

NEET 2017

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 announced post test submission.
10. The test will be auto-submitted once the timer ends.

Physics

Section A

1. A physical quantity of the dimensions of length that can be formed out of c , G and $\frac{e^2}{4\pi\epsilon_0}c$ is velocity of light, G is universal constant of gravitation and e is charge]
1. $c^2 \left[G \frac{e^2}{4\pi\epsilon_0} \right]^{1/2}$
 2. $\frac{1}{c^2} \left[\frac{e^2}{G4\pi\epsilon_0} \right]^{1/2}$
 3. $\frac{1}{c} G \frac{e^2}{4\pi\epsilon_0}$
 4. $\frac{1}{c^2} \left[G \frac{e^2}{4\pi\epsilon_0} \right]^{1/2}$
2. Preeti reached the metro station and found that the escalator was not working. She walked up the stationary escalator in time t_1 . On other days, if she remains stationary on the moving escalator, then the escalator takes her up in time t_2 . The time taken by her to walk up on the moving escalator will be
1. $\frac{t_1 t_2}{t_2 - t_1}$
 2. $\frac{t_1 t_2}{t_2 + t_1}$
 3. $t_1 - t_2$
 4. $\frac{t_1 + t_2}{2}$
3. The x and y coordinates of the particle at any time are $x = 5t - 2t^2$ and $y = 10t$ respectively, where x and y are in metres and t in seconds.

The acceleration of the particle at $t = 2$ is

1. 5 ms^{-2}
 2. -4 ms^{-2}
 3. -8 ms^{-2}
 4. 0
4. Consider a drop of rain water having mass 1 g falling from a height of 1 km. It hits the ground with a speed of 50 ms^{-1} . Take 'g' constant with a value 10 ms^{-2} . The work done by the (i) gravitational force and the (ii) resistive force of air is
- | | |
|---------------|--------------|
| 1. (i) 1.25 J | (ii) -8.25 J |
| 2. (i) 100 J | (ii) 8.75 J |
| 3. (i) 10 J | (ii) -8.75 J |
| 4. (i) -10 J | (ii) 8.25 J |
5. Which of the following statements are correct?
- (1) Centre of mass of a body always coincides with the centre of gravity of the body.
 - (2) Centre of mass of a body is the point at which the total gravitational torque on the body is zero.
 - (3) A couple on a body produces both translational and rotational motion in a body.
 - (4) Mechanical advantage greater

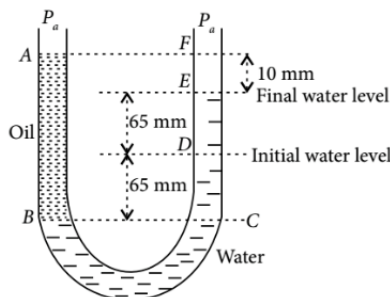
than one means that small effort can be used to lift a large load.

1. (1) and (2)
2. (2) and (3)
3. (3) and (4)
4. (2) and (4)

6. A rope is wound around a hollow cylinder of mass 3kg and radius 40cm is free to rotate about its geometrical axis. What is the angular acceleration of the cylinder if the rope is pulled with a force of 30N ?

1. 0.25 rads^{-2}
2. 25 rads^{-2}
3. 5 rads^{-2}
4. 2.5 rads^{-2}

7. A U tube with both ends open to the atmosphere, is partially filled with water. Oil, which is immiscible with water, is poured into one side until it stands at a distance of 10 mm above the water level on the other side. Meanwhile the water rises by 65 mm from its original level (see diagram). The density of the oil is

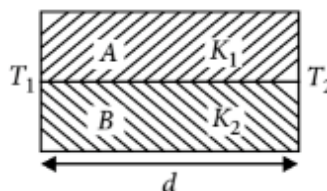


1. 425 kg m^{-3}
2. 800 kg m^{-3}
3. 928 kg m^{-3}
4. 650 kg m^{-3}

8. A spherical black body radiates 1000 watt power at 450 K. If the radius were halved and the temperature doubled, the power radiated (in watt) would be

1. 450
2. 1000
3. 1800
4. 225

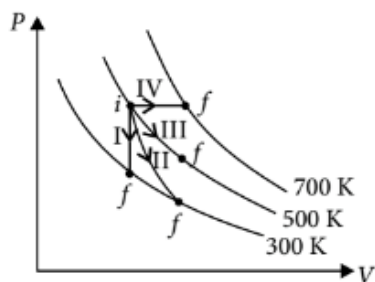
9. Two rods A and B of different materials are welded together as shown in figure. Their thermal conductivities are K_1 and K_2 .



The thermal conductivity of the composite rod will be

1. $\frac{3(K_1+K_2)}{2}$
2. $K_1 + K_2$
3. $2(K_1 + K_2)$
4. $\frac{K_1+K_2}{2}$

10. Thermodynamic processes are indicated in the following diagram.



Match the following.

Column-I	Column-II
P) Process I	A) Adiabatic
Q) Process II	B) Isobaric
R) Process III	C) Isochoric
S) Process IV	D) Isothermal

1. $P \rightarrow C, Q \rightarrow A, R \rightarrow D, S \rightarrow B$

2. $P \rightarrow C, Q \rightarrow D, R \rightarrow B, S \rightarrow A$

3. $P \rightarrow D, Q \rightarrow B, R \rightarrow A, S \rightarrow C$

4. $P \rightarrow A, Q \rightarrow C, R \rightarrow D, S \rightarrow B$

11. A Carnot engine having an efficiency of $\frac{1}{10}$ as a heat engine, is used as a refrigerator. If the work done on the system is 10 J, the amount of energy absorbed from the reservoir at lower temperature is

1. 90 J
2. 99 J
3. 100 J
4. 1 J

12. The two nearest harmonics of a tube closed at one end and open at other

end are 220 Hz and 260 Hz. What is the fundamental frequency of the system?

1. 20 Hz
2. 30 Hz
3. 40 Hz
4. 10 Hz

13. Two cars moving in opposite directions approach each other with speed of 22 m s^{-1} and 16.5 m s^{-1} respectively. The driver of the first car blows a horn having a frequency 400 Hz. The frequency heard by the driver of the second car is

[velocity of sound 340 m s^{-1}]

1. 361 Hz
2. 411 Hz
3. 448 Hz
4. 350 Hz

14. A capacitor is charged by a battery. The battery is removed and another identical uncharged capacitor is connected in parallel. The total electrostatic energy of resulting system

1. decreases by a factor of 2
2. remains the same
3. increases by a factor of 2

4. increases by a factor of 4

15. The resistance of a wire is 'R' ohm.

If it is melted and stretched to 'n' times its original length, its new resistance will be

1. $\frac{R}{n}$

2. $n^2 R$

3. $\frac{R}{n^2}$

4. nR

16. A potentiometer is an accurate and versatile device to make electrical measurements of EMF because the method involves

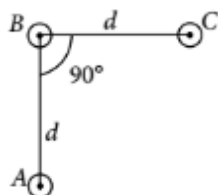
1. potential gradients

2. a condition of no current flow through the battery

3. a combination of cells, galvanometer and resistances

4. cells

17. An arrangement of three parallel straight wires placed perpendicular to plane of paper carrying same current 'I' along the same direction as shown in figure. Magnitude of force per unit length on the middle wire 'B' is given by



1. $\frac{2\mu_0 I^2}{\pi d}$

2. $\frac{\sqrt{2}\mu_0 I^2}{\pi d}$

3. $\frac{\mu_0 I^2}{\sqrt{2}\pi d}$

4. $\frac{\mu_0 I^2}{2\pi d}$

18. A 250 -turn rectangular coil of length 2.1 cm and width 1.25 cm carries a current of $85 \mu\text{A}$ and subjected to a magnetic field of strength 0.85 T. Work done for rotating the coil by 180° against the torque is

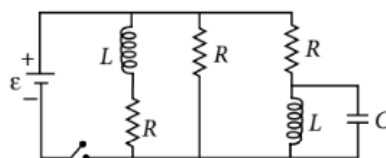
1. $4.55 \mu\text{J}$

2. $2.3 \mu\text{J}$

3. $1.15 \mu\text{J}$

4. $9.1 \mu\text{J}$

19. Figure shows a circuit that contains three identical resistors with resistance $R = 9.0 \Omega$ each, two identical inductors with inductance $L = 2.0 \text{ mH}$ each, and an ideal battery with emf $\varepsilon = 18 \text{ V}$. The current i through the battery just after the switch closed is



1. 0.2 A

2. 4 A

3. 0 ampere

4. 2 mA

20. In an electromagnetic wave in free space the root mean square value of the electric field is $E_{\text{rms}} = 6 \text{ Vm}^{-1}$. The peak value of the magnetic field is

1. $2.83 \times 10^{-8} \text{ T}$ 2. $0.70 \times 10^{-8} \text{ T}$ 3. $4.23 \times 10^{-8} \text{ T}$ 4. $1.41 \times 10^{-8} \text{ T}$

21. A thin prism having refracting angle 10° is made of glass of refractive index 1.42. This prism is combined with another thin prism of glass of refractive index 1.7. This combination produces dispersion without deviation. The refracting angle of second prism should be

1. 6° 2. 8° 3. 10° 4. 4°

22. Two polaroids P_1 and P_2 are placed with their axis perpendicular to each other. Unpolarised light I_0 , is incident on P_1 . A third polaroid P_3 is kept in between P_1 and P_2 such that its axis makes an angle 45° with that of P_1 . The intensity of transmitted light through P_2 is

1. $\frac{I_0}{4}$ 2. $\frac{I_0}{8}$ 3. $\frac{I_0}{16}$ 4. $\frac{I_0}{2}$

23. Young's double slit experiment is first performed in air and then in a medium other than air. It is found that 8th bright fringe in the medium lies where 5th dark fringe lies in air. The refractive index of the medium is nearly

1. 1.59

2. 1.69

3. 1.78

4. 1.25

24. The ratio of resolving powers of an optical microscope for two wavelengths $\lambda_1 = 4000\text{\AA}$ and $\lambda_2 = 6000\text{\AA}$ is

1. 9 : 4

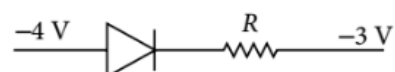
2. 3 : 2

3. 16 : 81

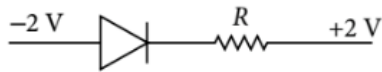
4. 8 : 27

25. Which one of the following represents forward bias diode?

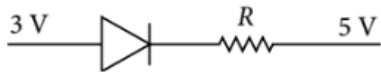
1.



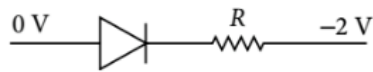
2.



3.



4.



26. In a common emitter transistor amplifier the audio signal voltage across the collector is 3 V. The resistance of collector is $3\text{ k}\Omega$. If current gain is 100 and the base resistance is $2\text{ k}\Omega$, the voltage and power gain of the amplifier is

1. 15 and 200
2. 150 and 15000
3. 20 and 2000
4. 200 and 1000

27. The given electrical network is equivalent to



1. OR gate

2. NOR gate

3. NOT gate

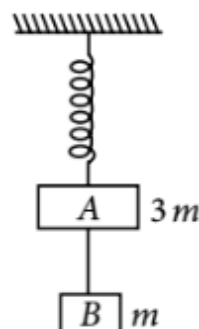
4. AND gate

28. The photoelectric threshold wavelength of silver is $3250 \times 10^{-10}\text{ m}$. The velocity of the electron ejected from a silver surface by ultraviolet light of wavelength $2536 \times 10^{-10}\text{ m}$ is

[Given $h = 4.14 \times 10^{-15}\text{ eVs}$
and $c = 3 \times 10^8\text{ m s}^{-1}$]

1. $\approx 0.6 \times 10^6\text{ m s}^{-1}$
2. $\approx 61 \times 10^3\text{ m s}^{-1}$
3. $\approx 0.3 \times 10^6\text{ m s}^{-1}$
4. $\approx 6 \times 10^5\text{ m s}^{-1}$

29. Two blocks A and B of masses 3 m and m respectively are connected by a massless and inextensible string. The whole system is suspended by a massless spring as shown in figure. The magnitudes of acceleration of A and B immediately after the string is cut, are respectively



1. $\frac{g}{3}, g$

2. g, g

3. $\frac{g}{3}, \frac{g}{3}$

4. $g, \frac{g}{3}$

30. One end of string of length l is connected to a particle of mass ' m ' and the other end is connected to a small peg on a smooth horizontal table. If the particle moves in circle with speed ' v ', the net force on the particle (directed towards centre) will be (T represents the tension in the string)

1. $T + \frac{mv^2}{l}$

2. $T - \frac{mv^2}{l}$

3. zero

4. T

31. Two discs of same moment of inertia rotating about their regular axis passing through center and perpendicular to the plane of disc with angular velocities ω_1 and ω_2 . They are brought into contact face to face coinciding the axis of rotation. The expression for loss of energy during this process is:

1. $\frac{1}{4}I(\omega_1 - \omega_2)^2$

2. $I(\omega_1 - \omega_2)^2$

3. $\frac{1}{8}I(\omega_1 - \omega_2)^2$

4. $\frac{1}{2}I(\omega_1 + \omega_2)^2$

32.

Two astronauts are floating in gravitational free space after having lost contact with their spaceship. The two will

1. move towards each other.

2. move away from each other.

3. will become stationary.

4. keep floating at the same distance between them.

33. The acceleration due to gravity at a height 1 km above the earth is the same as at a depth d below the surface of earth. Then

1. $d = 1 \text{ km}$

2. $d = \frac{3}{2} \text{ km}$

3. $d = 2 \text{ km}$

4. $d = \frac{1}{2} \text{ km}$

34. The bulk modulus of a spherical object is ' B '. If it is subjected to uniform pressure ' p ', the fractional decrease in radius is

1. $\frac{B}{3p}$

2. $\frac{3p}{B}$

3. $\frac{p}{3B}$

4. $\frac{p}{B}$

35. A gas mixture consists of 2 moles of O_2 and 4 moles of Ar at temperature T . Neglecting all vibrational modes, the total internal energy of the system is

1. 15 RT
2. 9 RT
3. 11 RT
4. 4 RT

36. A particle executes linear simple harmonic motion with an amplitude of 3 cm. When the particle is at 2 cm from the mean position, the magnitude of its velocity is equal to that of its acceleration. Then its time period in seconds is

1. $\frac{\sqrt{5}}{2\pi}$
2. $\frac{4\pi}{\sqrt{5}}$
3. $\frac{2\pi}{\sqrt{3}}$
4. $\frac{\sqrt{5}}{\pi}$

37. A spring of force constant k is cut into lengths of ratio 1 : 2 : 3. They are connected in series and the new force constant is k' . Then they are connected in parallel and force constant is k'' . Then $k' : k''$ is:

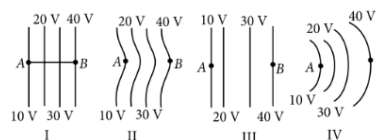
1. 1 : 9
2. 1 : 11
3. 1 : 14
4. 1 : 6

38. Suppose the charge of a proton and an electron differ slightly. One of them is $(-e)$, the other is $(e + \Delta e)$. If the net of electrostatic force and gravitational force between two

hydrogen atoms placed at a distance d (much greater than atomic size) apart is zero, then Δe is of the order of.... Given mass of hydrogen is: $[m_h = 1.67 \times 10^{-27} \text{ kg}]$

1. 10^{-23} C
2. 10^{-37} C
3. 10^{-47} C
4. 10^{-20} C

39. The diagrams below show regions of equipotentials.



A positive charge is moved from A to B in each diagram.

1. In all the four cases the work done is the same.
 2. Minimum work is required to move q in figure (I)
 3. Maximum work is required to move q in figure (II).
 4. Maximum work is required to move q in figure (III).
40. If θ_1 and θ_2 be the apparent angles of dip observed in two vertical planes at right angles to each other, then the true angle of dip θ is given by

1. $\tan^2 \theta = \tan^2 \theta_1 + \tan^2 \theta_2$

2. $\cot^2 \theta = \cot^2 \theta_1 - \cot^2 \theta_2$

3. $\tan^2 \theta = \tan^2 \theta_1 - \tan^2 \theta_2$

4. $\cot^2 \theta = \cot^2 \theta_1 + \cot^2 \theta_2$

41. A long solenoid of diameter 0.1 m has 2×10^4 turns per meter. At the centre of the solenoid, a coil of 100 turns and radius 0.01 m is placed with its axis coinciding with the solenoid axis. The current in the solenoid reduces at a constant rate to 0 A from 4 A in 0.05 s. If the resistance of the coil is $10\pi^2\Omega$, the total charge flowing through the coil during this time is

1. $16 \mu\text{C}$

2. $32 \mu\text{C}$

3. $16\pi \mu\text{C}$

4. $32\pi \mu\text{C}$

42. A beam of light from a source L is incident normally on a plane mirror fixed at a certain distance x from the source. The beam is reflected back as a spot on a scale placed just above the source L. When the mirror is rotated through a small angle θ the spot of the light is found to move through a distance y on the scale. The angle θ is given by

1. $\frac{y}{x}$

2. $\frac{x}{2y}$

3. $\frac{x}{y}$

4. $\frac{y}{2x}$

43. The de-Broglie wavelength of a neutron in thermal equilibrium with heavy water at a temperature T (kelvin) and mass m , is

1. $\frac{h}{\sqrt{3mkT}}$

2. $\frac{2h}{\sqrt{3mkT}}$

3. $\frac{2h}{\sqrt{mkT}}$

4. $\frac{h}{\sqrt{mkT}}$

44. The ratio of wavelengths of the last line of Balmer series and the last line of Lyman series is

1. 1

2. 4

3. 0.5

4. 2

45. Radioactive material 'A' has decay constant ' λ ' and material 'B' has decay constant ' 8λ '. Initially they have same number of nuclei. After what time, the ratio of number of nuclei of material 'B' to that 'A' will be e ?

1. $\frac{1}{7\lambda}$

2. $\frac{1}{8\lambda}$

3. $\frac{1}{9\lambda}$

4. $\frac{1}{\lambda}$

Chemistry

Section A

46.

For a given reaction,
 $\Delta H = 35.5 \text{ kJmol}^{-1}$ and
 $\Delta S = 83.6 \text{ JK}^{-1} \text{ mol}^{-1}$ The
 reaction is spontaneous at (Assume
 that ΔH and ΔS do not vary with
 temperature.)

1. $T > 425 \text{ K}$
2. all temperatures
3. $T > 298 \text{ K}$
4. $T < 425 \text{ K}$

47. The element $Z = 114$ has been
 discovered recently. It will belong to
 which of the following family/group
 and electronic configuration?

Carbon family, $[\text{Rn}] 5f^{14} 6$
 1. $d^{10} 7s^2 7p^2$

Oxygen family, $[\text{Rn}] 5f^{14} 6$
 2. $d^{10} 7s^2 7p^4$

Nitrogen family, $[\text{Rn}] 5f^{14} 6$
 3. $d^{10} 7s^2 7p^6$

Halogen family, $[\text{Rn}] 5f^{14} 6$
 4. $d^{10} 7s^2 7p^5$

48. Which of the following pairs of
 compounds is isoelectronic and
 isostructural?

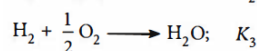
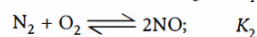
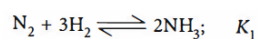
1. $\text{TeI}_2, \text{XeF}_2$
2. $\text{IBr}_2^-, \text{XeF}_2$
3. $\text{IF}_3, \text{XeF}_2$
4. $\text{BeCl}_2, \text{XeF}_2$

49. A gas is allowed to expand in a well
 insulated container against a constant
 external pressure of 2.5 atm from an

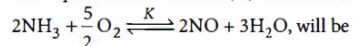
initial volume of 2.50 L to a final
 volume of 4.50 L. The change in
 internal energy ΔU of the gas in
 joules will be

1. -500 J
2. -505 J
3. +505 J
4. 1136.25 J

50. The equilibrium constants of the
 following are



The equilibrium constant (K) of the reaction :



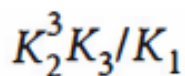
1.

$$K_2 K_3^3 / K_1$$

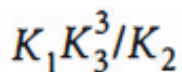
2.

$$K_2 K_3 / K_1$$

3.



4.



51. Concentration of the Ag^+ ions in a saturated solution of $\text{Ag}_2\text{C}_2\text{O}_4$ is $2.2 \times 10^{-4} \text{ mol L}^{-1}$. Solubility product of $\text{Ag}_2\text{C}_2\text{O}_4$ is

1. 2.66×10^{-12}
2. 4.5×10^{-11}
3. 5.3×10^{-12}
4. 2.42×10^{-8}

52. In which pair of ions both the species contain S - S bond?

1. $\text{S}_4\text{O}_6^{2-}$, $\text{S}_2\text{O}_3^{2-}$
2. $\text{S}_2\text{O}_7^{2-}$, $\text{S}_2\text{O}_8^{2-}$
3. $\text{S}_4\text{O}_6^{2-}$, $\text{S}_2\text{O}_7^{2-}$
4. $\text{S}_2\text{O}_7^{2-}$, $\text{S}_2\text{O}_3^{2-}$

53. HgCl_2 and I_2 both when dissolved in water containing I^- ions, the pair of species formed is

1. HgI_2 , I^-
2. HgI_4^{2-} , I_3^-
3. Hg_2I_2 , I^-

4. HgI_2 , I_3^-

54. With respect to the conformers of ethane, which of the following statements is true?

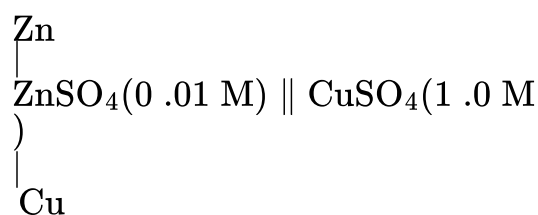
1. Bond angle changes but bond length remains same.
2. Both bond angle and bond length change.
3. Both bond angle and bond length remain same.
4. Bond angle remains same but bond length changes.

55. Which is the incorrect statement?

1. Density decreases in case of crystals with Schottky defect.
2. $\text{NaCl}(\text{s})$ is insulator, silicon is semiconductor, silver is conductor, quartz is piezoelectric crystal.
3. Frenkel defect is favoured in those ionic compounds in which sizes of cation and anions are almost equal.

4. $\text{FeO}_{0.98}$ has non-stoichiometric metal deficiency defect.

56. In the electrochemical cell :



the emf of this Daniel cell is E_1 .

When the concentration of ZnSO_4 is

changed to 1.0 M and that of CuSO_4 changed to 0.01 M, the emf changes to E_2 . From the following, which one is the relationship between E_1 and E_2 (Given, $RT/F = 0.059$)

1. $E_1 < E_2$
2. $E_1 > E_2$
3. $E_2 = 0 \neq E_1$
4. $E_1 = E_2$

57. A first order reaction has a specific reaction rate of 10^{-2} sec^{-1} . How much time will it take for 20 g of the reactant to reduce to 5 g?

1. 138.6 sec
2. 346.5 sec
3. 693.0 sec
4. 238.6 sec

58. Extraction of gold and silver involves leaching with CN^- ion. Silver is later recovered by

1. distillation
2. zone refining
3. displacement with Zn
4. liquation.

59. The correct order of the stoichiometries of AgCl formed when AgNO_3 in excess is treated with the complexes

$\text{CoCl}_3 \cdot 6 \text{NH}_3$, $\text{CoCl}_3 \cdot 5 \text{NH}_3$, $\text{CoCl}_3 \cdot 4 \text{NH}_3$ respectively is

1. 3AgCl, 1AgCl, 2AgCl
2. 3AgCl, 2AgCl, 1AgCl
3. 2AgCl, 3AgCl, 2AgCl
4. 1AgCl, 3AgCl, 2AgCl

60. Pick out the correct statement with respect to $[\text{Mn}(\text{CN})_6]^{3-}$

It is $sp^3 d^2$ hybridised and
1. tetrahedral.

It is $d^2 sp^3$ hybridised and
2. octahedral.

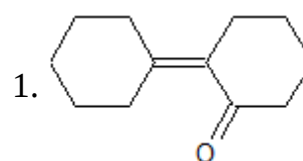
It is dsp^2 hybridised and
3. square planar.

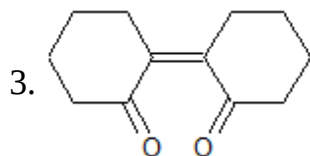
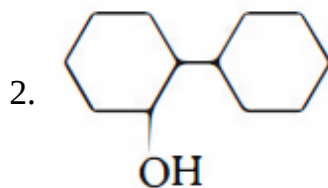
It is $sp^3 d^2$ hybridised and
4. octahedral.

61. The heating of phenyl methyl ether with HI produces

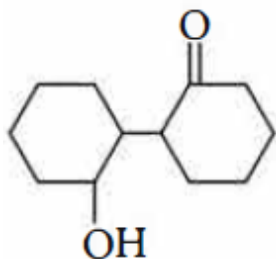
1. iodobenzene
2. phenol
3. benzene
4. ethyl chloride.

62. Of the following, which is the product formed when cyclohexanone undergoes aldol condensation followed by heating?





4.



63. Which of the following statements is not correct?

1. Ovalbumin is a simple food reserve in egg-white
2. Blood proteins thrombin and fibrinogen are involved in blood clotting
3. Denaturation makes the proteins more active
4. Insulin maintains the sugar level in the blood of a human body

64. The species, having bond angles of 120° is

1. ClF_3
2. NCl_3
3. BCl_3
4. PH_3

65.

The most suitable method of separation of 1 : 1 mixture of ortho and para-nitrophenols is

1. chromatography
2. crystallisation
3. steam distillation
4. sublimation.

66. Which one of the following statement is not correct?

1. The value of equilibrium constant is changed in the presence of a catalyst in the reaction at equilibrium.
2. Enzymes catalyse mainly biochemical reactions.
3. Coenzymes increase the catalytic activity of enzyme.
4. Catalyst does not initiate any reaction.

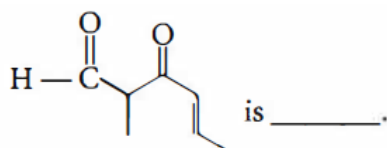
67. Ionic mobility of which of the following alkali metal ions is lowest when aqueous solution of their salts are put under an electric field?

1. K
2. Rb
3. Li
4. Na

68. It is because of inability of ns^2 electrons of the valence shell to participate in bonding that

1. Sn^{2+} is Oxidising while Pb^{4+} is reducing
2. Sn^{2+} and Pb^{2+} are both Oxidising and reducing
3. Sn^{4+} is reducing while Pb^{4+} is Oxidising
4. Sn^{2+} is reducing while Pb^{4+} is Oxidising.

69. The IUPAC name of the compound



1. 5-formylhex-2-en-3-one
2. 5-methyl-4-oxohex-2-en-5-al
3. 3-keto-2-methylhex-5-enal
4. 3-keto-2-methylhex-4-enal

70. The correct statement regarding electrophile is

1. electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from another electrophile
2. electrophiles are always neutral species and can form a bond by accepting a pair of electrons from a nucleophile

3. electrophile can be either neutral or positively charged species and can form a bond by accepting a pair of electrons from a nucleophile
4. electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from a nucleophile.

71. Which of the following is a sink for CO ?

1. Micro-organisms present in the soil
2. Oceans
3. Plants
4. Haemoglobin

72. Mechanism of a hypothetical reaction



- (i) $\text{X}_2 \rightarrow \text{X} + \text{X}$ (fast)
- (ii) $\text{X} + \text{Y}_2 \rightleftharpoons \text{XY} + \text{Y}$ (slow)
- (iii) $\text{X} + \text{Y} \rightarrow \text{XY}$ (fast)

The overall order of the reaction will be

1. 2
2. 0
3. 1.5
4. 1

73.

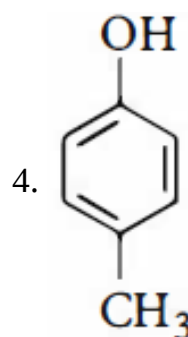
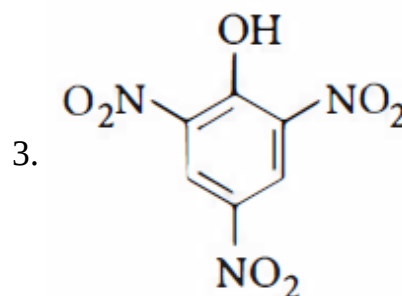
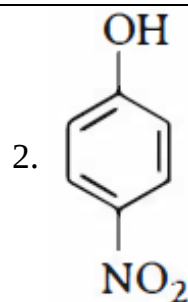
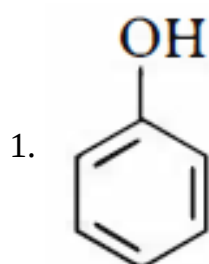
The reason for greater range of oxidation states in actinides is attributed to

1. actinide contraction
2. 5f, 6d and 7s sub levels have comparable energies
3. 4f and 5d levels being close in energies
4. the radioactive nature of actinoides

74. An example of a sigma bonded organometallic compound is

1. Grignard reagent
2. ferrocene
3. cobaltocene
4. ruthenocene.

75. Which one is the most acidic compound?

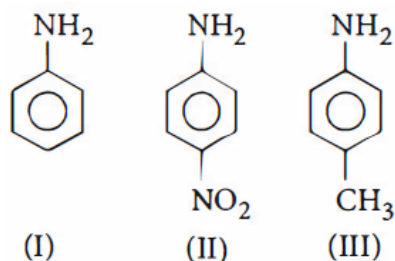


76. Which of the following reactions is appropriate for converting acetamide to methanamine?

1. Hoffmann hypobromamide reaction
2. Stephen's reaction
3. Gabriel phthalimide synthesis

4. Carbylamine reaction

77. The correct increasing order of basic strength for the following compounds is



1. III < I < II
2. III < II < I
3. II < I < III
4. II < III < I

78. A 20 litre container at 400 K contains $CO_2(g)$ at pressure 0.4 atm and an excess of SrO (neglect the volume of solid SrO). The volume of the container is now decreased by moving the movable piston fitted in the container. The maximum volume of the container, when pressure of CO_2 attains its maximum value, will be

(Given that :
 $SrCO_{3(s)} \rightleftharpoons SrO_{(s)} + CO_{2(g)}$, $K_p = 1.6 \text{ atm}$
)

1. 10 litre

2. 4 litre

3. 2 litre

4. 5 litre

79. Correct increasing order for the wavelengths of absorption in the visible region for the complexes of Co^{3+} is

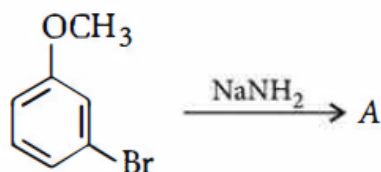
1. $[Co(H_2O)_6]^{3+}$, $[Co(en)_3]^{3+}$, $[Co(NH_3)_6]^{3+}$

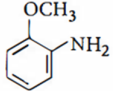
2. $[Co(en)_3]^{3+}$, $[Co(NH_3)_6]^{3+}$, $[Co(H_2O)_6]^{3+}$

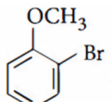
3. $[Co(NH_3)_6]^{3+}$, $[Co(en)_3]^{3+}$, $[Co(H_2O)_6]^{3+}$

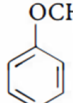
4. $[Co(en)_3]^{3+}$, $[Co(NH_3)_6]^{3+}$, $[Co(H_2O)_6]^{3+}$

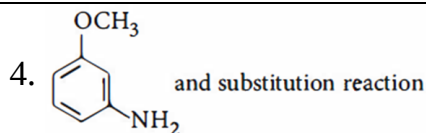
80. Identify A and predict the type of reaction.



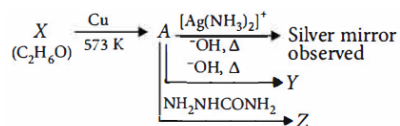
1.  and elimination addition reaction

2.  and cine substitution reaction

3.  and cine substitution reaction



81. Consider the reactions,



Identify A, X, Y and Z.

- A-Methoxymethane, X-Ethanol, Y-Ethanoic acid, Z-Semicarbazide.
- A-Ethanal, X-Ethanol, Y-But-2-enal, Z-Semicarbazone.
- A-Ethanol, X-Acetaldehyde, Y-Butanone, Z-Hydrazone.
- A-Methoxymethane, X-Ethanoic acid, Y-Acetate ion, Z-Hydrazine.

82. Which one is the wrong statement?

- The uncertainty principle is $\Delta E \times \Delta t \geq \frac{h}{4\pi}$
- Half filled and fully filled orbitals have greater stability due to greater exchange energy, greater symmetry and more balanced arrangement.
- The energy of 2s-orbital is less than the energy of 2p-orbital in case of hydrogen like atoms.
- de-Broglie's wavelength is given by $\lambda = \frac{h}{mv}$, where m = mass of

the particle, v = velocity of the particle.

83. Which one of the following pairs of species have the same bond order?

- O_2, NO^+
 - CN^-, CO
 - N_2, O_2^-
 - CO, NO
84. Name the gas that can readily decolourise acidified KMnO_4 solution.
- SO_2
 - NO_2
 - P_2O_5
 - CO_2

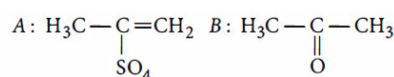
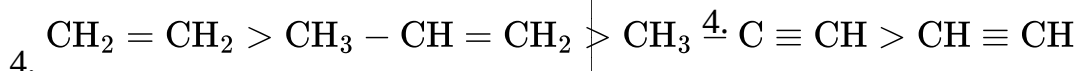
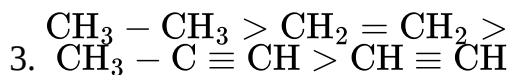
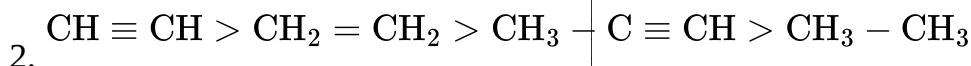
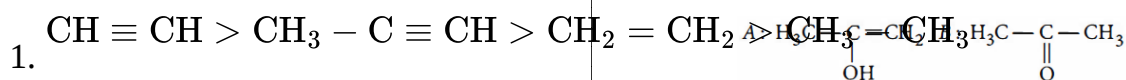
85.

Column-I	Column-II
(A) XX'	(i) T-shape
(B) XX'_3	(ii) Pentagonal bipyramidal
(C) XX'_5	(iii) Linear
(D) XX'_7	(iv) Square pyramidal
	(v) Tetrahedral

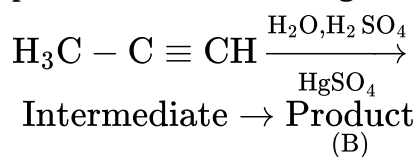
Match the interhalogen compounds of column-I with the geometry in column-II and assign the correct code.

- A -iii ; B - i ; C -iv ; D - ii
- A -v ; B - iv ; C -iii ; D - ii
- A -iv ; B - iii ; C -ii ; D - i
- A -iii ; B - iv ; C -i ; D - ii

86. Which one is the correct order of acidity?



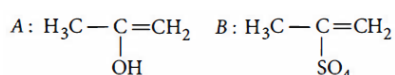
87. Predict the correct intermediate and product in the following reaction



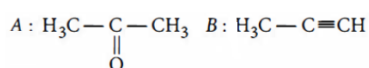
(B)

(A)

1.



2.



3.

88. Which of the following is dependent on temperature?

1. Molarity
2. Mole fraction
3. Weight percentage
4. Molality

89. If molality of the dilute solution is doubled, the value of molal depression constant (K_f) will be

1. halved
2. tripled
3. unchanged
4. doubled.

90. Mixture of chloroxylenol and terpineol acts as

1. antiseptic
2. antipyretic

3. antibiotic

4. analgesic.

Botany

Section A

91. Virioids differ from viruses in having

1. DNA molecules without protein coat
2. RNA molecules with protein coat
3. RNA molecules without protein coat
4. DNA molecules with protein coat

92. Anaphase Promoting Complex (APC) is a protein degradation machinery necessary for proper mitosis of animal cell. If APC is defective in a human cell, which of the following is expected to occur?

1. Chromosomes will be fragmented.
2. Chromosomes will not segregate.
3. Recombination of chromosome arms will occur.
4. Chromosomes will not condense.

93. During DNA replication, Okazaki fragments are used to elongate

1. the lagging strand towards replication fork

2. the leading strand away from replication fork

3. the lagging strand away from the replication fork

4. the leading strand towards replication fork

94. The genotypes of a husband and wife are $I^A I^B$ and $I^A i$

Among the blood types of their children, how many different genotypes and phenotypes are possible?

1. 3 genotypes; 4 phenotypes
2. 4 genotypes; 3 phenotypes
3. 4 genotypes; 4 phenotypes
4. 3 genotypes; 3 phenotypes

95. Which of the following RNAs should be the most abundant RNA in animal cell?

1. tRNA
2. mRNA
3. SnRNA
4. rRNA

96. Spliceosomes are not found in cells of

1. Fungi
2. Animals
3. Bacteria
4. Plants

97. If there are 999 bases in an RNA that code for a protein with 333 amino acids, and the base at position 901 is deleted such that the length of the RNA becomes 998 bases, how many codons will be altered?

1. 11
2. 33
3. 333
4. 1

98. Among the following characters, which one was not considered by Mendel in his experiments on pea?

1. Trichomes-Glandular or non-glandular
2. Seed-Green or yellow
3. Pod-Inflated or constricted
4. Stem-Tall or dwarf

99. Plants which produce characteristic pneumatophores and show vivipary belong to

1. halophytes
2. psammophytes
3. hydrophytes
4. mesophytes

100. The association of histone H_1 with a nucleosome indicates that

1. DNA replication is occurring
2. The DNA is condensed into a chromatin fibre
3. The DNA double helix is exposed
4. Transcription is occurring

101. Which one from those given below is the period for Mendel's hybridisation experiments?

1. 1840-1850
2. 1857-1869
3. 1870-1877
4. 1856-1863

102. Root hairs develop from the region of

1. elongation
2. root cap
3. meristematic activity
4. maturation

103. In *Bougainvillea*, thorns are the modifications of

1. adventitious root
2. stem
3. leaf
4. stipules

104. DNA replication in bacteria occurs

1. within nucleolus

2. prior to fission

3. just before transcription

4. during S phase

105. The water potential of pure water is

1. Less than zero

2. More than zero but less than one

3. More than one

4. Zero

106. An example of colonial alga is

1. *Volvox*

2. *Ulothrix*

3. *Spirogyra*

4. *Chlorella*

107. Which of the following components provides sticky character to the bacterial cell?

1. Nuclear membrane

2. Plasma membrane

3. Glycocalyx

4. Cell wall

108. The final proof for DNA as the genetic material came from the experiments of

1. Hershey and Chase

2. Avery, MacLeod and McCarty

3. Hargobind Khorana

4. Griffith

109. The DNA fragments separated on an agarose gel can be visualised after staining with

1. Acetocarmine

2. Aniline blue

3. Ethidium bromide

4. Bromophenol blue

110. What is the criterion for DNA fragments movement on agarose gel during gel electrophoresis ?

1. The smaller the fragment size, the farther it moves.

2. Positively charged fragments move to farther end.

3. Negatively charged fragments do not move.

4. The larger the fragment size, the farther it moves.

111. Which of the following options gives the correct sequence of events during mitosis?

1. Condensation → nuclear membrane disassembly → arrangement at equator → centromere division → separation of chromatids → telophase

2. Condensation → crossing over → nuclear membrane

disassembly → segregation → telophase

3. Condensation → segregation → arrangement at the equator → centromere division → telophase

4. Condensation → nuclear membrane disassembly → crossing over → segregation → telophase

112. Which of the following are found in extreme saline conditions?

1. Eubacteria
2. Cyanobacteria
3. Mycobacteria
4. Archaeobacteria

113. Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen?

1. *Pseudomonas*
2. Mycoplasma
3. *Nostoc*
4. *Bacillus*

114. Fruit and leaf drop at early stages can be prevented by the application of

1. ethylene
2. auxins
3. gibberellic acid

4. cytokinins

115. Which of the following is correctly matched with the product produced by them?

1. *Methanobacterium* : Lactic acid
2. *Penicillium notatum* : Acetic acid
3. *Saccharomyces cerevisiae*: Ethanol
4. *Acetobacter aceti* : Antibiotics

116. Which of the following facilitates opening of stomatal aperture?

1. Decrease in turgidity of guard cells
2. Radial orientation of cellulose microfibrils in the cell wall of guard cells
3. Longitudinal orientation of cellulose microfibrils in the cell wall of guard cells
4. Contraction of outer wall of guard cells

117. Which statement is **wrong** for Krebs' cycle?

- There is one point in the cycle
1. where FAD^+ is reduced to FADH_2 .
 2. During conversion of succinyl CoA to succinic acid, a molecule of GTP is synthesised.
 3. The cycle starts with condensation of acetyl group

(acetyl CoA) with pyruvic acid to yield citric acid.

4. There are three points in the cycle where NAD^+ is reduced to $\text{NADH} + \text{H}^+$.

118. A gene whose expression helps to identify transformed cell is known as

1. vector
2. plasmid
3. structural gene
4. selectable marker

119. A dioecious flowering plant prevents both

1. autogamy and geitonogamy
2. geitonogamy and xenogamy
3. cleistogamy and xenogamy
4. autogamy and xenogamy.

120. Flowers which have single ovule in the ovary and are packed into inflorescence are usually pollinated by

1. bee
2. wind
3. bat
4. water

121. Attractants and rewards are required for

1. entomophily

2. hydrophily

3. cleistogamy

4. anemophily

122. Functional megaspore in an angiosperm develops into an

1. endosperm
2. embryo sac
3. embryo
4. ovule

123. Double fertilisation is exhibited by

1. algae
2. fungi
3. angiosperms
4. gymnosperms

124. The morphological nature of the edible part of coconut is

1. cotyledon
2. endosperm
3. pericarp
4. perisperm

125. At which of the following stages of sewage treatment, suspended solids are removed ?

1. Secondary treatment
2. Primary treatment
3. Sludge treatment

4. Tertiary treatment

126. Phosphoenol pyruvate is the primary CO₂ acceptor in

1. C₄ plants
2. C₂ plants
3. C₃ and C₄ plants
4. C₃ plants

127. Select the mismatch.

1. *Cycas* - Dioecious
2. *Salvinia* - Heterosporous
3. *Equisetum* - Homosporous
4. *Pinus* - Dioecious

128. Coconut fruit is a

1. berry
2. nut
3. capsule
4. drupe

129. The vascular cambium normally gives rise to

1. primary phloem
2. secondary xylem
3. periderm
4. phelloderm

130. Which of the following is made up of dead cells?

1. Collenchyma

2. Phellem

3. Phloem

4. Xylem parenchyma

131. Identify the wrong statement in context of heartwood.

1. It is highly durable.
2. It conducts water and minerals efficiently.
3. It comprises dead elements with highly lignified walls.
4. Organic compounds are deposited in it.

132. Select the **mismatch**.

1. *Rhodospirillum* - Mycorrhiza
2. *Anabaena* - Nitrogen fixer
3. *Rhizobium* - Alfalfa
4. *Frankia* - *Alnus*

133. The process of separation and purification of expressed protein formed in heterologous host before marketing is called

1. downstream processing
2. bioprocessing
3. postproduction processing
4. upstream processing.

134. Zygotic meiosis is characteristic of

1. *Fucus*

2. *Funaria*

3. *Chlamydomonas*

4. *Marchantia*

135. Life cycles of *Ectocarpus* and *Ficus* respectively are

1. diplontic, haplodiplontic
2. haplodiplontic, diplontic
3. haplodiplontic, haplontic
4. haplontic, diplontic

136. With reference to factors affecting the rate of photosynthesis, which of the following statements is **not** correct?

1. Atmospheric CO₂ concentration upto 0.05% can enhance CO₂ fixation rate
2. C₃ plants respond to higher temperatures with enhanced photosynthesis while C₄ plants have much lower temperature optimum
3. Tomato is a green house crop which can be grown in CO₂ enriched atmosphere for higher yield
4. Light saturation for CO₂ fixation occurs at 10% of full sunlight

137. Which of the following cell organelles is responsible for extracting energy from carbohydrates to form ATP?

1. Ribosome
2. Chloroplast
3. Mitochondrion
4. Lysosome

Zoology

Section A

138. Which of the following statements is correct?

1. The descending limb of loop of Henle is impermeable to water.
2. The ascending limb of loop of Henle is permeable to water.
3. The descending limb of loop of Henle is permeable to electrolytes.
4. The ascending limb of loop of Henle is impermeable to water.

139. A baby boy aged two years is admitted to play school and passes through a dental check-up. The dentist observed that the boy had twenty teeth. Which teeth were absent?

1. Canines
2. Premolars
3. Molars
4. Incisors

140. Which one of the following statements is not valid for aerosols?

1. They alter rainfall and monsoon patterns.
2. They cause increased agricultural productivity.
3. They have a negative impact on agricultural land.
4. They are harmful to human health.

141. Lungs are made up of air-filled sacs, the alveoli. They do not collapse even after forceful expiration, because of

1. inspiratory reserve volume
2. tidal volume
3. expiratory reserve volume
4. residual volume

142. The function of copper ions in copper releasing IUDs is

1. they inhibit gametogenesis
2. they make uterus unsuitable for implantation
3. they inhibit ovulation
4. they suppress sperm motility and fertilising capacity of sperms

143. Which of the following options best represents the enzyme composition of pancreatic juice?

1. Amylase, pepsin, trypsinogen, maltase

2. Peptidase, amylase, pepsin, rennin
3. Lipase, amylase, trypsinogen, procarboxypeptidase
4. Amylase, peptidase, trypsinogen, rennin

144. Asymptote in a logistic growth curve is obtained when

1. $K = N$
2. $K > N$
3. $K < N$
4. the value of 'r' approaches zero.

145. The region of biosphere reserve which is legally protected and where no human activity is allowed is known as

1. buffer zone
2. transition zone
3. restoration zone
4. core zone.

146. Capacitation occurs in

1. epididymis
2. vas deferens
3. female reproductive tract
4. rete testis

147. The hepatic portal vein drains blood to liver from

1. stomach
2. kidneys
3. intestine
4. heart

148. Match the following sexually transmitted diseases (column I) with their causative agent (column II) and select the correct option.

Column I	Column II
A Gonorrhoea (i)	HIV
B Syphilis	(ii) <i>Neisseria</i>
C Genital warts	(iii) <i>Treponema</i>
D AIDS	Human (iv) papilloma virus

	A	B	C	D
1.	iii	iv	i	ii
2.	iv	ii	iii	i
3.	iv	iii	ii	i
4.	ii	iii	iv	i

1. 1
2. 2
3. 3
4. 4

149. Mycorrhizae are the example of

1. amensalism
2. antibiosis
3. mutualism
4. fungistasis

150.

In case of a couple where the male is having a very low sperm count, which technique will be suitable for fertilisation?

1. Gamete intracytoplasmic fallopian transfer
2. Artificial insemination
3. Intracytoplasmic sperm injection
4. Intrauterine transfer

151. Select the correct route for the passage of sperms in male frogs.

1. Testes → Vasa efferentia → Kidney → Seminal vesicle → Urinogenital duct → Cloaca
2. Testes → Vasa efferentia → Bidder's canal → Ureter → Cloaca
3. Testes → Vasa efferentia → Kidney → Bidder's canal → Urinogenital duct → Cloaca
4. Testes → Bidder's canal → Kidney → Vasa efferentia → Urinogenital duct → Cloaca

152. Frog's heart when taken out of the body continues to beat for sometime.

Select the best option from the following statements.

- (a) Frog is a poikilotherm.
- (b) Frog does not have any coronary circulation.

(c) Heart is "myogenic" in nature.

(d) Heart is autoexcitable.

1. Only (d)
2. (a) and (b)
3. (c) and (d)
4. Only (c)

153. Important characteristic that hemichordates share with chordates is

1. ventral tubular nerve cord
2. pharynx with gill slits
3. pharynx without gill slits
4. absence of notochord

154. Presence of plants arranged into well defined vertical layers depending on their height can be seen best in

1. tropical rainforest
2. grassland
3. temperate forest
4. tropical savannah

155. Myelin sheath is produced by

1. astrocytes and Schwann cells
2. oligodendrocytes and osteoclasts
3. osteoclasts and astrocytes
4. Schwann cells and oligodendrocytes

156. GnRH, a hypothalamic hormone, needed in reproduction, acts on

1. anterior pituitary gland and stimulates secretion of LH and FSH
2. posterior pituitary gland and stimulates secretion of oxytocin and FSH
3. posterior pituitary gland and stimulates secretion of LH and relaxin
4. anterior pituitary gland and stimulates secretion of LH and oxytocin.

157. Receptor sites for neurotransmitters are present on

1. pre-synaptic membrane
2. tips of axons
3. post-synaptic membrane
4. membranes of synaptic vesicles

158. Hypersecretion of growth hormone in adults does not cause further increase in height, because

1. epiphyseal plates close after adolescence
2. bones lose their sensitivity to growth hormone in adults
3. muscle fibres do not grow in size after birth

4. growth hormone becomes inactive in adults

159. Which cells of 'crypts of Lieberkühn' secrete antibacterial lysozyme?

1. Paneth cells
2. Zymogen cells
3. Kupffer cells
4. Argentaffin cells

160. Adult human RBCs are enucleate. Which of the following statement(s) is/are most appropriate explanation for this feature?

- (1) They do not need to reproduce.
- (2) They are somatic cells.
- (3) They do not metabolise.
- (4) All their internal space is available for oxygen transport.

1. Only (1)
2. (1), (2) and (4)
3. (2) and (3)
4. Only (4)

161. Which ecosystem has the maximum biomass?

1. Grassland ecosystem
2. Pond ecosystem
3. Lake ecosystem
4. Forest ecosystem

162. Alexander von Humboldt described which of the following?

1. Laws of limiting factor
2. Species area relationship
3. Population growth equation
4. Ecological biodiversity

163. Out of ____ 'X' ____ pairs of ribs in humans only ____ 'Y' ____ pairs are true ribs. Select the option that correctly represents values of X and Y and provides their explanation.

X Y

1 125 True ribs are attached dorsally to vertebral column and sternum on the two ends

2 242 The true ribs are dorsally attached to vertebral column but free on ventral side

3 24 12 True ribs are dorsally attached to vertebral column but free on ventral side

4 12 7 True ribs are attached dorsally to vertebral column and ventrally to the sternum

1. 1

2. 2

3. 3

4. 4

164. In case of poriferans, the spongocoel is lined with flagellated cells called

1. oscula

2. choanocytes

3. mesenchymal cells

4. ostia

165. The pivot joint between atlas and axis is a type of

1. cartilaginous joint

2. synovial joint

3. saddle joint

4. fibrous joint

166. Good vision depends on adequate intake of carotene rich food. Select the best option from the following statements.

(1) Vitamin A derivatives are formed from carotene.

(2) The photopigments are embedded in the membrane discs of the inner segment.

(3) Retinal is a derivative of vitamin A.

(4) Retinal is a light-absorbing part of all the visual photopigments.

1. (1), (3) and (4)

2. (1) and (3)

3. (2), (3) and (4)

4. (1) and (2)

167. Transplantation of tissues/organs fails often due to non acceptance by the patient's body. Which type of

immune response is responsible for such rejections?

1. Cell-mediated immune response

2. Hormonal immune response

3. Physiological immune response

4. Autoimmune response

168. MALT constitutes about _____ percent of the lymphoid tissue in human body.

1. 20%

2. 70%

3. 10%

4. 50%

169. Which one of the following is related to ex situ conservation of threatened animal and plants?

1. Biodiversity hotspots

2. Amazon rainforest

3. Himalayan region

4. Wildlife safari parks

170. Artificial selection to obtain cows yielding higher milk output represents

1. directional, as it pushes the mean of the character in one direction

2. disruptive, as it splits the population into two, one yielding higher output and the other lower output

3. stabilising, followed by disruptive as it stabilises the population to produce higher yielding cows

4. stabilising, selection as it stabilises this character in the population

171. Which of the following represents order of 'Horse'?

1. Perissodactyla
2. *Caballus*
3. *Ferus*
4. *Equidae*

172. Thalassaemia and sickle cell anaemia are caused due to a problem in globin molecule synthesis. Select the correct statement.

1. Both are due to a quantitative defect in globin chain synthesis.
2. Thalassaemia is due to less synthesis of globin molecules.
3. Sickle cell anaemia is due to a quantitative problem of globin molecules.
4. Both are due to a qualitative defect in globin chain synthesis.

173. A decrease in blood pressure/volume will **not** cause the release of

1. atrial natriuretic factor
2. aldosterone

3. ADH

4. renin

174. A temporary endocrine gland in the human body is

1. corpus cardiacum
2. corpus luteum
3. corpus allatum
4. pineal gland

175. Which among these is the correct combination of aquatic mammals?

1. Dolphins, seals, *Trygon*
2. Whales, dolphins, seals
3. *Trygon*, whales, seals
4. Seals, dolphins, sharks

176. Homozygous purelines in cattle can be obtained by

1. mating of unrelated individuals of same breed
2. mating of individuals of different breed
3. mating of individuals of different species
4. mating of related individuals of same breed

177. A disease caused by an autosomal primary non-disjunction is

1. Klinefelter's syndrome

2. Turner's syndrome

3. sickle cell anaemia

4. Down's syndrome

178. Which of the following statements is correct with reference to enzymes?

1. Holoenzyme = Apoenzyme + Coenzyme

2. Coenzyme = Apoenzyme + Holoenzyme

3. Holoenzyme = Coenzyme + Co-factor

4. Apoenzyme = Holoenzyme + Coenzyme

179. DNA fragments are

1. Negatively charged

2. Neutral

3. Either positively or negatively charged depending on their size

4. Positively charged.

180. Which of the following is not a polymeric?

1. Proteins

2. Polysaccharides

3. Lipids

4. Nucleic acids