



CREATIVE NEET ACADEMY

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NEET (UG)-2025 (CNMT - 1)

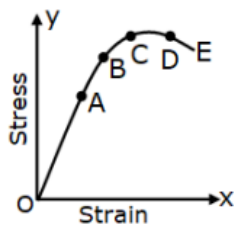
QUESTION PAPER

PHYSICS

1. Two bodies of mass 1 kg and 3 kg have position vectors $\hat{i} + 2\hat{j} + \hat{k}$ and $-3\hat{i} - 2\hat{j} + \hat{k}$ respectively. The centre of mass of this system has a position vector:

A) $-\hat{i} + \hat{j} + \hat{k}$ B) $-2\hat{i} + 2\hat{k}$ C) $-2\hat{i} - \hat{j} + \hat{k}$ D) $2\hat{i} - \hat{j} - 2\hat{k}$

2. Behaviour of an elastic wire under external increasing load is shown in the graph. Which of the following point represents the proportionality limit ?



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

3. The electric field at a distance of 20 cm from the centre of a dielectric sphere of radius 10 cm is 100 V/m. Electric field at a distance 3cm from the centre of sphere is :-

A) 100 V/m B) 125 V/m C) 120 V/m D) Zero

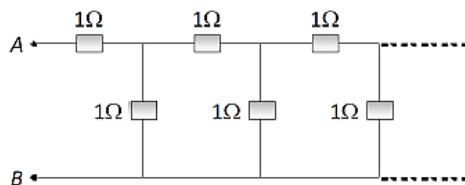
4. A particle is moving towards a fixed spherical mirror. The image:

A) must move away from the mirror B) must move towards the mirror
C) may move towards the mirror D) none of these

5. A small linear segment of an electric circuit is lying on x-axis extending from $X = -\frac{a}{2}$ to $X = \frac{a}{2}$ and a current is flowing in it. The magnetic induction due to the segment at a point on x-axis will be

A) $\propto a$ B) Zero C) $\propto a^2$ D) $\propto \frac{1}{a}$

6. The equivalent resistance between points A and B of an infinite network of resistances each of 1Ω connected as shown, is -



A) Infinite B) 2Ω C) $\frac{1+\sqrt{5}}{2}\Omega$ D) Zero

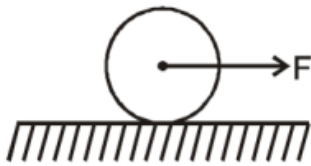
7. A boy hits a baseball with a bat and imparts an impulse J to the ball. The boy hits the ball again with the same force, except that the ball and the bat are in contact for twice the amount of time as in the first hit. The new impulse equals.

A) half the original impulse B) the original impulse
C) twice the original impulse D) four times the original impulse

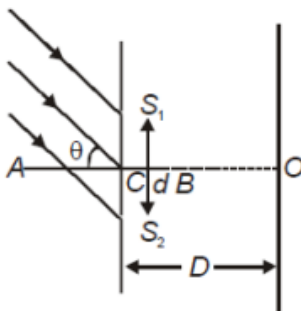




8. A uniform solid brass sphere is rotating with angular speed ω_0 about a diameter. If its temperature is now increased by 100°C what will be its new angular speed? (Given $\alpha_B = 2.0 \times 10^{-5} / ^\circ\text{C}$)
A) $1.1\omega_0$ B) $1.5\omega_0$ C) $0.996\omega_0$ D) $1.2\omega_0$
9. A astronomical telescope has objective and eyepiece of focal lengths 40 cm and 4 cm respectively. To view an object 200 cm away from the objective, the lenses must be separated by a distance:
A) 37.3cm B) 46.0cm C) 50.0cm D) 54.0cm
10. A solid sphere of mass 10 kg is placed on a rough surface having coefficient of friction $\mu = 0.1$. A constant force $F = 7\text{ N}$ is applied along a line passing through the centre of the sphere as shown in the figure. The value of frictional force on the sphere is :



- A) 1 N B) 2 N C) 3 N D) 7 N
11. In Young's double slit experiment, light beam falls on the slits at angle θ from a line AB as shown. The path difference between the two waves meeting at O will be (separation between two slits is d)



- A) Zero B) $\frac{d}{\cos\theta}$ C) $\frac{d}{\sin\theta}$ D) $d \sin\theta$
12. A mass m attached to a spring oscillates with a period of 3 s. If the mass is increased by 1kg the period increases by 1 second. The initial mass m in kg is :
A) $\frac{7}{9}$ B) $\frac{9}{7}$ C) $\frac{14}{9}$ D) $\frac{18}{7}$
13. The capacity of a condenser is 4×10^{-6} Farad and its potential is 100 volts. The energy released on discharging it fully will be:
A) 0.02 joule B) 0.04 joule C) 0.025 joule D) 0.05 joule
14. A bar magnet is cut into two equal halves by a plane parallel to the magnetic axis. Of the following physical quantities, the one which remains unchanged is -
A) pole strength B) magnetic moment





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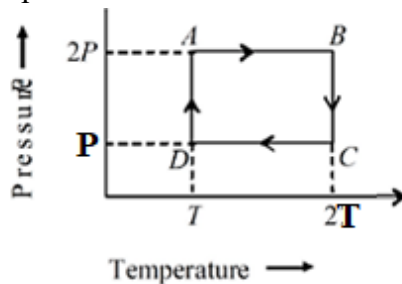
QUESTION PAPER

- C) Intensity of magnetisation D) Moment of inertia
15. Subtract 0.2 J from 5.27 J and express the result with correct number of significant figures:
A) 5.1 J B) 5.06 J C) 5.0 J D) 5 J
16. A particle of mass m and radius of gyration K is rotating with angular acceleration α . The torque acting on the particle is
A) $\frac{1}{2}mK^2\alpha$ B) $mK^2\alpha$ C) mK^2 / α D) $\frac{1}{2}mK^2\alpha^2$
17. Two identical waves, each of frequency 10 Hz, are traveling in opposite directions in a medium with a speed of 20 cm s^{-1} . The distance between adjacent nodes is
A) 1.0 cm B) 1.2 cm C) 1.5 cm D) 2.0 cm
18. A charge Q is placed at each of the opposite [diagonal] corners of a square. A charge q is placed at each of the other two corners. If the net electrical force on Q is zero, then the $\frac{Q}{q}$ equals
A) $-2\sqrt{2}$ B) -1 C) 1 D) $-\frac{1}{\sqrt{2}}$
19. A bus moves over a straight level path with constant acceleration a . A boy in the bus drops a ball outside. The magnitude of acceleration of the ball w.r.t. the earth and the bus respectively are-
A) a and $(g - a)$ B) $(a + g)$ and g C) g and $\sqrt{a^2 + g^2}$ D) $(a - g)$ and $(a + g)$
20. The amount of heat required to raise the temperature of 1 kg of water through 1°C is called
A) kilo-calorie B) calorie C) B.T.U. D) calorie/ $^\circ\text{C}$
21. Water is flowing through a horizontal pipe of non-uniform cross-section. At the extreme narrow portion of the pipe, the water will have :-
A) maximum speed and least pressure B) maximum pressure and least speed
C) Both pressure and speed maximum D) Both pressure and speed least
22. Lenz's law is based on the law of conservation of-
A) charge B) momentum C) mass D) energy
23. If the normal force is doubled the co-efficient of friction is :
A) halved B) doubled C) tripled D) not changed
24. A spherical black body with a radius of 12cm radiates 450W power at 500K. If the radius were halved and the temperature doubled, the power radiated in watts would be
A) 225 B) 450 C) 900 D) 1800
25. The excess pressure inside an air bubble of radius r just below the surface of water is P_1 . The excess pressure inside a drop of the same radius just outside the surface is P_2 . If T is surface tension then -
A) $P_1 = 2P_2$ B) $P_1 = P_2$ C) $P_2 = 2P_1$ D) $P_2 = 0, P_1 \neq 0$
26. A long solenoid has 1000 turns. When a current 4A of flows through it, the magnetic flux linked with each turn of the solenoid is 4×10^{-3} Wb. The self-inductance of the solenoid is:
A) 4H B) 3H C) 2H D) 1H



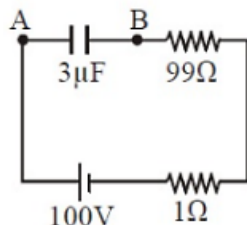


27. A car turns a corner on a slippery road at a constant speed of 12 m/s. If the coefficient of friction is 0.4, the minimum radius of the arc in metre in which the car turns is
A) 72 B) 36 C) 18 D) 9
28. One mole of an ideal gas having initial volume V , pressure $2P$ and temperature T undergoes a cyclic process ABCDA as shown below:



The net work done in the complete cycle is :-

- A) Zero B) $\frac{1}{2}RT \ln 2$ C) $RT \ln 2$ D) $\frac{3}{2}RT \ln 2$
29. The potential difference between point A & B in steady state will be :-



- A) 99 V B) 100 V C) 97 V D) Zero
30. A body of mass M tied to a string is lowered at a constant acceleration of $(g/4)$ through a vertical distance h . The work done by the string will be..

- A) $\frac{3}{4}Mgh$ B) $\frac{1}{4}Mgh$ C) $\frac{-3}{4}Mgh$ D) $\frac{-1}{4}Mgh$

31. The polaroid glass is used in sunglasses as :

- A) it is a fashion B) this reduce glare
C) this is cheaper than other types D) this looks more beautiful

32. A wire P has resistance of 20 ohm. Another wire Q of same material but length twice that of P has resistance of 8 ohm. If r is the radius of cross-section of P, the radius of crosssection of Q is :

- A) r B) $r/\sqrt{2}$ C) $r\sqrt{5}$ D) $2r$

33. A parallel plate capacitor has two layers of dielectric as shown in figure. This capacitor is connected across a battery. The graph which shows the variation of electric field (E) and distance (x) from left plate.





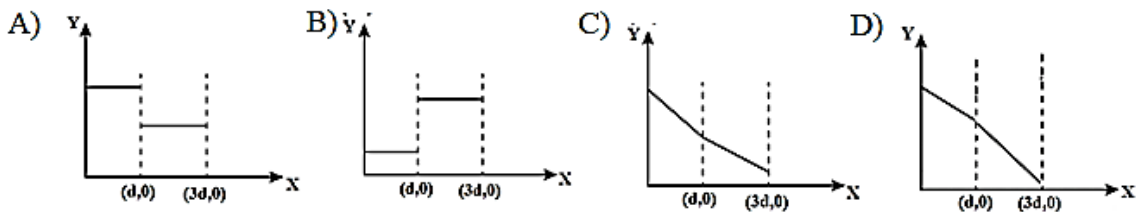
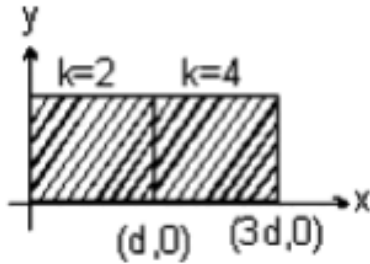
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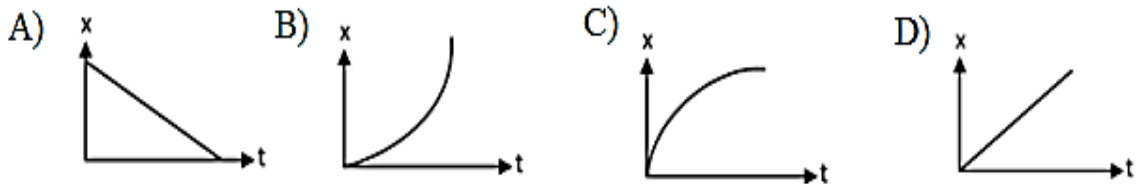
QUESTION PAPER



34. In a container neon gas has two isotopes Ne^{20} and Ne^{22} . The ratio of rms velocities of Ne^{20} and Ne^{22} is:

- A) $\sqrt{11} : \sqrt{10}$ B) $\sqrt{10} : \sqrt{11}$ C) 10 : 11 D) 11 : 10

35. The position-time ($x - t$) graph for positive acceleration is



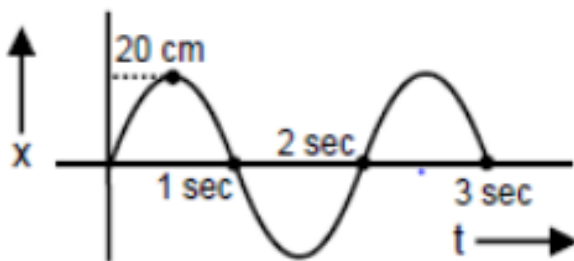
36. A hypothetical gas expands adiabatically such that its volume changes from 08 litres to 27 litres. If the ratio of final pressure of the gas to initial pressure of the gas is $\frac{16}{81}$ Then the ratio of $\frac{C_p}{C_v}$ will be

- A) $\frac{3}{1}$ B) $\frac{4}{3}$ C) $\frac{1}{2}$ D) $\frac{3}{2}$

37. The maximum displacement of the particle executing S.H.M. is 1cm and the maximum acceleration is $(1.57)^2 \text{ cms}^{-2}$. Its time period is

- A) 0.25 sec B) 4.0 sec C) 1.57 sec D) $(1.57)^2$ sec

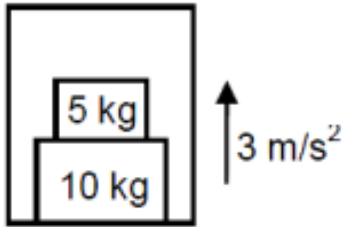
38. If x vs t curve of a particle is shown in diagram then its a_{max} will be –



- A) $20 \pi^2 \text{ m/sec}^2$ B) $\frac{4\pi^2}{5} \text{ m/sec}^2$ C) 2 m/sec^2 D) 4 m/sec^2



39. The force exerted on 5 kg block by 10 kg block, shown in the figure is (take $g = 10 \text{ m/s}^2$)



- A) 58 N
- B) 35 N
- C) 65 N
- D) 105 N

40. In an orbital motion, the angular momentum vector is :-

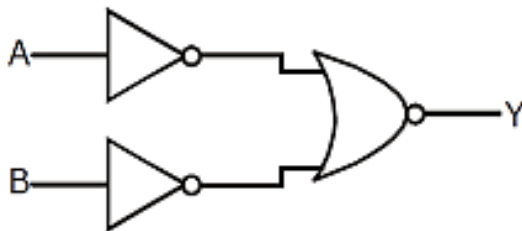
- A) Along the radial vector
- B) Parallel to linear momentum
- C) In the orbital plane
- D) Perpendicular to orbital plane

41. A particle moving with velocity that is three times that of velocity of electron. If ratio of the de-Broglie wavelength of particle with respect to electron is 1.8×10^{-4} . Find of mass of particle

($m_e = 9.1 \times 10^{-31} \text{ kg}$)

- A) $1.6 \times 10^{-27} \text{ kg}$
- B) $1.3 \times 10^{-13} \text{ kg}$
- C) $2.6 \times 10^{-27} \text{ kg}$
- D) $6.63 \times 10^{-34} \text{ kg}$

42. For the logic circuit shown, the truth table is :

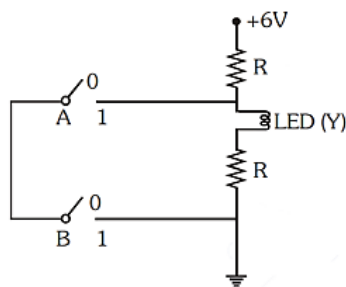


| | | | |
|-------------|-------------|-------------|-------------|
| $A \ B \ Y$ | $A \ B \ Y$ | $A \ B \ Y$ | $A \ B \ Y$ |
| 0 0 1 | 0 0 1 | 0 0 0 | 0 0 0 |
| A) 0 1 1 | B) 0 1 0 | C) 0 1 0 | D) 0 1 1 |
| 1 0 1 | 1 0 0 | 1 0 0 | 1 0 1 |
| 1 1 0 | 1 1 0 | 1 1 1 | 1 1 1 |

43. A stone falls from a balloon that is descending at a uniform rate of 12 m/s . Time of flight of stone is 12 sec. Then displacement of the stone from the point of release after 10 sec is-

- A) 490 m
- B) 510 m
- C) 610 m
- D) 725 m

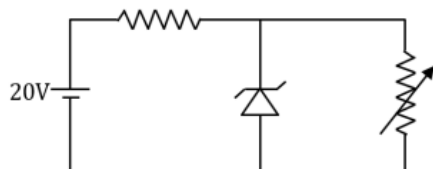
44. The correct Boolean operation represented by the circuit diagram drawn is





- A) NAND B) NOR C) AND D) OR

45. In the given circuit, the voltage across the load is maintained at 12 V. The current in the zener diode varies from 0 – 50 mA. What is the maximum wattage of the diode?



- A) 12 W B) 6 W C) 0.6 W D) 1.2 W

CHEMISTRY

46. Which amongst the following is incorrect statement?

- A) B₂ molecule has one electron in each of the two π molecular orbitals
B) He₂²⁺ ion has two electrons
C) N₂⁺ ion is diamagnetic
D) The bond orders of O₂⁺, O₂ and O₂⁻ are 2.5, 2 and 1.5 respectively

47. Which amongst the following options is the correct relation between change in enthalpy and change in internal energy for the reaction, C_(s) + O_{2(g)} → CO_{2(g)} ?

- A) $\Delta H = \Delta U + RT$ B) $\Delta H = \Delta U$ C) $\Delta H = \Delta U - RT$ D) $\Delta H = \Delta U + 3RT$

48. Given below are two statements.

Statement – I: A unit formed by the attachment of a base to 1st – position of sugar is known as nucleoside.

Statement – II: When nucleoside is linked to phosphoric acid at 5th – position of sugar moiety, we get nucleotide.

- A) Both Statement I and Statement II are true
B) Statement I is false but Statement II is true
C) Statement I is true but Statement II is false
D) Both Statement I and Statement II are false

49. The correct statements regarding enzymes are

- I) Almost all the enzymes are globular proteins
II) Enzymes are polysaccharides
III) Enzymes which catalyse the oxidation of one substrate with simultaneous reduction of another substrate are called oxidoreductase enzymes.
IV) Enzymes are biocatalysts

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

50. Arrhenius equation is: $k = Ae^{-E_a/RT}$. Which of the following graphs represents the variation of rate constant k against temperature T?



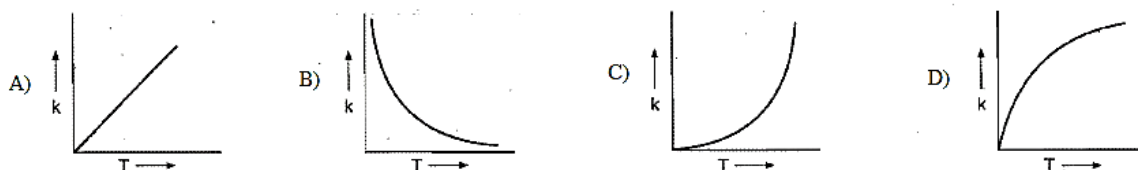
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QUESTION PAPER



51. Which among the following compounds has least number of lone pairs on central atom?
 A) ClF_3 B) XeF_2 C) SF_4 D) XeF_4
52. If energy of third Bohr orbit of the H-atom is -2.42×10^{-19} J/atom, the energy of second Bohr orbit of Li^{2+} ion will be
 A) -1.2×10^{-20} J/atom B) -4.9×10^{-18} J/atom
 C) -2.18×10^{-18} J/atom D) -2.4×10^{-19} J/atom
53. Mass of H_3PO_4 present in 100 ml of deci normal solution of it is
 A) 9.8 g B) 4.9 g C) 0.33 g D) 0.98 g
54. In acidic medium, $\text{K}_2\text{Cr}_2\text{O}_7$ oxidises iodide to iodine. The change in oxidation state of chromium in this reaction is from
 A) +6 to +4 B) +7 to +3 C) +6 to +3 D) +7 to +4
55. Solubility of MX_3 type of electrolyte is 0.2×10^{-5} . Then k_{sp} of electrolyte is
 A) 4.32×10^{-26} B) 4.32×10^{-24} C) 4.32×10^{-22} D) 4.32×10^{-20}
56. Match list – I with list – II

| List – I (Electrolyte) | List – II (Product of electrolysis at cathode with inert electrodes) |
|---------------------------|---|
| A. aq. KOH | I. Na |
| B. aq. CuSO_4 | II. Ca |
| C. Fused NaCl | III. H_2 |
| D. Fused CaH_2 | IV. Cu |
| | V. K |

- A) A – III, B – IV, C – I, D – II B) A – V, B – IV, C – III, D – II
 C) A – IV, B – II, C – I, D – III D) A – V, B – III, C – I, D – II
57. Given below are two statements.
Statement – I: All measurable properties of the system remain constant at equilibrium in a physical process.
Statement – II: Expression for equilibrium constant is applicable only when concentrations of the reactants and products have attained constant value at equilibrium state
 In the light of the above statements, choose the correct answer from the options given below.
 A) Both Statement I and Statement II are true
 B) Statement I is false but Statement II is true
 C) Statement I is true but Statement II is false
 D) Both Statement I and Statement II are false
58. Given below are two statements. One is labeled as assertion and other is labeled as reason.

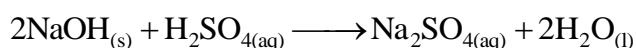


Assertion (A): A mixture of chloroform and acetone forms a solution with negative deviation from Raoult's law.

Reason (R): Chloroform molecule is able to form hydrogen bond with acetone molecule.

- A) Both A and R are correct, and R is the correct explanation of A.
B) Both A and R are correct, and R is not the correct explanation of A.
C) A is not correct, but R is correct
D) A is correct, but R is not correct

59. What mass of 80% pure NaOH will be required to neutralise 100 mL of 0.1 M H_2SO_4 solution according to the following reaction?



- A) 0.64 g B) 0.8 g C) 1 g D) 1.6 g

60. For irreversible expansion of an ideal gas under isothermal condition, the correct option is

- A) $\Delta U \neq 0, \Delta S_{\text{total}} = 0$ B) $\Delta U = 0, \Delta S_{\text{total}} = 0$
C) $\Delta U \neq 0, \Delta S_{\text{total}} \neq 0$ D) $\Delta U = 0, \Delta S_{\text{total}} \neq 0$

61. Which of the following salts will give least pH in water?

- A) Na_2SO_4 B) $(\text{NH}_4)_2\text{SO}_4$ C) Na_2CO_3 D) KNO_3

62. Which of the following statements are correct?

- I. Electromagnetic theory can not explain the nature of emission of radiation from hot bodies.
II. Number of electrons ejected in photoelectric effect experiment is proportional to the intensity of light.
III. The principal quantum number determines the shape of orbitals.
IV. Magnetic quantum number, refers to the orientation of the spin of electron. 1 m

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

63. Given below are two statements. One is labeled as assertion and other is labeled as reason.

Assertion (A) : If copper is added to nitric acid, copper is oxidized by hydrogen and H_2 gas is liberated.

Reason (R) : Standard electrode potential of Cu^{2+} is positive.

- A) Both A and R are correct, and R is the correct explanation of A.
B) Both A and R are correct, and R is not the correct explanation of A.
C) A is not correct, but R is correct
D) A is correct, but R is not correct

64. Specific reaction rate of a first order reaction is $2 \times 10^{-3} \text{ s}^{-1}$. The time taken for 200 g of reactant to reduce to 100 g is

- A) 138.6 sec B) 346.5 sec C) 693.0 sec D) 238.6 sec

65. Which one of the following has maximum number of atoms? (Atomic mass of Ag = 108)

- A) 10 g CH_4 B) 10 g Ag C) 10 g N_2 D) 10 g Ne

66. Correct order of dipole moment of compounds given below is

- A) $\text{HF} < \text{HCl} < \text{HBr} < \text{HI}$ B) $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$
C) $\text{HCl} > \text{HF} > \text{HBr} > \text{HI}$ D) $\text{HF} > \text{HCl} \approx \text{HBr} > \text{HI}$





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QUESTION PAPER

67. Phenolphthalein is a suitable indicator for which of the following titrations?
- I. HCl vs KOH
II. H_2CO_3 vs NaOH
III. NaHCO_3 vs HCl
IV. CH_3COOH vs KOH
- A) I, II, III and IV B) I, II only C) I, II, III only D) I, II, IV only
68. Incorrect match of IUPAC symbol of elements with its respective atomic number is
- A) Sg : 106 B) Mt : 109 C) Bh : 105 D) Hs : 108
69. Among the following identify the correct statements?
- a) $\text{B} < \text{Al} < \text{In} < \text{Tl}$, (Atomic radius)
b) $\text{Al} < \text{Ga} < \text{Tl} < \text{B}$, (first Ionization enthalpy)
c) $\text{Al} < \text{Ga} < \text{In} < \text{Tl} < \text{B}$, (Electronegativity)
- A) only a B) only a and b C) only b and c D) a, b and c
70. In which pair, both the species are acidic in nature?
- A) SnO_2 and PbO_2 B) GeO_2 and PbO C) SnO_2 and GeO D) GeO_2 and SiO_2
71. Reaction by which, benzaldehyde cannot be prepared is
- A) $\text{C}_6\text{H}_6 + \text{CO} + \text{HCl}$ in presence of AlCl_3 (anhy)
B) $\text{C}_6\text{H}_5\text{COOH} + \text{Zn/Hg}$ and conc.HCl
C) $\text{C}_6\text{H}_5\text{CH}_3 + \text{CrO}_2\text{Cl}_2$ in CS_2 followed by H_3O^+
D) $\text{C}_6\text{H}_5\text{COCl} + \text{H}_2$ in presence of Pd-BaSO₄
72. The major products obtained during ozonolysis of 2,3-dimethylbut-1-ene and subsequent reductions with Zn and H_2O are
- A) methanoic acid and 2-methyl-2-butanone
B) methanal and 3-methyl-2-butanone
C) methanol and 2,3-dimethyl-3-butanone
D) methanoic acid and 2-methyl-3-butanone.
73. Which of the following compounds can exhibit both geometrical isomerism & enantiomerism ?
- A) $\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$ B) $\text{CH}_3\text{CH}_2 - \overset{\text{CH}_3}{\underset{|}{\text{C}}} - \text{CH} = \text{CH} - \text{CH}_3$
- C) $\text{CH}_3\text{CH}_2 - \overset{\text{CH}_3}{\underset{|}{\text{C}}} = \text{CH} - \text{COOH}$ D) $\text{CH}_3 - \text{CHOH} - \text{COOH}$
74. The nature of Cr^{2+} and Mn^{3+} respectively are
- A) Oxidising and reducing B) Oxidising and oxidising
C) Reducing and reducing D) Reducing and oxidizing
75. The metals which are present in Ziegler Natta Catalyst are
- A) V and Ti B) Ti and Al C) Ti and Mg D) Zr and Zn
76. The facial and meridional isomers are possible in
- A) $[\text{CoCl}_2(\text{en})_2]^+$ B) $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$
C) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$ D) $[\text{Co}(\text{en})_3]^{3+}$
77. The correct order of increasing field strength is





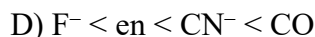
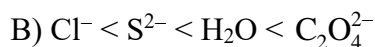
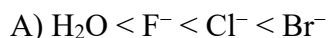
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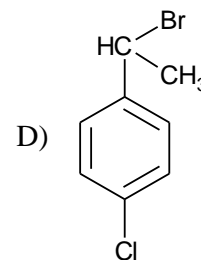
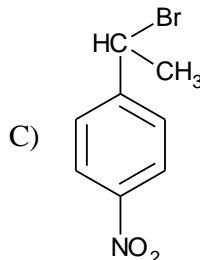
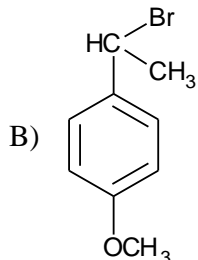
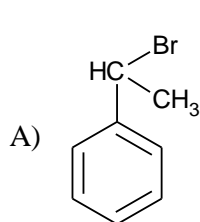
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78. The compound which will react fastest by $\text{S}_{\text{N}}1$ mechanism is



79. The alcohol which will react fastest with $\text{ZnCl}_2 / \text{HCl}$ is

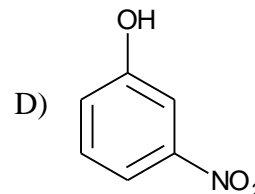
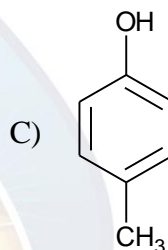
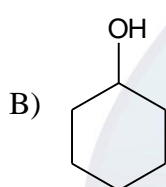
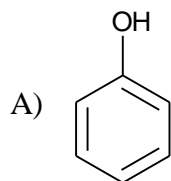
A) Pentan-2-ol

B) Pentan-1-ol

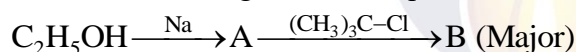
C) 3-Methylbutan-2-ol

D) 2-Methylbutan-2-ol

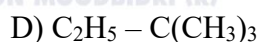
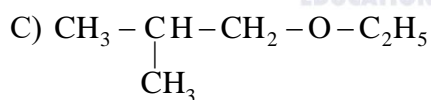
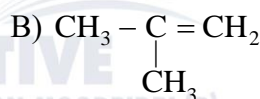
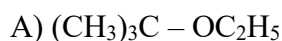
80. Most acidic compound among the following



81. Consider the following reaction sequence



Major product B is



82. A compound with the maximum ionic character is formed from

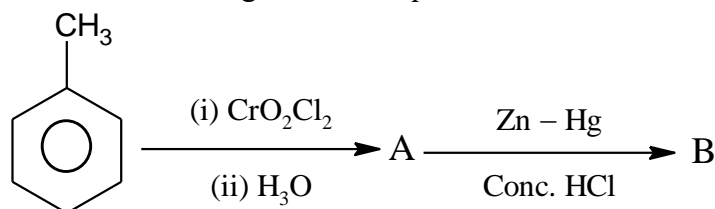
A) Na and F

B) Cs and F

C) Cs and I

D) Na and Cl

83. Consider the following reaction sequence



A and B respectively are



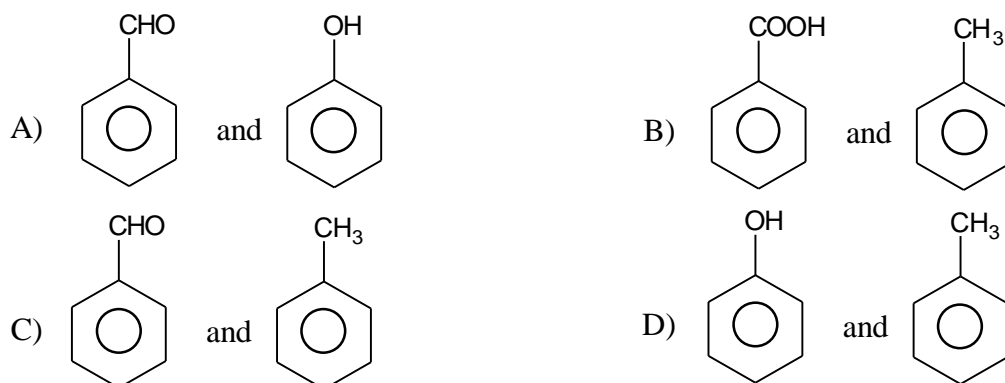
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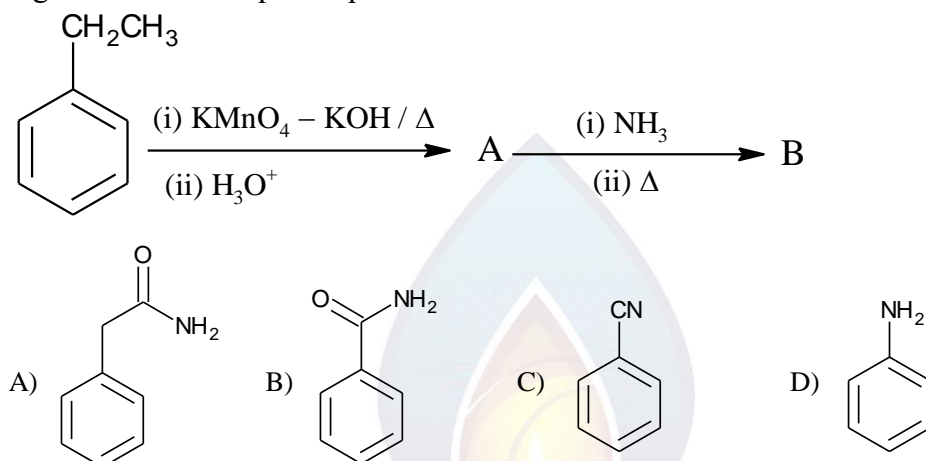
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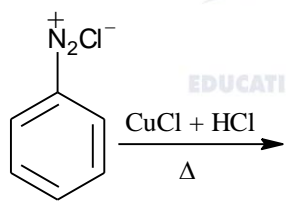
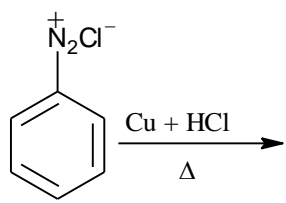
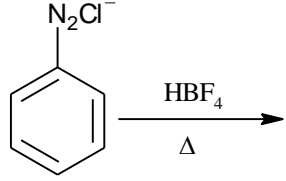
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84. In the given reaction sequence product B is



85. Match the column I with column II and mark the appropriate choice

| Column I | Column II |
|---|---------------------------|
| (A)  | (i) Coupling reaction |
| (B)  | (ii) Balzschmann reaction |
| (C)  | (iii) Gatterman reaction |



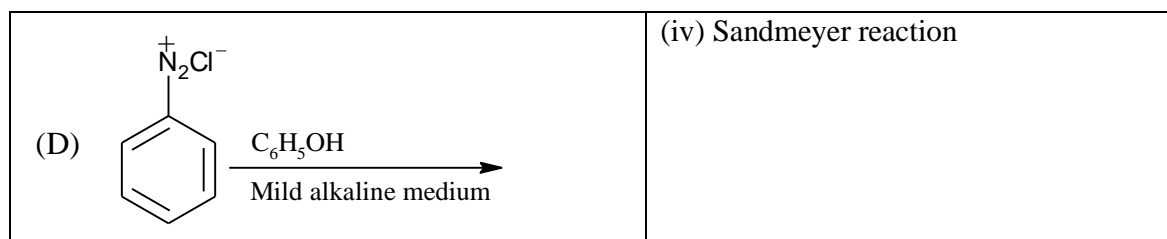
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A) A-iv, B-iii, C-ii, D-i

B) A-iii, B-iv, C-i, D-ii

C) A-ii, B-iii, C-iv, D-i

D) A-i, B-ii, C-iii, D-iv

86. Consider the given set of reactions $\text{CH}_3\text{CONH}_2 \xrightarrow[\text{(ii) H}_2\text{O}]{\text{(i) LiAlH}_4} \text{A} \xrightarrow[\text{H}_2\text{O}]{\text{NaNO}_2/\text{HCl}} \text{B}$ Major product

B is

A) CH_3COOH

B) $\text{CH}_3\text{CH}_2\text{OH}$

C) $\text{CH}_3\text{CH}_2\text{Cl}$

D) $\text{CH}_3\text{CH}_2\text{NO}_2$

87. Given below are two statements

Statement-I: Reaction of propanamide with Br_2/KOH (aq) produces ethanamide.

Statement-II: During Hoffmann's bromamide reaction amides produce amines with one carbon atom less

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

A) Both Statement-I and Statement-II are correct

B) Both Statement-I and Statement-II are incorrect

C) Statement-I is incorrect while Statement-II is correct

D) Statement-I is correct while Statement-II is incorrect

88. Given below are two statements: One is labeled as Assertion (A) and the other is labelled as Reason (R)

Assertion (A): Toulene is more reactive than benzene towards electrophilic substitution reaction

Reason (R): Presence of $-\text{CH}_3$ group increases the electron density at o/p positions in toluene.

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

A) Both A & R are true and the R is the correct explanation of the A

B) Both A & R are true and the R is not the correct explanation of the A

C) A is true but R is false

D) Both A & R are false

89. Incorrect statement among the following is

A) Paper chromatography is a type of partition chromatography

B) In paper chromatography chromatography paper contains water trapped in it, which acts as stationary phase

C) Thin layer chromatography is a type of adsorption chromatography

D) In column chromatography, the least adsorbed substances are retained near the top and other substances come down to various distances in the column





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90. Incorrect statement about nitration of benzene using nitration mixture is
- A) The electrophile is nitrosonium ion
 - B) Nitric acid acts as a base
 - C) Sigma complex is formed as intermediate
 - D) In sigma complex one of the carbon is sp^3 hybridised

BOTANY

91. Read the following statements and choose the correct option.
- Statement-I: The word systematics is derived from the Latin word “systema” which means systematic arrangement of organisms.
- Statement-II: Systematics takes into account evolutionary relationship between organisms.
- A) Both Statement-I and Statement-II are true.
 - B) Statement-I is false but Statement-II is true.
 - C) Statement-I is true but Statement-II is false.
 - D) Both Statement-I and Statement-II are false.
92. Read the Assertion and Reason carefully and choose the correct option.
- Assertion(A): Genus may have one or more than one specific epithet.
- Reason(R): Genus comprise a group of related species.
- A) Both A and R are correct and R is the correct explanation of A.
 - B) Both A and R are correct but R is not the correct explanation of A.
 - C) A is not correct but R is correct.
 - D) A is correct but R is not correct.
93. Match the following
- | Column-I | Column-II |
|-------------------------|-------------------------|
| A. <i>Cuscuta</i> | i. Insectivorous plants |
| B. Bladderwort | ii Imperfect fungi |
| C. <i>Trichoderma</i> | iii. Unicellular fungi |
| D. <i>Saccharomyces</i> | iv. Parasitic plant |
- A) A(iv), B(i), C(ii), D(iii)
 - B) A(i), B(ii), C(iv), D(iii)
 - C) A(iii), B(iv), C(ii), D(i)
 - D) A(ii), B(iii), C(iv), D(i)
94. Which one of the following is not a criterion for classification of fungi
- A) Mode of spore formation
 - B) Type of fruiting body
 - C) Morphology of mycelium
 - D) Mode of nutrition
95. In gymnosperms, female gametophyte
- (A) Act as an endosperm.
 - (B) Bears two or more archegonia.
 - (C) Is dependent on sporophyte.
- Choose the correct option to complete the sentence.
- A) Only B is correct
 - B) A and B are correct





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- C) A and C are correct
D) A, B and C are correct
96. *Ectocarpus* is a
A) Thalloid branched filamentous red alga. B) Colonial brown alga.
C) Branched filamentous brown alga. D) Filamentous branched green alga.
97. Identify the suitable answer.
(A) Potato is a modified root while sweet potato is a modified stem.
(B) Leaves are arranged in basipetal order on main stem or branches.
(C) China rose, mustard, sunflower shows alternate phyllotaxy.
(D) In the flowers of pea or bean the large posterior petal overlaps the two lateral petals.
A) A and B correct, C and D incorrect.
B) only A is incorrect but B, C and D are correct.
C) A, B and C are correct but D incorrect.
D) A and B incorrect but C and D are correct.
98. The character of flower represented by floral formula but not by floral diagram is.....
A) Position of ovary B) Adhesion of stamens
C) Placentation D) Aestivation
99. Which of the following statement is incorrect?
A) The mustard flower is tetramerous
B) The stamens of disc florets of *Helianthus* are epipetalous and syngenesious
C) The ray florets of Asteraceae members have an inferior ovary
D) China rose is a unisexual flower with an inferior ovary
100. Match the following columns
- | Column-I | Column-II |
|------------------------|--|
| 1. Sieve tube elements | A. Help in maintaining pressure gradient in sieve tube |
| 2. Companion cells | B. Stores food material |
| 3. Phloem parenchyma | C. Sclerenchymatous cells |
| 4. Phloem fibres | D. Eucleated and associated with companion cells |
- A) 1 – D; 2 – A; 3 – B; 4 – C
B) 1 – A; 2 – B; 3 – C; 4 – D
C) 1 – B; 2 – C; 3 – D; 4 – A
D) 1 – C; 2 – B; 3 – A; 4 – D
101. Lateral roots arise from
A) Epiblema B) Pericycle C) Endodermis D) Cambium
102. Ribosomes are composed of
A) DNA and RNA B) DNA and Proteins
C) rRNA and Proteins D) rRNA and Phospholipids
103. Assertion (A): In acrocentric chromosomes, the centromere is situated close to one end, forming one extremely short arm and one very long arm
Reason (R): The position of the centromere determines the length of the arms of a chromosome, resulting in unequal arms in chromosomes like acrocentric ones.
Choose the correct option





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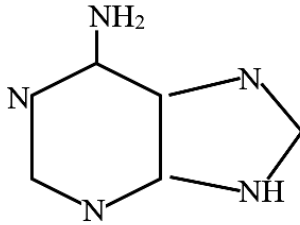
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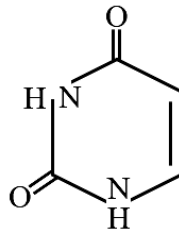
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- A) Both A and R are correct, and R is the correct explanation of A
- B) Both A and R are correct, but R is not the correct explanation of A
- C) A is incorrect, but R is correct
- D) A is correct, but R is incorrect

104. Identify the structures A and B



(A)



(B)

A

- A) Adenine
- B) Adenine
- C) Guanine
- D) Guanine

B

- A) Cytosine
- B) Uracil
- C) Uracil
- D) Cytosine

105. Select the incorrect match

- A) Trypsin – Enzyme
- B) Collagen – Intracellular ground substance
- C) Insulin – Hormone
- D) Antibody – Defence against infection

106. Read the following statements and choose the correct option.

Statement-I: During 'G₀' phase of cell cycle, the cell is metabolically inactive.

Statement-II: The centrosome undergoes duplication during S phase of interphase.

- A) Both Statement-I and Statement-II are true.
- B) Statement-I is false but Statement-II is true.
- C) Statement-I is true but Statement-II is false.
- D) Both Statement-I and Statement-II are false.

107. During meiosis, the haploid condition is achieved by the separation of sister chromatids in which of the following stages?

- A) Anaphase I
- B) Anaphase II
- C) Metaphase II
- D) Prophase II

108. C₄ plants differ from C₃ plants in which of the following aspects?

- a) The initial substrate that accepts CO₂
 - b) The type of end product formed during the C₃ cycle
 - c) The type of pigments involved in photosynthesis
 - d) The total number of ATP molecules consumed to fix 6 molecules of CO₂
- A) (a) and (d)
 - B) (a) only
 - C) (a) and (c)
 - D) (a), (b), (c) and (d)

109. Chemiosmosis requires

- I) a membrane
 - II) A proton pump
 - III) Proton gradient
 - IV) ATP synthase
- A) I and IV only
 - B) I, II, and III only
 - C) I, II and IV only
 - D) I, II, III and IV





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110. Assertion (A): The inner membrane of the mitochondrion contains systems involved in electron transport.

Reason (R): The mitochondrial matrix contains all the enzyme complexes of the Krebs cycle except succinate dehydrogenase.

Choose the correct option:

- A) Both A and R are correct, and R is the correct explanation of A.
- B) Both A and R are correct, but R is not the correct explanation of A.
- C) A is incorrect, but R is correct.
- D) A is correct, but R is incorrect

111. Redox equivalents or hydrogen generated during oxidation of succinate in the TCA cycle is received by

- A) Complex I
- B) Complex II
- C) Complex III
- D) Complex IV

112. Match the contents of Column I and Column II.

Column-I

- A. Auxins
- B. Gibberellins
- C. Cytokinins
- D. Ethylene

Column-II

- I. Coconut milk factor
- II. Apical hook formation
- III. Internodal elongation
- IV. Apical dominance

A) A – IV, B – I, C – II, D – III

B) A – IV, B – III, C – I, D – II

C) A – III, B – IV, C – I, D – II

D) A – III, B – I, C – IV, D – III

113. Read the following statements and choose the correct option.

Statement-I: ABA promote fruit like apple to elongate and improve its shape.

Statement-II: Ethylene is largely a growth inhibitor.

- A) Both Statement-I and Statement-II are true.
- B) Statement-I is false but Statement-II is true.
- C) Statement-I is true but Statement-II is false.
- D) Both Statement-I and Statement-II are false.

114. The chemical nature of Kinetin is

- A) Indole 3-acetic acid
- B) N_6 – furfuryl aminopurine
- C) Indole butyric acid
- D) Naphthalene acetic acid.

115. Which of the following statements about the monosporic embryo sac is incorrect?

- A) Matured embryo sac is monosporic, 7-celled, and 8-nucleated.
- B) During embryo sac formation 6 nuclei out of 8 nuclei go through cytokinesis or wall formation
- C) Polar nuclei are responsible for the formation of antipodal cells in the embryo sac.
- D) The egg apparatus is located at the micropylar end of the embryo sac.

116. Assertion (A): The period for which pollen grains remain viable is highly variable.

Reason (R): Pollen viability is influenced by species-specific factors as well as environmental conditions like temperature and humidity.

Choose the correct option:





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- A) Both A and R are correct, and R is the correct explanation of A.
- B) Both A and R are correct, but R is not the correct explanation of A.
- C) A is incorrect, but R is correct.
- D) A is correct, but R is incorrect.

117. Which of the following statement is incorrect?

- A) Apomixis is a form of asexual reproduction that mimics sexual reproduction.
- B) Seeds are always the products of pollination and fertilization and cannot be formed by apomixis.
- C) The epiblast in a monocot embryo is considered a rudimentary cotyledon.
- D) Residual, persistent nucellus in a seed is known as perisperm

118. Statement I: In Snapdragon, F_1 plants exhibit neither red nor white flowers.

Statement II: Snapdragon flowers show incomplete dominance, where neither of the two alleles is completely dominant over the other, resulting in intermediate inheritance.

Choose the correct option:

- A) Both Statement I and Statement II are true.
- B) Statement I is false, but Statement II is true.
- C) Statement I is true, but Statement II is false.
- D) Both Statement I and Statement II are false

119. In F_2 generation of Mendelian dihybrid cross which of the following genotypes appear with a probability of $1/16$?

- A) AABB, AaBB, AaBb
- B) AaBb, AABb, AAbb
- C) AABB, AABb, aaBB
- D) AABB, AAbb, aaBB, aabb

120. Match the contents of Column I and Column II.

| Column – I | | Column – II | |
|------------|--------------------|-------------|---|
| A | Reginald C. Punnet | I | Law of Inheritance |
| B | Mendel | II | Linkage and Recombination |
| C | Sutton and Boveri | III | Genotype probability |
| D | T. H. Morgan | IV | Parallel behaviour of genes and chromosomes |

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

121. If the Meselson and Stahl experiment begins with $^{15}\text{N}/^{15}\text{N}$ DNA and is continued for four generations in bacteria growing in a medium containing only ^{14}N , what will be the ratio of $^{15}\text{N}/^{15}\text{N}$: $^{15}\text{N}/^{14}\text{N}$: $^{14}\text{N}/^{14}\text{N}$ DNA after the fourth generation?

- A) 1 : 1 : 0
- B) 1 : 4 : 0
- C) 0 : 1 : 3
- D) 0 : 1 : 7

122. In prokaryotes the initiation and termination factors of transcription are respectively

- A) σ and ρ
- B) ρ and σ
- C) σ and β
- D) ρ and τ

123. Read the following statements (a-e) and identify which are correct:

- (a) A gene is the functional unit of inheritance and is located on DNA.





(b) Monocistronic structural genes are mostly found in eukaryotes, while polycistronic genes are mostly found in prokaryotes.

(c) Exons are coding sequences that appear in mature or processed RNA.

(d) Introns are non-coding sequences that do not appear in mature or processed RNA.

(e) Promoter and regulatory sequences, though not coding for RNA or protein, can influence the inheritance of a character.

A) (a), (b), (c) only B) (a), (c), (d), (e) only C) (a), (b), (d), (e) only D) All of the above

124. *Monascus purpureus* is a source of

A) Blood clot removing agent.

B) Blood purifying agent.

C) Blood cholesterol lowering agent.

D) Immunosuppressive agent.

125. Match the Columns

Column-I

Column-II

A. Citric acid

I. Inhibiting enzyme responsible for synthesis of cholesterol.

B. Statins

II. Used in organ transplantation

C. Streptokinase

III. Produced by *Aspergillus*

D. Cyclosporine

IV. Important agent for use in treatment during myocardial infarction (MI).

A) A – I, B – II, C – III, D – IV

B) A – III B – IV, C – II, D – I

C) A – III, B – I, C – IV, D – II

D) A – III B – IV, C – I, D – II

126. Which of the following is not a characteristic feature of the pBR322 vector?

A) It is a *E. coli* cloning vector.

B) It has antibiotic – resistance genes i.e., “tet^R” and “amp^R”

C) The ampicillin resistance gene has restriction sites for “BamHI” and “SalI”.

D) The restriction site for “PvuII” is present in the “rop” sequence.

127. Read the following statements and choose the correct option.

Statement-I: The normal *E. coli* has resistance against antibiotics kanamycin and tetracycline.

Statement-II: Selectable marker gene helps in the selection of transformants.

A) Both Statement-I and Statement-II are true.

B) Statement-I is false but Statement-II is true.

C) Statement-I is true but Statement-II is false.

D) Both Statement-I and Statement-II are false.

128. Which of the following statements is incorrect with respect to gene cloning?

A) Cosmid: A hybrid molecule that combines features of plasmids and phages, used to clone larger DNA fragments.

B) Plasmid: A linear, single-stranded DNA molecule used in genetic engineering.

C) Lambda phage: A virus that infects bacteria and is often used for DNA cloning.

D) Electroporation: A technique used to introduce foreign DNA into cells by applying an electrical field





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129. The RNA interference (RNAi) technique has been successfully used to control _____ infection in tobacco plants:

- A) *Ascaris lumbricoides* B) *Pseudomonas*
C) *Streptococcus pneumoniae* D) *Meloidogyne incognita*

130. *cryIIAb* and *cryIAb* produce toxins that control.

- A) Dragonfly.
B) Cotton bollworms and corn borer, respectively.
C) Aphids.
D) Nematodes and armyworms respectively.

131. With the increase in substrate concentration, the velocity of the enzymatic reaction

- A) rises at first B) suddenly decreases
C) increases continuously D) remains constant from the beginning itself

132. Pith tissue is well developed in

- A) Monocot root and monocot stem B) Dicot root and dicot stem
C) Monocot root and dicot stem D) Dicot root and monocot stem

133. Monoadelphous stamens seen in the members of

- A) Asteraceae B) Malvaceae C) Solanaceae D) Brassicaceae

134. If a single cell undergoes 7 generations of mitosis, calculate the total number of cells produced and the number of mitotic divisions required by using formulae given below.

Formula 1: Total number of cells produced after n generations is given by $N = 2^n$.

Formula 2: The number of mitotic divisions required to produce N cells is if $N-1$.

- A) 128 cells; 127 divisions B) 64 cells; 63 divisions
C) 128 cells; 64 divisions D) 256 cells; 255 divisions

135. Which of the following statements is false with respect to photorespiration?

- A) Oxygenation of RuBP occurs in the chloroplast.
B) Neither sugars nor ATP are synthesized during photorespiration.
C) Synthesis of NADPH occurs during photorespiration.
D) One molecule of phosphoglycerate and one molecule of phosphoglycolate are formed per oxygenation of RuBP.

ZOOLOGY

136. Which of the following is not a characteristic of class Chondrichthyes?

- A) Gill slits are without operculum B) They are predaceous
C) Air bladder is present D) Notochord is persistent throughout the life

137. In frog, bidder's canal is

- A) Found in kidney and transports sperms.
B) Found in testis and transports sperms.
C) Found in kidney and transports both urine and sperms.
D) Found in testis and transports both urine and sperms.





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138. Choose the odd one with respect to skull bones in an adult human
A) Hyoid B) Incus C) Ethmoid D) Ischium
139. Which of the following is incorrect?
A) The DNA finger print of a child matches 50% with that of either parent.
B) The DNA finger prints of identical twins are very much similar to each other.
C) DNA fingerprinting helps in determining population and genetic diversities.
D) DNA finger prints of a son and a daughter of same pair of parents match 100% with each other.
140. Choose the correct statements related to tissues
(I) Adipose tissue has semifluid ground substance.
(II) The main tissue that provides structural frame to the body is areolar tissue.
(III) Compound epithelium helps in secretion and absorption.
A) I and III B) I, II and III C) II only D) none of these
141. Assertion(A): Aldosterone is a steroid hormone which mainly acts at the renal tubules.
Reason(R): Aldosterone stimulates excretion of sodium and water at DCT.
A) Both A and R are correct and R is the correct explanation of A
B) Both A and R are correct but R is NOT the correct explanation of A
C) A is correct but R is not correct
D) A is not correct but R is correct
142. Visceral nervous system
A) Is a part of somatic nervous system.
B) Relays impulses from viscera to central nervous system.
C) Relays impulses from central neural system to skeletal muscle.
D) Relays impulses from central neural system to voluntary organs.
143. Match List-I with List-II
List-I List-II
A. Comb plates I. *Fasciola*
B. Suckers II. *Sycon*
C. Medusa III. *Pleurobrachia*
D. Spicules IV. *Aurelia*
A) A – IV, B – I, C – II, D – III B) A – III, B – I, C – IV, D – II
C) A – II, B – I, C – IV, D – III D) A – I, B – II, C – III, D – IV
144. During oogenesis, primary oocyte is found in
A) Primary follicle only
B) Primary follicle and Secondary follicle only
C) Primary follicle, Secondary follicle and Tertiary follicle
D) Graafian follicle
145. Statement-I: Feather like gills are present in between hump and mantle in molluscs.
Statement-II: Some molluscs are terrestrial.
A) Both Statement I and Statement II are true





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- B) Statement I is false but Statement II is true
C) Statement I is true but Statement II is false
D) Both Statement I and Statement II are False
146. Identify the incorrect combination from the following
A) Periodic abstinence – Natural method B) Cervical caps – Barrier method
C) Lippes loop – Hormonal IUD D) Saheli – OCPs
147. Neural centres that control eating and drinking are found in
A) Hypothalamus B) Pons C) Limbic system D) Cerebellum
148. Choose the incorrect statements related to muscle fibre
(I) A band has both thick and thin filaments.
(II) Sarcomere has one 'I' band and two halves of 'A' bands.
(III) 'Z' line passes through centre of 'I' band.
A) I and II B) I and III C) III only D) II only
149. Ejaculatory duct of male cockroach
A) Situated in genital pouch B) Present in 4th to 6th segment
C) Opens into male gonopore D) Encloses phallomeres
150. Assertion(A): Possibility of females with Down's syndrome is more than that of males.
Reason(R): Down's syndrome results due to the aneuploidy.
A) Both A and R are correct and R is the correct explanation of A
B) Both A and R are correct but R is NOT the correct explanation of A
C) A is correct but R is not correct
D) A is not correct but R is correct
151. Which of the following statement is not true?
A) Lysozyme is an antibacterial agent. B) Interferon is an antiviral protein.
C) Heparin is an anticoagulant. D) Histamine is an antiallergic.
152. Smack is obtained from
A) latex of *Papaver somniferum*. B) Inflorescence of *Cannabis sativa*
C) Leaves of *Erythroxylum coca*. D) Inflorescence of *Papaver somniferum*.
153. Match List-I with List-II
- | List-I | List-II |
|--------------------|----------------------|
| A. Proliferative | I. 1st – 5th day |
| B. Secretory phase | II. 6th – 13th day |
| C. Menstrual phase | III. 15th – 28th day |
| D. Ovulation | IV. 14th day |
- A) A – III, B – II, C – I, D – IV B) A – II, B – III, C – IV, D – I
C) A – I, B – II, C – III, D – IV D) A – II, B – III, C – I, D – IV
154. Volume of air that will remain in the lungs after normal expiration
A) RV + ERV B) TV + IRV C) TV + FRC D) TV + IRV + RV
155. Statement-I: Chorionic villi and uterine tissue becomes interdigitated to form placenta.





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Statement-II: Formation of placenta between embryo and maternal body is called implantation.

- A) Both Statement I and Statement II are true
- B) Statement I is false but Statement II is True
- C) Statement I is true but Statement II is false
- D) Both Statement I and Statement II are false

156. Choose the correct sequence of evolution

- A) Thecodont → therapsids → mammals
- B) Pelycosaurs → thecodont → dinosaurs
- C) Tracheophyte ancestors → Zosterophyllum → lycopods
- D) Chlorophyte ancestors → Rhynia type plants → tracheophyte ancestors

157. Statement-I: Gause's competitive exclusion principle is true if resources are limiting.

Statement-II: Paul Ehrlich's hypothesis explains the importance of key species of an ecosystem.

- A) Both Statement I and Statement II are true
- B) Statement I is false but Statement II is true
- C) Statement I is true but Statement II is false
- D) Both Statement I and Statement II are False

158. If 0.6 J of energy is present at the secondary carnivore of an ecosystem, energy found in plants in the form of gross primary productivity in that ecosystem is _____.

[If the rate of respiration in plants is 25% of GPP]

- A) 600 J
- B) 800 J
- C) 200 J
- D) 60 J

159. In humans the male accessory ducts does not include

- A) Seminiferous tubule
- B) Epididymis
- C) Vas deferens
- D) Vasa efferentia

160. Match List-I with List-II

List-I

- A. Glucocorticoids
- B. Gonadotropins
- C. Catecholamines
- D. Androgens

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

List-II

- I. Maintains corpus luteum
- II. Increase rate of respiration
- III. Act on central neural system
- IV. Maintains kidney functioning

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

161. Read the following statements and choose the incorrect one.

(I) Trichomoniasis is an RTI and is caused by the virus *Trichomonas*.

(II) STDs like genital herpes is completely curable if detected early.

(III) Infertility can be caused if STIs are not treated early.

- A) (II) and (III)
- B) (III) and (I)
- C) (I) and (II)
- D) (II) only

162. During normal functioning of heart, tricuspid and bicuspid valves are pushed open during

- A) Atrial systole
- B) Joint diastole





- C) Ventricular systole
D) Atrial and ventricular systole
163. Assertion(A): Sense of hearing is absent in *Calotes*.
Reason(R): *Calotes* does not have external ear openings.
A) Both A and R are correct and R is the correct explanation of A
B) Both A and R are correct but R is NOT the correct explanation of A
C) A is correct but R is not correct
D) A is not correct but R is correct
164. In human, how much percent of the genome codes for proteins
A) 99.9%
B) 50%
C) Greater than ten percent
D) Less than two percent
165. Statement-I: Many transgenic animals are designed to increase our understanding of how genes contribute to the development of disease.
Statement-II: The first transgenic cow, Rosie, produced α -1-antitrypsin, used in the treatment of emphysema.
A) Both Statement I and Statement II are true
B) Statement I is false but Statement II is true
C) Statement I is true but Statement II is false
D) Both Statement I and Statement II are False
166. Match List-I with List-II
- | List-I | List-II |
|----------------------|--------------------------|
| A. Pillar like cells | I. Cardiac muscle |
| B. Branching pattern | II. Erythrocyte |
| C. Fusiform | III. Smooth muscle fibre |
| D. Biconcave | IV. Columnar epithelium |
- A) A – III, B – I, C – II, D – IV
B) A – IV, B – III, C – I, D – II
C) A – IV, B – I, C – III, D – II
D) A – I, B – III, C – II, D – IV
167. Hormones that promote the development of mammary glands are
A) Prolactin and leutinizing hormone.
B) Estradiol and progesterone.
C) Prolactin and oxytocin.
D) Progesterone and relaxin.
168. Among the following sets of examples for convergent evolution, select the incorrect option.
A) Flipper of whale and wing of bat.
B) Sweet potato and potato.
C) Eyes of octopus and that of mammals.
D) Wings of bird and wings of butterfly.
169. Statement-I: *Entamoeba*, a protozoan parasite causes abdominal pain and constipation.
Statement-II: *Wuchereria*, an intestinal parasite spreads through the bite of female mosquito.
A) Both Statement I and Statement II are true
B) Statement I is false but Statement II is true
C) Statement I is true but Statement II is false
D) Both Statement I and Statement II are false
170. "In recent years, ex-situ conservation has advanced beyond keeping threatened species in enclosures". Which of the following supports this statement?





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- A) Zoological park
C) Sacred grove
- B) Cryopreservation
D) Biodiversity hot spot
171. Nicotine in tobacco stimulates
A) Adrenal cortex thus raising blood pressure.
B) Adrenal medulla thus raising the blood pressure.
C) Adrenal cortex thus lowering blood pressure.
D) Adrenal medulla thus lowering the blood pressure.
172. Choose the statements related to Darwinism
(I) Ability to adapt has genetic basis.
(II) Many life forms do not exist anymore due to extinctions in different periods of history.
(III) Variations are small and directional.
A) I, II and III
B) I and II only
C) II and III only
D) I and III only
173. The hepatic portal vein drains blood from
A) Heart to liver B) Liver to intestine C) Intestine to liver D) Liver to heart
174. Assertion(A): Lymph nodes acts as the secondary lymphoid organs.
Reason(R): Lymphocytes develop into effector cells in these organs.
A) Both A and R are correct and R is the correct explanation of A
B) Both A and R are correct but R is NOT the correct explanation of A
C) A is correct but R is not correct
D) A is not correct but R is correct
175. Grave's disease is caused due to
A) Hyposecretion of thyroid hormones. B) Hyposecretion of adrenal gland hormones.
C) Autoimmunity D) Allergy
176. Choose the correct statements
(I) Nile perch got extinct due to over exploitation.
(II) Communities with a greater number of species shows more year to year variations in biomass.
(III) Tropical environments are less seasonal than temperate environments.
A) I only B) III only
C) I and II D) I and III
177. Female bird is produced when a sperm with
A) 'W' chromosome fertilizes ovum with 'Z'.
B) 'Z' chromosome fertilizes ovum with 'Z'.
C) 'W' chromosome fertilizes ovum with 'W'.
D) 'Z' chromosome fertilizes ovum with 'W'.
178. Match List-I with List-II
- | List-I | List-II |
|------------------------|---------------------------|
| A. Cartilaginous joint | I. Between atlas and axis |
| B. Gliding joint | II. Between tarsals |



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C. Hinge joint

D. Pivot joint

A) A – II, B – III, C – IV, D – I

C) A – III, B – II, C – IV, D – I

III. Between two coxal bones

IV. Elbow joint

B) A – IV, B – I, C – III, D – II

D) A – II, B – I, C – III, D – IV

179. Embryological evidence for evolution was proposed by

A) Miller

B) Louis Pasteur

C) Ernst Haeckel

D) Alfred Wallace

180. Statement-I: Small amounts of urea enter the thin segment of the ascending limb of Henle's loop which is transported back to the interstitium by the collecting tubule.

Statement-II: The osmolarity of interstitial fluid in kidneys increases towards inner medulla.

A) Both Statement I and Statement II are true

B) Statement I is false but Statement II is true

C) Statement I is true but Statement II is false

D) Both Statement I and Statement II are false



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PHYSICS

1. Ans: C) As per the given data, The center of mass is given as:

$$\vec{R}_{cm} = \frac{m_1 \vec{r}_1 + m_2 \vec{r}_2}{m_1 + m_2}$$

By substituting the given values, we get

$$\vec{R}_{cm} = \frac{1(\hat{i} + 2\hat{j} + \hat{k}) + 3(-3\hat{i} - 2\hat{j} + \hat{k})}{1 + 3} = -2\hat{i} - \hat{j} + \hat{k}$$

2. Ans: A) Behaviour of a wire under increasing load : Let a wire is suspended at one end and loads are

attached to the other end. When loads are gradually increased the following changes are noticed.

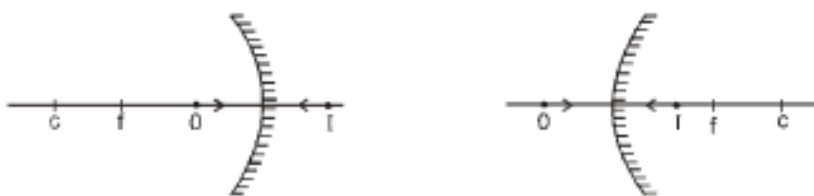
Proportionality limit (OA) : When load is increased the elongation of the wire gradually increases. The maximum load upto which the elongation is directly proportional to the load is called proportionality limit (A). The graph drawn between load and extension is a straight line. So point A is called proportionality limit. In this region Hooke's Law is obeyed.

3. Ans: C) $E_{20} = 100 = \frac{kq}{(20 \times 10^{-2})^2}$

$$E_3 = \frac{kq_r}{R^3} = \frac{400 \times 10^{-2} \times 3 \times 10^{-2}}{10 \times 10 \times 10 \times 10^{-6}}$$

$$E = 120V / m$$

4. Ans: C)



If the mirror is concave and a real object is approaching it, the image will move away from the mirror for object distance greater than focal length. If object distance is less than the focal length, virtual image will be formed which moves toward the mirror.

If mirror is convex, as object is approaching the mirror, image will move from focus to pole, i.e., toward the mirror.

5. Ans: B) Given data,

The electric circuit is lying on the x-axis extending from

$$x = -\frac{a}{2} \text{ to } x = \frac{a}{2}$$

current = i





By using the relation between the magnetic field and current

$$\vec{B} = \frac{\mu_0}{4\pi} I \int \frac{d\vec{L} \times \vec{r}}{r^3}$$

For the given point $x = a$

$$d\vec{L} \parallel \vec{r}$$

$$d\vec{L} \times \vec{r} = 0$$

then,

$$\vec{B} = 0$$

Or

at axial location due to current carrying wire magnetic field is zero

6. Ans: C) $R = R_1 + \frac{R_2 \times R}{R_2 + R}$

$$\therefore R = 1 + \frac{1 \times R}{1 + R} \Rightarrow R^2 + R = 1 + R + R$$

$$\Rightarrow R^2 - R - 1 = 0 \text{ or } R = \frac{1 \pm \sqrt{1+4}}{2} = \frac{1 \pm \sqrt{5}}{2}$$

Since R cannot be negative, hence. therefore (C) is correct option

7. Ans: C) Impulse = change in momentum

$$\int F \cdot dt = \Delta P$$

$$\text{Given, } \int F \cdot dt = J$$

Now, Contact time is twice than the earlier.

$$\int F \cdot 2dt = J' = 2J$$

Therefore, the correct answer is (C)

8. Ans: C) Let M be the mass of the sphere and R be its radius before increasing the temperature.

After increasing the temperature,

$$R = R_0(1 + \alpha_B \Delta \theta)$$

$$\therefore R^2 = R_0^2(1 + 2\alpha_B \Delta \theta)$$

Then from conservation of angular momentum:



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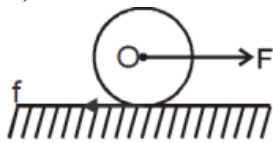
$$\begin{aligned} \ell\omega &= \ell_0\omega_0 \\ \text{or } \omega &= \frac{\ell_0}{\ell}\omega_0 \\ &= \frac{\frac{2}{5}MR_0^2\omega_0}{\frac{2}{5}MR_0^2(1+2\alpha_B\Delta\theta)} \\ &= \frac{\omega_0}{1+2\alpha_B\Delta\theta} \\ &= \frac{\omega_0}{1+2(2.0 \times 10^{-5})(100)} \\ &= \omega_0(1+4 \times 10^{-3})^{-1} \\ &= \omega_0(1-4 \times 10^{-3}) \\ &= 0.996 \omega_0 \end{aligned}$$

9. Ans: D) On applying the lens formula for the objective lens:

$$\begin{aligned} \frac{1}{f_0} &= \frac{1}{v_0} - \frac{1}{u_0} \\ \frac{1}{v_0} &= \frac{1}{f_0} + \frac{1}{u_0} \\ \frac{1}{v_0} &= \frac{1}{40} + \frac{1}{-200} \\ v_0 &= 50\text{cm} \end{aligned}$$

Therefore, tube length = $v_0 + f_e = 50 + 4 = 54\text{cm}$

10. Ans: B)



$$F - f = Ma$$

τ about O

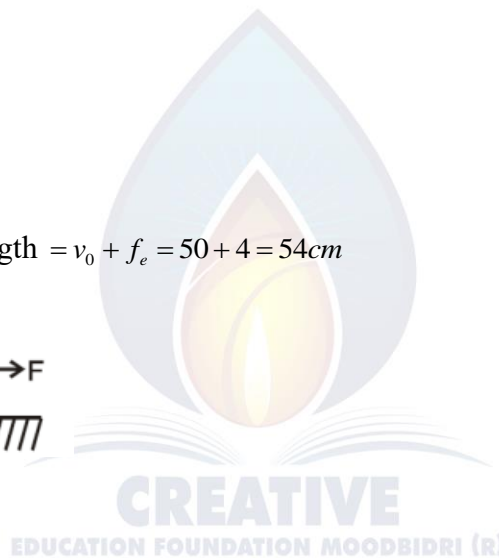
$$f \times R = I\alpha$$

$$f \times R = \frac{2}{5}MR^2 \times \frac{a}{R} \Rightarrow f = \frac{2}{5}Ma \Rightarrow Ma = \frac{5f}{2}$$

$$F - f = \frac{5}{2}f$$

$$F = \frac{7}{2}f \Rightarrow f = \frac{2}{7}F$$

11. Ans: D)





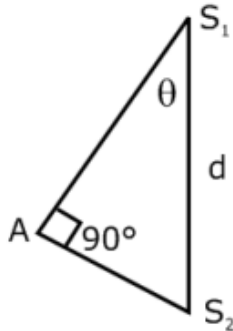
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$$AS_2 = d \sin \theta$$

12. Ans: B) Time – period of spring – mass system :-

$$T = 2\pi \sqrt{\frac{m}{k}}$$

From initial condition :

$$T_1 = 3s = 2\pi \sqrt{\frac{m}{k}} \text{ ---- (1)}$$

Now m is become (m +1) then

$$T_2 = 4s = 2\pi \sqrt{\frac{m+1}{k}} \text{ ---- (2)}$$

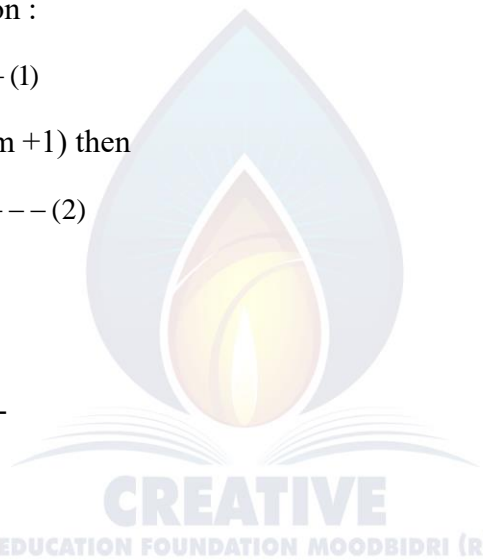
From (2) – (1) :-

$$\frac{4}{3} = \sqrt{\frac{m+1}{m}}$$

Squaring both side :-

$$\frac{16}{9} = 1 + \frac{1}{m}$$

$$m = \frac{9}{7} \text{ kg}$$



13. Ans: A) The energy released on discharging the capacitor, $U = \frac{1}{2} CV^2$

$$\text{So, } U = \frac{1}{2} \times 4 \times 10^{-6} \times 10^4 = 0.02J$$

14. Ans: C) For each half pole strength m becomes half $M = m \times 2l$ becomes half and volume $V = A \times 2l$ also becomes half therefore, Magnetic Intensity remains constant.

15. Ans: A) In addition or subtraction, the final result should retain as many decimal places as are there in the number with the least decimal places.

16. Ans: B) We know that,

$$\tau = I\alpha$$

$$\tau = (mR^2) \cdot \alpha$$

For particle of mass m





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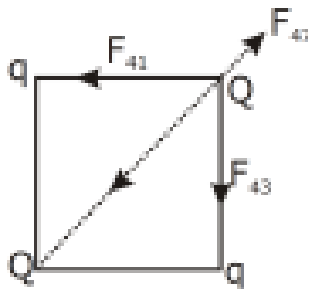
$$R = K \therefore \tau = mK^2\alpha$$

17. Ans: A) As we know that

$$\text{distance} = \text{speed} \times \text{time} = \text{speed} \times \frac{1}{\text{frequency}}$$

$$\lambda = 20/10 = 2\text{cm}. \text{ Distance between adjacent nodes is } \frac{\lambda}{2} = 1\text{cm}$$

18. Ans: A)



$$= \sqrt{2}F_{\text{each}} = \sqrt{2} \frac{1}{4\pi\epsilon_0} \frac{Qq}{d^2}$$

Resultant on Q becomes zero only when q charges are of negative nature.

$$F_{4,2} = \frac{1}{4\pi\epsilon_0} \frac{Q \times Q}{(\sqrt{2}d)^2}$$

$$\Rightarrow \sqrt{2} \frac{qQ}{d^2} = \frac{Q \times Q}{2d^2}$$

$$\Rightarrow \sqrt{2} \frac{qQ}{d^2} = \frac{Q \times Q}{2d^2}$$

$$\therefore q = \frac{Q}{2\sqrt{2}} \text{ or } \frac{Q}{q} = -2\sqrt{2}$$

19. Ans: C) $\vec{a}_{BE} = -g$

$$\vec{a}_{B/Bus} = \vec{a}_{BE} - \vec{a}_{BUS/E}$$

$$= g\hat{i} - a\hat{i} = -g\hat{i} - a\hat{i}$$

$$\text{So } |\vec{a}_B|_{BUS} = \sqrt{g^2 + a^2}$$

20. Ans: A) $\therefore Q = ms\Delta T$; m = amount of water, S = specific heat of water.

ΔT = change in temperature.

The amount of heat required to raise the temperature of 1 kg. of water through 1°C is called kilo - calorie.

21. Ans: A) From the equation of continuity





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$$Q = AV = \text{constant}$$

$$V = \frac{\text{constant}}{A}$$

If A = least

if A \rightarrow is narrow

\therefore V = maximum

By Bernoulli equation \rightarrow

$$P + \frac{1}{2}\rho V^2 + \rho gh = \text{constant}$$

$$P + \frac{1}{2}\rho V^2 = \text{constant} \{ \because h = 0 \}$$

Now, V \rightarrow Maximum

\therefore P \rightarrow Minimum

22. Ans: D) Lenz's law is based upon the law of conservation of energy. This law states that the induced

current always tends to oppose the cause which produces it. So in order to do work against opposing forces, we have to put extra effort. This extra work leads to periodic changes in magnetic flux hence more current is induced. So the extra effort is just transformed into electrical energy which is the law of conservation of energy.

Therefore, the correct answer is (D).

23. Ans: D) μ does not depend on normal reaction. So coefficient of friction will remain same.

24. Ans: D) $P = \sigma AT^4 \Rightarrow P = \sigma(4\pi R^2)T^4$

$$\frac{P_1}{P_2} = \left(\frac{R_1}{R_2}\right)^2 \times \left(\frac{T_1}{T_2}\right)^4$$

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25. Ans: B) For both the cases (air bubble inside water & the water drop inside air), there is only one air-water interface, hence

$$\text{Excess- Pressure for air bubble : } P_1 = \frac{2T}{R} \text{ -----(1)}$$

$$\text{Excess- Pressure for water drop : } P_2 = \frac{2T}{R} \text{ -----(2)}$$

From (1) & (2)

$$P_1 = P_2$$

26. Ans: D) Flux linked with each turn = 4×10^{-3} Wb

$$\Rightarrow \text{Total flux linked} = 1000 \times 4 \times 10^{-3} \text{ Wb}$$

$$\Rightarrow \phi_{\text{total}} = 4$$

$$\Rightarrow LI = 4$$

$$\Rightarrow L = 1H$$





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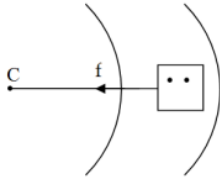
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SOLUTIONS

27. Ans: B)



$$\frac{mv^2}{r} \leq f$$

$$\frac{mv^2}{r} \leq \mu mg$$

$$r_{\min} = \frac{v^2}{\mu g} = \frac{(12)^2}{0.4(10)} = 36m$$

28. Ans: C)

$$\text{Work done } \Delta W = P \Delta V$$

At constant pressure

$$\Delta W = P(V_f - V_i) = nR(T_f - T_i)$$

At constant temperature

$$\Delta W = nRT \ln \left(\frac{V_f}{V_i} \right) = nRT \ln \left(\frac{P_i}{P_f} \right)$$

$$\therefore \Delta W_{AB} = 1 \times R \times (2T - T) = RT$$

$$\Delta W_{BC} = 1 \times R \times 2T \ln \frac{2P}{P} = 2RT \ln 2$$

$$\Delta W_{CD} = 1 \times R \times (T - 2T) = -RT$$

$$\Delta W_{DA} = 1 \times R \times T \ln \left(\frac{P}{2P} \right) = RT \ln \left(\frac{1}{2} \right)$$

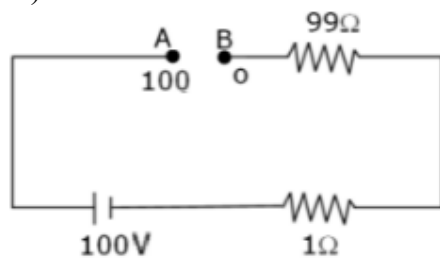
Net work done in the complete cycle is

$$\Delta W = \Delta W_{AB} + \Delta W_{BC} + \Delta W_{CD} + \Delta W_{DA}$$

$$= RT + 2RT \ln 2 - RT + RT \ln \left(\frac{1}{2} \right)$$

$$= 2RT \ln 2 + RT \ln 1 - RT \ln 2 = 2RT \ln 2 - RT \ln 2 = RT \ln 2$$

29. Ans: B)



Potential difference A & B is 100V, at steady state capacitor is fully charged.

30. Ans: C)



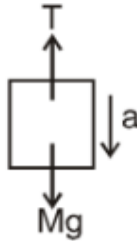
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For the block

Mass = M

gravitational acceleration = g

$$\text{acceleration} = \frac{g}{4}$$

vertical distance = h

As we know, $F_{\text{net}} = ma_{\text{net}}$

$$\therefore Mg - T = \frac{Mg}{4}$$

$$T = Mg - \frac{Mg}{4} = \frac{3mg}{4}$$

Since, Displacement is opposite

\therefore Work done

$$= -Th$$

$$= \frac{-3mgh}{4}$$

31. Ans: B) Polarised sunglasses are used to reduce glare. When light is reflected from flat surfaces becomes polarised, meaning travel in a uniform direction. To overcome this, polarised lenses are used.

32. Ans: C)

Given, resistance in P wire = 20Ω

radius of wire P = r

The length of the wire P = L

resistance in Q wire = 8Ω

radius of wire Q = r_1

The length of the wire Q = 2L

By using the relation

$$\text{Resistance (R)} = \frac{\text{resistivity} \times \text{length}}{\text{Area}} = \frac{\rho L}{A}$$

The resistance of wire P





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$$R_P = \frac{\rho L_P}{A_P}$$

$$20 = \frac{\rho L}{\pi r^2} \dots\dots(1)$$

The resistance of the wire Q

$$R_Q = \frac{\rho L_Q}{A_Q}$$

$$8 = \frac{\rho(2L)}{\pi r_1^2} \dots\dots\dots(2)$$

Divide equation (1) by equation (2)

$$\frac{20}{8} = \frac{\frac{\rho L}{\pi r^2}}{\frac{\rho(2L)}{\pi r_1^2}} \Rightarrow \frac{20}{8} = \frac{\rho L}{\pi r^2} \times \frac{\pi r_1^2}{\rho 2L}$$

$$\frac{5 \times 2}{2} = \frac{r_1^2}{r^2}$$

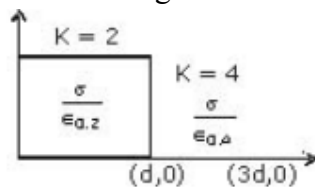
$$\left(\frac{r_1}{r}\right)^2 = 5 \Rightarrow \frac{r_1}{r} = \sqrt{5} \Rightarrow r_1 = \sqrt{5}r$$

33. Ans: A) Electric field between two plates of capacitor is given by $\frac{\sigma}{K \epsilon_0}$

When $K = 1$ then $E = \frac{\sigma}{\epsilon_0}$

Then $K = K$ then $E = \frac{\sigma}{K \epsilon_0}$

On increasing dielectric constant electric field decreases.



Therefore, the answer correct is (A).

34. Ans: A) RMS velocity is given by



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$$v_{\text{rms}} = \sqrt{\frac{3RT}{M}}$$

given gases, Ne^{20} and Ne^{22}

$$\frac{(v_{\text{rms}})_{\text{Ne}^{20}}}{(v_{\text{rms}})_{\text{Ne}^{22}}} = \sqrt{\frac{3RT}{M_{\text{Ne}^{20}}}} \div \sqrt{\frac{M_{\text{Ne}^{22}}}{3RT}}$$

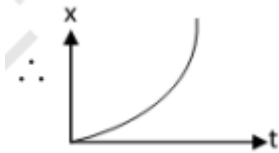
$$\frac{(v_{\text{rms}})_{\text{Ne}^{20}}}{(v_{\text{rms}})_{\text{Ne}^{22}}} = \sqrt{\frac{22}{20}}$$

$$\frac{(v_{\text{rms}})_{\text{Ne}^{20}}}{(v_{\text{rms}})_{\text{Ne}^{22}}} = \sqrt{\frac{11}{10}}$$

35. Ans: B) +ve acceleration

$\frac{dv}{dt} > 0$ so, velocity is increasing

\Rightarrow slop of $x - t$ graph is increasing



36. Ans: B) Let γ be the ratio of $\frac{C_p}{C_v}$

Then for adiabatic process

$$PV^\gamma = \text{constant}$$

$$\Rightarrow \frac{P_i}{P_f} = \left(\frac{V_f}{V_i}\right)^\gamma$$

$$\Rightarrow \frac{81}{16} = \left(\frac{27}{8}\right)^\gamma$$

$$\Rightarrow \gamma = \frac{4}{3}$$

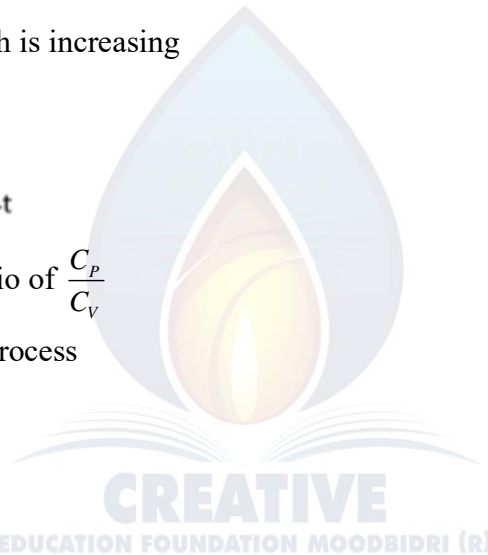
37. Ans: B) $A = 1 \text{ cm}$

$$a_{\text{max}} = A\omega^2 = (1.57)^2$$

$$\omega = 1.57$$

$$T = \frac{2\pi}{\omega}$$

$$T = \frac{2\pi}{1.57} = \frac{2 \times 3.14}{1.57} = 4 \text{ sec}$$





38. Ans: C) The maximum acceleration in SHM is given by

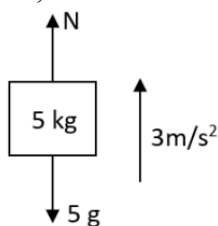
$$a_{\max} = A\omega^2$$

$$a_{\max} = 20 \times 10^{-2} \times \left(\frac{2\pi}{T}\right)^2 = 20 \times 10^{-2} \times \left(\frac{2\pi}{2}\right)^2$$

$$a_{\max} = 2 \text{ m/s}^2$$

Therefore, the correct answer is (C).

39. Ans: C)



The forces acting on the 5 kg object is given by considering the free body diagram

$$N - 5g = 5a \dots \dots (1)$$

given,

$$m = 5 \text{ kg}$$

$$g = 10 \text{ m/s}^2$$

$$a = 3 \text{ m/s}^2$$

from the above figure

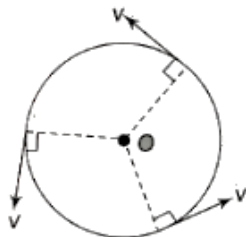
$$N = m(g + a)$$

$$N = 5 \times 13$$

$$N = 65 \text{ N}$$

40. Ans: D) Angular momentum is given by $L = I\omega = mrv$

Since direction of velocity is perpendicular to orbital plane and $L \propto v$, therefore, in an orbital motion the angular momentum vector is perpendicular to the orbital plane



41. Ans: A) de-Broglie wavelength of particle

$$\lambda_p = \frac{h}{m_p v_p}$$

Velocity of particle

$$v_p = 3v_e$$





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de-Broglie wavelength of electron

$$\lambda_e = \frac{h}{m_e v_e}$$

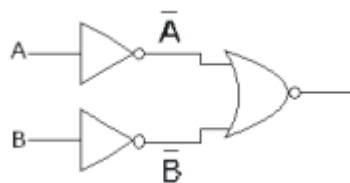
Now,

$$\frac{\lambda_p}{\lambda_e} = \frac{h}{m_p v_p} \times \frac{m_e v_e}{h}$$

$$m_p = \frac{9.1 \times 10^{-31} \times v_e}{3v_e \times 1.8 \times 10^{-4}}$$

$$m_p = 1.6 \times 10^{-27} \text{ kg}$$

42. Ans: C)



There are two NOT gates and one OR gate in this circuit

Applying De Morgan's theorem It states that the complement of the product is equal to the sum of the complement and the complement of the sum is equal to the product of the complement

$$\overline{\overline{A+B}} = \overline{\overline{A} \cdot \overline{B}} = A \cdot B$$

Hence it is AND gate. So we make the truth table of AND gate

| \therefore | A | B | $y = A \cdot B$ |
|--------------|---|---|-----------------|
| | 0 | 0 | 0 |
| | 0 | 1 | 0 |
| | 1 | 0 | 0 |
| | 1 | 1 | 1 |

43. Ans: C) Since, the balloon is descending and a stone falls from it, the stone will be having same initial velocity as that of balloon i.e.

$$u = -12 \text{ m/s},$$

$$a = g = -9.8 \text{ m/s}^2$$

$$t = 10 \text{ sec}$$

From equation of motion we have,



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$$S = ut + \frac{1}{2}at^2$$

$$\Rightarrow -h = -12 \times 10 - \frac{1}{2} \times 9.8 \times (10)^2$$

$$\Rightarrow -h = -120 - 490$$

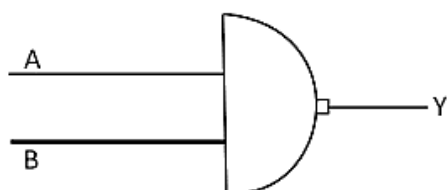
$$\Rightarrow -h = -610m$$

$$\Rightarrow h = 610m$$

Hence, displacement of stone is $h = 610$ m.

44. Ans: A)

NAND Gate



Output of the circuit

| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

| A | B | Y' | Y |
|---|---|----|---|
| 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 1 |
| 0 | 1 | 0 | 1 |
| 1 | 1 | 1 | 0 |

45. Ans: C) The voltage drop across the diode and the load are same because they are connected in parallel. The maximum current through the diode is 50 mA. Thus, the maximum power dissipated in the diode will be times $12 \text{ V} = 0.6 \text{ W}$.

CHEMISTRY

46. Ans: C) N_2^+ has one unpaired electron in $\sigma 2p_z$ orbital. So it is paramagnetic.

47. Ans: B) $\Delta n_g = 0$ for the given reaction.

$$\therefore \Delta H = \Delta U$$

48. Ans: A) Both the statements are true

49. Ans: B) Enzymes are not polysaccharides. They are proteins.

50. Ans: C) Rate constant increases exponentially with temperature

51. Ans: C) $\text{ClF}_3 - 2\text{LP}$, $\text{XeF}_2 - 3\text{LP}$, $\text{SF}_4 - 1\text{LP}$, $\text{XeF}_4 - 2\text{LP}$.

52. Ans: B



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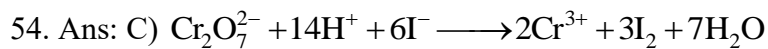
$$\frac{E_{n_1, Z_1}}{E_{n_2, Z_2}} = \left(\frac{Z_1}{Z_2}\right)^2 \left(\frac{n_2}{n_1}\right)^2 = \frac{-2.42 \times 10^{-19}}{E} = \left(\frac{1}{3}\right)^2 \left(\frac{2}{3}\right)^2$$

$$E = \frac{81}{4} (-2.42 \times 10^{-19} \text{ J}) = -4.9 \times 10^{-18} \text{ J}$$

53. Ans: C) $N = \text{No. of eq. of solute} \times \frac{1000}{V_{\text{sol}}^n (\text{mL})}$

$$0.1 = \frac{x}{98} \times \frac{1000}{100} \Rightarrow x = 0.33\text{g}$$

$$\therefore x = 98\text{g}$$



Oxidation state of Cr changes from +6 to +3.

55. Ans: C) $K_{\text{sp}} = 27S^4 = 27 \times (2 \times 10^{-6})^4 = 4.32 \times 10^{-22}$

56. Ans: A) Aqueous KOH releases gas at cathode

Aqueous CuSO_4 forms Cu metal at cathode.

57. Ans: A) Both statements are true.

58. Ans: A) Negative deviation from Raoult's law for given mixture is due to H bond.

59. Ans: C) $n_{\text{H}_2\text{SO}_4} = M \times V_{(\text{L})} = 0.1 \times 0.1 \text{ mol} = 10^{-2} \text{ mol}$

$$n_{\text{NaOH}} = 2n_{\text{H}_2\text{SO}_4} = 2 \times 10^{-2}$$

$$\text{Mass of pure NaOH required} = 2 \times 10^{-2} \times 40 = 0.8\text{g}$$

$$\text{Mass of 80\% pure NaOH required} = \frac{0.8 \times 100}{80} = 1\text{g}$$

60. Ans: D) Process is isothermal. So $\Delta U = 0$

Process is irreversible. So $\Delta S_{\text{total}} > 0$

61. Ans: B) Salt of strong acid and weak base is acidic.

62. Ans: B) Azimuthal quantum number determines shape of orbital spin quantum number refers to the orientation of the spin.

63. Ans: C) Copper can not displace hydrogen from acids.

64. Ans: B

$$K = \frac{2.303}{t} \log \frac{[R]_0}{[R]}$$

$$t = \frac{2.303}{2 \times 10^{-3}} \log \frac{200}{100} = 346.5 \text{ sec}$$

65. Ans: A





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$$\text{No. of atoms}(N) = \frac{m}{M} \times N_A \times \text{atomicity}$$

$$\text{CH}_4 : N = \frac{10}{16} \times N_A \times 5(\text{max})$$

$$\text{N}_2; N = \frac{10}{28} \times N_A \times 2$$

$$\text{Ag}; N = \frac{10}{28} \times N_A$$

$$\text{Ne}; N = \frac{10}{20} \times N_A$$

66. Ans: B) Dipole moment of hydrogen halides decrease down the group.

67. Ans: D) Phenolphthalein is suitable indicator for titration of strong acid and strong base and weak acid and strong base only.

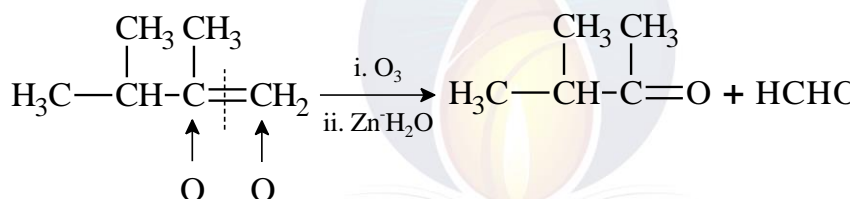
68. Ans: C) Atomic number = 105 is dubnium

69. Ans: D) All orders given are correct

70. Ans: D) SiO₂ & GeO₂, GeO acidic and SnO₂, PbO₂, PbO are amphoteric

71. Ans : B

72. Ans : B



73. Ans: B



It has a double each carbon of which has two different substituents and hence shows geometrical isomerism. Since it has a chiral centre also, therefore, it shows enantiomerism also.

74. Ans: D) Cr⁺² is reducing in nature to get d³ (t_{2g}³) and Mn⁺³ is oxidizing and get d⁵ E.c.

75. Ans: B) Ziegler-Natta catalyst is TiCl₃ + Al(CH₃)₃

76. Ans: B) Ma₃b₃ shows fac-mer isomerism

77. Ans: D) Field strength of ligands is CO > CN⁻ > en > H₂O > X⁻

78. Ans: B) Reactively towards S_N1 α stability of carbo cation formed

79. Ans: D) Tertiary alcohols gives turbidity immediately with Lucas reagent

80. Ans: D) EWG increase the acidic strength

81. Ans: B) Tertiary alcohol with RO⁻ produce alkene by elimination





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82. Ans : B) Using Fajan's rule, a larger cation and a smaller anion will have the maximum ionic character.
83. Ans: C) A is benzaldehyde by Etard reaction & B is Toulene by Clemenson's reduction
84. Ans: B) A is benzoic acid & B is benzamide
85. Ans: A) Conceptual
86. Ans: B) A is $\text{CH}_3\text{-CH}_2\text{-NH}_2$ & B is $\text{CH}_3\text{-CH}_2\text{-OH}$
87. Ans: C) During Hoffmann's bromamide reaction amides produce amines with one carbon atom less
88. Ans: A) Presence of ERG (CH_3) group on benzene ring increases the electron density at Ortho & Para position
89. Ans: D) In column chromatography, the least readily adsorbed substances are travel more distance from the top.
90. Ans: A) During nitration of benzene electrophile is nitronium ion (NO_2^+)

BOTANY

| | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| A | A | A | D | D | C | D | A | D | A |
| 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 |
| B | C | A | B | B | B | B | A | D | B |
| 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 |
| B | B | B | B | C | A | B | A | D | A |
| 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 |
| D | A | D | C | C | C | B | B | D | B |
| 131 | 132 | 133 | 134 | 135 | | | | | |
| A | C | B | A | C | | | | | |

ZOOLOGY

| | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 |
| C | A | D | D | D | C | B | B | C | A |
| 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 |
| C | A | D | C | D | D | A | D | A | C |
| 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 |
| C | A | B | A | A | C | B | D | D | C |
| 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 |
| C | B | A | C | B | B | A | C | A | C |
| 176 | 177 | 178 | 179 | 180 | | | | | |
| B | D | C | C | A | | | | | |