F2 = 0, F3 = 0$ **B)** $F1 = 0, F2 \neq 0, F3 = 0$
C) $F1 \neq 0, F2 \neq 0, F3 \neq 0$ **D)** $F1 = 0, F3 \neq 0, F2 = 0$

98. Two parallel plate capacitors of capacitances $2\mu F$ and $3\mu F$ are joined in series and connected to a battery of V volts. The values of potential across the two capacitors V1 and V2 and energy stored in them U1 and U2 are related as :

A) $\frac{V_2}{V_1} = \frac{U_2}{U_1} = \frac{2}{3}$
B) $\frac{V_2}{V_1} = \frac{U_2}{U_1} = \frac{3}{2}$
C) $\frac{V_2}{V_1} = \frac{2}{3}, \frac{U_2}{U_1} = \frac{3}{2}$
D) $\frac{V_2}{V_1} = \frac{3}{2}, \frac{U_2}{U_1} = \frac{2}{3}$

99. For an electric dipole in a non-uniform electric field with dipole moment parallel to the field, force F and torque t are :

A) $F = 0, T = 0$ **B)** $F \neq 0, T = 0$
C) $F = 0, T \neq 0$ **D)** $F \neq 0, T \neq 0$

100. For a full wave rectifier, if the input frequency is $50\ Hz$, the output frequency will be

A) 50 Hz **B)** 100 Hz **C)** 25 Hz **D)** 0 Hz

101. According to Bohr's Model :
(A) The radius of the orbiting electron is directly proportional to $'n'$.
(B) The speedof the orbiting electron is directly proportional to $\frac{1}{n}$
(C) The magnitude of the total energy of the orbiting electron is directly proportional to $\frac{1}{n^2}$
(D) The radius of the orbiting electron is directly proportional to $= n^2$
Correct options :

A) (A), (B), (C) **B)** (A), (B), (D)
C) (A), (B), (C), (D) **D)** (B), (C), (D)

102. For an astronomical telescope with 10 m focal length objective and 10 cm eyepiece, tube length and magnification are :

A) $20\ cm, 1$ **B)** $1000\ cm, 1$
C) $1010\ cm, 1$ **D)** $1010\ cm, 100$

103. Two slits 0.1 mm apart with screen 2 m away produce fringe separation with 500 nm light. The separation is :

A) 1 cm **B)** 0.15 cm **C)** 1.5 cm **D)** 0.1 cm

104. Lower half of a convex lens is opaque. The image of an object placed in front will :

A) No change in image
B) Show only half of the object
C) Intensity reduced
D) Show half of object and reduced intensity

105. A solenoid with 2×10^4 turns per meter, diameter 0.1 m , has a coil of 100 turns and 0.01 m radius placed inside. If solenoid current decreases from 4 A to 0 in 0.05 s , total charge through coil is :

A) $16\mu C$ **B)** $32\mu C$
C) $16\pi\mu C$ **D)** $32\pi\mu C$

106. A 50 Hz AC current of crest 1 A flows through a transformer primary. With mutual inductance $0.5\ H$, the crest voltage induced in secondary is :

A) 75 V **B)** 150 V **C)** 100 V **D)** 200 V

107. A conducting ring of radius r in a magnetic field varying at rate x has electric field intensity at any ring point as :

A) rx **B)** $rx/2$ **C)** 2 rx **D)** 4 rx

108. Ferromagnetic material in transformers should have :

A) Low permeability, High Hysteresis loss
B) High permeability, Low Hysteresis loss
C) High permeability, High Hysteresis loss
D) Low permeability, Low Hysteresis loss

109. Magnetic moment of a thin bar magnet is ' M '. If it is bent into a semicircular form, its new magnetic moment will be

A) M/π **B)** $M/2$ **C)** M **D)** $2M/\pi$

110. P, Q, R and S are four wires of resistances $3, 3, 3$ and 4Ω respectively. They are connected to form the four arms of a wheatstone bridge circuit. The resistance with which S must be shunted in order that the bridge may be balanced is

A) 14Ω **B)** 12Ω
C) 15Ω **D)** 7Ω

111. A cell of emf 1.1 V and internal resistance 0.5Ω is connected to a 0.5Ω wire. Another cell of same emf is added in series, but current remains unchanged. The second cell's internal resistance is :

A) 1Ω **B)** 2.5Ω
C) 1.5Ω **D)** 2Ω

112. A metal wire under constant potential difference, when heated, shows that the drift velocity of the electron :

A) increases, thermal velocity decreases
B) decreases, thermal velocity decreases
C) increases, thermal velocity increases
D) decreases, thermal velocity increases

113. A copper ball of density $8\ g/cc$ and $1cm$ diameter, immersed in oil of density 0.8 g/cc, remains suspended in an electric field of $600\pi V/m$. The charge on the ball is :

A) $2 \times 10^6 C$ **B)** $2 \times 10^{-5} C$
C) $1 \times 10^{-5} C$ **D)** $1 \times 10^{-6} C$

114. When a slab of insulating material 4 mm thick is introduced between the plates of a parallel plate capacitor of separation 4 mm , it is found that the distance between the plates has to be increased by 3.2 mm to restore the capacity to its original value. The dielectric constant of the material is

A) 2 **B)** 5 **C)** 3 **D)** 7

115. The transfer of integral number of _____ is one of the evidence of quantization of electric charge.

A) photons **B)** nuclei **C)** electrons **D)** neutrons

116. The refractive index of the material of an equilateral prism is $\sqrt{2}$. The angle of minimum deviation of that prism is

A) 60° **B)** 75°
C) 30° **D)** 90°

117. Two charged particles, placed at a distance d apart in vacuum, exert a force F on each other. Now, each of the charges is doubled. To keep the force unchanged, the distance between the charges should be changed to :

A) 4d **B)** 2d **C)** d **D)** $d/2$

118. Silicon can be doped to get an n-type semiconductor by using :
(A) Arsenic (As)
(B) Phosphorus (P)
(C) Boron (B)
(D) Antimony (Sb)

A) (A) and (C) only **B)** (B) and (C) only
C) (A), (B) and (D) **D)** (C) and (D) only

119. The shortest wavelengths in the hydrogen spectrum, in decreasing order, for spectral series Pfund, Balmer, Brackett, and Lyman are :

A) (A), (B), (C), (D) **B)** (A), (C), (B), (D)
C) (B), (A), (D), (C) **D)** (A), (C), (D), (B)

120. Two nuclei with mass numbers A and B have density ratios of :

A) $A : B$ **B)** $\sqrt{A} : \sqrt{B}$
C) $A^2 : B^2$ **D)** $1 : 1$

121. The kinetic energy of an electron in the ground state of a hydrogen atom is K . The values of its potential energy and total energy respectively are :

A) $-2K, -K$ **B)** $+2K, -K$
C) $-K, +2K$ **D)** $+K, +2K$

122. A proton accelerated through potential difference V has de Broglie wavelength λ. On doubling the potential, the de Broglie wavelength of the proton :

A) remains unchanged **B)** becomes double
C) becomes four times **D)** decreases

123. Radiation of frequency $2v_0$ incident on a metal with threshold frequency v_0 results in maximum kinetic energy of photoelectrons as :

A) No photoelectrons emitted
B) All have kinetic energy equal to hv_0
C) Maximum kinetic energy can be hv_0
D) Maximum kinetic energy will be $2hv_0$

124. Using monochromatic light for diffraction in a single slit of width 0.1 mm , with a central maximum of 5 mm width on a screen 50 cm away, the wavelength of light used is :

A) $2.5 \times 10^{-7} m$ **B)** $4 \times 10^{-7} m$
C) $5 \times 10^{-7}\ m$ **D)** $7.5 \times 10^{-7} m$

125. For fixed radii of curvature of a lens, power is proportional to :

A) $P_\alpha(\mu - 1)$ **B)** $P \propto \mu^2$
C) $P \sim 1/\mu$ **D)** $P \propto \mu^2$

126. Match the electromagnetic waves in Column-I with production methods in Column-II

Column-I (Electromagnetic Waves)	Column-II (Production Methods)
(A) Microwaves	(I) LC oscillator
(B) Infrared	(II) Magnetron
(C) X-rays	(III) Vibration of atoms/molecules
(D) Radio waves	(IV) Bombarding large atomic number metal target with fast-moving electrons

Choose the correct answer from the options given below :

A) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
B) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)
C) (A) - (II), (B) - (I), (C) - (IV), (D) - (III)
D) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

127. In an electromagnetic wave, the ratio of energy densities of electric and magnetic fields is :

A) 1 : 1 **B)** 1 : c **C)** c : 1 **D)** $1 : c^2$

BIOLOGY - Section A (MCQ)

128. In humans, mammary gland is divided into _____ lobes.

A) 10-12 **B)** 25-30 **C)** 30-35 **D)** 15-20

129. Primary Endosperm Nucleus is the product of :

A) Double fusion **B)** Triple fusion
C) Parthenogenesis **D)** Apomixis

130. Match List-l with List-II:

List-I (Structures)	List-II (Functions)
(A) Filiform apparatus	(I) Made up of sporopollenin
(B) Tapetum	(II) Attachment of ovule to the placenta
(C) Exine	(III) Guides pollen tube into the synergid
(D) Funicle	(IV) Nourishes the pollen grain

Choose the correct answer from the options given below:

A) (A) - (IV), (B) - (I), (C) - (II), (D) - (III)
B) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)
C) (A) - (III), (B) - (I), (C) - (II), (D) - (IV)
D) (A) - (I), (B) - (III), (C) - (IV), (D) - (II)

131. Cells present in the mature pollen grains are _____ .

A) Central cell and generative cell
B) Antipodal cell and vegetative cell
C) Vegetative cell and generative cell
D) Filiform cell and micropylar cell

132. Read the passage carefully and give the answers to the question :
Does the number of species in a community really matter to the functioning of the ecosystem? This is a question for which ecologists have not been able to give a definitive answer. For many decades, ecologists believed that communities with more species, generally, tend to be more stable than those with less species. According to the International Union for Conservation of Nature and Natural Resources (IUCN) (2004), the total number of plant and animal species described so far is more than 1.5 million.
The following are the various hypotheses proposed in explaining the greatest biological diversity in tropics except :

A) Temperate regions are subjected to glaciations, but tropical latitudes have remained relatively undisturbed.
B) Tropical environments have less humidity/moisture which helps the diversity to flourish.
C) Tropical environments are less seasonal and more constant.
D) There is more solar energy available in the tropics which contributes to higher productivity and hence, biodiversity.

133. Read the passage carefully and give the answers to the question :
Does the number of species in a community really matter to the functioning of the ecosystem? This is a question for which ecologists have not been able to give a definitive answer. For many decades, ecologists believed that communities with more species, generally, tend to be more stable than those with less species. According to the International Union for Conservation of Nature and Natural Resources (IUCN) (2004), the total number of plant and animal species described so far is more than 1.5 million.
Among the vertebrates, which of the following is the most species-rich group ?

A) Reptiles **B)** Fishes **C)** Insects **D)** Mammals

134. Read the passage carefully and give the answers to the question :

Does the number of species in a community really matter to the functioning of the ecosystem? This is a question for which ecologists have not been able to give a definitive answer. For many decades, ecologists believed that communities with more species, generally, tend to be more stable than those with less species. According to the International Union for Conservation of Nature and Natural Resources (IUCN) (2004), the total number of plant and animal species described so far is more than 1.5 million.

The scientist who proved that species richness directly correlates with the stability of a community, was

A) Paul Ehrlich **B)** Robert May
C) David Tilman **D)** Edward Wilson

135. Read the passage carefully and give the answers to the question :

Does the number of species in a community really matter to the functioning of the ecosystem? This is a question for which ecologists have not been able to give a definitive answer. For many decades, ecologists believed that communities with more species, generally, tend to be more stable than those with less species.

According to the International Union for Conservation of Nature and Natural Resources (IUCN) (2004), the total number of plant and animal species described so far is more than 1.5 million.

In 'rivet popper hypothesis' the 'rivet' signifies :

A) Key species **B)** Community
C) Endemic species **D)** Species

136. Read the passage carefully and give the answers to the question :

Does the number of species in a community really matter to the functioning of the ecosystem? This is a question for which ecologists have not been able to give a definitive answer. For many decades, ecologists believed that communities with more species, generally, tend to be more stable than those with less species.

According to the International Union for Conservation of Nature and Natural Resources (IUCN) (2004), the total number of plant and animal species described so far is more than 1.5 million.

Which of the following is not a characteristic of a stable biological community?

A) It must be resistant to invasions by alien species.
B) It should not show too much variation in productivity from year to year.
C) All the species are equally important in a stable community and absence of any one leads to its unstability.
D) It is resilient to occasional disturbances, whether natural or man-made.

137. Read the passage carefully and give the answers to the question :

India was amongst the first countries in the world to initiate action plans and programmes at a national level to attain total reproductive health as a social goal.

These programmes called 'family planning' were initiated in 1951 and were periodically assessed over the past decades. Improved programmes covering wider reproduction-related areas are currently in operation. Creating awareness among the people about various reproduction-related aspects and providing facilities and support for building up a reproductively healthy society are the major tasks under these programmes.

'Saheli' - an oral contraceptive pill, also known as the 'Once a week' pill, was developed by :

A) AIIMS **B)** NBRI **C)** CDRI **D)** NBPGR

138. Arrange the given steps of DNA fingerprinting in the sequence from initiation to end.
(A) Digestion of DNA by restriction endonuclease
(B) Isolation of DNA
(C) Hybridisation using labelled VNTR probe
(D) Transferring (blotting) of separated DNA fragments to synthetic membrane
Choose the correct answer from the options given below :

A) (A), (B), (C), (D) **B)** (A), (D), (C), (B)
C) (B), (A), (D), (C) **D)** (C), (A), (B), (D)

139. Which of the following statements are incorrect with respect to nucleotides ?
(A) Purines and pyrimidines are nitrogenous bases.
(B) Nucleotides and nucleosides are same.
(C) Phosphate group is linked to - OH of 5' C of a nucleoside through phosphoester linkage.
(D) In RNA, every nucleotide residue has an additional - OH group present at 3' position in the ribose.
(E) Thymine is an example of Pyrimidine.
Choose the correct answer from the options given below :

A) (A), (B) and (E) only **B)** (D) and (E) only
C) (B) and (D) only **D)** (B) and (E) only

140. Match List-l with List-II:

List-I (Scientists)	List-II (Discovery)
(A) Sutton and Boveri	(I) X-Body
(B) Sturtevant	(II) Chromosomal Theory of Inheritance
(C) Henking	(III) Transformation in bacteria
(D) Griffith	(IV) Genetic maps

Choose the correct answer from the options given below:

A) (A) - (II), (B) - (IV), (C) - (I), (D) - (III)
B) (A) - (III), (B) - (I), (C) - (IV), (D) - (III)
C) (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
D) (A) - (IV), (B) - (I), (C) - (III), (D) - (II)

141. Select the correctly matched pair about sickle cell anaemia:
Genotype: Phenotype
(A) HbA HbA: Diseased phenotype
(B) HbA Hbs: Diseased phenotype
(C) Hbs Hbs: Diseased phenotype
(D) Hbs HbA: Carrier of disease
Choose the correct answer from the options given below:

A) (C) and (D) only
B) (A) and (C) only
C) (B), (C) and (D) only
D) (A), (B) and (C) only

142. Failure of chromatids to segregate during cell division cycle results in :

A) Polyploidy **B)** Euploidy
C) Aneuploidy **D)** Autopolyploidy

143. Which of the following pair of contrasting traits was not studied by Mendel ?

A) Pink and white flowers
B) Inflated and constricted pods
C) Axial and terminal flowers
D) Green and yellow pods

144. Read the passage carefully and give the answers to the question .
India was amongst the first countries in the world to initiate action plans plans and programmes at a national level to attain total reproductive health as a social goal.
These programmes called 'family planning' were initiated in 1951 and were periodically assessed over the past decades. Improved programmes covering wider reproduction-related areas are currently in operation. Creating awareness among the people about various reproduction-related aspects and providing facilities and support for building up a reproductively healthy society are the major tasks under these programmes.
Which of the following methods of contraception is not meant for females?

A) IUDs **B)** Lactational amenorrhea
C) Vasectomy **D)** Condoms

145. Arrange the following stages of oogenesis in order of their occurrence.
(A) Ovum
(B) Oogonia
(C) Primary oocyte
(D) Secondary oocyte
Choose the correct answer from the options given below :

A) (C), (B), (D), (A) **B)** (B), (C), (D), (A)
C) (D), (C), (A), (B) **D)** (A), (D), (C), (B)

146. Sex in human embryo is determined by:

A) X' chromosome of egg
B) X' or 'Y' chromosome of sperm
C) Only 'Y' chromosome of sperm

D) Health of mother

147. In sewage treatment, flocs are:

A) the solids that settle during sedimentation.
B) the supernatant that is formed above the primary sludge.
C) the masses of bacteria associated with fungal filaments.
D) the bacteria which grow anaerobically and are also called anaerobic sludge digesters.

148. Analogous structures are a result of:

A) Convergent evolution
B) Divergent evolution
C) Parallel evolution
D) Retrogressive evolution

149. Which of the following does not affect the Hardy-Weinberg equilibrium?

A) Natural selection **B)** Genetic drift
C) Gene pool **D)** Gene migration

150. Which of the following primates was more like an ape?

A) Homo erectus **B)** Dryopithecus
C) Australopithecines **D)** Ramapithecus

151. Nucleosome is associated with_____ molecules of histones.

A) Four **B)** Nine **C)** Two **D)** Eight

152. Select the observations drawn from the human genome project which are correct.
(A) The human genome contains 3164.7 million bp.
(B) The average gene consists of 3000 bases.
(C) Total number of genes is estimated at 30,000.
(D) The functions are unknown for over 50% of discovered genes.
(E) Less than 2% of the genome codes for proteins.
Choose the correct answer from the options given below:

A) (A), (B), (C) and (D) only
B) (A), (C), (D) and (E) only
C) (A), (C) and (E) only
D) (A), (B), (C), (D) and (E)

153. Match List-l with List-II:

List-I (Placental mammals)	List-II (Counterpart Marsupials)
(A) Anteater	(I) Spotted cuscus
(B) Bobcat	(II) Numbat
(C) Lemur	(III) Flying Phalanger
(D) Flying squirrel	(IV) Tasmanian tiger cat

Choose the correct answer from the options given below:

A) (A) - (II), (B) - (IV), (C) - (I), (D) - (III)
B) (A) - (II), (B) - (I), (C) - (IV), (D) - (III)
C) (A) - (IV), (B) - (I), (C) - (II), (D) - (III)
D) (A) - (IV), (B) - (I), (C) - (III), (D) - (II)

154. Identify the incorrect statement/s:
(A) Intestinal perforation and death may occur in severe cases of typhoid infection.
(B) Common cold is caused by Rhinoviruses.
(C) Lips and fingernails may turn grey to bluish colour in severe cases of pneumonia.
(D) Pneumonia is caused by Salmonella.
(E) Typhoid fever could be confirmed by Widal test.
Choose the answer from the options given below:

A) (A), (C) and (D) only **B)** (B) and (E) only
C) (D) only **D)** (A) and (D) only

155. Match List-l with List-II:

List-I (Types of barriers)	List-II (Examples)
(A) Cytokine barriers	(I) Mucus coating
(B) Physical barriers	(II) Tears from eyes
(C) Cellular barriers	(III) Phagocytosis
(D) Physiological barriers	(IV) Interferons

Choose the correct answer from the options given below:

A) (A) - (IV), (B) - (III), (C) - (I), (D) - (II)
B) (A) - (II), (B) - (IV), (C) - (III), (D) - (I)
C) (A) - (II), (B) - (I), (C) - (IV), (D) - (III)
D) (A) - (IV), (B) - (I), (C) - (III), (D) - (II)

156. Smack is chemically:

A) Diacetyl morphine **B)** Cocaine
C) Benzodiazepine **D)** Amphetamine

157. Antibodies are secreted by:

A) T-Cells **B)** B-Cells **C)** NK Cells **D)** Macrophages

158. Match List-I with List-II:

List-I (Products)	List-II (Organisms)
(A) Statin	(I) Streptococcus
(B) Clot buster	(II) Trichoderma
(C) Swiss cheese	(III) Monascus
(D) Cyclosporin-A	(IV) Propionibacterium

Choose the correct answer from the options given below:

A) (A) - (II), (B) - (I), (C) - (IV), (D) - (III)
B) (A) - (III), (B) - (I), (C) - (IV), (D) - (II)
C) (A) - (III), (B) - (IV), (C) - (II), (D) - (I)
D) (A) - (II), (B) - (III), (C) - (I), (D) - (IV)

159. The beetle used as a biocontrol agent for aphids and mosquitoes is:

A) Trichoderma **B)** Dragonflies
C) Ladybird **D)** Silver fish

160. Downstream processing method involves:

A) Identification **B)** Amplification
C) Fermentation **D)** Purification

161. Which of the following is not the correctly matched pair of organism and its respective cell wall degrading enzyme

A) Fungi - Chitinase
B) Algae - Methylase
C) Plant cells – Cellulase
D) Bacteria - Lysozyme

162. Arrange the following steps involved in transformation of bacteria in a sequence from initiation to end.
(A) Incubation of rDNA with bacterial cell on ice
(B) Treatment with divalent cations
(C) Heat shock treatment
(D) Selection on antibiotic containing agar plate
(E) Placed them again on ice
Choose the correct answer from the options given below:

A) (A), (B), (D), (C), (E)
B) (B), (A), (C), (E), (D)
C) (B), (C), (D), (A), (E)
D) (A), (C), (B), (D), €

163. Which of the following statements are incorrect?
(A) Fragments of DNA can be separated by ELISA.
(B) Transformation is a procedure through which a piece of DNA is introduced in a host bacterium.
(C) Recombinant DNA technology does not involve isolation of a desired DNA fragment.
(D) DNA ligases are used for stitching DNA fragments into a vector.
Choose the correct answer from the options given below:

A) (A) and (C) only **B)** (A) and (B) only
C) (B) and (C) only **D)** (A), (C) and (D) only

164. Which of the following statements are true ?
(A) Milk obtained from 'Rosie' is nutritionally more balanced for human babies than natural human milk.
(B) Biopiracy refers to the use of bioresources without proper authorization from MNCs.
(C) GEAC is the decisive body for safety and validity of GMOs and GM research respectively.
(D) Transgenic animals help us to understand the contribution of genes in the development of disease.
Choose the correct answer from the options given below:

A) (A) and (C) only **B)** (C) and (D) only
C) (A) and (D) only **D)** (B) and (C) only

165. Match List-I with List-II:

List-I (Transgene)	List-II (Used for/Products)
(A) α-1-antitrypsin	(I) Meloidogyne incognitia
(B) crylAc	(II) Corn borer
(C) Antisense RNA	(III) Treat emphysema
(D) crylAb	(IV) Cotton bollworms

Choose the correct answer from the options given below:

A) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)
B) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
C) (A) - (III), (B) - (II), (C) - (I), (D) - (IV)
D) (A) - (I), (B) - (IV), (C) - (III), (D) - (II)

166. Expand "GEAC":

A) Genetic and Environmental Advisory Committee
B) Gene Establishment Approval Committee
C) Genetic Engineering Advisory Committee

D) Genetic Engineering Approval Committee

167. When an insect feeds on the Bt plant, the insect dies due to the conversion of inactive protein to active protein in:

A) Alkaline pH of the gut.
B) Acidic pH of the gut.
C) Acidic pH of saliva.
D) Alkaline pH of saliva.

168. Match List-I with List-II:

List-I (Interspecies Relationships)	List-II (Features)
(A) Commensalism	(I) One species is benefitted at the expense of the other
(B) Mutualism	(II) One species is harmed and the other is unaffected
(C) Amensalism	(III) Both the species are benefitted
(D) Parasitism	(IV) One species benefits and other remains unaffected

Choose the correct answer from the options given below:

A) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
B) (A) - (IV), (B) - (III), (C) - (II), (D) - (I)
C) (A) - (II), (B) - (I), (C) - (III), (D) - (IV)
D) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

169. In a country, at any time, the population has the same number of youngs and mature ones. What type of growth does it reflect?

A) Expanding B) Declining C) Stable D) S-shaped

170. Two closely related species can co-exist indefinitely and violate the Gause's 'Competitive Exclusion Principle' by:

A) eliminating the inferior species.
B) resource partitioning.
C) interacting with each other symbiotically.
D) changing the area of grazing.

171. The process of mineralization by microorganisms helps in the release of:

A) inorganic nutrients from detritus and formation of humus.
B) organic nutrients from humus.
C) inorganic nutrients from humus.
D) organic and inorganic nutrients from detritus.

172. In which ecosystem is the biomass of primary consumers greater than producers?

A) Forests B) Grassland C) Desert D) Sea

173. Choose the correct statements with respect to decomposition from the following:
(A) Decomposition is an anaerobic process.
(B) Decomposition rate of detritus depends upon the chemical nature of it.
(C) Water-soluble organic nutrients go into the soil and get precipitated in the process of leaching.
(D) Humification follows mineralization.
Choose the correct answer from the options given below:

A) (B) and (D) only B) (A) and (C) only
C) (B) and (C) only D) (A) and (D) only

174. Match List-I with List-II:

List-I (Concepts)	List-II (Explanation)
(A) Standing state	(I) Available biomass for the consumption of heterotrophs
(B) Secondary productivity	(II) Rate of formation of organic matter by consumers
(C) Standing crop	(III) Mass of living matter in a trophic level at a given time
(D) Net primary productivity	(IV) Amount of mineral nutrients in the soil at a given time

Choose the correct answer from the options given below:

A) (A) - (IV), (B) - (III), (C) - (II), (D) - (I)
B) (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
C) (A) - (IV), (B) - (II), (C) - (III), (D) - (I)
D) (A) - (I), (B) - (IV), (C) - (II), (D) - (III)

175. Read the passage carefully and give the answers to the question :

India was amongst the first countries in the world to initiate action plans and programmes at a national level to attain total reproductive health as a social goal.

These programmes called 'family planning' were initiated in 1951 and were periodically assessed over the past decades. Improved programmes covering wider reproduction-related areas are currently in operation. Creating awareness among the people about various reproduction-related aspects and providing facilities and support for building up a reproductively healthy society are the major tasks under these programmes.

Which of the following is not a Sexually Transmitted Disease?

A) Chlamydiasis **B)** Filariasis
C) Genital herpes **D)** Trichomoniasis

176. Read the passage carefully and give the answers to the question :

India was amongst the first countries in the world to initiate action plans and programmes at a national level to attain total reproductive health as a social goal.

These programmes called 'family planning' were initiated in 1951 and were periodically assessed over the past decades. Improved programmes covering wider reproduction-related areas are currently in operation. Creating awareness among the people about various reproduction-related aspects and providing facilities and support for building up a reproductively healthy society are the major tasks under these programmes.

Which of the following statements is incorrect with respect to Medical Termination of Pregnancy?

A) They are considered safe during the first trimester.
B) It is legalised in India from 1971.
C) MTPs can be performed even after 24 weeks, but with the opinion of 2 registered medical practitioners on specific grounds.
D) About 20% of the total number of conceived pregancies undergo MTP in a year globally.

177. Read the passage carefully and give the answers to the question :

India was amongst the first countries in the world to initiate action plans and programmes at a national level to attain total reproductive health as a social goal.

These programmes called 'family planning' were initiated in 1951 and were periodically assessed over the past decades. Improved programmes covering wider reproduction-related areas are currently in operation. Creating awareness among the people about various reproduction-related aspects and providing facilities and support for building up a reproductively healthy society are the major tasks under these programmes.

Match Column I with Column II

Column I	Column II
(A) ZIFT	(I) Sperm injected into ovum
(B) ICSI	(II) Embryo in uterus
(C) IUI	(III) Embryo in fallopian tube
(D) IUT	(IV) Semen in uterus

Choose the correct answer from the options given below

A) (A) - (IV), (B) - (I), (C) - (II), (D) - (III)
B) (A) - (III), (B) - (IV), (C) - (II), (D) - (I)
C) (A) - (III), (B) - (I), (C) - (IV), (D) - (V)
D) (A) - (I), (B) - (III), (C) - (IV), (D) - (II)