



Alpha Waves Coaching Centre

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Mock Test 6

180 x 4 = 720 MARKS

Physics

01. 20 divisions on the main scale of a Vernier callipers coincides with 21 divisions on the Vernier scale. If each division on the main scale is of 0.5mm, the least count of the instrument in mm is

- 1) 1 / 42
- 2) 20 / 21
- 3) 5 / 20
- 4) 5 / 21

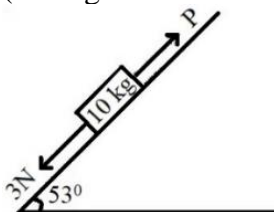
02. Two bodies of different masses are dropped from heights of 16 m and 25 m respectively. Ignoring the air resistance, the ratio of the time taken by them to reach the ground is

- 1) 25 / 16
- 2) 5 / 4
- 3) 4 / 5
- 4) 16 / 25

03. A projectile is thrown at angle β with vertical. It reaches a maximum height H. The time taken to reach the highest point of its path is

- 1) $\sqrt{\frac{8H}{g}}$
- 2) $\sqrt{\frac{2H}{g}}$
- 3) $\sqrt{\frac{H}{2g}}$
- 4) $\sqrt{\frac{2H}{g \cos \beta}}$

04. A block of mass 10 kg is kept on a rough inclined plane as shown in the figure. A force of 3N is applied on the block. The coefficient of static friction between the plane and the block is 0.6. What should be the minimum value of force P, such that the block does not move downward? (Take $g = 10 \text{ ms}^{-2}$ and $\sin 53^\circ = 0.8$)



- 1) 47 N
- 2) 119 N
- 3) zero
- 4) 35 N

05. A cricket player catches a ball of mass 120g moving with 25 m/s speed. If the catching process is completed in 0.1 s then the magnitude of force exerted by the ball on the hand of player will be (in SI unit):

- 1) 30
- 2) 24
- 3) 12
- 4) 25

06. A family uses 10 kW of power. Direct solar energy is incident on horizontal surface at a rate of 250 W per square meter. If 20% of its energy is converted into useful electric energy, how large area is needed to meet family demand of power.

- 1) 200 m²
- 2) 220 m²
- 3) 50 m²
- 4) 40 m²

07. A stationary shell explodes into two fragments, having masses in the ratio of 1:2. The heavier fragment attains a Kinetic energy of 100 J. The kinetic energy released in the explosion is

- 1) 200 J
- 2) 150 J
- 3) 300 J
- 4) 600 J

08. Two bodies of masses 2 kg and 4 kg initially at rest are moving with velocities 20 ms⁻¹ and 10 ms⁻¹ towards each other due to mutual gravitation attraction. What is the velocity of their centre of mass?

- 1) 5 ms⁻¹
- 2) 6 ms⁻¹
- 3) 8 ms⁻¹
- 4) zero

09. A ring of radius r and mass m rotates about a diametric axis passing through its centre with angular velocity ω . Its kinetic energy is

- 1) $mr^2\omega^2$
- 2) $\frac{mr\omega^2}{2}$
- 3) $\frac{mr^2\omega^2}{4}$
- 4) $\frac{mr^2\omega^2}{2}$

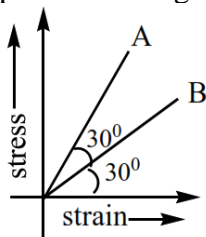
10. A person standing on a rotating platform has his hands lowered. If he suddenly stretches out his arms then the angular momentum of the system

- 1) Becomes zero
- 2) Increases
- 3) Decreases
- 4) Remains the same

11. A thin weightless bag suspended to spring balance is filled with 2 kg of water and then immersed in water. The reading of spring balance is

- 1) 2 kgwt
- 2) 2.5 kgwt
- 3) 1.75 kgwt
- 4) zero

12. Stress-strain curves for two rods A and B are shown. The two rods of equal area of cross sections, lengths ' l ' and ' $3l$ ', made of different materials are equally strained. The ratio of potential energies stored in the rods A & B is



- 1) 1 : 3
- 2) 3 : 1
- 3) 1 : 1
- 4) 9 : 1

13. A drop of liquid of diameter 2.8 mm breaks up into 125 identical drops. The change in energy is nearly ($S = 75 \text{ dyne cm}^{-1}$)

- 1) Zero
- 2) $7.4 \times 10^{-9} \text{ J}$
- 3) $7.4 \times 10^{-6} \text{ J}$
- 4) $7.4 \times 10^{-4} \text{ J}$

14. Two spheres of radii in the ratio 1:2 and densities in the ratio 2:1 and of same specific heat, are heated to same temperature and left in the same surrounding. Their rate of cooling will be in the ratio

- 1) 2 : 1
- 2) 1 : 1
- 3) 1 : 2
- 4) 1 : 4

15. It is hotter for the same distance over the top of a fire than it is in the side of it, mainly because

- 1) Air conducts heat upwards only
- 2) Heat is radiated only upwards
- 3) In addition to radiation, convection also takes heat upwards
- 4) Convection, conduction and radiation all contribute significantly transferring heat upwards

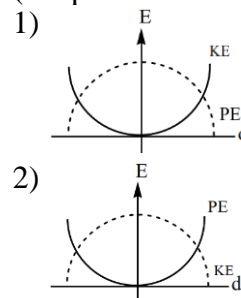
16. Considering earth as a uniform solid sphere, the difference between acceleration due to gravity at poles and at equator is ' x '. If the earth starts rotating with double the present angular speed, the difference becomes.

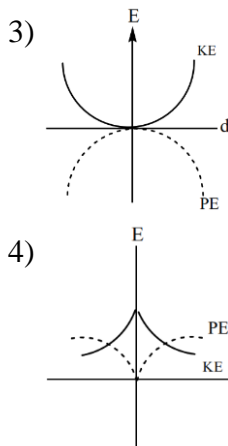
- 1) $> 4x$
- 2) zero
- 3) $4x$
- 4) $9x$

17. A planet is revolving around the sun in an elliptical orbit. During its motion from A to B, which quantity remains constant?

- 1) Angular velocity
- 2) Momentum
- 3) Tangential velocity
- 4) Areal velocity about sun

18. For a simple pendulum, a graph is plotted between its kinetic energy (KE) and potential energy (PE) against its displacement d . Which one of the following represents these correctly? (Graphs are not drawn to scale)





19. The number of degrees of freedom for a diatomic gas like Cl_2 , taking vibrational mode into account is

- 1) 2
- 2) 5
- 3) 6
- 4) 7

20. Match the following

(a) Isothermal	(i) Pressure constant
(b) Isochoric	(ii) Temperature constant
(c) Adiabatic	(iii) Volume constant
(d) Isobaric	(iv) Heat content is constant

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

21. 1g of a liquid at its boiling point is converted to vapour at 3×10^5 Pa pressure. If increase in the volume is 1600 cm^3 during this phase change, then the increase in internal energy in the process will be:

(Latent heat of liquid is 500 cal g^{-1})

- 1) 1620 cal
- 2) 1620 J
- 3) 1620 erg
- 4) 1620 eV

22. A cylinder of fixed capacity 44.8 litres contains helium gas at standard temperature and pressure. The amount of heat needed to raise the temperature of the gas in the cylinder by 15.0°C is nearly

- 1) 45 J
- 2) 374 J
- 3) 90 J
- 4) 623 J

23. Two identical charged spheres are suspended by strings of equal length. The strings make an angle θ with each other. When suspended in water the angle remains the same. If density of the material of the sphere is 1.5 g/cc , the dielectric constant of water will be ____

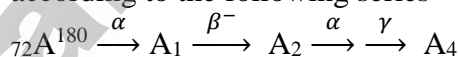
(Take density of water = 1 g / cc)

- 1) 5
- 2) 3
- 3) 4
- 4) 1.5

24. Two identical bulbs when connected in series to a battery, consume electric power of 60W. If these bulbs are now connected in parallel combination to the same battery, electric power consumed will be:

- 1) 60W
- 2) 240W
- 3) 120 W
- 4) 30W

25. A hypothetical radioactive nucleus decays according to the following series



If the mass number and atomic number of A are respectively 180 and 72. Then to atomic number and mass number of A_4 will respectively be

- 1) 69,171
- 2) 70,172
- 3) 68,172
- 4) 69,172

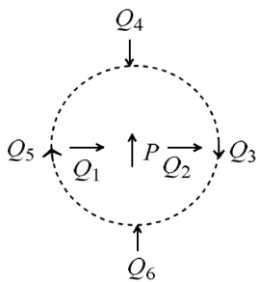
26. Hydrogen atom from excited state comes to the ground state by emitting a photon of wavelength λ . If R is the Rydberg constant, the principal quantum number n of the excited state is

- 1) $\sqrt{\frac{\lambda R}{\lambda R - 1}}$
- 2) $\sqrt{\frac{\lambda}{\lambda R - 1}}$
- 3) $\sqrt{\frac{\lambda R^2}{\lambda R - 1}}$
- 4) $\sqrt{\frac{\lambda R}{\lambda R + 1}}$

27. Statement(A): Increasing the current sensitivity of moving coil galvanometer may not necessarily increase its voltage sensitivity
Statement(B): A charged particle moves through a magnetic field perpendicular to field direction. Then its momentum changes but the kinetic energy is constant

- 1) A is true, B is false
- 2) A is false, B is true
- 3) Both A and B are true
- 4) Both A and B are false

28. The figure shows the various positions (labelled by subscripts) of small magnetised needles P and Q. The arrows show the direction of their magnetic moment and all are of same magnitude. Which configuration corresponds to the lowest potential energy among all the configurations shown



- 1) PQ₃
- 2) PQ₄
- 3) PQ₅
- 4) PQ₆

29. Assertion (A): Soft iron is preferred to steel as the core of transformer.

Reason (R): Steel has less retentivity than soft iron, but it has high coercivity than soft iron.

- 1) A and R are correct R is the correct explanation of A
- 2) A&R are correct but R is not the correct explanation of A
- 3) A is not correct but R is correct
- 4) A is correct but R is not correct

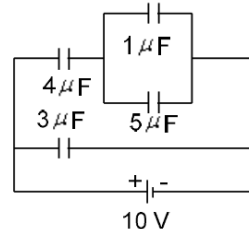
30. Electric field strength due to a short dipole of dipole moment ' \vec{P} ' at a distance ' r ' on its equatorial line is

- 1) $\frac{1}{4\pi\epsilon_0} \left(\frac{-\vec{P}}{r^3} \right)$
- 2) $\frac{1}{4\pi\epsilon_0} \left(\frac{2\vec{P}}{r^3} \right)$
- 3) $\frac{1}{4\pi\epsilon_0} \left(\frac{\vec{P} \cdot \vec{r}}{r^3} \right)$
- 4) $\frac{1}{4\pi\epsilon_0} \left(\frac{\vec{P} \times \vec{r}}{r^3} \right)$

31. A $4\mu\text{F}$ capacitor is charged to 400V and then its plates are joined through a resistance 50Ω . The heat produced in the resistance is

- 1) 1.6 J
- 2) 0.32 J
- 3) 0.64 J
- 4) 1.28 J

32. For the circuit shown in figure the charge on $4\mu\text{F}$ capacitor is

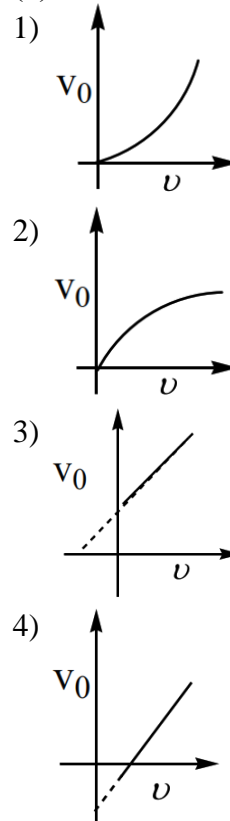


- 1) $40\mu\text{C}$
- 2) $30\mu\text{C}$
- 3) $24\mu\text{C}$
- 4) $54\mu\text{C}$

33. In a resonance tube, using a tuning fork of frequency 325 Hz, two successive resonance length are observed as 25.4 cm and 77.4 cm respectively. The velocity of sound in air is

- 1) 338 ms^{-1}
- 2) 328 ms^{-1}
- 3) 330 ms^{-1}
- 4) 320 ms^{-1}

34. For a photo electric cell the graph showing variation of cut off voltage (V_0) with frequency (ν) of incident radiation is best represented by



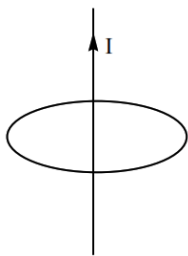
35. Which of the following is true?

- 1) Forbidden energy gap of semiconductors is $>3\text{eV}$
- 2) In an unbiased p-n junction diode, electrons diffuse from n-region to p-region
- 3) NOT gate is a universal gate
- 4) Solar cell is forward biased

36. Meter bridge works on the principle of

- 1) Law of conservation of energy
- 2) Wheatstone's bridge and its balance condition
- 3) Ohm's law
- 4) Ampere's circuital law

37. A thin long straight conductor is along the axis of a circular loop. If the current in the straight conductor is increasing then



- 1) Induced current flows in the circular loop
- 2) Induced current flows in clockwise
- 3) Emf is induced but, induced current is zero
- 4) Induced current is zero as emf is not induced at all

38. A thin, long, straight conductor carries a current 0.5A vertically up. If a particle of mass 1 mg carrying a charge of 1 nC is projected with a velocity of 1800 kmph towards east, on the east of conductor at a distance 5cm from it. The acceleration of the particle at that instant is

- 1) Zero
- 2) 10^{-6} ms^{-2}
- 3) 10^{-11} ms^{-2}
- 4) 10^{-10} ms^{-2}

39. A magnet released freely in a long vertical copper tube falls with

- 1) constant acceleration
- 2) zero acceleration from the beginning
- 3) decreasing velocity but increasing acceleration
- 4) decreasing acceleration but increasing velocity

40. Statement (A): Infrared rays are used in remote switches of household electronic systems.

Statement (B): In Microwave oven, as the frequency of the microwaves match the resonant frequency of water molecules, so that energy is efficiently transferred from waves to the food item containing water molecules

- 1) Both A and B are correct
- 2) Both A and B are wrong
- 3) A is correct and B is wrong
- 4) A is wrong and B is correct.

41. An AC voltage $V=20 \sin 200 \pi t$ is applied to a series LCR circuit which drives a current $I = 10 \sin \left(200 \pi t + \frac{\pi}{3} \right)$. The average power dissipated is

- 1) 50 W
- 2) 21.6 W
- 3) 173.2 W
- 4) 200 W

42. In Young's double slit experiment, the slits of equal widths. If one slit is made narrow, then in the interference pattern

- 1) The intensities of both the maxima and the minima increase
- 2) The intensity of maxima increases and the minima has zero intensity
- 3) The intensity of maxima decreases and that of the minima increases
- 4) The intensity of maxima decreases and the minima has zero intensity

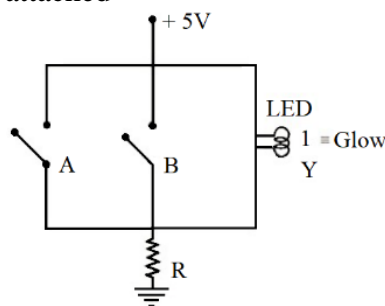
43. A mango tree is at the bank of a river and one of the branch of tree extends over the river. A tortoise lives in the river. A mango falls just above the tortoise. The acceleration of the mango falling from tree as it appears to the tortoise is (refractive index of water is $4/3$ and the tortoise is stationary)

- 1) g
- 2) $3g/4$
- 3) $4g/3$
- 4) none of these

44. The magnification of an object placed in front of a convex lens is $+2$. The focal length of the lens is 2.0 m . Find the distance by which the object has to be moved to obtain a magnification of -2 (in metres)

- 1) 2 m
- 2) 4 m
- 3) 1 m
- 4) 3 m

45. Name the logic gate equivalent to the diagram attached



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

Chemistry

46. Number of electrons in 0.2 gram ion of P^{3-} ion is

- 1) 0.6 NA
- 2) 1.6 NA
- 3) 3.6 NA
- 4) 3 NA

47. When 2 moles of Na_2CO_3 reacts with 6 moles of HCl, the volume of CO_2 gas liberated at S.T.P will be 2

- 1) 22.4 L
- 2) 44.8 L
- 3) 67.4 L
- 4) 89.6 L

48. Assertion (A): 3 d_{xy} has two nodal planes xz and yz .

Reason (R): d -orbitals have double dumb-bell shape except dz^2 .

- 1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion
- 2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
- 3) Assertion is true statement but Reason is false
- 4) Both Assertion and Reason are false statements

49. Assertion (A): Limiting line of any spectral series in H atom is the line when $n_f = \infty$.

Reason (R): In hydrogen atom if electrons falls from 5th shell to ground state then the maximum number of visible lines observed will be three.

- 1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion
- 2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion

- 3) Assertion is true statement but Reason is false
- 4) Both Assertion and Reason are false statements

50. A sudden large jump between the values of second and third ionisation energies of element would be associated with which of the following electronic configuration?

- 1) $1s^2 2s^2, 2p^6, 3s^1$
- 2) $1s^2, 2s^2 2p^6, 3s^2 3p^1$
- 3) $1s^2, 2s^2, 2p^6, 3s^2 3p^2$
- 4) $1s^2, 2s^2, 2p^6, 3s^2$

51. The percentage of p-character in the orbitals of P_4 molecule is

- 1) 50%
- 2) 75%
- 3) 60%
- 4) 66.6%

52. The number of electrons present in antibonding molecular orbitals in N_2^+ ion is

- 1) 5
- 2) 4
- 3) 6
- 4) 7

53. Which pair of orbitals result in π bond formation on overlapping (if x-axis is internuclear axis)?

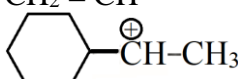
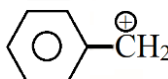
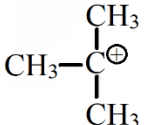
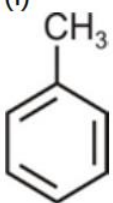
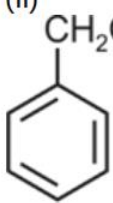
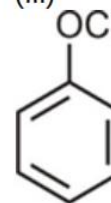
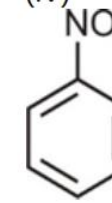
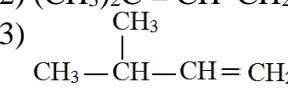
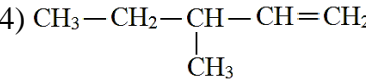
- 1) $p_x + p_y$
- 2) $s + p_y$
- 3) $p_x + p_x$
- 4) $p_y + p_y$

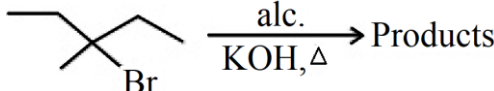
54. $\Delta_f H^\circ$ of H_2O is -68 kcal, then heat of formation of OH^- is

- 1) $+54.3 \text{ kcal mol}^{-1}$
- 2) $-54.3 \text{ kcal mol}^{-1}$
- 3) $-34 \text{ kcal mol}^{-1}$
- 4) $+68 \text{ kcal mol}^{-1}$

55. 1 mole of an ideal gas undergoes reversible isothermal expansion from a volume of 10 L to 100 L at 27°C temperature. The work done in the process is

- 1) -3.5 kJ
- 2) 6.5 kJ
- 3) -5.7 kJ
- 4) 10.2 kJ

56. If the equilibrium constant of a reaction is 2×10^3 at 25°C then the standard Gibbs free energy change for the reaction will be nearly
- 1) $-2.5R \times 298$
 - 2) $-7.6R \times 298$
 - 3) $-7.6R$
 - 4) $-5.1R \times 298$
57. The solubility products of two salts AB_2 and C_2D_3 are same then the relation between solubilities of salt C_2D_3 (S) and AB_2 (S) is
- 1) $S = 27\sqrt{2S'}$
 - 2) $S' = 108S^3$
 - 3) $S = \sqrt[5]{27S'^3}$
 - 4) $S = \sqrt[3]{27S'^5}$
58. Equilibrium constant (K_C) of equilibrium $\text{I}_2\text{Cl}_6(\text{aq}) \rightleftharpoons 2\text{ICl}(\text{aq}) + 2\text{Cl}_2(\text{aq})$, is 16×10^{10} . If initial concentration of I_2Cl_6 is 0.1 M then equilibrium concentration of I_2Cl_6 is
- 1) 10^{-8}
 - 2) 10^8
 - 3) 10^{-14}
 - 4) 10^{-16}
59. Strongest reducing agent among the following is
- 1) $\text{Fe}^{3+}/\text{Fe}^{2+}$, $E^\circ = 0.77 \text{ V}$
 - 2) Br_2/Br^- , $E^\circ = 1.09 \text{ V}$
 - 3) $\text{MnO}_2/\text{Mn}^{2+}$, $E^\circ = 1.23 \text{ V}$
 - 4) $\text{Cr}_2\text{O}_7^{2-}/\text{Cr}^{3+}$, $E^\circ = 1.33 \text{ V}$
60. Crosslink silicone polymers can be obtained by the condensation of
- 1) $\text{Si}(\text{OH})_4$
 - 2) $(\text{CH}_3)_2\text{Si}(\text{OH})_2$
 - 3) $\text{CH}_3\text{Si}(\text{OH})_3$
 - 4) $(\text{CH}_3)_3\text{SiOH}$
61. First ionization enthalpy is least for which of the given elements?
- 1) Pb
 - 2) Sn
 - 3) Ge
 - 4) Si
62. The most stable carbocation among the following is
- 1) $\text{CH}_2 = \text{CH}^+$
 - 2) 
 - 3) 
 - 4) 
63. 200 mg of an organic compound containing nitrogen was digested according to Kjeldahl's method and the evolved NH_3 gas was absorbed in 30 ml of 0.2 M HCl solution. The excess of acid required 20 ml of 0.2 M NaOH solution for complete neutralisation. The percentage of nitrogen in the compound is
- 1) 12%
 - 2) 14%
 - 3) 20%
 - 4) 22%
64. Assertion: Repulsive interaction between the electron clouds is known as torsional strain.
Reason: Magnitude of torsional strain depends upon the angle of rotation about C–C bond
- 1) Both assertion (A) and reason (R) are correct statements, and reason is the correct explanation of the assertion.
 - 2) Both assertion (A) and reason (R) are correct statements, but reason is not the correct explanation of the assertion.
 - 3) Assertion (A) is correct, but reason (R) is wrong statements
 - 4) Assertion (A) is wrong, but reason (R) is correct statement.
65. Decreasing order of electrophilic substitution reaction for the given compounds is
- (I)  (II)  (III)  (IV) 
- 1) $\text{I} > \text{II} > \text{III} > \text{IV}$
 - 2) $\text{II} > \text{I} > \text{III} > \text{IV}$
 - 3) $\text{III} > \text{I} > \text{II} > \text{IV}$
 - 4) $\text{III} > \text{II} > \text{I} > \text{IV}$
66. Which of the following alkenes does not undergo rearrangement on heating with a strong acid?
- 1) $(\text{CH}_3)_3\text{C}-\text{CH}=\text{CH}_2$
 - 2) $(\text{CH}_3)_2\text{C}=\text{CH}-\text{CH}_2-\text{CH}_3$
 - 3) 
 - 4) 

67. If two liquids A (boiling point = t_1 °C) and B (boiling point = t_2 °C) on mixing forms azeotropic solution which shows positive deviation from Raoult's law, then boiling point of azeotropic solution will be [Given, $t_1 > t_2$]
 1) $> t_1$
 2) $> (t_1 + t_2)$
 3) $= t_1$
 4) $< t_2$
68. The van't Hoff factor for 0.1 M $\text{Ba}(\text{NO}_3)_2$ is 2.74. Percentage degree of dissociation is
 1) 91.3 %
 2) 87 %
 3) 75 %
 4) 63.5 %
69. $\text{Cu}^+ + \text{e}^- \rightarrow \text{Cu}$, $E^\circ = x_1$ volt
 $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$, $E^\circ = x_2$ volt, then for $\text{Cu}^{2+} + \text{e}^- \rightarrow \text{Cu}^+$, E° (volt) will be:
 1) $x_1 - 2x_2$
 2) $x_1 + 2x_2$
 3) $x_1 - x_2$
 4) $2x_2 - x_1$
70. Assertion: Conductivity of an electrolytic solution decreases on dilution.
 Reason: On dilution number of ions per unit volume decreases.
 1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion
 2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
 3) Assertion is true statement but Reason is false
 4) Both Assertion and Reason are false statements
71. The energy of activation of a reaction for which rate doubles when the temperature is raised from 300 K to 310 K is
 1) 9.8 kcal
 2) 14.2 kcal
 3) 12.9 kcal
 4) 11.2 kcal
72. For a reaction, threshold energy would be equal to
 1) Activation energy
 2) Activation energy + Normal energy of reactants
 3) Normal energy of reactants
 4) Activation energy – Normal energy of reactants
73. The incorrect statement is
 1) H_2S is a weak dibasic acid
 2) Bond angle of H_2S is less than the bond angle in H_2O
 3) H_2S acts as an oxidising agent as well as reducing agent
 4) H_2S is colourless, flammable and hazardous gas
74. The complete hydrolysis of which of the following compounds of Xe is a redox reaction?
 1) XeF_2
 2) XeF_4
 3) XeF_6
 4) Both 1 & 2
75. Which of the following carbonyl compounds, will have the longest C–O bond length?
 1) $[\text{Cr}(\text{CO})_6]^-$
 2) $[\text{Mn}(\text{CO})_6]^+$
 3) $[\text{V}(\text{CO})_6]^-$
 4) $[\text{Ti}(\text{CO})_6]^{2-}$
76. Assertion: Crystal field splitting in ferricyanide ion is greater than that in ferrocyanide ion.
 Reason: Oxidation state of iron in ferrocyanide ion is +2 and in ferricyanide is +3.
 1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion
 2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
 3) Assertion is true statement but Reason is false
 4) Both Assertion and Reason are false statements
77. Consider the following reaction.

 Total number of eliminated products possible in the above reaction is
 1) 2
 2) 1
 3) 4
 4) 3
78. t-butyl bromide with sodium t-butoxide undergoes
 1) $\text{S}_\text{N}1$ reaction
 2) $\text{E}1$ reaction
 3) $\text{S}_\text{N}2$ reaction
 4) $\text{E}2$ reaction

79. $\text{COCl}_2 \xrightarrow[\text{(ii) H}_3\text{O}^+]{\text{(i) PhMgBr (excess)}} \text{X}$; Major product

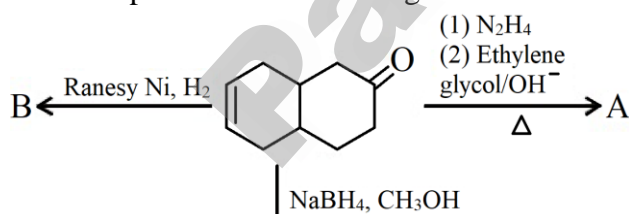
X is

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

80. The product B is

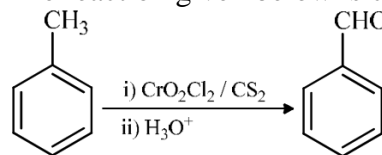
- 1)
- 2)
- 3)
- 4)

81. Correct option for the following reaction is



- 1) B and C:
- 2) B: C:
- 3) A:
- 4) C:

82. The reaction given below is called



- 1) Stephen reaction
- 2) Wolf-Kishner reaction
- 3) Rosenmund reduction
- 4) Etard reaction

83. Which compound will not give yellow precipitate in the following reaction is

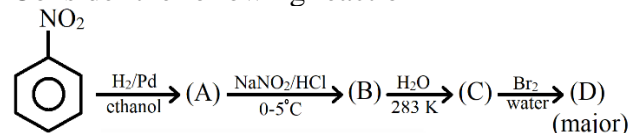
- 1)
- 2)
- 3)
- 4)

84. Consider the following statements.

- a) Primary aliphatic amines react with HNO_2 to form unstable diazonium salts
 - b) $\text{C}_6\text{H}_5\text{SO}_2\text{Cl}$ is known as Hinsberg's reagent
 - c) $-\text{NH}_2$ is ortho and para-directing group
- Choose the correct statement(s).

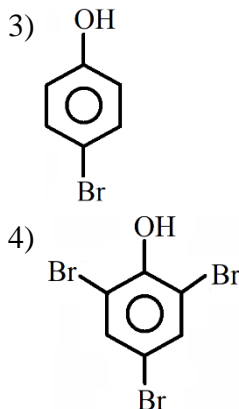
- 1) Only a
- 2) a & c only
- 3) b & c only
- 4) a, b & c

85. Consider the following reaction



Product (D) is

- 1)
- 2)



86. Cellulose is a linear polymer of

- 1) α -D-Glucose
- 2) β -D-Glucose
- 3) α -D-Fructose
- 4) β -L-Glucose

87. Which of the following molecules are amino acids?

- (a) Cellulose
 - (b) Alanine
 - (c) Valine
 - (d) Ribose
 - (e) Thymine
- 1) (a) and (d) only
 - 2) (b) and (c) only
 - 3) (a), (b) and (e) only
 - 4) (b), (c) and (e) only

88. On addition of group reagent to the original solution various basic radicals precipitates in the form of their respective salts. Match the given radicals (column-I) with their respective salt (column-II) in the form of which they precipitate.

Basic radical	Precipitates as
a) Pb^{2+} (Group-I)	(i) Carbonate
b) Al^{3+} (Group-II)	(ii) Sulphide
c) Zn^{2+} (Group-III)	(iii) Hydroxide
d) Ca^{2+} (Group-IV)	(iv) Chloride

Select the correct option.

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

89. If there is effervescence with the evolution of a colourless and odourless gas on adding dil. H_2SO_4 to the solid salt, this indicates the presence of

- 1) CO_3^{2-}
- 2) SO_4^{2-}
- 3) Cl^-
- 4) Br^-

90. Incorrect statement with respect to physical properties of carboxylic acids is

- 1) Carboxylic acids have higher boiling point than alcohols of comparable molecular masses
- 2) Most carboxylic acids exist as dimer in the vapour phase
- 3) Solubility of carboxylic acids in water increases with increasing number of carbon atoms
- 4) Carboxylic acids are also soluble in less polar organic solvents like benzene, ether, chloroform etc.

Botany

91. Fungi usually store the reserve food material in the form of

- 1) Starch
- 2) Glycogen and oil
- 3) Lipid
- 4) Protein

92. When a shoot tip transforms into a flower,

- 1) It is always solitary.
- 2) The flower is always short-lived.
- 3) It is never solitary.
- 4) The flower is always long-lived.

93. Ray florets have:

- 1) Superior ovary
- 2) Hypogynous ovary
- 3) Half inferior ovary
- 4) Inferior ovary

94. Algae occur in both well lighted regions close to the surface of water and also at great depths in oceans are included in

- 1) Chlorophyceae
- 2) Phaeophyceae
- 3) Rhodophyceae
- 4) Green Algae

95. Which of the following is the correct floral formula of solanaceae

- 1) $\% \overset{\sigma}{\underset{+}{\text{C}}}_{1+2+(2)} \overset{\sigma}{\underset{+}{\text{A}}}_{(9)+1} \underline{\text{G}}_1$
- 2) $\oplus \overset{\sigma}{\underset{+}{\text{C}}}_{(5)} \overset{\sigma}{\underset{+}{\text{K}}}_{(5)} \overset{\sigma}{\underset{+}{\text{A}}}_{(5)} \underline{\text{G}}_{(2)}$
- 3) $\oplus \overset{\sigma}{\underset{+}{\text{C}}}_{(5)} \overset{\sigma}{\underset{+}{\text{K}}}_{(5)} \overset{\sigma}{\underset{+}{\text{A}}}_{(5)} \underline{\text{G}}_{(2)}$
- 4) $\text{Br} \oplus \overset{\sigma}{\underset{+}{\text{P}}}_{(3+3)} \overset{\sigma}{\underset{+}{\text{A}}}_{3+3} \underline{\text{G}}_{(3)}$

96. Match the following.

(A) Psilopsida	(i) <i>Dryopteris</i>
(B) Lycopside	(ii) <i>Equisetum</i>
(C) Sphenopsida	(iii) <i>Selaginella</i>
(D) Pteropsida	(iv) <i>Psilotum</i>

- 1) A - iv; B - iii; C - ii; D - i
- 2) A - iii; B - ii; C - i; D - iv
- 3) A - ii; B - i; C - iv; D - iii
- 4) A - i; B - iv; C - iii; D - ii

97. Which of the following is incorrect about leaf?

- 1) It is arranged in acropetal order.
- 2) It develops at node.
- 3) It is generally flattened in shape.
- 4) It is arranged in basipetal order.

98. Bulliform cell are modification of?

- 1) Abaxial epidermal cells
- 2) Adaxial epidermal cells
- 3) Bundle sheath cells
- 4) Sclerenchymatous cells

99. Which of the following does not occur during cytokinesis of plant cells?

- 1) Furrow formation
- 2) Phragmoplast formation
- 3) Cell wall formation
- 4) Centrifugal growth of cell plate

100. How many of the following below are true for both mitochondria and chloroplast?

- (A) Endosymbiont
- (B) Presence of cristae
- (C) Presence of ribosomes
- (D) Presence of enzymes for protein synthesis
- (E) Site for oxidative phosphorylation
- (F) Occurrence of chain of oxidation–reduction reactions

- 1) Six
- 2) Five
- 3) Four
- 4) Three

101. Mark the incorrect statement

- 1) Nucleolus reappears in Telophase–I
- 2) In mitochondria, single circular RNA molecule is present
- 3) Carotenoids are fat soluble pigments
- 4) Primary cell wall is capable of growth

102. The following statements describes prophase–I of meiosis:

- (i) Thin thread like chromosomes appears
- (ii) Appearance of recombination nodules
- (iii) Formation of Bivalents/Tetrads
- (iv) Terminalisation of chiasmata
- (v) Appearance of chiasmata

Arrange the given statements in the correct sequence of their occurrence during prophase–I:

- 1) (i)→(iii)→(ii)→(v)→(iv)
- 2) (i)→(ii)→(iii)→(iv)→(v)
- 3) (i)→(iv)→(v)→(ii)→(iii)
- 4) (i)→(iii)→(ii)→(iv)→(v)

103. Pollen intine is made of:

- 1) Sporopollenin
- 2) Cellulose and Pectin
- 3) Ergosterol
- 4) Phospholipids and cholesterol

104. Which of the following is/are formed during Z–scheme of photophosphorylation?

- 1) ATP
- 2) NADPH₂
- 3) O₂
- 4) All of these

105. Centrosome is found in

- 1) Chromosomes
- 2) Nucleus
- 3) Cytoplasm
- 4) Nucleolus

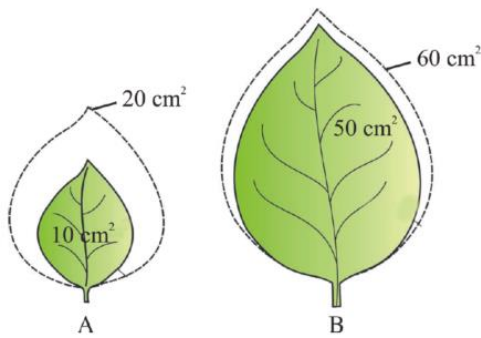
106. Which of the following is correct with respect to Kreb's cycle?

- 1) The primary acceptor of acetyl CoA is OAA
- 2) CO₂ is not produced
- 3) FAD⁺ is oxidised to FADH²
- 4) All of the above

107. One of the plant hormone which gets removed along with apical bud of tea plant is

- 1) An adenine derivative
- 2) The hormone also isolated from corn–kernels
- 3) Gaseous hormone
- 4) The hormone first isolated from human urine.

108.



Which option will correctly denote the absolute growth rate (AGR) and relative growth rate (RGR) in the leaves A and B:-

- 1) A = AGR - 10 cm^2 , RGR - 50%, B = AGR- 10 cm^2 , RGR- 25%
- 2) A = AGR - 20 cm^2 , RGR - 50%, B = AGR- 60 cm^2 , RGR- 25%
- 3) A = AGR - 10 cm^2 , RGR - 100%, B = AGR- 10 cm^2 , RGR - 50%
- 4) A = AGR - 10 cm^2 , RGR - 100%, B = AGR- 10 cm^2 , RGR - 20%

109. Asexual reproductive structures found in Penicillium are

- 1) Conidia
- 2) Buds
- 3) Gemmules
- 4) Zoospore

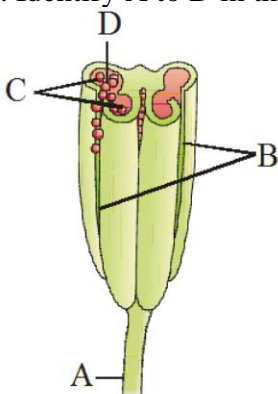
110. Nucellus is

- 1) Nutritive tissue enclosed by integument
- 2) Nutritive tissue enclosed by Embryosac
- 3) Nutritive tissue enclosed by sporoderm in Anther
- 4) Multiple options are correct

111. Find odd one out w.r.t plant adapted to pollination by air?

- 1) Pollen grain are light & non-sticky
- 2) Well exposed stamen
- 3) Single ovule in each ovary
- 4) Large petal & rare in Grasses

112. Identify A to D in the following diagram:



- 1) A-Filament, B-Pollen sacs, C-Pollen grains, D-Line of dehiscence
- 2) A-Filament, B-Pollen sacs, C-Line of dehiscence, D-Pollen grains
- 3) A-Pedicel, B-Line of dehiscence, C-Pollen sacs, D-Pollen grains
- 4) A-Filament, B-Line of dehiscence, C-Pollen sacs, D-Pollen grains

113. How many statements are correct:

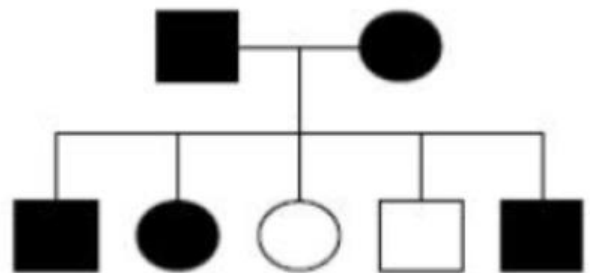
- 1) Mendel selected 7 true breeding pea plant varieties.
- 2) F_1 hybrid always resembles either one of the parents genotypically & it was observed by Mendel.
- 3) Yellow pod colour is dominant over green pod colour.
- 4) Genes are unit of inheritance.

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

114. The first step of decarboxylation in cellular respiration is

- 1) Conversion of PGAL to DHAP
- 2) Conversion of PGAL to PGA
- 3) Conversion of Pyruvate to Acetyl CoA
- 4) Conversion of BPGA to PGA

115. Analyse the given pedigree and answer the following questions



The characteristic indicated by the blackened figures is probably:

- 1) Dominant
- 2) Recessive
- 3) Non-dominant
- 4) Sex-linked recessive

116. Which substance is *Calotropis* gives itself protection against predators?

- 1) Carotenoids
- 2) Concanavalin A
- 3) Glycolipids
- 4) Cardiac glycosides

117. Find the incorrect match regarding HGP?

- 1) SNP's – 1.4 million locations
- 2) Largest chromosome – chromosome no. 1
- 3) Smallest Gene – Present on X chromosome
- 4) Largest Gene – Dystrophin Gene

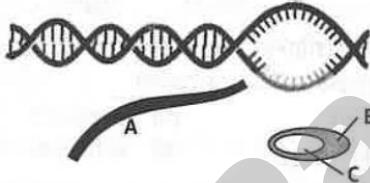
118. Watson and crick proposed certain features for double helical model of structure of DNA which of the following is not a feature of double helical structure of DNA

- 1) Two chains are anti-parallel to each other
- 2) Nitrogen bases of two strands are complementary and paired through covalent bonds
- 3) Each DNA strands is made up of nucleotides
- 4) Nitrogen bases are present towards inner side of double helix

119. What is the correct sequence of DNA finger printing?

- a - Digestion by restriction endonuclease
 - b - Separation of desired DNA by gel electrophoresis
 - c - Isolation of DNA
 - d - Hybridisation using labelled VNTR probe
 - e - Southern blotting
- 1) a → c → b → e → d
 - 2) c → a → b → d → e
 - 3) c → a → b → e → d
 - 4) c → b → a → e → d

120. The given figure represents the process of transcription in bacteria.



Select the option which correctly labels A, B and C.

- 1) A – DNA, B – RNA, C – Promoter
- 2) A – RNA, B – RNA polymerase, C – Rho factor
- 3) A – RNA, B – RNA polymerase, C – Sigma factor
- 4) A – DNA, B – DNA polymerase, C – RNA

121. In a population per capita birth rate is 0.15 and per capita death rate is 0.08 during a unit time period. What is the value of r (intrinsic rate of natural increase) for the given population?

- 1) 0.23
- 2) 0.07
- 3) 0.05
- 4) 0.25

122. In the equation

$$GPP - R = NPP$$

GPP is Gross Primary Productivity NPP is net Primary Productivity R here is ____

- 1) Reproductive allocation
- 2) Photosynthetically active radiation
- 3) Respiratory quotient
- 4) Respiratory loss

123. Assertion: Fruit is the mature or ripened ovary developed after fertilisation.

Reason: Parthenocarpic fruit is formed without fertilisation of ovary.

- 1) A & R are true & the R is a correct explanation of the A
- 2) A & R are true but R is not a correct explanation of the A
- 3) Assertion is True but the Reason is False.
- 4) Both Assertion & Reason are False.

124. Assertion: Some organisms such as purple and green sulphur bacteria do not release O_2 during photo synthesis.

Reason: These use H_2S as hydrogen donor which produce sulphur or sulphate depending on the organism and not O_2 .

- 1) A & R are true & the R is a correct explanation of the A
- 2) A & R are true but R is not a correct explanation of the A
- 3) Assertion is True but the Reason is False.
- 4) Both Assertion and Reason are False.

125. In a field experiment, when all Pisaster starfish were removed from an enclosed intertidal area, the result was:

- 1) Increase in diversity of invertebrates
- 2) Extinction of many invertebrate species
- 3) Inability of the Pisaster to enter the area again
- 4) Replacement of Pisaster by other starfish

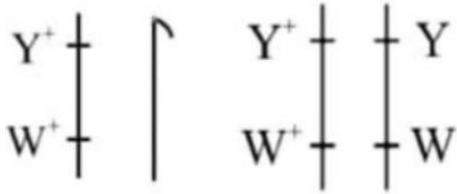
126. Darwinian fitness is represented by:

- 1) Low r value
- 2) High r value
- 3) High K value
- 4) Low K value

127. Choose the correct match w.r.t number of species present on earth

- 1) Beetles– 30,000
- 2) Fishes– 2800
- 3) Orchids– 20,000
- 4) Ants– 2000

128. How many types of gametes will be produced by male and female *Drosophila* respectively having following arrangement of two genes?



- 1) Four and two
- 2) Two and four
- 3) One and two
- 4) Four and four

129 Sickle cell anaemia is caused due to

- 1) Point mutation
- 2) Aneuploidy
- 3) Polyploidy
- 4) Frame shift mutation

130. A tobacco plant heterozygous for a recessive character is self-pollinated and 1200 seeds are subsequently germinated. How many seedlings would have the parental genotype?

- 1) 1200
- 2) 600
- 3) 300
- 4) 750

131. Assertion(A): The constantly dividing cells, both at the root apex and shoot apex, represent the meristematic phase of growth.

Reason(R): The exponential growth can be expressed as $L_t = L_o + rt$.

- 1) A and R are true and R is the correct explanation of A.
- 2) A & R are true but R is not the correct explanation of A.
- 3) Assertion is true but Reason is false.
- 4) Assertion is false but Reason is true.

132. Statement-I: Plastoquinone is the H-carrier located on the outer side of thylakoid membrane. Statement-II: NADP reductase enzyme is located on the stroma side of the membrane.

- 1) Statement I is correct and statement II is incorrect
- 2) Statement I and statement II both are correct
- 3) Statement I is incorrect and statement II is correct
- 4) Statement I and statement II both are incorrect

133. The _A_ in chloroplast is responsible for the synthesis of _B_ and NADPH.

- 1) A-Stroma, B-Sugar
- 2) A-Stroma, B-ATP
- 3) A-Membrane system, B-Glucose
- 4) A-Membrane system, B-ATP

134. Assertion: Pyruvate enters mitochondrial matrix undergoes oxidative-decarboxylation by complex set of reaction.

Reason: In link Reaction, pyruvic acid release CO_2 and H^+ atoms catalysed by pyruvate dehydrogenase enzyme.

- 1) A & R are true & the R is a correct explanation of the A
- 2) A&R are true but R is not a correct explanation of the A
- 3) Assertion is true but the Reason is false.
- 4) Both Assertion and Reason are false.

135. Tilman found that plots with ____, show less year to year variation in biomass.

- 1) Less species
- 2) More species
- 3) Key stone species
- 4) Endemic species

Zoology

136. Which of the following is incorrect about the risk of smoking

- 1) CO content in the blood reduces the concentration of haembound oxygen
- 2) Because of CO body suffers from oxygen deficiency
- 3) Nicotine in tobacco stimulates adrenal gland to release catecholamines
- 4) It unpaves the way to hard drugs

137. Canal system of Porifera is not connected with

- 1) Food gathering
- 2) Respiratory gas exchange
- 3) Removal of waste
- 4) Locomotion

138. Which of the following characters is not seen in the class Mammalia?

- 1) Thecodont dentition
- 2) Alveolar lungs
- 3) Ten pairs of cranial nerves
- 4) Seven cervical vertebrae

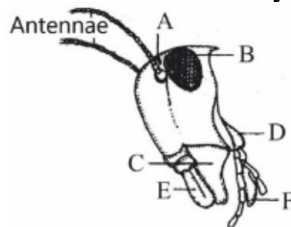
139. In which of the following sets of animals all the four give birth to young ones?

- 1) Kangaroo, Flying fox, Dolphin, Lion
- 2) Lion, Bat, Whale, Ostrich
- 3) Platypus, Penguin, Bat, Hippopotamus
- 4) Shrew, Bat, Cat, Kiwi

140. Young one of the cockroach is called

- 1) Naid
- 2) Grub
- 3) Nymph
- 4) Maggot

141. The figure given below shows the head region of cockroach. Identify A to F.



- 1) A– Compound eye, B–Ocellus, C–Maxilla, D–Mandible, E–Labrum, F–Labium
- 2) A–Ocellus, B–Compound eye, C–Mandible, D–Maxilla, E–Labrum, F–Labium
- 3) A–Ocellus, B–Compound eye, C–Mandible, D–Maxilla, E–Labium, F–Labrum
- 4) A–Ocellus, B–Compound eye, C–Maxilla, D–Mandible, E–Labrum, F–Labium

142. Fat and oil are triglyceride in which fatty acids are esterified with

- 1) Amino acid
- 2) Fatty acid
- 3) Glycerol
- 4) Sugar

143. Possible ill effects of some of the contraceptives are:

- (i) Nausea
- (ii) Abdominal pain
- (iii) Irregular menstrual bleeding
- (iv) Breast cancer
- (v) Break through bleeding
- 1) (i), (ii) and (iii) only
- 2) (ii), (iii) and (iv) only
- 3) (iii), (iv) and (v) only
- 4) (i), (ii), (iii), (iv) and (v)

144. What percentage of CO_2 is transported by RBCs?

- 1) 5 - 7%
- 2) 70%
- 3) 20 - 25%
- 4) 98%

145. How erythroblastosis foetalis can be avoided?

- 1) By administering Rh – antibodies to the mother immediately after the delivery of 1st child.
- 2) By administering Rh – antigens to the mother immediately after the delivery of 1st child
- 3) By administering anti Rh antibodies to the mother immediately after the conception of 2nd child
- 4) By administering anti Rh antibodies to the mother immediately after the delivery of 1st child.

146. The total volume of air accommodated in the lungs at the end of a forced inspiration:

- 1) FRC
- 2) VC
- 3) TLC
- 4) IC

147. In all these places water absorption occurs except in

- 1) PCT
- 2) Ascending LH
- 3) Descending LH
- 4) DCT

148. Our excretory system can concentrate the glomerular filtrate upto

- 1) 2 times
- 2) 3 times
- 3) 4 times
- 4) 5 times

149. Hyoid bone is included in

- 1) Skull
- 2) Pectoral girdle
- 3) Pelvic girdle
- 4) Appendicular skeleton

150. Appendicular skeleton includes all except

- 1) Hind limb
- 2) Fore limb
- 3) Vertebrae
- 4) Pectoral and pelvic girdles

151. Which body of the Government of India regulates GM research and safety of introducing GM organisms for the public services?

- 1) Indian Council of Agricultural Research.
- 2) Genetic Engineering Approval Committee.
- 3) Research Committee on Genetic Manipulation.
- 4) Bio-safety Committee

152. Assertion: Intercalated discs are important regions of cardiac muscle cells.

Reason: Intercalated discs function as boosters for muscle contraction waves.

- 1) A and R are true and R is the correct explanation of A.
- 2) A & R are true but R is not the correct explanation of A.
- 3) If assertion is true but reason is false
- 4) If both assertion and reason are false.

153. First transgenic cow Rosie milk is rich in which protein?

- 1) Human alpha globin
- 2) Human alpha lactalbumin
- 3) Human beta lactalbumin
- 4) Human beta globin chain

154. Assertion (A): Enzymes through their active sites, catalyse reactions at high rate.

Reason (R): An active site of an enzyme is a pocket formed always in the quaternary structure of protein into which substrate fits.

- 1) A and R are true and R is the correct explanation of A.
- 2) A & R are true but R is not the correct explanation of A.
- 3) Assertion is true but Reason is false.
- 4) Both Assertion and Reason are false.

155. Match the source gland with its respective hormone as well as the function

	Source gland	Hormone	Function
1)	Hypothalamus	Vasopressin	Stimulates reabsorption of water from renal tubules
2)	Corpus luteum	FSH	Supports pregnancy
3)	Thyroid	Thyroxine	Regulates blood calcium level
4)	Anterior pituitary	Oxytocin	Contraction of uterus muscles during child birth

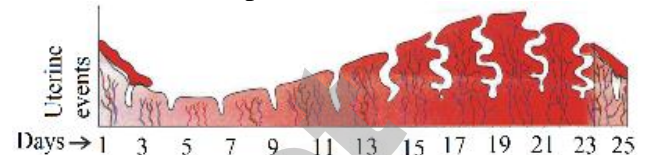
156. If the duration of menstrual cycle is 35 days then the duration of luteal phase will be

- 1) 21 days
- 2) 14 days
- 3) 14–18 days
- 4) 11 days

157. Arrange the events in female reproductive cycle

- (A) Secretion of FSH
- (B) Formation of corpus luteum
- (C) Development of Graafian follicle
- (D) Ovulation
- (E) LH surge
- 1) A–D–C–E–B
- 2) A–C–E–D–B
- 3) C–A–D–B–E
- 4) B–A–C–D–E

158. Choose correct option:–



	(C)	(B)	(A)
	A	B	C
1)	Menstruation	Luteal phase	Secretory phase
2)	Luteal phase	Secretory phase	Menstruation
3)	Luteal phase	Follicular phase	Menstruation
4)	Menstruation	Luteal phase	Secretory phase

159. Intensely lactating mothers generally do not conceive due to

- 1) Suppression of gonadotropins
- 2) Hyper secretion of gonadotropins
- 3) Suppression of gamete transport
- 4) Suppression of fertilization

160. Emergency contraceptives are effective if used within

- 1) 72 hours of coitus
- 2) 72 hours of ovulation
- 3) 72 hours of menstruation
- 4) 72 hours of implantation

161. Possible early source of energy was

- 1) Chlorophyll
- 2) CO₂
- 3) UV radiations and lightning
- 4) Green plants

162. What is the correct arrangement of periods of palaeozoic era in ascending order in geological time scale?

- 1) Devonian → Silurian → Carboniferous → Permian
- 2) Silurian → Devonian → Carboniferous → Permian
- 3) Permian → Silurian → Carboniferous → Devonian
- 4) Silurian → Devonian → Permian → Carboniferous

163. The brain capacity of *Homo erectus* was about

- 1) 650 cc
- 2) 900 cc
- 3) 1500 cc
- 4) 1400 cc

164. Which of the following had the smallest brain capacity?

- 1) *Homo neanderthalensis*
- 2) *Homo habilis*
- 3) *Homo erectus*
- 4) *Homo sapiens*

165. A person exposed to HIV shows the appearance of symptoms

- 1) After a lag-phase of few months to several years
- 2) After a lag-phase of 5-10 days
- 3) After a lag-phase of 1-5 weeks
- 4) Immediately

166. Which of the following is a high risk activity involved in transmission of HIV?

- 1) Multiple sex partners
- 2) Sharing of injection needles in drug addicts
- 3) Receiving blood from unknown sources through transfusion repeatedly
- 4) All of these

167. The transformation of normal cells into neoplastic cells can be caused due to exposure of the cells to

- 1) Constant touch and irritation by uv-radiations
- 2) Chemical agents in cigarette smoke
- 3) Onco viruses like EBV [Epstein – Barr Virus]
- 4) All of these

168. Which of the following statements are TRUE regarding electrical synapses?

- (I) Number of electrical synapses are rare in our body.
- (II) Pre and post synaptic membrane lie in close proximity.
- (III) Receptors for neurotransmitters can be present on both pre-and post synaptic membrane.
- (IV) Transmission mechanism in a electrical synapse is similar to impulse conduction through a single axon.

- 1) I, II, III only
- 2) I, II, IV only
- 3) All are true
- 4) II, IV only

169. Biocontrol refers to

- 1) Indiscriminate use of microbes for human welfare
- 2) Use of microbes to control plant diseases
- 3) Use of microbes to clean environment
- 4) Both 2 and 3

170. The Ladybird & Dragonflies are useful to get rid of ____.

- 1) Fungus
- 2) Aphids
- 3) Mosquitoes
- 4) Both 2 and 3

171. IPM stands for

- 1) Indian Pollution Management
- 2) Institute of Pest Management
- 3) Integrated Pest Management
- 4) Institute of Pollution Management

172. Electroporation involves

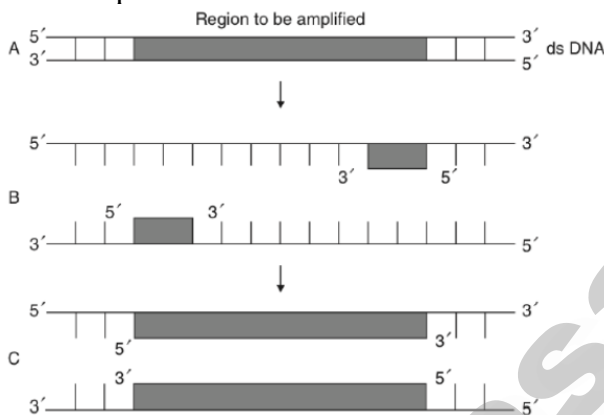
- 1) Promotion of seed germination by induced inhibition of water with electric current
- 2) Making transient pores in cell membrane to facilitate entry of gene constructs
- 3) Purification of saline water with the help of an artificial membrane
- 4) Passage of sucrose through sieve pores by electro-osmosis

173. The figure shows DNA separated out, removed by:



- 1) Spooning
- 2) Spooling
- 3) Spilling
- 4) Speeling

174. The figure below shows three steps (A, B, C) of Polymerase Chain Reaction (PCR). Select the option giving correct identification together with what it represents?



- 1) A: Denaturation at a temperature of about 50°C
- 2) C: Extension in the presence of heat stable DNA polymerase
- 3) A: Annealing with two sets of primers
- 4) B: Denaturation at a temperature of about 98°C separating the two DNA strands

175. Which of the following is incorrect statement.

- 1) On an average 1100–1200 ml of blood is filtered by both the kidneys per minute.
- 2) Vasa-recta is absent or highly reduced in cortical nephrons.
- 3) GFR in a healthy individual is approximately 125 ml/minute.
- 4) Angiotensin II decreases the glomerular blood pressure.

176. Statement–I: In human kidney, the cortex extends in between the medullary pyramids as renal columns called columns of Bertini.
Statement–II: Blood from glomerulus is carried away by an efferent arteriole.

- 1) Statement I and II are correct.
- 2) Statement I and II are incorrect.
- 3) Statement I is correct, Statement II is incorrect.
- 4) Statement I is incorrect, Statement II is correct.

177. DNA ligase helps in the

- 1) Removal of nucleotide residues
- 2) Linking of single stranded nicks
- 3) Fragmentation of DNA strand
- 4) Energy supply to DNA synthesis

178. How many ova laid by mature female frog at a time?

- 1) 2000-5000
- 2) 2500-5000
- 3) 2500-3000
- 4) 100-500

179. Here are given two lists, one contain type of epithelial tissue and other contain list of location, where they are found. Select the correct match.

(A) Squamous epithelia	i) Fallopian tube
(B) Cuboidal epithelia	ii) wall of blood vessels
(C) Columnar epithelia	iii) Lining of stomach
(D) Ciliated epithelia	iv) Tubular parts of nephron

- 1) A-iii, B-ii, C-iv, D-i
- 2) A-i, B-iii, C-ii, D-iv
- 3) A-ii, B-iv, C-iii, D-i
- 4) A-ii, B-iii, C-iv, D-i

180. Match the following:

(A) Areolar tissue	(i) Fat storing cells
(B) Adipocytes	(ii) Osteocytes
(C) Ligament	(iii) Loose connective tissue
(D) Bone	(iv) Dense regular connective tissue

- 1) A-(iii), B-(i), C-(ii), D-(iv)
- 2) A-(iii), B-(i), C-(iv), D-(ii)
- 3) A-(iii), B-(iv), C-(i), D-(ii)
- 4) A-(iii), B-(ii), C-(i), D-(iv)



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Mock Test 6

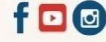
180 x 4 = 720 MARKS

<u>Physics</u>	<u>Chemistry</u>	<u>Botany</u>	<u>Zoology</u>
01. (1)	46. (3)	91. (2)	136. (3)
02. (3)	47. (2)	92. (1)	137. (4)
03. (2)	48. (2)	93. (4)	138. (3)
04. (1)	49. (2)	94. (3)	139. (1)
05. (1)	50. (4)	95. (3)	140. (3)
06. (1)	51. (2)	96. (1)	141. (2)
07. (3)	52. (2)	97. (4)	142. (3)
08. (4)	53. (4)	98. (2)	143. (1)
09. (3)	54. (2)	99. (1)	144. (3)
10. (4)	55. (3)	100. (3)	145. (4)
11. (4)	56. (2)	101. (2)	146. (3)
12. (3)	57. (4)	102. (1)	147. (2)
13. (3)	58. (3)	103. (2)	148. (3)
14. (2)	59. (1)	104. (4)	149. (1)
15. (3)	60. (3)	105. (3)	150. (3)
16. (3)	61. (2)	106. (1)	151. (2)
17. (4)	62. (4)	107. (4)	152. (1)
18. (2)	63. (2)	108. (4)	153. (2)
19. (4)	64. (2)	109. (1)	154. (3)
20. (3)	65. (3)	110. (1)	155. (1)
21. (2)	66. (2)	111. (4)	156. (2)
22. (2)	67. (4)	112. (4)	157. (2)
23. (2)	68. (2)	113. (3)	158. (3)
24. (2)	69. (4)	114. (3)	159. (1)
72. (4)	70. (1)	115. (1)	160. (1)
26. (1)	71. (3)	116. (4)	161. (3)
27. (3)	72. (2)	117. (3)	162. (2)
28. (4)	73. (3)	118. (2)	163. (2)
29. (2)	74. (4)	119. (3)	164. (2)
30. (1)	75. (4)	120. (2)	165. (1)
31. (2)	76. (1)	121. (2)	166. (4)
32. (3)	77. (4)	122. (4)	167. (4)
33. (1)	78. (4)	123. (2)	168. (2)
34. (4)	79. (3)	124. (1)	169. (4)
35. (2)	80. (1)	125. (2)	170. (4)
36. (2)	81. (2)	126. (2)	171. (3)
37. (4)	82. (4)	127. (3)	172. (2)
38. (2)	83. (4)	128. (2)	173. (2)
39. (4)	84. (4)	129. (1)	174. (2)
40. (1)	85. (4)	130. (2)	175. (4)
41. (1)	86. (2)	131. (3)	176. (1)
42. (3)	87. (2)	132. (3)	177. (2)
43. (3)	88. (4)	133. (4)	178. (3)
44. (1)	89. (1)	134. (1)	179. (3)
45. (3)	90. (3)	135. (2)	180. (2)



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Mock Test 6

180 x 4 = 720 MARKS

Solution

Physics

01. Answer (1)

$$20MSD = 21VSD$$

$$LC = 1MSD - 1VSD \Rightarrow$$

$$LC = 1MSD - \frac{20}{21}MSD = \frac{1}{21}MSD = \frac{1}{42}mm$$

02. Answer (3)

$$t = \sqrt{\frac{2h}{g}} \Rightarrow \frac{t}{t_2} = \sqrt{\frac{16}{25}} = \frac{4}{5}$$

03. Answer (2)

$$H = \frac{u^2 \sin^2 \beta}{2g} \Rightarrow u \sin \beta = \sqrt{2gH}$$

$$\text{But } t = \frac{T}{2} = \frac{u \sin \beta}{g} \Rightarrow t = \sqrt{\frac{2H}{g}}$$

04. Answer (1)

$$P + \mu mg \cos \theta = (mg \sin \theta + 3)$$

$$P = 100 \left(\frac{4}{5} - 0.6 \times \frac{3}{5} \right) + 3 = 47N$$

05. Answer (1)

$$F = ma = m \frac{v}{t} = 120 \times 10^{-3} \times \frac{25}{10^{-1}} = 30N$$

06. Answer (1)

$$20\% \ 250 \times A = 10 \times 10^3$$

$$A = \frac{10^4}{250} \times \frac{100}{20} = 200 m^2$$

07. Answer (3)

Momentum is

$$\text{Conserved} \Rightarrow \frac{K_1}{K_2} = \frac{m_2}{m_1}$$

$$\Rightarrow \frac{100}{K_2} = \frac{1}{2}$$

$$\Rightarrow K_2 = 200J$$

$$\Rightarrow \text{Total energy} = K_1 + K_2 = 300J$$

08. Answer (4)

Internal forces don't change the state of centre of mass.

09. Answer (3)

$$KE = \frac{1}{2} I \omega^2 = \frac{1}{2} \times \frac{mr^2 \omega^2}{2}$$

10. Answer (4)

Angular momentum is conserved

11. Answer (4)

$$W_{app} = mg - F_B$$

$$= mg - V_{dis} \rho_w g = mg - mg$$

$$= \text{zero}$$

12. Answer (3)

$$U = \frac{1}{2} \times Y \times \text{strain}^2 \times \text{volume}$$

$$\Rightarrow \frac{1}{2} (\text{slope of stress-strain curve}) \times \text{strain}^2 \times \text{volume}$$

$$\Rightarrow \frac{U_A}{U_B} = \frac{\tan 60}{\tan 30} \times \frac{l}{3l} = 1$$

13. Answer (3)

$$\Delta V = 4\pi R^2 T \left(n^{1/3} - 1 \right)$$

$$= 4 \times \frac{22}{7} \times 1.4 \times 1.4 \times 10^{-6} \times 75 \times 10^{-3} (5 - 1)$$

$$= 7392 \times 10^{-9} J$$

$$= 7.392 \times 10^{-6} J$$

14. Answer (2)

$$\Delta Q = \sigma A (T - T_0)$$

$$ms\Delta T \propto A \Rightarrow \left(\frac{\Delta T}{\Delta t} \right) \propto \frac{1}{r\rho}$$

 \Rightarrow Ratio of rate of cooling = 1:1

15. Answer (3)

Conceptual

16. Answer (3)

$$g_\phi = g_{pole} - R\omega^2 \cos^2 \phi$$

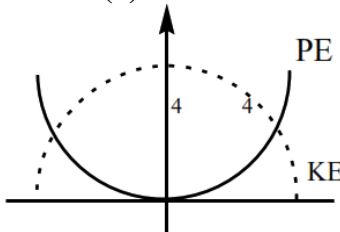
$$\Rightarrow g_{pole} - g_{eq} = (g_{pole}) - (g_{pole} - R\omega^2) = R\omega^2$$

$$\Rightarrow x^1 = 4x$$

17. Answer (4)

Areal velocity of a planet around the sun is constant.

18. Answer (2)



19. Answer (4)

(3 translational + 2 potential + 2 vibrational) degrees

20. Answer (3)

Conceptual

21. Answer (2)

$$\Delta U = \Delta Q - P\Delta V$$

$$= mL - Pdv$$

$$= (10^{-3} \times 500 \times 4200) - 3 \times 10^5 \times 1600 \times 10^{-6}$$

$$= (2100 - 480) J = 1620 J$$

22. Answer (2)

From G.M.V, number of mole of given gas = 2 and $Q = nC_v dT$

$$\Rightarrow Q = 2 \times \left(\frac{3}{2} \times 8.314 \right) \times 15 = 374.13 J$$

23. Answer (2)

$$F = \frac{1}{4\pi\epsilon_0} \frac{q^2}{r^2} = mg \tan \theta$$

$$F^1 = \frac{1}{4\pi\epsilon_0} \frac{1}{K} \frac{q^2}{r^2} = mg \left(1 - \frac{\rho_l}{\rho_b} \right) \tan \theta$$

$$\Rightarrow \frac{1}{K} = \left(\frac{1.5 - 1}{1.5} \right) \Rightarrow k = \frac{1.5}{0.5} = 3$$

24. Answer (2)

$$P = \frac{V^2}{R} \Rightarrow \frac{P^1}{P} = \frac{2R}{(R/2)}$$

$$P^1 = 4 \times 60 W = 240 W$$

25. Answer (4)

Emission of α particle decreases atomic number by 2 and mass number by 4 where as emission of β particle increases atomic number by 1 unit and emission of γ causes no change in Z and A

26. Answer (1)

$$\frac{1}{\lambda} = R \left(1 - \frac{1}{n^2} \right)$$

$$\frac{1}{n^2} = \left(1 - \frac{1}{R\lambda} \right)$$

$$n = \sqrt{\frac{\lambda R}{\lambda R - 1}}$$

27. Answer (3)

When current sensitivity is doubled, resistance also is doubled \Rightarrow voltage sensitivity remains same

28. Answer (4)

$$U = -\vec{M} \cdot \vec{B}$$

$$= -MB \cos \theta$$

$$\text{For } PQ_6; U = -MB_A \cos 0^\circ$$

 $\Rightarrow PQ_6$ has least potential energy

29. Answer (2)

Soft iron has smaller area for hysteresis curve than that of steel hence used as core of transformer.

30. Answer (1)

Conceptual

31. Answer (2)

$$H = \frac{1}{2} CV^2 = \frac{1}{2} \times 4 \times 10^{-6} \times (4 \times 10^2)^2 J = 0.32 J$$

32. Answer (3)

$1\mu F$ and $5\mu F$ capacitors are in parallel

$\Rightarrow C_p = 6\mu F$; C_p & $4\mu F$ are in series

$$\Rightarrow V_1 = \left(\frac{6}{4+6} \right) \times 10V = 6V$$

\therefore charge on $4\mu F = 24\mu C$

33. Answer (1)

$$V = 2n(l_2 - l_1)$$

$$= 2 \times 325(77.4 - 25.4) \times 10^{-2} ms^{-1}$$

$$= 338 ms^{-1}$$

34. Answer (4)

$$eV_0 = hv - \phi \Rightarrow V_0 = \frac{h}{e} \nu - \frac{\phi}{e}$$

35. Answer (2)

1) for insulators

2) $E_g > 3eV$

3) NAND and NOR gates are universal gate

4) Solar cell is not biased

36. Answer (2)

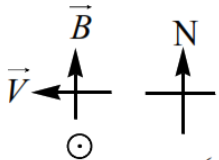
Meter bridge uses principle of Wheatstone's bridge and its balance condition.

37. Answer (4)

Flux through circular loop is zero as \vec{B} is in the plane of the loop.

\Rightarrow emf induced = 0

38. Answer (2)



$$F = qvB = qv \left(\frac{\mu_0 I}{2\pi r} \right)$$

$$= 10^{-9} \times \left(1800 \times \frac{5}{18} \right) \times \left(2 \times 10^{-7} \times \frac{0.5}{5 \times 10^{-2}} \right) = 10^{-12} N$$

$$\vec{a} = \frac{\vec{F}}{m} = \frac{10^{-12}}{10^{-6}} ms^{-2}$$

39. Answer (4)

Due to increasing eddy currents, magnet falls with decreasing acceleration and finally falls with terminal velocity

40. Answer (1)

Conceptual

41. Answer (1)

$$V = 20 \sin 200\pi t$$

$$I = 10 \sin \left(200\pi t + \frac{\pi}{3} \right)$$

$$P_{avg} = V_{rms} i_{rms} \cos \phi = \frac{V_0}{\sqrt{2}} \times \frac{i_0}{\sqrt{2}} \cos \phi$$

$$= \frac{20}{\sqrt{2}} \times \frac{10}{\sqrt{2}} \times \frac{1}{2} = \frac{200}{4} = 50W$$

42. Answer (3)

$$I_1 < I_0 \text{ and } I_2 = I_0$$

$$\Rightarrow I_{max} < 4I_0 \text{ and } I_{min} > 0$$

43. Answer (3)

$$d_A = \mu d_R$$

$$x = \frac{4}{3} y \Rightarrow \frac{d^2 x}{dt^2} = \frac{4}{3} \frac{d^2 y}{dt^2}$$

$$\Rightarrow a_{app} = \frac{4}{3} g$$

44. Answer (1)

$$m = \frac{f}{f-u} \Rightarrow -2 = \frac{2}{2-u_1} \Rightarrow u_1 = -3m$$

$$\text{Also } +2 = \frac{2}{2-u_2} \Rightarrow u_2 = -1m \Rightarrow \Delta u = 2m$$

45. Answer (3)

Truth table

A	B	Y
0	0	1
1	0	0
0	1	0
1	1	0

\Rightarrow NOR gate

Chemistry

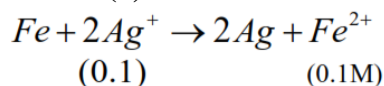
46. Answer (3)

CrO_3 -Acidic; NO -Neutral; ZnO -
amphoteric; V_2O_5 -Basic

47. Answer (2)

Only 1 amines give foul smell in carbyl
amine test

48. Answer (2)



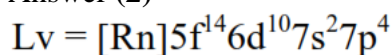
$$E_{cell}^0 = 0.8 - (-0.44) = 1.24$$

$$E_{cell} = 1.24 - \frac{0.0591}{2} \log \frac{10^{-1}}{(10^{-1})^2}$$

$$E_{cell} = 1.24 - \frac{0.0591}{2} \log 10$$

$$= 1.24 - 0.03 = 1.21V$$

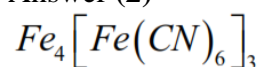
49. Answer (2)



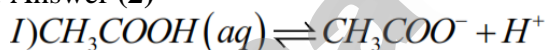
50. Answer (4)

$$V_n \propto \frac{Z}{n}$$

51. Answer (2)



52. Answer (2)



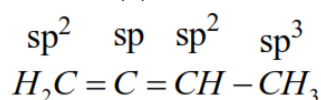
53. Answer (4)

- I) Equilibrium
II) Non-spontaneous
III) Spontaneous

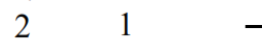
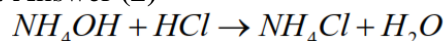
54. Answer (2)

PbS -Galena
 SnO_2 -Tinstone
 Ag_2S -Silver glance
 $PbCO_3$ -Cerussite

55. Answer (3)



56. Answer (2)



1:1 mole ratio of $NH_4Cl + NH_4OH$ mixture
is a basic buffer

57. Answer (4)

I) w.r.t 'A'

$$4^x = 2$$

$$x = \frac{1}{2}$$

$$II) 2^x \cdot 2^y = 2$$

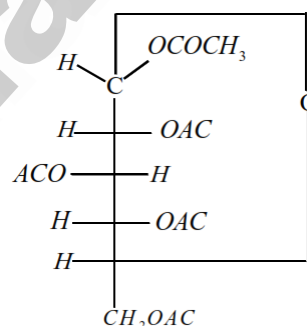
$$x + y = 1$$

$$y = \frac{1}{2}$$

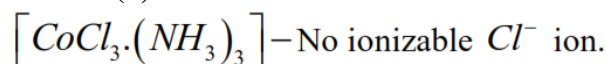
58. Answer (3)

Conceptual

59. Answer (1)



60. Answer (3)



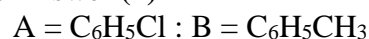
61. Answer (2)

Decomposition of $NH_3(g)$ is endothermic-
favoured at high 'T'
2 volume \rightarrow 4 volumefavoured at Low 'P'

62. Answer (4)

Conceptual

63. Answer (2)



64. Answer (2)

Spin quantum number is not a consequence of
SWE

65. Answer (3)

(A)1-butene (E₂); B.....2-butene (E₁)

66. Answer (2)

$$K_{sp} = 6912S^7$$

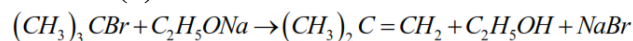
$$= 6912 \times 10^{-56}$$

$$= 6.912 \times 10^{-53}$$

67. Answer (4)

LVP is a colligative property

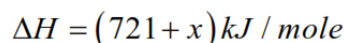
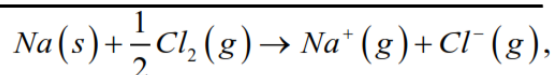
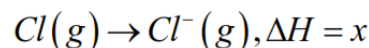
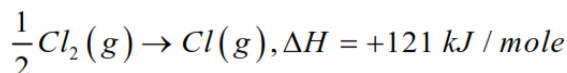
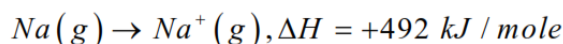
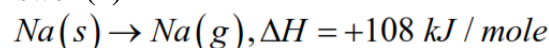
68. Answer (2)



69. Answer (4)

S > Cl > P > Si

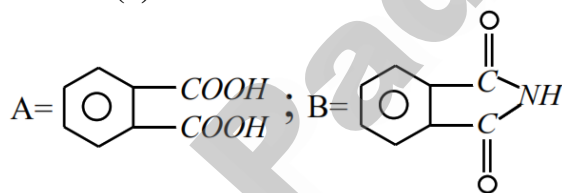
70. Answer (1)



71. Answer (3)

Conceptual

72. Answer (2)



73. Answer (3)

1.5, 2.5, 3, 2

74. Answer (4)

Dipole moment of II is greater than zero.

75. Answer (4)

Conceptual

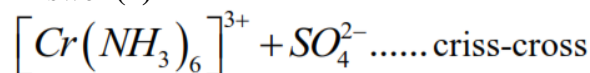
76. Answer (1)

Conceptual

77. Answer (4)

Conceptual

78. Answer (4)



79. Answer (3)

C₂H₅OH cannot react with Lucas reagent at room temperature.

80. Answer (1)

$$Q_c = \frac{(10^{-4})}{(10^{-4})(10^{-1})} = 10$$

Q_c > K_c, reaction proceeds in backward direction

81. Answer (2)

Shows negative deviations from Raoult's law

82. Answer (4)

CrO₄²⁻ colour due to charge transfer phenomena

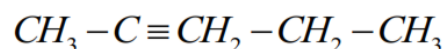
83. Answer (4)

Conceptual

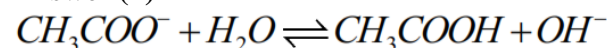
84. Answer (4)

(1) formaldehyde acetal formed between formaldehyde and two mole of CH₃OH

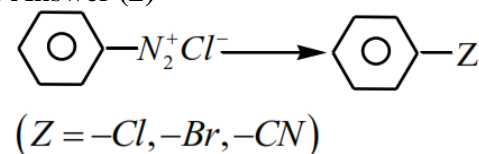
85. Answer (4)

'A' is CH₃-C≡C⁻Na⁺; B is

86. Answer (2)



87. Answer (2)



88. Answer (4)

Conceptual

89. Answer (1)

$$3 > 2 > 1 > 4 \left(p^{k_b} \right)$$

90. Answer (3)

Applicable to one electron species only.

Botany

091. Answer (2)
092. Answer (1)
093. Answer (4)
094. Answer (3)
095. Answer (3)
096. Answer (1)
097. Answer (4)
098. Answer (2)
099. Answer (1)
100. Answer (3)
101. Answer (2)
102. Answer (1)
103. Answer (2)
104. Answer (4)
105. Answer (3)
106. Answer (1)
107. Answer (4)
108. Answer (4)
109. Answer (1)
110. Answer (1)
111. Answer (4)
112. Answer (4)
113. Answer (3)
114. Answer (3)
115. Answer (1)
116. Answer (4)
117. Answer (3)
118. Answer (2)
119. Answer (3)
120. Answer (2)
121. Answer (2)
122. Answer (4)
123. Answer (2)
124. Answer (1)
125. Answer (2)
126. Answer (2)
127. Answer (3)
128. Answer (2)
129. Answer (1)
130. Answer (2)
131. Answer (3)
132. Answer (3)
133. Answer (4)
134. Answer (1)
135. Answer (2)

Zoology

136. Answer (3)
137. Answer (4)
138. Answer (3)
139. Answer (1)
140. Answer (3)
141. Answer (2)
142. Answer (3)
143. Answer (1)
144. Answer (3)
145. Answer (4)
146. Answer (3)
147. Answer (2)
148. Answer (3)
149. Answer (1)
150. Answer (3)
151. Answer (2)
152. Answer (1)
153. Answer (2)
154. Answer (3)
155. Answer (1)
156. Answer (2)
157. Answer (2)
158. Answer (3)
159. Answer (1)
160. Answer (1)
161. Answer (3)
162. Answer (2)
163. Answer (2)
164. Answer (2)
165. Answer (1)
166. Answer (4)
167. Answer (4)
168. Answer (2)
169. Answer (4)
170. Answer (4)
171. Answer (3)
172. Answer (2)
173. Answer (2)
174. Answer (2)
175. Answer (4)
176. Answer (1)
177. Answer (2)
178. Answer (3)
179. Answer (3)
180. Answer (2)