NEET 2019 (Odisha)

Test Instructions

1. Total duration of this test is **180** minutes.
2. This test has 4 subjects consisting of
   180 questions in total.
3. There are **4** total sections in the test.
4. Sections Info :

   Physics

       a. **Section A** has **45** questions, compulsory questions **45**. **4** marks will be given for correct attempt and incorrect attempt **-1** .

   Chemistry

       a. **Section A** has **45** questions, compulsory questions **45**. **4** marks will be given for correct attempt and incorrect attempt **-1** .

   Botany

       a. **Section A** has **47** questions, compulsory questions **47**. **4** marks will be given for correct attempt and incorrect attempt **-1** .

   Zoology

       a. **Section A** has **43** questions, compulsory questions **43**. **4** marks will be given for correct attempt and incorrect attempt **-1** .

5. Total marks for this test is **720** marks.
6. No marks will be deducted for unattempted questions.
7. This test can be submitted only once.
8. Once the test has been submitted, you cannot edit the responses.
9. Results will be anounced post test submission.
10. The test will be auto-submitted once the timer ends.

Physics

Section A

1. The main scale of a vernier callipers has n divisions/cm. n divisions of the vernier scale coincide with (n − 1) divisions of main scale. The least count of the vernier callipers is,

   1. $\frac{1}{n(n+1)}$ cm

   2. $\frac{1}{(n+1)(n-1)}$ cm

   3. $\frac{1}{n}$ cm

   4. $\frac{1}{n^2}$ cm

2. An object kept in a large room having air temperature of 25°C takes 12 minutes to cool from 80°C to 70°C.The time taken to cool for the same object from 70°C to 60°C would be nearly,

   1. 15 min

   2. 10 min

   3. 12 min

   4. 20 min

3. The value of $\gamma\left(=\frac{C_p}{C_v}\right)$ for hydrogen, helium and another ideal diatomic gas X (whose molecules are not rigid but have an additional vibrational mode), are respectively equal to,

   1. $\frac{7}{5}, \frac{5}{3}, \frac{7}{5}$

   2. $\frac{7}{5}, \frac{5}{3}, \frac{9}{7}$

   3. $\frac{5}{3}, \frac{7}{5}, \frac{9}{7}$

   4. $\frac{5}{3}, \frac{7}{5}, \frac{7}{5}$

4. A sphere encloses an electric dipole with charges $\pm 3 \times 10^{-6}$ C. What is the total electric flux across the sphere?

   1. 6×10^{-6} Nm^2/C

   2. -3×10^{-6} Nm^2/C

   3. Zero

   4. 3×10^{-6} Nm^2/C

5. Two metal spheres, one of radius R and the other of radius 2R respectively have the same surface charge density σ. They are brought in contact and separated. What will be the new surface charge densities on them?

   1. $\sigma_1 = \frac{5}{3}\sigma, \sigma_2 = \frac{5}{6}\sigma$

   2. $\sigma_1 = \frac{5}{6}\sigma, \sigma_2 = \frac{5}{2}\sigma$

   3. $\sigma_1 = \frac{5}{2}\sigma, \sigma_2 = \frac{5}{6}\sigma$

   4. $\sigma_1 = \frac{5}{2}\sigma, \sigma_2 = \frac{5}{3}\sigma$

6. Two toroids 1 and 2 have total no. of turns 200 and 100 respectively with average radii 40 cm and 20 cm respectively. If they carry same current i, the ratio of the magnetic fields along the two loops is,

   1. 1 : 2

   2. 1 : 1

   3. 4 : 1

   4. 2 : 1

7. For a transparent medium, relative permeability and permittivity, μ_r and $\in_r$ are 1.0 and 1.44 respectively. The velocity of light in this medium would be,

   1. 4.32×10^8 m/s

   2. 2.5×10^8 m/s

   3. 3×10^8 m/s

   4. 2.08×10^8 m/s

8. An LED is constructed from a p-n junction diode using Ga As P. The energy gap is 1.9 eV. The wavelength of the light emitted will be equal to

   1. 654×10^{-11} m

   2. 10.4×10^{-26} m

   3. 654 nm

   4. 654 $\overset{\text{o}}{\text{A}}$

9. An equiconvex lens has power P. It is cut into two symmetrical halves by a plane containing the principal axis. The power of one part will be,

   1. P

   2. 0

   3. $\frac{P}{2}$

   4. $\frac{P}{4}$

10. A particle of mass 5m at rest suddenly breaks on its own into three fragments. Two fragments of mass m each move along mutually perpendicular direction with speed v each. The energy released during the process is,

   1. $\frac{4}{3}mv^2$

   2. $\frac{3}{5}mv^2$

   3. $\frac{5}{3}mv^2$

   4. $\frac{3}{2}mv^2$

11. An object flying in air with velocity $\left(20\hat{i} + 25\hat{j} - 12\widehat{k}\right)$ suddenly breaks into two pieces whose masses are in the ratio 1 : 5. The smaller mass flies off with a velocity $\left(100\hat{i} + 35\hat{j} + 8\widehat{k}\right)$. The velocity of the larger piece will be,

   1. $-20\hat{i} - 15\hat{j} - 80\widehat{k}$

   2. $4\hat{i} + 23\hat{j} - 16\widehat{k}$

   3. $-100\hat{i} - 35\hat{j} - 8\widehat{k}$

   4. $20\hat{i} + 15\hat{j} - 80\widehat{k}$

12. A person travelling in a straight line moves with a constant velocity v_1 for certain distance 'x' and with a constant velocity v_2 for next equal distance. The average velocity v is given by the relation

   1. $v = \sqrt{v_1 v_2}$

   2. $\frac{1}{v} = \frac{1}{v_1} + \frac{1}{v_2}$

   3. $\frac{2}{v} = \frac{1}{v_1} + \frac{1}{v_2}$

   4. $\frac{v}{2} = \frac{v_1 + v_2}{2}$

13. A person standing on the floor of an elevator drops a coin. The coin

reaches the floor in time t_1 if the elevator is at rest and in time t_2 if the elevator is moving uniformly. Then

1. $t_1 = t_2$

2. $t_1 < t_2$ or $t_1 > t_2$ depending upon whether the lift is going up or down

3. $t_1 < t_2$

4. $t_1 > t_2$

14. Two bullets are fired horizontally and simultaneously towards each other from roof tops of two buildings 100 m apart and of same height of 200 m, with the same velocity of 25 m/s. When and where will the two bullets collide? ($g = 10$ m/s^2)

    1. They will not collide

    2. After 2 s at a height of 180 m

    3. After 2 s at a height of 20 m

    4. After 4 s at a height of 120 m

15. A particle starting from rest, moves in a circle of radius 'r'. It attains a velocity of V_0 m/s in the nth round. Its angular acceleration will be,

    1. $\frac{V_0^2}{4\pi nr}$ rad $/s^2$

    2. $\frac{V_0}{n}$ rad $/s^2$

    3. $\frac{V_0^2}{2\pi nr^2}$ rad $/s^2$

    4. $\frac{V_0^2}{4\pi nr^2}$ rad $/s^2$

16.

An object of mass 500 g, initially at rest, is acted upon by a variable force whose X-component varies with X in the manner shown. The velocities of the object at the points X = 8 m and X = 12 m, would have the respective values of (nearly)
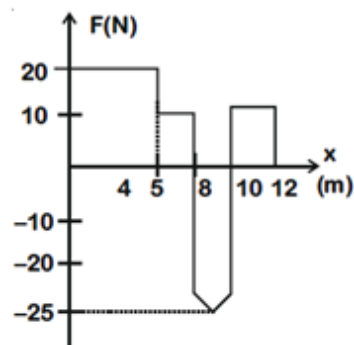
1. 18 m/s and 20.6 m/s

2. 18 m/s and 24.4 m/s

3. 23 m/s and 24.4 m/s

4. 23 m/s and 20.6 m/s

17. A truck is stationary and has a bob suspended by a light string, in a frame attached to the truck. The truck suddenly moves to the right with an acceleration of a. The pendulum will tilt

    1. to the left and angle of inclination of the pendulum with the vertical is $\tan^{-1}\left(\frac{g}{a}\right)$

    2. to the left and angle of inclination of the pendulum with the vertical is $\sin^{-1}\left(\frac{g}{a}\right)$

    3. to the left and angle of inclination of the pendulum with the vertical is $\tan^{-1}\left(\frac{a}{g}\right)$

4. to the left and angle of inclination of the pendulum with the vertical is $\sin^{-1}\left(\frac{a}{g}\right)$

18. A body of mass m is kept on a rough horizontal surface (coefficient of friction = μ). A horizontal force is applied on the body, but it does not move. The resultant of normal reaction and the frictional force acting on the object is given by F, where F is,

1. $\left|\overrightarrow{F}\right| = mg$

2. $\left|\overrightarrow{F}\right| = mg + \mu mg$

3. $\left|\overrightarrow{F}\right| = \mu mg$

4. $\left|\overrightarrow{F}\right| \leq mg\sqrt{1 + \mu^2}$

19. A solid cylinder of mass 2 kg and radius 50 cm rolls up an inclined plane of angle of inclination 30°. The centre of mass of the cylinder has speed of 4 m/s. The distance travelled by the cylinder on the inclined surface will be,
$\left[\text{take } g = 10 \text{ m/s}^2\right]$

1. 2.4 m

2. 2.2 m

3. 1.6 m

4. 1.2 m

20. Assuming that the gravitational potential energy of an object at infinity is zero, the change in potential energy (final – initial) of an object of mass m, when taken to a height h from the surface of earth (of radius R), is given by,

1. $\frac{GMm}{R+h}$

2. $-\frac{GMm}{R+h}$

3. $\frac{GMmh}{R(R+h)}$

4. mgh

21. The time period of a geostationary satellite is 24 h, at a height R_E (R_E is radius of earth) from surface of earth. The time period of another satellite whose height is 2.5 R_E from surface will be,

1. $\frac{12}{2.5} h$

2. $6\sqrt{2} h$

3. $12\sqrt{2} h$

4. $\frac{24}{2.5} h$

22. The stress-strain curves are drawn for two different materials X and Y. It is observed that the ultimate strength point and the fracture point are close to each other for material X but are far apart for material Y. We can say that materials X and Y are likely to be (respectively),
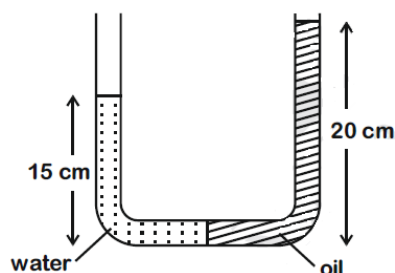
1. Plastic and ductile

2. Ductile and brittle

3. Brittle and ductile

4. Brittle and plastic

23. In a U-tube as shown in the fig. water and oil are in the left side and right side of the tube respectively. The heights from the bottom for water and oil columns are 15 cm and 20 cm respectively. The density of the oil is

    $\left[\text{take}\ \rho_{\text{water}} = 1000\,\text{kg}/\text{m}^3\right]$

    1. $1333\,\text{kg}/\text{m}^3$

    2. $1200\,\text{kg}/\text{m}^3$

    3. $750\,\text{kg}/\text{m}^3$

    4. $1000\,\text{kg}/\text{m}^3$

24. Two small spherical metal balls, having equal masses, are made from materials of densities ρ_1 and ρ_2 $(\rho_1 = 8\rho_2)$ and have radii of 1 mm and 2 mm, respectively, they are made to fall vertically (from rest) in a viscous medium whose coefficient of viscosity equals η and whose density is $0.1\rho_2$. The ratio of their terminal velocities would be,

    1. $\frac{79}{36}$

    2. $\frac{79}{73}$

    3. $\frac{19}{36}$

    4. $\frac{39}{72}$

25. A deep rectangular pond of surface area A, containing water (density = ρ), specific heat capacity = s), is located in a region where the outside air temperature is at a steady value of –26°C. The thickness of the frozen ice layer in this pond, at a certain instant is x.

    Taking the thermal conductivity of ice as K, and its specific latent heat of fusion as L, the rate of increase of the thickness of ice layer, at this instant, would be given by

    1. $26\,\text{K}/\rho \times (\text{L} + 4\,\text{s})$

    2. $26\,\text{K}/\rho \times (\text{L} - 4\,\text{s})$

    3. $26\,\text{K}/\left(\rho x^2\,\text{L}\right)$

    4. $26\,\text{K}/(\rho x\text{L})$

26. 1 g of water, of volume $1\ \text{cm}^3$ at 100°C, is converted into steam at same temperature under normal atmospheric pressure $\left(1 \times 10^5\ \text{Pa}\right)$. The volume of steam formed equals $1671\,\text{cm}^3$. If the specific latent heat of vaporization of water is 2256 J/g, the change in internal energy is:

    1. 2256 J

    2. 2423 J

    3. 2089 J

    4. 167 J

27. The distance covered by a particle undergoing SHM in one time period is (amplitude = A),

1. 4A

2. Zero

3. A

4. 2A

28. A mass falls from a height 'h' and its time of fall 't' is recorded in terms of time period T of a simple pendulum. On the surface of earth it is found that t = 2T. The entire set up is taken on the surface of another planet whose mass is half of that of earth and radius the same. Same experiment is repeated and corresponding times noted as t' and T' . Then we can say

   1. t'=2T'

   2. t'=$\sqrt{2}$T'

   3. t'>2T'

   4. t'<2T'

29. A tuning fork with frequency 800 Hz produces resonance in a resonance column tube with upper end open and lower end closed by water surface. Successive resonance are observed at lengths 9.75 cm, 31.25 cm and 52.75 cm. The speed of sound in air is,

   1. 172 m/s

   2. 500 m/s

   3. 156 m/s

   4. 344 m/s

30. Two identical capacitors C_1 and C_2 of equal capacitance are connected as shown in the circuit. Terminals a and b of the key k are connected to charge capacitor C_1 using battery of EMF V volt. Now disconnecting a and b the terminals b and c are connected. Due to this, what will be the percentage loss of energy?
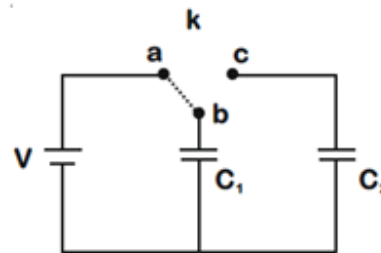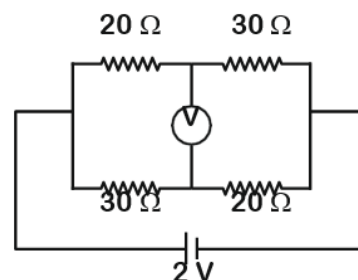

   1. 25%

   2. 75%

   3. 0%

   4. 50%

31. The reading of an ideal voltmeter in the circuit shown is,
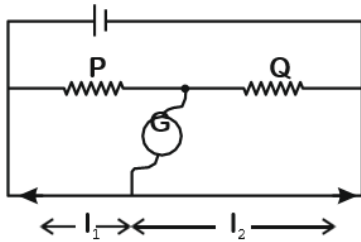

   1. 0.4 V

   2. 0.6 V

   3. 0 V

   4. 0.5 V

32.

The meter bridge shown is in balance position with $\frac{P}{Q} = \frac{l_1}{l_2}$. If we now interchange the positions of galvanometer and cell, will the bridge work? If yes, what will be balance condition?

1. yes, $\frac{P}{Q} = \frac{I_1}{I_2}$

2. yes , $\frac{P}{Q} = \frac{l_2 - l_1}{l_2 + l_1}$

3. no, no null point

4. yes, $\frac{P}{Q} = \frac{I_2}{I_1}$

33. A straight conductor carrying current i splits into two parts as shown in the figure. The radius of the circular loop is R. The total magnetic field at the centre P of the loop is,
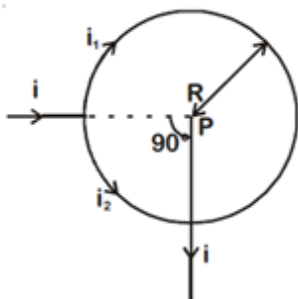
1. $\frac{\mu_0 i}{2R}$, inward

2. Zero

3. $3\mu_0 i / 32R$, outward

4. $3\mu_0 i / 32R$, inward

34. The relations amongst the three elements of earth's magnetic field, namely horizontal component H, vertical component V and dip δ are, (B_E = total magnetic field)

1. $V = B_E, H = B_E \tan \delta$

2. $V = B_E \tan \delta, H = B_E$

3. $V = B_E \sin\delta, H = B_E \cos\delta$

4. $V = B_E \cos\delta, H = B_E \sin\delta$

35. A cycle wheel of radius 0.5 m is rotated with constant angular velocity of 10 rad/s in a region of magnetic field of 0.1 T which is perpendicular to the plane of the wheel. The EMF generated between its centre and the rim is,

1. Zero

2. 0.25 V

3. 0.125 V

4. 0.5 V

36. The variation of EMF with time for four types of generators are shown in the figures. Which amongst them can be called AC?
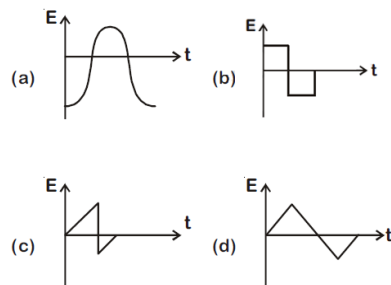
1. Only (a)

2. (a) and (d)

3. (a), (b), (c), (d)

4. (a) and (b)

37. A circuit when connected to an AC source of 12 V gives a current of 0.2 A. The same circuit when connected to a DC source of 12 V, gives a steady current of 0.4 A. The circuit is

1. Series LCR

2. Series LR

3. Series RC

4. Series LC

38. A double convex lens has focal length 25 cm. The radius of curvature of one of the surfaces is double of the other. Find the radii if the refractive index of the material of the lens is 1.5.

1. 50 cm, 100 cm

2. 100 cm, 50 cm

3. 25 cm, 50 cm

4. 18.75 cm, 37.5 cm

39. In a Young's double slit experiment, if there is no initial phase difference between the light from the two slits, a point on the screen corresponding to the fifth minimum has path difference

1. $11\frac{\lambda}{2}$

2. $5\frac{\lambda}{2}$

3. $10\frac{\lambda}{2}$

4. $9\frac{\lambda}{2}$

40. Angular width of the central maxima in the Fraunhofer diffraction for $\lambda = 6000 \overset{0}{\text{Å}}$ is θ_0 . When the same slit is illuminated by another monochromatic light, the angular width decreases by 30%. The wavelength of this light is

1. $420\overset{0}{\text{Å}}$

2. $1800\overset{0}{\text{Å}}$

3. $4200\overset{0}{\text{Å}}$

4. $6000\overset{0}{\text{Å}}$

41. A proton and an α–particle are accelerated from rest to the same energy. The de Broglie wavelengths λ_p and λ_α are in the ratio,

1. 4 : 1

2. 2 : 1

3. 1 : 1

4. $\sqrt{2} : 1$

42. The work function of a photosensitive material is 4.0 eV. The longest wavelength of light that can cause photon emission from the subs is (approximately)

1. 310 nm

2. 3100 nm

3. 966 nm

4. 31 nm

43. The radius of the first permitted Bohr orbit, for the electron, in a hydrogen atom equals $0.51 \overset{0}{A}$ and its ground state energy equals $-13.6 \ eV$. If the electron in the hydrogen atom is replaced by muon (μ^-) [charge same as electron and mass 207 m_e], the first Bohr radius and ground state energy will be,

1. 2.56×10^{-13}m, -13.6 eV

2. 0.53×10^{-13}m, -3.6 eV

3. 25.6×10^{-13}m, -2.8 eV

4. 2.56×10^{-13}m, -2.8 keV

44. The rate of radioactive disintegration at an instant for a radioactive sample of half life 2.2×10^9 s is 10^{10} s^{-1} The number of radioactive atoms in that sample at that instant is,

1. 3.17×10^{19}

2. 3.17×10^{20}

3. 3.17×10^{17}

4. 3.17×10^{18}

45. The circuit diagram shown here corresponds to the logic gate,
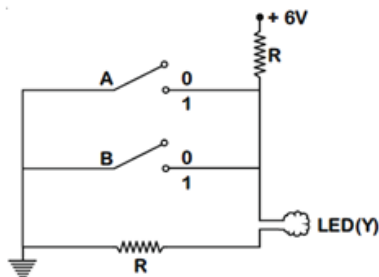
1. NAND

2. NOR

3. AND

4. OR

Chemistry

Section A

46. The volume occupied by 1.8 g of water vapour at 374°C and 1 bar pressure will be

   [Use $\mathbf{R} = 0.083 \ \text{barLK}^{-1} \ \text{mol}^{-1}$]

   1. 5.37 L

   2. 96.66 L

   3. 55.87 L

   4. 3.10 L

47. In water saturated air, the mole fraction of water vapour is 0.02. If the total pressure of the saturated air is 1.2 atm, the partial pressure of dry air is

   1. 0.98 atm

   2. 1.18 atm

   3. 1.76 atm

   4. 1.176 atm

48. The molar solubility of $\text{CaF}_2 \left(\text{K}_{\text{sp}} = 5.3 \times 10^{-11} \right)$ in 0.1 M solution of NaF will be

   1. $5.3 \times 10^{-10} \ \text{molL}^{-1}$

   2. $5.3 \times 10^{-11} \ \text{molL}^{-1}$

   3. $5.3 \times 10^{-8} \ \text{molL}^{-1}$

4. $5.3 \times 10^{-9} \, molL^{-1}$

49. The oxidation state of Cr in CrO_5 is

    1. -6

    2. +12

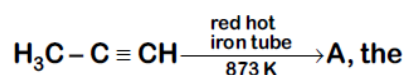   3. +6

    4. +10

50. The number of hydrogen bonded water molecule(s) associated with $CuSO_4. \, 5H_2O$ is

    1. 5

    2. 3

    3. 1

    4. 2

51. The alkane that gives only one mono-chloro product on chlorination with Cl_2 in presence of diffused sunlight is

    1. Isopentane

    2. 2, 2-dimethylbutane

    3. neopentane

    4. n-pentane

52. In the following reaction,

    $H_3C-C \equiv CH \xrightarrow[\substack{\text{red hot} \\ \text{iron tube} \\ 873 \, K}]{} A$, the

    number of sigma (σ) bonds present in the product A, is

    1. 18

    2. 21

3. 9

4. 24

53. Formula of nickel oxide with metal deficiency defect in its crystal is $Ni_{0.98} \, O$. The crystal contains Ni^{2+} and Ni^{3+} ions. The fraction of nickel existing as Ni^{2+} ions in the crystal is

    1. 0.3

    2. 0.96

    3. 0.04

    4. 0.50

54. The standard electrode potential $(E^{\ominus})$ values of $Al^{3+} / Al, \, Ag^+ / Ag, \, K^+/K$ and Cr^{3+} / Cr are −1.66 V, 0.80 V, −2.93 V and −0.74 V, respectively. The correct decreasing order of reducing power of the metal is

    1. Al > K > Ag > Cr

    2. Ag > Cr > Al > K

    3. K > Al > Cr > Ag

    4. K > Al > Ag > Cr

55. Following limiting molar conductivities are given as
    $\lambda_m^{\circ}(H_2 \, SO_4) = x \, Scm^2 \, mol^{-1} \, \lambda_m^{\circ}$
    $(K_2 \, SO_4) = y \, Scm^2 \, mol^{-1} \, \lambda_m^{\circ}$
    $(CH_3 \, COOK) = z \, Scm^2 \, mol^{-1}$
    $\lambda_m^{\circ} \, (\text{in } Scm^2 \, mol^{-1})$ for $CH_3 \, COOH$ willbe

    1. $\frac{(x-y)}{2} + z$

2. $x - y + 2z$

3. $x + y - z$

4. $x - y + z$

56. A first order reaction has a rate constant of $2.303 \times 10^{-3} s^{-1}$. The time required for 40 g of this reactant to reduce to 10 g will be [Given that $\log_{10} 2 = 0.3010$]

   1. 602 s

   2. 230.3 s

   3. 301 s

   4. 2000 s

57. For a reaction, activation energy $E_a = 0$ and the rate constant at 200 K is $1.6 \times 10^6 s^{-1}$. The rate constant at 400 K will be [Given that gas constant, $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$]

   1. $3.2 \times 10^6 s^{-1}$

   2. $3.2 \times 10^4 s^{-1}$

   3. $1.6 \times 10^6 s^{-1}$

   4. $1.6 \times 10^3 s^{-1}$

58. The correct option representing a Freundlich adsorption isotherm is

   1. $\frac{x}{m} = kp^{-1}$

   2. $\frac{x}{m} = kp^{0.3}$

   3. $\frac{x}{m} = kp^{2.5}$

   4. $\frac{x}{m} = kp^{-0.5}$

59. Identify the incorrect statement.

   1. Gangue is an ore contaminated with undesired materials

   2. The scientific and technological process used for isolation of the metal from its ore is known as metallurgy

   3. Minerals are naturally occurring chemical substances in the earth's crust
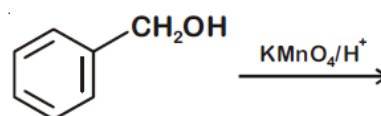
   4. Ores are minerals that may contain a metal

60. When neutral or faintly alkaline $KMnO_4$ is treated with potassium iodide, iodide ion is converted into 'X'. 'X' is

   1. IO^-

   2. I_2

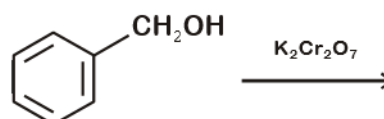   3. IO_4^-

   4. IO_3^-
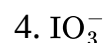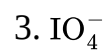
61. The reaction that does not give benzoic acid as the major product is

   1.

   2.

   3.

$$\xrightarrow[\text{(ii) } H_3O^+]{\text{(i) NaOCl}}$$

4.

$$\xrightarrow[\text{(Pyridinium Chlorochromate)}]{\text{PCC}}$$
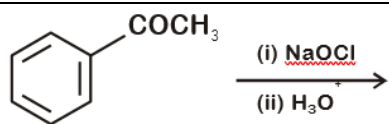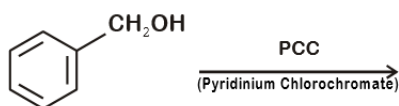
62. The amine that reacts with Hinsberg's reagent to give an alkali insoluble product is

1.

2.

3.

4.
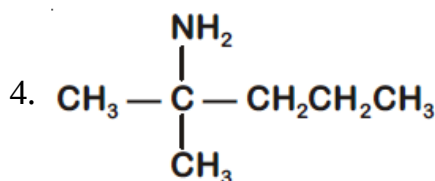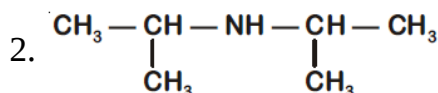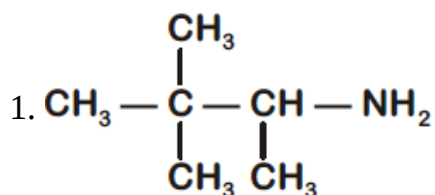
63. Which of the following is the correct order of dipole moment?

1. $H_2O < NF_3 < NH_3 < BF_3$

2. $NH_3 < BF_3 < NF_3 < H_2O$

3. $BF_3 < NF_3 < NH_3 < H_2O$

4. $BF_3 < NH_3 < NF_3 < H_2O$
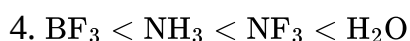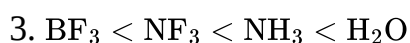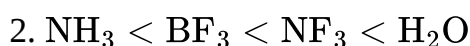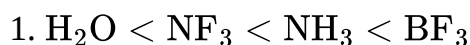
64. An ideal gas expands isothermally from 10^{-3} m^3 to 10^{-2} m^3 at 300 K against a constant pressure of 10^5 N.m^2. The work done by the gas is

1. - 900 kJ

2. + 270 kJ

3. – 900 J

4. + 900 kJ

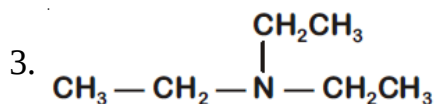65. The pH of 0.01 M NaOH (aq) solution will be

1. 9

2. 7.01

3. 2

4. 12

66. Which of the following cannot act both as Bronsted acid and as Bronsted base?

1. HSO_4^-

2. HCO_3^-

3. NH_3

4. HCl

67. Which of the alkali metal chloride (MCl) forms its dihydrate salt (MCl. $2H_2O$) easily?

1. KCl

2. LiCl

3. CsCl

4. RbCl
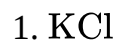
68. Crude sodium chloride obtained by crystallisation of brine solution does

not contain

  1. $CaSO_4$

  2. $MgSO_4$

  3. Na_2SO_4

  4. $MgCl_2$

69. Aluminium chloride in acidified aqueous solution forms a complex 'A', in which hybridisation state of Al is 'B'. What are 'A' and 'B', respectively?

  1. $[Al(H_2O)_6]^{3+}$, d^2sp^3

  2. $[Al(H_2O)_6]^{3+}$, sp^3d^2

  3. $[Al(H_2O)_4]^{3+}$, sp^3

  4. $[Al(H_2O)_4]^{3+}$, dsp^2

70. The liquified gas that is used in dry cleaning along with a suitable detergent is

  1. CO_2

  2. Water gas

  3. Petroleum gas

  4. NO_2

71. Which of the following compounds is used in cosmetic surgery?

  1. Zeolites

  2. Silica

  3. Silicates

  4. Silicones

72.

Which of the following oxoacids of phosphorus has strongest reducing property?

  1. H_3PO_4

  2. $H_4P_2O_7$

  3. H_3PO_3

  4. H_3PO_2

73. Identify the correct formula of 'oleum' from the following.

  1. $H_2S_2O_8$

  2. $H_2S_2O_7$

  3. H_2SO_3

  4. H_2SO_4

74. The most stable carbocation, among the following, is

  1.

$$CH_3 - CH_2 - \overset{\oplus}{C}H_2$$

  2.

$$(CH_3)_3 C - \overset{\oplus}{C}H - CH_3$$

  3.

$$CH_3 - CH_2 - \overset{\oplus}{C}H - CH_2 - CH_3$$

  4.

$$CH_3 - \overset{\oplus}{CH} - CH_2 - CH_2 - CH_3$$
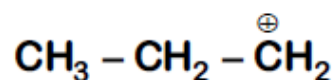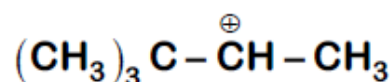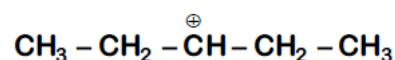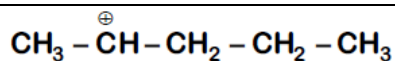
75. Which of the following statements is correct regarding a solution of two components A and B exhibiting positive deviation from ideal behaviour?

   1. Intermolecular attractive forces between A-A and B-B are equal to those between A-B.

   2. Intermolecular attractive forces between A-A and B-B are stronger than those between A-B.

   3. $\Delta_{mix} H = 0$ at constant T and P.

   4. $\Delta_{mix} V = 0$ at constant T and P.

76. Match the catalyst with the process

Catalyst	Process
(i) V_2O_5	(p) The oxidation of ethyne to ethanal
(ii) $TiCl_4 + Al(CH_3)_3$	(q) Polymerization of alkynes
(iii) $PdCl_2$	(r) Oxidation of SO_2 in the manufacture of H_2SO_4
(iv) Nickel complexes	(s) Polymerization of ethylene

Which of the following is the correct option?

   1. (i)-(r), (ii)-(s), (iii)-(p), (iv)-(q)

   2. (i)-(p), (ii)-(q), (iii)-(r), (iv)-(s)

   3. (i)-(p), (ii)-(r), (iii)-(q), (iv)-(s)

   4. (i)-(r), (ii)-(p), (iii)-(s), (iv)-(q)

77. The Crystal Field Stabilisation Energy (CFSE) for $[CoCl_6]^{-4}$ is 18000 cm^{-1}. The CFSE for $[CoCl_4]^{-2}$ will be

   1. $8000 \, cm^{-1}$

   2. $6000 \, cm^{-1}$

   3. $16000 \, cm^{-1}$

   4. $18000 \, cm^{-1}$

78. The hydrolysis reaction that takes place at the slowest rate, among the following is

   1. $-CH_2Cl \xrightarrow{aq.\ NaOH}$ $-CH_2OH$

   2. $\xrightarrow{aq.\ NaOH}$

   3. $H_3C - CH_2 - Cl \xrightarrow{aq.NaOH} H_3C - CH_2 - OH$

   4. $H_2C = CH - CH_2\,Cl \xrightarrow{aq.NaOH} H_2C = CH - CH_2\,OH$
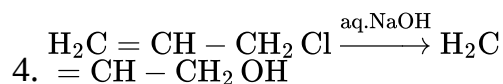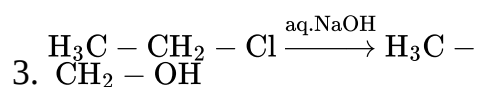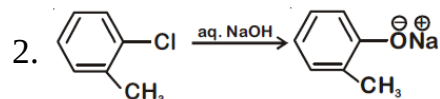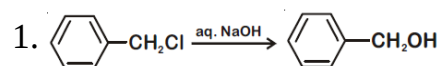
79. When vapours of a secondary alcohol is passed over heated copper at 573 K, the product formed is

   1. an alkene

   2. a carboxylic acid

   3. a ketone

   4. an aldehyde

80. The major products C and D formed in the following reaction respectively are

$$H_3C - CH_2 - CH_2 - O - C(CH_3)_3$$
$$\xrightarrow[\Delta]{excess HI} C + D$$

   1. $H_3C - CH_2 - CH_2 - OH$ and $HO - C(CH_3)_3$

   2. $H_3C - CH_2 - CH_2 - I$ and $I - C(CH_3)_3$

   3. $H_3C - CH_2 - CH_2 - OH$ and $I - C(CH_3)_3$

   4. $H_3C - CH_2 - CH_2 - I$ and $HO - C(CH_3)_3$
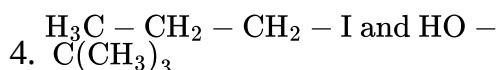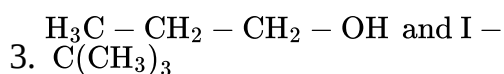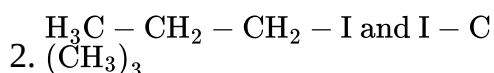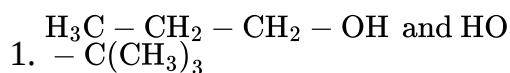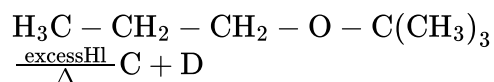
81. Which structure(s) of proteins remain(s) intact during denaturation process?

   1. Tertiary structure only

   2. Both secondary and tertiary structures

   3. Primary structure only

   4. Secondary structure only

82. The polymer that is used as a substitute for wool in making commercial fibres is

   1. Buna-N

   2. melamine

   3. nylon-6,6

   4. polyacrylonitrile

83. The artificial sweetener stable at cooking temperature and does not provide calories is

   1. alitame

   2. saccharin

   3. aspartame

   4. sucralose

84. Reversible expansion of an ideal gas under isothermal and adiabatic conditions are as shown in the figure.
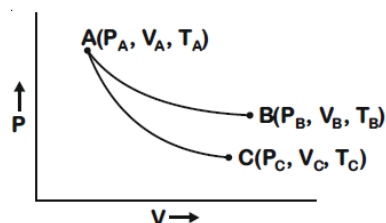
   AB → Isothermal expansion
   AC →Adiabatic expansion
   Which of the following options is not correct?

   1. $T_C > T_A$

   2. $\Delta S_{isothermal} > \Delta S_{adiabatic}$

   3. $T_A = T_B$

   4. $W_{isothermal} > W_{adiabatic}$

85. In hydrogen atom, the de Broglie wavelength of an electron in the second Bohr orbit is (Bohr's radius, $a_0 = 52.9$ pm)

   1. 105.3 pm

   2. 211.6 πpm

   3. 211.6 pm

   4. 52.9 π pm

86. Orbital having 3 angular nodes and 3 total nodes is

1. 6d

2. 5p

3. 3d

4. 4f

87. The density of 2 M aqueous solution of NaOH is 1.28 g/cm^3. The molality of the solution is [Given that molecular mass of NaOH = 40 g mol^{-1}]

    1. 1.20 m

    2. 1.56 m

    3. 1.67 m

    4. 1.32 m

88. Match the oxide given in column A with its property given in column B

Column-A	Column-B
(A) Na_2O	(i) Neutral
(B) Al_2O_3	(ii) Basic
(C) N_2O	(iii) Acidic
(D) Cl_2O_7	(iv) Amphoteric

Which of the following options has all correct pairs?

1.
(A)	(B)	(C)	(D)
ii	i	iv	iii

2.
(A)	(B)	(C)	(D)
iii	ii	i	iv

3.
(A)	(B)	(C)	(D)
i	iv	ii	iii

4.
(A)	(B)	(C)	(D)
ii	iv	i	iii

89. Which of the following is paramagnetic?

    1. O_2

    2. N_2

    3. H_2

    4. Li_2

90. A compound 'X' upon reaction with H_2O produces a colorless gas 'Y' with rotton fish smell. Gas 'Y' is absorbed in a solution of $CuSO_4$ to give Cu_3P_2 as one of the products. Predict the compound 'X'.

    1. $Ca_3(PO_4)_2$

    2. Ca_3P_2

    3. NH_4Cl

    4. As_2O_3

Botany

Section A

91. One scientist cultured *Cladophora* in a suspension of *Azotobacter* and illuminated the culture by splitting light through a prism. He observed that bacteria accumulated mainly in the region of

    1. violet and green light

    2. indigo and green light

    3. orange and yellow light

    4. blue and red light

92. Which of the following shows whorled phyllotaxy?

1. Mustard

2. China rose

3. *Alstonia*

4. *Calotropis*

93. Bicarpellary ovary with obliquely placed septum is seen in

   1. *Brassica*

   2. *Aloe*

   3. *Solanum*

   4. *Sesbania*

94. In a marriage between male with blood group A and female with blood group B, the progeny had either blood group AB or B. What could be the possible genotype of parents ?

   1. $I^A i$ (Male) : $I^B I^B$ (Female)

   2. $I^A I^A$ (Male) : $I^B I^B$ (Female)

   3. $I^A I^A$ (Male) : $I^B i$ (Female)

   4. $I^A i$ (Male) : $I^B i$ (Female)

95. Where is respiratory electron transport system (ETS) located in plants ?

   1. Mitochondrial matrix

   2. Outer mitochondrial membrane

   3. Inner mitochondrial membrane

   4. Intermembrane space

96. Match the organisms in column-I with habitats in column-II.

	Column I		Column II
(A)	Halophiles	(I)	Hot springs
(B)	Thermoacidophiles	(II)	Aquatic environment
(C)	Methanogens	(III)	Guts of ruminants
(D)	Cyanobacteria	(IV)	Salty area

Select the correct answer from the options given below:-

	(A)	(B)	(C)	(D)
(1)	IV	I	III	II
(2)	I	II	III	IV
(3)	III	IV	II	I
(4)	II	IV	III	I

   1. 1

   2. 2

   3. 3

   4. 4

97. Match the following RNA polymerase with their transcribed products :

Column I	Column II
(a) RNA polymerase I	(i) tRNA
(b) RNA polymerase II	(ii) rRNA
(c) RNA polymerase III	(iii) hnRNA

Select the correct option from the following :

	a	b	c

1	i	iii	ii
2	i	ii	iii
3	ii	iii	i
4	iii	ii	i

1. 1

2. 2

3. 3

4. 4

98. Match the placental types (column-I) with their examples (column-II).

Column I	Column II
(a) Basal	(i) Mustard
(b) Axile	(ii) *China* rose
(c) Parietal	(iii) *Dianthus*
(d) Free central	(iv) Sunflower

Choose the correct answer from the following

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

1. 1

2. 2

3. 3

4. 4

99. Match the column I with column II.

Column I	Column II

(a) Golgi apparatus	(i) Synthesis of protein
(b) Lysosomes	(ii) Trap waste and excretory products
(c) Vacuoles	(iii) Formation of glycoproteins and glycolipids
(d) Ribosomes	(iv) Digesting biomolecules

Choose the right match from the options given below:-

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

1. 1

2. 2

3. 3

4. 4

100. Which of the following is not a feature of active transport of solutes in plants ?

1. Occurs against concentration gradient

2. Non-selective

3. Occurs through membranes

4. Requires ATP

101. The main difference between active and passive transport across cell membrane is

1. passive transport is non-selective whereas active transport is selective.

2. passive transport requires a concentration gradient across a biological membrane whereas active transport requires energy to move solutes.

3. passive transport is confined to anionic carrier proteins whereas active transport is confined to cationic channel proteins.

4. active transport occurs more rapidly than passive transport.

102. Regeneration of parts of grass removed by herbivores is largely due to the activity of

   1. lateral meristem

   2. apical meristem

   3. intercalary meristem

   4. secondary meristem

103. What will be the direction of net movement of water molecules when a plant cell is placed in a hypotonic solution ?

   1. Water will flow in both directions

   2. Water will flow out of the cell

   3. Water will flow into the cell

   4. No flow of water in any direction

104.

Which of the following is against the rules of ICBN?

   1. Hand written scientific names should be underlined.

   2. Every species should have a generic name and a specific epithet.

   3. Scientific names are in Latin and should be italized.

   4. Generic and specific names should be written starting with small letters.

105. Which of the following nucleic acids is present in an organism having 70S ribosomes only ?

   1. Single stranded DNA with protein coat

   2. Double stranded circular naked DNA

   3. Double stranded DNA enclosed in nuclear membrane

   4. Double stranded circular DNA with histone proteins

106. An enzyme catalysing the removal of nucleotides from ends of DNA is

   1. DNA ligase

   2. endonuclease

   3. exonuclease

   4. protease

107.

Which scientist experimentally proved that DNA is the sole genetic material in bacteriophage ?

1. Beadle and Tautum

2. Messelson and Stahl

3. Hershey and Chase

4. Jacob and Monod

108. In mung bean, resistance to yellow mosaic virus and powdery mildew were brought about by

1. mutation breeding

2. biofortification

3. tissue culture

4. hybridization and selection

109. In order to increase the yield of sugarcane crop, which of the following plant growth regulators should be sprayed?

1. Ethylene

2. Auxins

3. Gibberellins

4. Cytokinins

110. The production of gametes by the parents, the formation of zygotes and nature of the F_1 and F_2 individuals can be understood using

1. pie diagram

2. a pyramid diagram

3. Punnet square

4. venn diagram

111. Removal of shoot tips is a very useful technique to boost the production of tea-leaves. This is because

1. gibberellins prevent bolting and are inactivated

2. auxins prevent leaf drop at early stages

3. effect of auxins is removed and growth of lateral buds is enhanced

4. gibberellins delay senescence of leaves

112. What type of pollination takes place in *Vallisneria*?

1. Pollination occurs in submerged condition by water

2. Flowers emerge above surface of water, and pollination occurs by insects

3. Flowers emerge above water surface, and pollen is carried by wind

4. Male flowers are carried by water currents to female flowers at surface of water

113. Which is the most common type of embryo sac in angiosperms ?

1. Tetrasporic with one mitotic stage of divisions

2. Monosporic with three sequential mitotic divisions

3. Monosporic with two sequential mitotic divisions

4. Bisporic with two sequential mitotic divisions

114. In which one of the following, both autogamy and geitonogamy are prevented?

1. Wheat

2. Papaya

3. Castor

4. Maize

115. The two antibiotic resistance genes on vector pBR322 are for

1. ampicillin and tetracycline

2. ampicillin and chloramphenicol

3. chloramphenicol and tetracycline

4. tetracycline and kanamycin

116. A selectable marker is used to:

1. help in eliminating the non-transformants, so that the transformants can be selectively grown.

2. identify the gene for a desired trait in an alien organism

3. select a suitable vector for transformation in a specific crop

4. mark a gene on a chromosome for isolation using restriction enzyme

117. In RNAi, the genes are silenced using

1. ds-RNA

2. ss-DNA

3. ss-RNA

4. ds-DNA

118. What will be the sequence of mRNA produced by the following stretch of DNA ?
3' ATGCATGCATGCATG5'
TEMPLATE STRAND
5' TACGTACGTACGTAC3'
CODING STRAND

1. 3'AUGCAUGCAUGCAUG5'

2. 5'UACGUACGUACGUAC 3'

3. 3' UACGUACGUACGUAC 5'

4. 5' AUGCAUGCAUGCAUG 3'

119. In the process of transcription in eukaryotes, the RNA polymerase I transcribes

1. mRNA with additional processing, capping and tailing

2. tRNA, 5 SrRNA and snRNAs

3. rRNAs- 28S, 18S and 5.8S

4. precursor of mRNA, hnRNA

120. Which of the following cell organelles is present in the highest number in secretory cells?

1. Mitochondria

2. Golgi complex

3. Endoplasmic reticulum

4. Lysosomes

121. "Ramachandran plot" is used to confirm the structure of

1. RNA

2. Proteins

3. Triacylglycerides

4. DNA

122. In Hatch and Slack pathway, the primary CO_2 acceptor is

1. oxaloacetic acid

2. phosphoglyceric acid

3. phosphoenolpyruvate

4. RuBisCO

123. From the following, identify the correct combination of salient features of genetic code

1. universal, non-ambiguous, overlapping

2. degenerate, overlapping, commaless

3. universal, ambiguous, degenerate

4. degenerate, non-overlapping, non-ambiguous

124. The contrasting characteristics generally in a pair used for identification of newly discovered organism in taxonomic key are referred to as

1. lead

2. couplet

3. doublet

4. triplet

125. In the dicot root the vascular cambium originates from :-

1. Tissue located below the phloem bundles and a portion of pericycle tissue above protoxylem

2. Cortical region

3. Parenchyma between endodermis and pericycle

4. Intrafascicular and interfascicular tissue in a ring

126. Which of the following statements about methanogens is **not** correct?

1. They can be used to produce biogas.

2. They are found in the rumen of cattle and their excreta.

3. They grow aerobically and breakdown cellulose- rich food.

4. They produce methane gas.

127. Prosthetic groups differ from co-enzymes in that

    1. they require metal ions for their activity

    2. they are tightly bound to apoenzymes.

    3. their association with apoenzymes is transient.

    4. they can serve as co-factors in a number of enzyme-catalyzed reactions.

128. Crossing over takes place between which chromatids and in which stage of the cell cycle ?

    1. Non-sister chromatids of non-homologous chromosomes at zygotene stage of prophase I.

    2. Non-sister chromatids of homologous chromosomes at pachytene stage of prophase I.

    3. Non-sister chromatids of homologous chromosomes at zygotene stage of prophase I.

    4. Non-sister chromatids of non-homologous chromosomes at pachytene stage of prophase I.

129. Which of the following bacteria reduce nitrate in soil into nitrogen ?

    1. *Nitrobacter*

    2. *Nitrococcus*

    3. *Pseudomonas*

    4. *Nitrosomonas*

130. Exploitation of bioresources of a nation by multinational companies without authorization from the concerned country is referred to as

    1. bioweapon

    2. biopiracy

    3. bioethics

    4. biowar

131. After meiosis I, the resultant daughter cells have

    1. same amount of DNA as in the parent cell in S phase

    2. twice the amount of DNA in comparison to haploid gamete

    3. same amount of DNA in comparison to haploid gamete

    4. four times the amount of DNA in comparison to haploid gamete

132. A biocontrol agent to be a part of an integrated pest management should be

    1. species-specific and symbiotic

    2. free living and broad spectrum

    3. narrow spectrum and symbiotic

4. species-specific and inactive on non-target organisms

133. Mad cow disease in cattle is caused by an organism which has

    1. inert crystalline structure

    2. abnormally folded protein

    3. free RNA without protein coat

    4. free DNA without protein coat

134. Which of the following statements is correct?

    1. Lichens do not grow in polluted areas.

    2. Algal component of lichens is called mycobiont.

    3. Fungal component of lichens is called phycobiont

    4. Lichens are not good pollution indicators.

135. Non-membranous nucleoplasmic structures in nucleus are the site for active synthesis of

    1. proteins

    2. mRNA

    3. rRNA

    4. tRNA

136. Among the following pairs of microbes, which pair has both the microbes that can be used as biofertilizers?

    1. *Aspergillus* and *Rhizopus*

    2. *Rhizobium* and *Rhizopus*

    3. Cyanobacteria and *Rhizobium*

    4. *Aspergillus* and Cyanobacteria

137. What initiation and termination factors are involved in the transcription of prokaryotes?

    1. σ and ρ, respectively

    2. α and β, respectively

    3. β and γ, respectively

    4. α and σ, respectively

Zoology

Section A

138. Match the following joints with the bones involved.

Column-I		Column-II
(a) Gliding joint	(i)	Between carpal and metacarpal of thumb
(b) Hinge joint	(ii)	Between atlas and axis
(c) Pivot joint	(iii)	Between the carpals
(d) Saddle joint	(iv)	Between the humerus and ulna

Select the correct option from the following.

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

2	iv	i	ii	iii
3	iv	ii	iii	i
4	i	iii	ii	iv

1. 1

2. 2

3. 3

4. 4

139. Exploration of molecular, genetic and species level diversity for novel products of economic importance is known as

   1. biopiracy

   2. bioenergetics

   3. bioremediation

   4. bioprospecting

140. In which genetic condition, each cell in the affected person, has three sex chromosomes XXY?

   1. Thalassemia

   2. Klinefelter's Syndrome

   3. Phenylketonuria

   4. Turner's Syndrome

141. Identify A, B and C in the diagrammatic representation of the mechanism of hormone action.
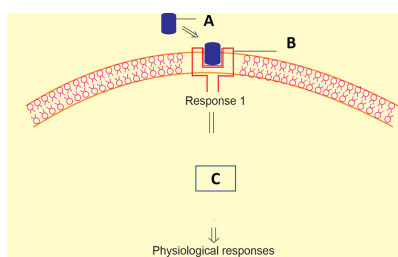
Select the correct option from the following.

	A	B	C
1.	Steroid hormone	Hormone-receptor complex	Protein
2.	Protein hormone	Receptor	Cyclic AMP
3.	Steroid hormone	Receptor	Second messenger
4.	Protein hormone	Cyclic AMP	Hormone-receptor complex

1. 1

2. 2

3. 3

4. 4

142. Decline in the population of indian native fishes due to introduction of *Clarias gariepinus* in river Yamuna can be categoriesd as

   1. Co-extinction

   2. Habitat fragmentation

   3. Over exploitation

   4. Allen species invasion

143. The maximum volume of air a person can breathe in after a forced expiration is known as

   1. expiratory capacity

   2. vital capacity

   3. inspiratory capacity

144. Select the correct statement.

1. Expiration occurs due to external intercostal muscles

2. Intrapulmonary pressure is lower than the atmospheric pressure during inspiration.

3. Inspiration occurs when atmospheric pressure is less than intrapulmonary pressure.

4. Expiration is initiated due to contraction of diaphragm.

145. Which of the following is a correct statement?

1. IUDs once inserted need not be replaced.

2. IUDs are generally inserted by the user herself.

3. IUDs increase phagocytosis of sperms in the uterus.

4. IUDs suppress gametogenesis.

146. All the components of the nodal tissue are autoexcitable. Why does the SA node act as the normal pacemakar?

1. SA node has the lowest rate of depolarisation.

2. SA node is the only component to generate the threshold potential.

3. Only SA node can convey the action potential to the other components.

4. SA node has the highest rate of depolarisation.

147. A population of a species invades a new area. Which of the following condition will lead to Adaptive Radiation ?

1. Area with large number of habitats having very low food supply

2. Area with a single type of vacant habitat

3. Area with many types of vacant habitats

4. Area with many habitats occupied by a large number of species

148. Match the items of column I with column II

	Column I		Column II
(a)	XX - XO method of sex determination	(i)	Turner's syndrome
(b)	XX - XY method of sex determination	(ii)	Female heterogametic
(c)	Karyotype 45	(iii)	Grasshopper
(d)	ZW - ZZ method of sex determination	(iv)	Female homogametic

Select the correct option from the following :

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

1. 1

2. 2

3. 3

4. 4

149. Which of the following statements is **incorrect**?

   1. Cockroaches exhibit mosaic vision with less sensitivity and more resolution.

   2. A mushroom- shaped gland is present in the 6th- 7th abdominal segments of male cockroach.

   3. A pair of spermatheca is present in the 6th segment of female cockroach.

   4. Female cockroach possesses sixteen ovarioles in the ovaries.

150. Match the items given in column I with those in column II and choose the correct option.

Column I		Column II
(a) Rennin	(i)	Vitamin B_{12}
(b) Enterokinase	(ii)	Facilitated transport
(c) Oxyntic cells	(iii)	Milk proteins

(d) Fructose		(iv) Trypsinogen

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

1. 1

2. 2

3. 3

4. 4

151. Which of the following hormones is responsible for both the milk ejection reflex and the foetal ejection reflex ?

   1. Estrogen

   2. Prolactin

   3. Oxytocin

   4. Relaxin

152. Kwashiorkor disease is due to

   1. simultaneous deficiency of proteins and fats

   2. simultaneous deficiency of proteins and calories

   3. deficiency of carbohydrates

   4. protein deficiency not accompained by calorie deficiency

153. If an agricultural field is liberally irrigated for a prolonged period of time, it is likely to face problem of:

1. Metal toxicity

2. Alkalinity

3. Acidity

4. Salinity

154. Select the correct sequence of events

1. Gametogenesis → Gamete transfer → Syngamy →Zygote → Cell division (Cleavage) → Cell differentiation → Organogenesis

2. Gametogenesis → Gamete transfer →Syngamy → Zygote → Cell division (Cleavage) → Organogenesis → Cell differentiation

3. Gametogenesis → Syngamy → Gamete transfer → Zygote → Cell division (Cleavage) → Cell differentiation → Organogenesis

4. Gametogenesis → Gamete transfer → Syngamy →Zygote → Cell differentiation → Cell division (Cleavage) → Organogenesis

155. Match the items in Column-I with those in Column-II:

	Column I		Column II
(a)	Podocytes	(i)	Crystallised oxalates
(b)	Protonephridia	(ii)	Annelids
(c)	Nephridia	(iii)	*Amphioxus*
(d)	Renal calculi	(iv)	Filtration slits

Select the correct option from the following :

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

1. 1

2. 2

3. 3

4. 4

156. Match the following parts of a nephron with their function:

	Column I		Column II
(a)	Descending limb of Henle's loop	(i)	Reabsorption of salts only
(b)	Proximal convoluted tubule	(ii)	Reabsorption of water only
(c)	Ascending limb of Henle's loop	(iii)	Conditional reabsorption of Sodium ion and water
(d)	Distal convoluted tubule	(iv)	Reabsorption of ion, water and organic nutrients

Select the correct option from the following :

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

1. 1

2. 2

3. 3

4. 4

157. Match the following genera with their respective phylum:

(a) *Ophiura*	(i) Mollusca
(b) *Physalia*	(ii) Platyhelminthes
(c) *Pinctada*	(iii) Echinodermata
(d) *Planaria*	(iv) Coelenterata

Select the correct option:

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

1. 1

2. 2

3. 3

4. 4

158. Match the following cell structure with its characteristic feature.

Column I		Column II
(a) Tight junctions	(i)	Cement neighbouring cells together to form sheet
(b) Adhering junctions	(ii)	Transmit information through chemical to another cell
(c) Gap junctions	(iii)	Establish a barrier to prevent leakage of fluid across epithelial cells
(d) Synaptic junctions	(iv)	Cytoplasmic channels to facilitate communication between adjacent cells

Select correct option from the following.

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

1. 1

2. 2

3. 3

4. 4

159. Which of the following animals are true coelomates with bilateral symmetry?

1. Adult echinoderms

2. Aschelminthes

3. Platyhelminthes

4. Annelids

160. Select the **incorrect** statement regarding inbreeding.

1. Inbreeding helps in elimination of deleterious alleles from the

population

2. Inbreeding is necessary to evolve a pureline in any animal

3. Continued inbreeding reduces fertility and leads to inbreeding depression

4. Inbreeding depression can not be overcome by out-crossing

161. Artificial light, extended work-time and reduced sleep time disrupt the activity of

    1. thymus gland

    2. pineal gland

    3. adrenal gland

    4. posterior pituitary gland

162. Which of the following conditions will stimulate parathyroid gland to release parathyroid hormone?

    1. Fall in active Vitamin D levels

    2. Fall in blood Ca^{2+} levels

    3. Fall in bone Ca^{2+} levels

    4. Rise in blood Ca^{2+} levels

163. Which of the following statements is **not** correct?

    1. An action potential in an axon does not move backward because the segment behind is in a refractory phase.

    2. Depolarisation of hair cells of cochlea results in the opening of

the mechanically gated potassium-ion channels.

3. Rods are very sensitive and contribute to daylight vision.

4. In the knee-jerk reflex, stimulus is the stretching of muscle and response is its contraction.

164. Which of the following receptors are specifically responsible for maintenance of balance of body and posture?

    1. Basilar membrane and otoliths

    2. Hair cells and organ of Corti

    3. Tectorial membrane and macula

    4. Crista ampullaris and macula

165. No new follicles develop in the luteal phase of the menstrual cycle because

    1. follicles do not remain in the ovary

    2. FSH levels are high in the luteal phase

    3. LH levels are high in the luteal phase

    4. both FSH and LH levels are low in the luteal phase

166. A specialised nodal tissue embedded in the lower corner of the right atrium, close to Atrio-ventricular septum, delays the spreading of

impulses to heart apex for about 0.1 sec. The delay allows

   1. blood to enter aorta.

   2. the ventricles to empty completely.

   3. blood to enter pulmonary arteries.

   4. the atria to empty completely.

167. In Australia, marsupials and placental mammals have evolved to share many similar characteristics. This type of evolution may be referred to as

   1. adaptive radiation

   2. divergent evolution

   3. cyclical evolution

   4. convergent evolution

168. Humans have acquired immune system that produces antibodies to neutralize pathogens. Still innate immune system is present at the time of birth because it

   1. is very specific and uses different macrophages.

   2. produces memory cells for mounting fast secondary response.

   3. has natural killer cells which can phagocytose and destroy microbes.

   4. provides passive immunity.

169. Western Ghats have a large number of plant and animal species that are not found anywhere else. Which of the following terms will you use to notify such species?

   1. Endemic

   2. Vulnerable

   3. Threatened

   4. Keystone

170. Which of the following is an innovative remedy for plastic waste?

   1. Burning in the absence of oxygen

   2. Burrying 500 m deep below soil surface

   3. Polyblend

   4. Electrostatic precipitator

171. Which of the following sexually transmitted diseases do **not** specifically affect reproductive organs?

   1. Genital warts and hepatitis-B

   2. Syphilis and genital herpes

   3. AIDS and hepatitis B

   4. Chlamydiasis and AIDS

172. Which of the following diseases is an autoimmune disorder?

   1. Myasthenia gravis

2. Arthritis

3. Osteoporosis

4. Gout

173. Carnivorous animals - lions and leopards, occupy the same niche but lions predate mostly larger animals and leopards take smaller ones. This mechanism of competition is referred to as

1. character displacement

2. altruism

3. resource partitioning

4. competitive exclusion

174. Between which among the following, the relationship is **not** an example of commensalism?

1. Orchid and the tree on which it grows

2. Cattle egret and grazing cattle

3. Sea anemone and Clown fish

4. Female wasp and fig species

175. Which of the following statements is correct about the origin and evolution of men?

1. Agriculture came around 50,000 years back.

2. The *Dryopithecus* and *Ramapithecus* primates existing 15 million years ago, walked like men.

3. *Homo habilis* buried their dead.

4. Neanderthal men lived in Asia betweeen 1,00,000 and 40,000 years back.

176. Which of the following statements about ozone is correct?

1. Tropospheric ozone protects us from UV radiations.

2. Stratospheric ozone is 'bad'

3. Tropospheric ozone is 'good'

4. Stratospheric ozone protects us from UV radiations.

177. Coca alkaloid or cocaine is obtained from

1. *Papaver somniferum*

2. *Atropa belladona*

3. *Erythroxylum coca*

4. *Datura*

178. Given below are four statements pertaining to separation of DNA fragments using gel electrophoresis. Identify the incorrect statements.
(a) DNA is negatively charged molecule and so it is loaded on gel towards the Anode terminal.
(b) DNA fragments travel along the surface of the gel whose concentration does not affect movement of DNA.
(c) Smaller the size of DNA fragment larger is the distance it

travels through it.

(d) Pure DNA can be visualized directly by exposing UV radiation. Choose correct answer from the options given below

1. (a), (c) and (d)

2. (a), (b) and (c)

3. (b), (c) and (d)

4. (a), (b) and (d)

179. Match the following enzymes with their functions :

Column I	Column II
(a) Restriction endonuclease	(i) Joins the DNA fragments
(b) Restriction exonuclease	(ii) Extends primers on genomic DNA template
(c) DNA ligase	(iii) Cuts DNA at a specific position
(d) *Taq* polymerase	(iv) Removes nucleotides from the ends of DNA

Select the correct option from the following :

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

1. 1

2. 2

3. 3

4. 4

180. Which of the following organic compounds is the main constituent of lecithin?

1. Arachidonic acid

2. Phospholipid

3. Cholesterol

4. Phosphoprotein