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PHYSICS

QUESTION PAPER

1. Three infinitely long charge sheets are placed as shown in figure. The electric field at point P is



2. Two bodies of masses and are connected by a wire of cross section 1 mm² going over a smooth pulley as shown in the figure. The longitudinal strain in the wire is: $(Y = 10^{11} \text{ N/m}^2 \text{ and } g = 10 \text{ m/s}^2)$



3. Four particles of mass 5,3,2,4 kg are at the points (1,6), (-1,5), (2,-3), (-1,-4). Find the coordinates of their centre of mass.

A)
$$\left(\frac{2}{7}, \frac{23}{14}\right)$$
 B) $\left(\frac{1}{7}, \frac{23}{14}\right)$ C) $\left(\frac{2}{7}, \frac{11}{4}\right)$ D) $\left(\frac{1}{7}, \frac{23}{3}\right)$

A concave and convex lens have the same focal length of 20 cm and are put into contact to form a lens combination. The combination is used to view an object of 5 cm length kept at 20 cm from the lens combination. As compared to the object, the image will be

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- A) Magnified and inverted
- B) Reduced and erect

- C) Of the same size as the object and erect
- D) Of the same size as the object but inverted

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- 5. Which of the following is a derived quantity in SI?
 - A) luminous intensity B) amount of substance
 - C) electric charge D) electric current
- Magnetic field due to a current carrying ring having n turns at a distance x from the centre on its axis is proportional to (if r = radius of ring)

A)
$$\frac{r}{(x^2 + r^2)}$$
 B) $\frac{nr}{(x^2 + r^2)^{3/2}}$ C) $\frac{nr^2}{(x^2 + r^2)^{3/2}}$ D) $\frac{n^2r^2}{(x^2 + r^2)^{3/2}}$

7. Find out work done by electric field in shifting a point charge $\frac{4\sqrt{2}}{27}\mu C$ from point P to S which are shown in the figure.



8. Two bodies of masses 1 kg and 2 kg are moving in two perpendicular direction with velocities 1 m/s and 2 m/s as shown in figure. The velocity of the centre of mass (in magnitude) of the system will



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10. Force F depends on distance x and time t as $F = ax^2 + bt^{1/2}$. Then dimension of b^2/a is A) $[M^{-1}L^2T^{-3}]$ B) $[M^1L^{-3}T^3]$ C) $[M^1L^3T^{-3}]$ D) $[M^2L^2T^1]$ 11. The radius of a disk at 20°C is 20cm. If the final radius at 90°C is 20.5cm, The coefficient

of area expansion is

A) $7.2 \times 10^{-4/0}$ C	B) $8.2 \times 10^{-4/0}$ C
C) $3.6 \times 10^{-4/0}$ C	D) $1.8 \times 10^{-4/0}$ C

12. A proton, a deuteron and an α -particle having the same kinetic energy are moving in circular trajectories in a constant magnetic field. If r_p , r_d and r_α denote respectively the radii of the trajectories of these particles then

- A) $r_{\alpha} = r_p < r_d$ B) $r_{\alpha} > r_d < r_p$ C) $r_{\alpha} = r_d > r_p$ D) $r_p = r_d = r_{\alpha}$
- 13. A charge 10 C is placed at a distance of 2 cm from a charge 40 C and 4 cm from another charge -20 C. The potential energy of the charge 10 C is (in 10¹² J)
 A) 87.5 B) 112.5 C) 135 D) zero
- 14. Three identical bars A, B and C are made of different magnetic materials. When kept in a uniform magnetic field, the field lines around them look as follows:



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Make the corresponding of these bars with their material being diamagnetic (D), ferromagnetic (F) and paramagnetic (P) :

- A) $A \leftrightarrow D, B \leftrightarrow P, C \leftrightarrow F$ B) $A \leftrightarrow F, B \leftrightarrow D, C \leftrightarrow P$
- C) $A \leftrightarrow P, B \leftrightarrow F, C \leftrightarrow P$ D) $A \leftrightarrow F, B \leftrightarrow P, C \leftrightarrow D$

15. If \vec{F} is the force acting on a particle having position vector \vec{r} and $\vec{\tau}$ be the torque of this force about the origin, then :-

A) $\vec{r}.\vec{\tau} = 0$ and $\vec{F}.\vec{\tau} \neq 0$ B) $\vec{r}.\vec{\tau} \neq 0$ and $\vec{F}.\vec{\tau} = 0$ C) $\vec{r}.\vec{\tau} > 0$ and $\vec{F}.\vec{\tau} < 0$ D) $\vec{r}.\vec{\tau} = 0$ and $\vec{F}.\vec{\tau} = 0$

16. In Young's double slit experiment, if monochromatic light is replaced by white light

A) All bright fringes become white

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B) All bright fringes have colours between violet and red

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- C) Only the central fringe is white, all other fringes are coloured
- D) No fringes are observed
- 17. A particle starts its motion from rest under the action of a constant force. If the distance covered in first 10 seconds is S₁ and that covered in the first 20 seconds is S₂, then

A) $S_2 = S_1$ B) $S_2 = 2S_1$ C) $S_2 = 3S_1$ D) $S_2 = 4S_1$

- 18. The volume of liquid flowing per second out of an orifice at the bottom of a tank does not depend upon:
 - A) height of the liquid above the orifice B) density of liquid
 - C) value of acceleration due to gravity D) area of the orifice
- 19. In the electric circuit shown in figure, the reading of voltmeter V_1 is 26 volt, and the reading of ammeter A_1 is 2 ampere. The value of resistance x is (all instruments are ideal)



20. The radius of gyration of a uniform rod of length *t* about an axis passing through one of its ends and perpendicular to its length is :

A)
$$\frac{l}{\sqrt{2}}$$
 B) $\frac{l}{3}$ C) $\frac{l}{\sqrt{3}}$ D) $\frac{l}{2}$

21. Starting from rest, a body slides down a 45° rough inclined plane is twice the time it takes to slide down the same distance in the absence of friction. The coefficient of friction between the body and the inclined plane is

22. In small time interval Δt , flux through a circuit of resistance R changes by $\Delta \emptyset$. Then the charge Q passes through any point in the circuit in given interval is

A)
$$Q = \frac{\Delta \phi}{R \Delta t}$$
 B) $Q = \frac{\Delta \phi}{R}$ C) $Q = \frac{\Delta \phi}{\Delta t}$ D) $Q = R \frac{\Delta \phi}{\Delta t}$

23. The MKS unit of Stefan's constant is

A) 2Ω

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- 24. The potential energy of a simple harmonic oscillator when the particle is at distance one third of amplitude from it's end point is (E total energy)
 - A) $\frac{2}{3}E$ B) $\frac{1}{8}E$ C) $\frac{4E}{9}$ D) $\frac{E}{2}$
- 25. The magnetic flux linked with a coil at any instant t is given by $\phi = 5t^3 100t + 300$, the emf induced in the coil after t = 2s is

	A) – 40 V	B) 40 V	C) 140 V	D) 300 V
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26. How much heat energy is gained when 5 kg of water at 20°C is brought to its boiling point?

- A) 1680 kJ B) 1700 kJ C) 1720 kJ D) 1740 kJ
- 27. A person is standing in an elevator. In which situation he finds his weight less than his true weight?
 - A) When the elevator moves upward with constant acceleration
 - B) When the elevator moves downward with constant acceleration
 - C) When the elevator moves upward with uniform velocity.
 - D) When the elevator moves downward with uniform velocity.
- 28. The fundamental frequency of a sonometer wire carrying a block of mass 1 kg and relative density 1.8 is 260Hz. When the block is completely immersed in a liquid of relative density
 - 1.2 then what will be its new frequency

A) 300 Hz	B) 150 Hz	C) 450 Hz	D) None of these
29. In an A.C. circuit, th	e inductive reactance X		
A) 2 πfL	B) $1/(2\pi fL)$	C) $\pi fL/2$	D) 2/ π fL

30. For shown situation the tension T_2 is :



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31. The figure shows a plot of photo current versus anode potential for a photo sensitive surface for three different radiations. Which one of the following is a correct statement?



A) curves (b) and (c) represent incident radiations of same frequency having same intensity

B) curves (a) and (b) represent incident radiations of different frequencies and different intensities

C) curves (a) and (b) represent incident radiations of same frequency but of different intensities

D) curves (b) and (c) represent incident radiations of different frequencies and different intensities

32. The ratio of the wavelength for $2 \rightarrow 1$ transition in Li⁺⁺, He⁺ and H is

A) 1 : 2 : 3 B) 1 : 4 : 9 C) 4 : 9 : 36 D) 9 : 4 : 1

33. Two coherent point sources S₁ and S₂ are separated by a small distance 'd' as shown. The fringes obtained on the screen will be :



A) semi-circles B) concentric circles C) points D) straight lines
34. The value of the resistance RP in figure is adjusted such that power dissipated in the 2Ω resistor is maximum. Then the power dissipated in the 2Ω will be:



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35. The number of free electrons per 10 mm of an ordinary copper wire is about 2×10^{21} . The average drift speed of the electrons is 0.25 mm/sec. The current flowing is

A) 0. 8 A B) 8 A C) 80 A D) 5 A

- 36. At what temperature rms speed of gaseous hydrogen molecules equal to that of oxygen molecules at 47°C
 - A) 20 K B) 80 K C) -73 K D) 3 K
- 37. A block follows the path as shown in the figure from height h. If radius of circular path is r, then relation holds good to complete full circle is.



- 38. A body of 10 kg mass falls form a height of 2.5m and gets rebound to 0.50m. If the loss in energy is converted to heat the body, then rise in temperature will be (sp. heat of material is 25.2 J/kg°K)
 - A) 0.79 K B) 0.095 K C) 0.0095 K D) none of these
- 39. A simple pendulum with a solid metal bob has a period T. The metal bob is now immersed in a liquid of density one-tenth that of the bob. The liquid is non-viscous. Now the period of the same pendulum with its bob remaining all the time in the liquid will be :

A) T B)
$$\frac{9T}{10}$$
 C) $\left(\sqrt{\frac{10}{9}}\right)T$ D) $\left(\sqrt{\frac{9}{10}}\right)T$

- 40. A fly wheel is rotating about its axis at a constant angular velocity. If suddenly an object sticks to it on the rim, then its M.I. will-
 - A) increase B) decrease C) remain unchanged D) nothing can be said
- 41. A particle of mass m at rest is acted upon by a force F for a time t. Its Kinetic energy after an interval t is



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- 42. Two waves of same frequency and same amplitude reach a common point of the medium simultaneously. If the amplitude of resultant wave is zero then the path difference between the waves will be
 - A) λ B) $\frac{\lambda}{2}$ C) 2λ D) $\frac{3\lambda}{4}$

43. A physical quantity P depends on α, β and γ as $P = \frac{\alpha^2 \beta}{\gamma^4}$. If the percentage error in the measurement of α, β and γ are respectively 0.1%, 0.2% and 0.4%, then the maximum percentage error in the measurement of P is

- A) 1.2 % B) 1.5 % C) 2.0 % D) 2.6 %
- 44. To make a PN-junction conducting
 - A) the value of forward bias should be more than the barrier potential
 - B) the value of forward bias should be less than the barrier potential
 - C) the value of reverse bias should be more than the barrier potential
 - D) the value of reverse bias should be less than the barrier potential
- 45. Which of the following represents correctly the truth table of configuration of gates shown here?



	Α	В	Y		A	В	Y
	0	0	0		0	0	1
A)	0	1	1	B)	0	1	0
	1	0	1		1	0	0
	1	1	1		1	1	1
	٨	D	V		٨	D	v
	A	D	1		A	D	1
	0	0	0		0	0	1
C)	0	1	1	D)	0	1	1
	1	0	1		1	0	1
	1	1	0		1	1	0

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angles in the given molecules?

C) $OF_2 < H_2O < OCl_2 < ClO_2$ D) $ClO_2 < OF_2 < OCl_2 < H_2O$

52. The boiling points of the following hydrides follow the order

A) $SbH_3 > NH_3 > AsH_3 > PH_3$	B) $NH_3 > PH_3 > AsH_3 > SbH_3$
C) $NH_3 > AsH_3 > PH_3 > SbH_3$	D) $SbH_3 > AsH_3 > NH_3 > PH_3$

53. For the reaction A (g) + B (g) \rightarrow C (g), $\Delta U = -5$ cal and $\Delta S = -10$ cal K⁻¹

- A) $\Delta G = +2379$ cal B) $\Delta G = -2379$ cal D) $\Delta G = -237.9$ cal D) $\Delta G = -237.9$ cal
- 54. For the equilibrium $N_2 + 3H_2 \rightleftharpoons 2NH_3$ at 298 K, $N_2 + 3H_2 \rightleftharpoons 2NH_3$ at 298 K and 5 atm. Pressure, increasing pressure to 50 atm will (here K is the equilibrium constant)

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- $(1) \quad \text{decreases the wield of NUL or well of the value of V$
 - A) decrease the yield of NH_3 as well as the value of K
 - B) increase the yield of NH_3 as well as the value of K

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- C) increase the yield of NH₃, but will not change the value of K
- D) increase the yield of NH₃, but will decrease the value of K
- 55. Separation of o- nitrophenol from the mixture of o- nitrophenol and p- nitrophenol can be achieved by
 - A) Sublimation B) Steam distillation
 - C) Crystallisation D) Fractional distillation

56. What is the correct order of decreasing stability of the following cations?

$$CH_{3} - \overset{\oplus}{\underset{(i)}{C}}H - CH_{3} \qquad CH_{3} - \overset{\oplus}{\underset{(ii)}{C}}H - OCH_{3} \qquad CH_{3} - \overset{\oplus}{\underset{(iii)}{C}}H - CH_{2} - OCH_{3}$$

A) (ii) > (i) > (iii)
B) (ii) > (iii) > (i)
C) (iii) > (i) > (ii)
D) (i) > (ii) > (iii)

57. Ammoniacal silver nitrate form a white precipitate easily with

A) $CH_3C \equiv CH$ B) $CH_3C \equiv C - CH_3$ C) $CH_3CH = CH_3$ D) $CH_3 - CH_3$

58. Match the following reactants in Column I with the corresponding reaction products in Column II

Colu	Column I		П
(a)	Benzene + $Cl_2 \xrightarrow{AlCl_3}$	1.	Benozoic acid
(b)	Benzene + CH ₃ Cl $\xrightarrow{\text{AlCl}_3}$	2.	Methyl phenyl ketone
(c)	$\text{Benzene} + \text{CH}_3\text{COCl} \xrightarrow{\text{AlCl}_3} \rightarrow$	3.	Toluene
(d)	Toluene $\xrightarrow{\text{KMnO}_4/\text{NaOH}}$	4.	Chlorobenzene
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Codes

	(a)	(b)	(c)	(d)
A)	4	3	2	1
B)	1	2	3	4
C)	4	3	1	5
D)	1	5	2	3

59. The oxidation states of S atoms in $S_4O_6^{2-}$ from left to right respectively are

$$\overline{O} - \overline{S} - S - S - S - S - S - O$$

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A) 6, 0, 0, 6	B) 3, 1, 1, 3	C) 5, 0, 0, 5	D) 4, 1, 1, 4
60. Statement I: The diffe	rence in the boiling po	oints of equimolar so	lution of HCl and HF
decreases as their molar	rity is decreased.		
Statement II: The exte	nt of dissociation decre	eases steadily with inc	reasing dilution.
A) Statement I is tr	rue, Statement II is tru	e; Statement II is a c	correct explanation for
Statement I			
B) Statement I is tru	ie, Statement II is true;	Statement II is not a o	correct explanation for
Statement I			
C) Statement I is tru	ie; Statement II is false		
D) Statement I is fail	lse; Statement II is true		
61. The molarity of NO_3^- in	the solution after 2 lit	res of 3M AgNO ₃ is n	nixed with 3 litres of 1
M BaCl ₂ is			
A) 0.6 M	B) 1.2 M	C) 1.6 M	D) 0.8 M
62. The elevation in boiling	g point for 13.44 g of	CuCl ₂ dissolved in 1	kg of water as solvent
will be $(K_b = 0.52 \text{ K kg})$	mol ⁻¹ , molar mass of	$CuCl_2 = 134 \cdot 4 \text{ g/mol}^{-1}$	-1)
A) 0.05	B) 0·10	C) 0·16	D) 0·20
63. In the first order reaction	n, the concent <mark>ration of</mark>	the reactants is reduce	ed to 25% in one hour.
The half-life period of t	he reaction is		
A) 2 hrs	B) 4 hrs	C) 1/2 hr	D) 1/4 hr
64. A plot of $\frac{1}{T}$ Vs in k for	a reaction gives the sl	ope -1×10^4 k. The e	nergy of activation for
the reaction is (Given H	$R = 8.314 \text{ J } \text{k}^{-1} \text{ mol}^{-1})$		
A) 1.202 kJ mol ⁻¹	B) 83.14 kJ mol ⁻¹	C) 8314 J mol ⁻¹	D) 12 .02 J mol ⁻¹
65. The unit of rate of reaction and rate constant are the same for a			
A) zero order reactiv	A) zero order reaction B) first order reaction		
C) second order reaction D) third order reaction			
66. E_1 , E_2 and E_3 are the emf values of three galvanic cells respectively			
$(A) Zn Zn_{1M}^{2+} Cu_{0.1M}^{+2} Cu \qquad (B) Zn Zn_{1M}^{2+} Cu_{1M}^{2+} Cu \qquad (C) Zn Zn_{0.1M}^{2+} Cu_{1M}^{2+} Cu_{$			
Which one of the following is true?			
A) $E_2 > E_3 > E_1$	B) $E_3 > E_2 > E_1$	C) $E_1 > E_2 > E_3$	D) $E_1 > E_3 > E_2$
<u>@</u>			<u>@</u>

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67. For the reduction of silver ions with copper metal, the standard cell potential was found to be + 0.46 V at 25°C. The value of standard Gibb's energy, ΔG° will be (F = 96500 C mol⁻¹)

A) – 89.0 kJ B) – 89.0 J C) – 44. 5 kJ D) – 98.0 kJ

68. The E° (standard reduction potential) of three electrodes A, B and C are respectively + 0.5

V; -3.0 V and -1.2 V respectively. The reducing powers of these metals are

 $A) A > C > B \qquad B) C > B > A \qquad C) B > C > A \qquad D) A > B > C$

69. Assertion (A): Zn, Cd, Hg are non-transition elements while Cu, Ag, Au are transition element.

Reason (R): In Zn, Cd, Hg (n–1) d orbitals are completely filled in their atomic state where as in Cu, Au they are incomplete.

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

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

C) (A) is true but (R) is false

D) Both (A) and (R) are false

70. Which of the following arrangements does not represent the correct order of the property stated against it?

A) Sc < Ti < Cr < Mn: number of oxidation states

B) $V^{2+} < Cr^{2+} < Mn^{2+} < Fe^{2+}$: paramagnetic behaviour

C) $Ni^{2+} < Co^{2+} < Fe^{2+} < Mn^{2+}$: Ionic size

D) $Co^{3+} < Fe^{3+} < Cr^{3+} < Sc^{3+}$: stability in aqueous solution

- 71. Arrange Ce⁺³, La⁺³, Pm⁺³ and Yb⁺³ in increasing order of their ionic radii
 - A) $Yb^{+3} < Pm^{+3} < Ce^{+3} < La^{+3}$ B) $Ce^{+3} < Yb^{+3} < Pm^{+3} < La^{+3}$

D)
$$Yb^{+3} < Pm^{+3} < La^{+3} < Ce^{+3}$$
 D) $Pm^{+3} < La^{+3} < Ce^{+3} < Yb^{+3}$

72. The crystal field stabilization energy (CFSE) is the highest for

A) $[CoF_4]^{2-}$ B) $[Co(NCS)_4]^{2-}$ C) $[Co(NH_3)_6]^{3+}$ D) $[CoCl_4]^{2-}$

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73. Which of the following complex species is not expected to exhibit optical isomerism?

A) $[Co(en)(NH_3)_2Cl_2]^+$ C) $[Co(en)_2Cl_2]^+$ B) $[Co(en)_3]^{3+}$ D) $[Co(NH_3)_3Cl_3]$

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- 74. One mole of a complex compound CoCl₃.5NH₃ give 3 moles of ions on dissolution in water. One mole of the same complex reacts with two moles of AgNO₃ solution to yield two moles of AgCl(s). The structure of the complex is
 - A) [Co(NH₃)₃Cl₃].2NH₃ B) [Co(NH₃)₄Cl₂]Cl.NH₃
 - C) [Co(NH₃)₄Cl]Cl₂.NH₃

D) [Co(NH₃)₅Cl]Cl₂

QUESTION PAPER

- 75. Which of the following acts as a positive ligand?
 - A) Acetate B) Carbonyl C) Nitro D) Nitrosonium
- 76. **Assertion (A):** Phosphorus chlorides (tri and penta) are preferred over thionyl chloride for the preparation of alkyl chlorides from alcohols.

Reason (R): Phosphorus chlorides give pure alkyl halides.

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

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

- C) (A) is true but (R) is false
- D) Both (A) and (R) are false

77. An organic compound C₄H₈O is found to be optically active. Which of the following could it be?

A) $CH_3 - CO - CH_2 - CH_3$	B) $CH_3 - CH_2 - CH_2 - CHO$
C) (CH ₃) ₂ CH – COOH	D) $CH_2 = CH - CH(OH) - CH_3$

78. S_N 1 reactivity of the following halides will be in the order

(i) (CH ₃) ₃ CBr	(ii) (C ₆ H ₅) ₂ CHBr	(iii) (C ₆ H ₅) ₂ C(CH ₃)Br
(iv) (CH ₃) ₂ CHBr	(v) C ₂ H ₅ Br	
A) $(v) > (iv) < (i) < (ii) < (iii)$	B) (i	i) > (i) > (iii) > (v) > (iv)
C) (i) > (iii) > (v) > (ii) > (iv)	D) (i	(ii) > (ii) > (i) > (iv) > (v)

79. Which of the following is correctly match with the given IUPAC name?



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D) $CH_3 - O - C - CH_2 - CH_3 \longrightarrow 2$ -methoxy-2-methylbutane CH₃

80. Consider the following reagents

(i) KMnO ₄ / H^+	(ii) NaOH / CO ₂ , H^+
(iii) K ₂ Cr ₂ O ₇ / H ⁺	(iv) H ₂ O ₂ / OH ⁻ , H ₂ O, B ₂ H ₆ / THF
(v) LiAlH ₄ / H ₂ O	

How many of them are suitable for converting benzyl alcohol into benzoic acid?

- A) 2 B) 3 C) 1 D) 4
- 81. Assertion (A): Cumene (isopropyl benzene) reacts with O₂ and after hydrolysis gives phenol and acetone.

Reason (R): Initially cumene converts into 2-phenylpropan-2-ol.

- A) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- B) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- C) (A) is true but (R) is false
- D) Both (A) and (R) are false
- 82. Assertion (A): A mixture of Ph–CO–Ph and Me–CO–H on treatment with dil. NaOH gives



Reason (R): The ketone is very hindered and very conjugated and so less reactive than aldehyde.

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

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- C) (A) is true but (R) is false
- D) Both (A) and (R) are false

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83. Assertion (A): pK_b of aniline is higher than ethylamine.

Reason (R): The lone pair of -NH₂ group in aniline is involved in conjugation with a benzene ring.

- A) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- B) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- C) (A) is true but (R) is false
- D) Both (A) and (R) are false
- 84. Assertion (A): α-glycosidic linkage is present in maltose,



Reason (R): Maltose is composed of two glucose units in which C-1 of one glucose unit is linked to C-4 of another glucose unit.

- A) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- B) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- C) (A) is true but (R) is false
- D) Both (A) and (R) are false
- 85. Consider the following compounds,



V. $CH_3 - CH - CH_3$ \downarrow OH

The number of compounds that will yellow precipitate with NaOH/I₂?



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- 86. Which of the following is the incorrect statement?
 - A) Carboxylic acids have the tendency to undergo H-bonding with each other.
 - B) First four members of carboxylic acids are miscible with water.
 - C) Carboxylic acids are held together by intramolecular hydrogen bonding.
 - D) Acetic acid is less acidic than formic acid.
- 87. Match the reactions given in Column I with the suitable reagents given in Column II.

Column-I (Reaction)	Column-II (Reagent)
A. Benzophenone \longrightarrow Diphenylonethane	1. LiAlH ₄
B. Benzaldehyde \longrightarrow 1-phenolethanol	2. DIBAl-H
C. Cyclohexanone \longrightarrow Cyclohexanol	3. Zn-Hg / Conc. HCl
D. Phenylbenzoal \longrightarrow Benzaldehyde	4. CH ₃ MgBr
(A) A - 3, B - 4, C - 1, D - 2 B	(A - 4, B - 3, C - 2, D - 1)
C) A – 3, B – 4, C – 2, D – 1	A - 4, B - 3, C - 1, D - 2

88. Consider the following statements

Statement – I: Amines are polar compounds.

Statement -II: Amines possess electronegativity difference between nitrogen and carbon.

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

- A) Both statement I and statement II are false
- B) Statement I is true and statement is false.
- C) Statement I is false and statement II is true
- D) Both statement I and statement II are true
- 89. The sequence in the structure of nucleic acid is

A) Base + phosphate + pentose

- B) Phosphate + pentose + baseD) phosphate + base + pentose
- C) pentose + base + phosphate
- 90. Amount of oxalic acid present in a solution can be determined by its titration with KMnO₄ solution in the presence of H₂SO₄ the titration gives unsatisfactory result when carried out in the presence of HCl. Why?

A) HCl is better reducing agent than oxalic acid.C) HCl react with oxalic acid

B) HCl is strong acidic in nature

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D) Reaction need basic medium

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- 91. The number and types of organisms present on earth make:
 - A) Taxonomy B) Plant diversity C) Animal diversity D) Biodiversity
- 92. Which of the following is / are not correctly match?

Common Name	Genus	Family	
(i) Man	Ното	Hominidae	
(ii) Housefly	Musa	Muscidae	
(iii) Mango	Mangifera	Anacardiaceae	
(iv) Wheat	Triticum	Poaceae	
A) i & ii	B) only i	C) only ii	D) iii & iv

93. Viroid was discovered by:

A) HaeckelB) PasteurC) T.O. DienerD) Theophrastus

94. Select the correct combination of the statement (a-d) regarding the characteristics of certain organisms:

- (a) Methanogens are Archaebacteria which produce methane in marshy areas
- (b) Nostoc is filamentous blue-green alga which fixes atmospheric nitrogen
- (c) Chemosynthetic autotrophic bacteria synthesize cellulose from glucose
- (d) Mycoplasma lack a cell wall and can survive without oxygen

The correct statements are:

A) (a), (b), (c) B) (b), (c), (d) C) (a), (b), (d) D) (b), (c)

95. The diatoms do not easily decay like most of the other Algae because:

A) They have water proof cells B) Their walls are mucilaginous

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C) They have highly siliceous wall D) They are non-living

96. Identify the diagram below and mention the class to which this plant belongs:





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A) Brassicaceae-Mustard

B) Fabaceae–Groundnut

C) Solanaceae-Petunia

D) Liliaceae–*Asparagus*

100. Supporting roots coming out of the lower nodes of the sugarcane stem are called:

B) Stilt roots

A) Prop roots	
---------------	--

C) Pneumatophores D) Fusiform roots

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A) By cell plate formation	B) By constriction
108. Which of the following is the method	of cytokinesis in plant cell?
C) Submetacentric	D) Acrocentric
A) Telocentric	B) Metacentric
107. Highest arm ratio occurs in which chro	omosome:
C) Chloroplast	D) Nucleus
A) Mitochondrion	B) Centriole
106. Organelle lacking DNA, but capable of	of duplication is:
C) Plastids	D) Golgi apparatus
A) Vacuoles	B) Lysosome
105. A number of proteins synthesised by r	ibosomes present on the ER are transferred to:
C) Companion cell	D) Collenchyma
A) Phloem fibre	B) Phloem parenchyma
104. Cell which is functionally related to si	eve tube:
C) Sclerenchyma	D) Aerenchyma
A) Parenchyma	B) Collenchyma
103. Fibre (longest plant cell), belongs to w	which tissue:
D) Xylem is always endarch	
C) Xylem and phloem are radial	
B) Vascular bundles are open and an	rranged in a ring
A) Vascular bundles are scattered w	vith cambium
102. In dicot root:	
C) Free central	D) Marginal
A) Axile	B) Basal
101. In placentation, the placenta	a forms a ridge along the ventral suture of the ovary.

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D) A) and C) both

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C) By furrow formation

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109. Which of the two events restore the normal nu	mber of chromosomes in life cycle?
A) Mitosis and Meiosis	B) Meiosis and fertilisation
C) Fertilisation and mitosis	D) Only meiosis
110. Observe the following scheme. Which stage of	f cell division occurs after G2 phase?
M	
A) Prophase	B) Metaphase
C) Anaphase	D) Diakinesis
111. The first stable compound formed in photosyn	thesis of C3 plants is:
A) Phosphoglyceric acid	B) Starch
C) Pyruvic acid	D) Ribulose diphosphate
112. Calvin cycle occurs in:	
A) Cytoplasm EDUCATION FOUNDATION	B) Chloroplasts
C) Mitochondria	D) Glyoxysomes
113. The first acceptor of atmospheric CO2 in C4 p	lant is
A) Pyruvic acid	B) Phosphoenol pyruvic acid
C) Acetic acid	D) Oxaloacetic acid
114. 1 molecule glucose $+$ 6 molecule of O_2 and 38	ADP combined to form 12H ₂ O, 6CO ₂ and
A) 38 molecules of ATP	B) 28 ATP
C) 38 AMP	D) 28 ADP
115. Link between glycolysis & TCA cycle is	

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- A) Pyruvic acid B) Acetyl Co-A C) Citric acid D) None
- 116. Which of the following is 5-carbon compound of Krebs cycle?
 - A) Citric acid B) Fumaric acid
 - C) Oxalosuccinic acid D) α-Ketoglutaric acid
- 117. While individual organisms die without fail, species continue to live through millions of

years

- A) without any checks or threats
- B) unless threatened by natural or anthropogenic extinction
- C) without undergoing any genetic variations
- D) even in the presence of unfavourable conditions
- 118. A typical microsporangium is generally surrounded by following wall layers:
 - A) the epidermis, endothecium, middle layers and the tapetum
 - B) the epidermis, endodermis, middle layers and the tapetum
 - C) the epidermis, endothecium, middle lamellae and the tapetum
 - D) the epidermis, endodermis, middle lamellae and the tapetum
- 119. Statement A: The vegetative cell is bigger, has abundant food reserve and a large irregularly shaped nucleus.
 - Statement B: The generative cell is small and floats in the cytoplasm of the vegetative cell.

Statement C: It is spindle shaped with dense cytoplasm and a nucleus.

- A) Statement A is true, B is wrong and C is the correct explanation for A
- B) Statement A is false, B is true and C is the correct explanation for A
- C) Both the statements A and B are true and C is the correct explanation for B
- D) Both the statements A and B are true and C is not applicable to any other statement

120. Adjacent nucleotides in a polynucleotide chain are joined by:

- A) N-glycosidic bond B) Phosphodiester bond
- C) O-glycosidic bond D) Hydrogen bond

121. Out of the two strands of DNA one is carrying genetic information for transcription and it is called:

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A) Coding strand
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B) Non template strand

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C) Se	ense	strand
-------	------	--------

D) Template strand

- 122. Packaging of DNA helix:
 - A) Involves polyamines in eukaryotes
 - B) Occurs with the help of NHC proteins only
 - C) Requires acidic proteins that help in coiling of DNA in prokaryotes
 - D) Is more complex in eukaryotes than prokaryotes
- 123. What would happen if in a gene encoding a polypeptide of 50 amino acids, 25th codon (UAU) is mutated to UAA:
 - A) A polypeptide of 24 amino acids will be formed
 - B) Two polypeptides of 24 and 25 amino acids will be formed
 - C) A polypeptide of 49 amino acids will be formed
 - D) A polypeptide of 25 amino acids will be formed
- 124. Antibiotics are mostly obtained from:

A) Bacteria	B) Actinomycetes
C) Cyanobacteria	D) (A) & (B)
. Which of the following Microorgani	sms use for Swiss cheese?

- 125. Which of the following Microorganisms use for Swiss cheese?
 - A) PropionibacteriumB) GeotrichumC) PenicilliumD) Streptococcus

126. Which biocontrol agent in very common in root ecosystem and is effective against several plant pathogens:

A) Baculoviruses	B) Trichoderma
C) Nucleopolyhedrovirus	D) Ladybird beetle and Dragonflies
127. In a mixture, DNA fragments are separated by	:
A) Bioprocess engineering	B) Restriction digestion
C) Gel electrophoresis	D) Polymerase chain reaction

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- 128. Select the correct statement from the following
 - A) Gel electrophoresis is used for amplification of a DNA segment.

B) The polymerase enzyme joins the gene of interest and the vector DNA.

C) Restriction enzyme digestions are performed by incubating purified DNA molecules with the restriction enzymes of optimum conditions.

- D) PCR is used for isolation and separation of gene of interest.
- 129. A specific recognition sequence identified by endonucleases to make cuts at specific positions within the DNA is:

A) Degenerate primer sequence B) Oka	zaki sequences
--------------------------------------	----------------

- C) Palindromic Nucleotide sequences D) Poly (A) tail sequences
- 130. The DNA molecules to which the gene of interest is integrated for cloning is called:

A) Carrier	B) Transformer

C) Vector D) Template

131. *Bacillus thuringiensis* forms protein crystals which contain insecticidal protein. This protein:

- A) Does not kill the carrier bacterium which is itself resistant to this toxin
- B) Binds with epithelial cells of midgut of the insect pest ultimately killing it
- C) Is coded by several genes including the gene cry
- D) Is activated by acid pH of the foregut of the insect pest
- 132. Human insulin is being commercially produced from a transgenic species of:
 - A) MycobacteriumB) Rhizobium
 - C) Saccharomyces D) Escherichia

133. In your opinion, which is the most effective way to conserve the plant diversity of an area

A) By creating biosphere reserve B) By creating crop land

C) By developing seed bank

D) By tissue culture method

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- 134. The method by which endangered plant species are conserved in a botanical garden or in some controlled circumstances
 - A) Afforestation B) In situ conservation
 - C) Ex situ conservation D) None of the above
- 135. Which of the following are parts of Biosphere reserves?
 - A) Transition zone
 - C) Core Zone

D) All of the above

B) Buffer zone

ZOOLOGY

136. There are certain limitations of ecological pyramids such as

- A. it cannot explain biomass in marine habitats
- B. it does not take into account the same species belonging to two or more trophic levels
- C. it assumes a simple food chain, something that almost never exists in nature
- D. it does not accommodate a food chain

E. saprophytes are not given any place in ecological pyramids

Choose the correct answer from the options given below:

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- A) A, B and E onlyB) B, C and E only
- C) B, C, D and E only D) A and B only
- 137. These are the factors known to affect Hardy- Weinberg equilibrium
 - A. Gene flow B. Genetic drift
 - C. Gene therapy
 - E. Inheritance of acquired characters

Choose the correct option:

A) A, B, and E only

B) A, B and C only

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D. Natural Selection

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C) A, B and D only

D) A, B, C and D only

138. The equation population growth is

 $N_{t+1} = N_t + [(B+I) - (D+E)]$

In the above, E is

A) the base of natural logarithm

B) intrinsic rate of natural increase

C) number of individuals who left the habitat

D) number of deaths in a population in a given time

139. Match List-I with List II:

List – I	List – II	
A) Connell	I) Co-existence	
B) Mac Arthur	II) Survival of the fittest	
C) Gause	III) Competitive release	
D) Darwin	IV) Competitive Exclusion	
Choose the correct answer from the options given below:		
A) A-I, B-III, C-II, D-IV	B) A-III, B-IV, C-II, D-I	
C) A-IV, B-III, C-II. –D-I	D) A-III, B-I, C-IV, D-II	
140. All are cannabinoids except		
A) marijuana	B) cocaine	
C) hashish	D) charas	
141. The type of joint found between metacarpal and carpal of thumb in human is		
A) saddle joint	B) pivot joint	
C) hinge joint	D) condyloid joint	

142. Given below are two statements:



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Statement-I: If there is a substantial risk that of the child were born, it would suffer from such physical or mental abnormalities as to be seriously handicapped, the termination of pregnancy is done during second trimester.

Statement-II: The termination of pregnancy can be done during second trimester with single medical practitioner opinion.

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

A) Statement I is correct, II is incorrect	B) Statement I is incorrect, II is correct
--	--

C) Both statement I and II are correct D) Both statement I and II are incorrect

143. A pair of short, thread-like structures found in male cockroach only are

A) anal cerci	B) pineal setae

C) caudal styles D) copulatory claspers

144. Zimbabwe had gifted the elephant to Ex- President of India Sri Shankar Dayal Sharma in1996. It is named as Shankar and has been housed at the National Zoological Park, Delhi.Such a conservation method is termed

A) Semiconservative method	B) In vitro culture method
C) Ex situ conservation method	D) On site conservation method

145. Which of the following type of cells are not found in testis of human?

A) Sertoli cells	B) Granulosa cells

C) Leydig cellsD) Immunological competent cells146. Given below are some periods of geological time scale: Arrange them in correct sequence.

(Past to Recent)
A. Silurian
C. Carboniferous
Choose the correct sequence from the options given below

A) D-A-C-B

B) B-A-D-C

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NEET (UG)-2025 (CNMT - 2) **QUESTION PAPER** C) C-B-D-A D) A-D-C-B 147. Which of the following is neither protein nor peptide hormone? A) Corticotrophin **B)** Prolactin C) Relaxin D) Androgen 148. All are the features of angiotensin-II except A) a powerful vasoconstrictor B) increases the glomerular blood C) decreases the GFR D) activates the adrenal cortex to release Aldosterone 149. The wing of pigeon shows homology with (a) and analogy with (B). (a) and (B) are A) (a) $- \log of \operatorname{cockroach}; (B) - \operatorname{pelvic} fin of shark$ B) (a) – forelimb of penguin; (B) – wing of locust C) (a) – forelimb of rabbit; (B) – flipper of whate D) (a) - Foot of snail; (B) - Wing of butterfly 150. Which of the following are Physiological Barriers? A. Mucus coat of respiratory tract B. Acid in the stomach C. Saliva in the mouth D. Phagocytosis by neutrophil E. Tears from eyes Choose the most appropriate answer from the options given below: A) A, B and D only B) B and E only C) B, C and E only D) A, C, D and E only 151. Match List-I with List-II with respect to modes of infection: List-I List-II A. Amoebiasis I. Food and water B. Chikungunya II. Inhalation of aerosols

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	C. Pneumonia	III. Insect bite
	D. Tetanus	IV. Spores in the soil
	Choose the correct answer free	om the options given below:
	A) A-I, B-III, C-II, D-IV	B) A-IV, B-III, C-I, D-II
	C) A-III, B-I, C-IV, D-II	D) A-II, B-IV, C-III, D-I
152. W	/hich of the following is not a A) Contraction of internal int	n event of inspiration? rercostal muscles
	B) Elevation of ribcage upwa	ard and forward
	C) Flattening of diaphragm	
	D) Decrease in intrapulmona	ary pressure
153. N	latch List-I with List-II	
	List-I	List-II
	A. Down's syndrome	I. Inborn error of metabolism
	B. Phenylketonuria	II. Blood related disorder
	C. Thalassemia	III. Allosomal monosomy
	D. Turner's syndrome	IV. Autosomal trisomy
	Choose the correct answer from	om the options given below:

A) A-I, B-II, C-III, D-IVB) A-II, B-III, C-IV, D-IC) A-III, B-IV, C-I, D-IID) A-IV, B-I, C-II, D-III

154. Given below are two statements: one is labelled as Assertion A and other is labelled as Reason R.

Assertion (A): Progesterone plays a major role in the maintenance of pregnancy as well as mammary gland development and milk secretion.

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Reason (R): Progesterone is secreted by both corpus luteum and placenta.



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

- A) Both A and R are true and R is the correct explanation of A
- B) Both A and R are true but R is NOT the correct explanation of A
- C) A is true but R is false
- D) A is false but R is true

155. Identify the mismatched combination from the following

- A) Smooth muscle Fusiform muscle fibres
- B) Myelinated neurons Saltatory transmission
- C) Cardiac muscle Intercalated discs
- D) Bipolar neurons Two dendrites

156. In SNPs, P stands for

A. Metastasis

B. Dependence

C. Vaccination

D. Antibiotics

A) polymerization	B) polymorphism	C) polyploidy	D) palindrome
157. Match List-I with List-	п		
List-I		List-II	

- **I.** Tendency of the body to manifest unpleasant withdrawal syndrome
 - II. Feared property of malignant tumour
 - III. Based on the property of memory of immune system
 - IV. Interaction of chemical with respect to pathogen.

Choose the correct answer from the options given below:

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- 158. In haplo-diploidy of honeybee,
 - A) drones are diploid B) females are haploid
 - C) females are formed by parthenogenesis D) drones have no father
- 159. Name the part of the brain which is concerned with a) intelligence and memory and b) posture and equilibrium:
 - A) a) cerebrum, b) cerebellum B) a) hypothalamus, b) thalamus
 - C) a) hypothalamus, b) medulla D) a) pons, b) cerebellum
- 160. Three types of connective tissues given as A, B and C. Identify the correct matching pair along the feature/location in human body



A) A-Dense regular: Tendon; B-Dense irregular: Skin; C-Bone-Non-pliable

- B) A-Dense irregular-Skin; B-Dense regular- Tendon; C-Bone-Pliable
- C) A-Dense regular: Tendon; B-Dense irregular-Skin: C-Cartilage-Non-pliable
- D) A-Dense irregular-Skin; B-Dense regular- Tendon; C-Cartilage-Pliable
- 161. Given below are two statements: One is labelled as Assertion A and other is labelled as Reason R.

Assertion (A): Cardiac output of an athlete will be much higher than that of an ordinary man.

Reason (R) : The body has the ability to alter the stroke volume but not the heart rate

to enhance the cardiac output.

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

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





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- 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
- 162. pO₂ is 95 mm Hg, 40 mmHg and 104 mmHg respectively in
 - A) systemic vein, pulmonary vein and alveoli
 - B) systemic artery, pulmonary artery and alveoli
 - C) systemic vein, pulmonary artery and alveoli
 - D) systemic artery, pulmonary vein and Alveoli
- 163. Consider the following statements:
 - A. Larva of echinoderm is radially symmetrical
 - B. Tapeworms are metamerically segmented
 - C. Statocysts are found in aquatic arthropods
 - D. Roundworms are exclusive parasites of animals

Choose the correct answer from the options given below:

A) B only

B) A only C) C only

D) D only

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164. Match List-I with List-II

- List-I List-II
- A. Condom I. Cervix
- B. Vault II. Fallopian tube
- C. IUD III. Vagina
- D. Tubectomy IV. Uterus

Choose the correct answer from the option given below:

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

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

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

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

165. Given below are two statements:

Statement-I: Conditional reabsorption of Na+ and water takes place in distal convoluted

tubule.

Statement-II: Large amounts of water could be reabsorbed from the distal convoluted tubule to produce a concentrated urine by obligate reabsorption of water.

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

A) Both statement I and Statement II are true

B) Both statement I and Statement II are false

C) Statement I is true but Statement II is false

D) Statement I is false but Statement II is true

166. Match List-I with List-II:

A. Pteropus

List-I

List-II

I. Platypus

B. Ornithorhynchus II. Kangaroo

C. Macropus III. Flying fox

D. Balaenoptera IV. Blue whale

Choose the correct answer from the options given below:

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

167. Match List-I with List-II:

List-I

List-II

A. Pectoral girdle

I. Tibia-fibula

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B. Pelvic girdle	II. Coxal bone
C. Forelimb	III. Radius-ulna
D. Hind limb	IV. Scapula

Choose the correct answer from the options given below:

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

168. Given below are two statements:

Statement-I: Oxytocin acts on the uterine muscle and causes stronger contractions, which in turn stimulates further secretion of oxytocin during parturition.

Statement-II: Oxytocin is synthesized, stored and released by neurohypophysis.

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

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D) Statement I is false but Statement II is True

169. Identify the mismatched combination from the following

A) Competitive interference: Flamingos and resident fishes for zooplankton

B) Competitive exclusion: Goat and Abingdon tortoise

C) Competitive release: Balanus and Chathamalus

D) Interspecific competition: Extinction of warblers due to severe competition between them

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170. Match List-I with List-II related to frog

List-I

List-II



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	A. Conus arteriosus	I. Heart	
	B. Corpora quadrigemina	II. Brain	
	C. Foramen magnum	III. Skull	
	D. Bidder's canal	IV. Kidney	
	Choose the correct answer fr	rom the options	s given below:
	A) A-IV, B-II, C-III, D-I		B) A-I, B-II, C-III, D-IV
	C) A-IV, B-III, C-II, D-I		D) A-III, B-II, C-IV, D-I
171. 7	The following are the statemen	ts about reptile	es:
	A. Thick shelled eggs are pro-	oduced	B. Vestigial gill slits seen in their embryos
	C. Mesodermal scales form	exoskeleton	D. Fertilization is internal
	E. All have three-chambered	l heart	
	Choose the most appropriate	e answ <mark>er from t</mark>	he options given below:
	A) A and C only		B) A, B and D only
	C) B, D and E only		D) B, C and D only
172.	Part of nephron that is not see	n in cortical reg	gion is
	A) loop of Henle	B) pro	oximal convoluted tubule
	C) distal convoluted tubule	D) co	llecting duct
173. (Given below are two statement	ts:	
	Statement I: A canal called c	erebral aquedu	ect passes through the midbrain.
	Statement II: The dorsal por corpora quadrigemina.	rtion of midbra	ain has mainly four round swellings called
	In the light of the above st options given below:	atements, choo	ose the most appropriate answer from the
	A) Both Statement I and Sta	tement II are co	orrect



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- B) Both Statement I and Statement II are incorrect
- C) Statement I is correct but Statement II is incorrect
- D) Statement I is incorrect but Statement II is Correct
- 174. Observe the following flow chart



Identify the correct with respect to the above chart

- A) (a) and (B) are haploid
- B) (e) and (f) are formed in fallopian tube
- C) No need of the sperm entry for the formation of (d) and (f)
- D) (c) is formed by mitotic division
- 175. An elastic fibre that bisects isotrophic band in a sarcomere is A) Z-line B) H-zone C) M-line

D) Y-intercept

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176. Given below are two statements:

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Statement-I: The primary and secondary responses are carried out with the help of two

special types of lymphocytes namely B - lymphocytes and T-lymphocytes.

Statement-II: Humoral response is antibody mediated and cell mediated immunity is mediated by T-lymphocytes.

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

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A) Both Statement I and Statement II are correct

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B) Both Statement I and Statement II are incorrect

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C) Statement I is correct but	C) Statement I is correct but Statement II is incorrect						
D) Statement I is incorrect	but Statement I	I is correct					
177. Moist surface of buccal cavity	is lined by						
A) simple squamous epithel	ium	B) compound epithe	elium				
C) columnar epithelium with	h microvilli	D) pseudostratified	epithelium				
178. A woman with blood type 'O' then the genotype of him is	' has a child w	th blood type 'O'. If	her husband has 'B',				
A) $I^A I^B$ B) $I^B I$	[^B	C) I ^B I ^O	D) I ^A I ^O				
179. Most abundant protein secrete A) elastin fibres B) ret	d by fibroblasts ticular fibres	in connective tissue a C) collagen fibres	are D) gelatin fibres				
180. Match List-I with List-II:	T. H						
L1st-I	L1st – II						
A. Addison's disease	I. Hyposecret	tion of insulin					
B. Cretinism	II. Hyposecre	etion of vasopressin					
C. Diabetes mellitus	III. <mark>Hyposec</mark> i	etion of corticoid hor	mones				
D. Diabetes insipidus	IV. Hyposecr	etion of thyroxine					
Choose the correct answer f	rom the options	given below					
A) A-I, B-III, C-II, D-IV	B) A-	IV, B-II, C-I, D-III					
C) A-III, B-IV, C-II, D-I	D) A-	III, B-IV, C-I, D-II					



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PHYSICS

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1. Ans: B)

$$E_{net} = \frac{-\sigma}{2e_0}k - \frac{2\sigma}{2e_0}k - \frac{\sigma}{2\varepsilon_0}k = \frac{-2\sigma}{\varepsilon_0}(k)$$

2. Ans: A)



Acceleration $a = \frac{\mathrm{Net \ pulling \ force}}{\mathrm{Total \ mass}}$

$$a = \frac{30-10}{4} = 5m/sec^2$$

 \therefore Tension in string \rightarrow

FBD of kg
$$\Rightarrow$$
T – 10 = 1 × a

$$T = 15N$$

Now the young's modulus is given by

$$Y = \frac{\text{stress}}{\text{strain}} = \frac{\frac{F}{A}}{\frac{\Delta L}{L}} \text{ or } Y = \frac{\frac{T}{A}}{\frac{\Delta L}{L}}$$

or $\frac{\Delta L}{L} = \frac{T}{A \times Y} = \frac{15}{1 \times 10^{-6} \times 10^{11}}$
 $\frac{\Delta L}{L} = 1.5 \times 10^{-4}$

3. Ans: B)

$$\begin{array}{c} \overset{(-1,-4)}{4kg} & \overbrace{2kg}^{(2,-3)} \\ \overset{(1,6)}{5kg} & \overbrace{5kg}^{(-1,5)} \\ x_{com} & = \frac{5 \times 1 + 3 \times (-1) + 2 \times 2 + 4 \times (-1)}{5 + 3 + 2 + 4} = \frac{1}{7} \\ y_{com} & = \frac{6 \times 5 + 3 \times 5 + 2 \times (-3) + 4 \times (-4)}{14} \\ y_{com} & = \frac{30 + 15 - 6 - 16}{14} = \frac{45 - 22}{14} = \frac{23}{14} \end{array}$$

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4. Ans: C) Resultant focal length = ∞

 \therefore It behaves as a plane slab of glass.

- 5. Ans: C) Electric charge is a derived quantity in SI. Therefore, the correct answer is (C)
- 6. Ans: C) We know that,

The Magnetic field on the axis of circular current carrying wire:

$$egin{array}{lll} \mathrm{B} = & rac{\mu_0}{4\pi} \; . \; rac{2\pi\mathrm{nir}^2}{\left(\mathrm{x}^2 + \mathrm{r}\,^2
ight)^{3/2}} \ \mathrm{B} \propto \; rac{\mathrm{nr}^2}{\left(\mathrm{x}^2 + \mathrm{r}^2
ight)^{3/2}} \end{array}$$

7. Ans: A) Work done by electric field :

$$w = PE_{i} - PE_{f} = q \left[V_{i} - V_{f} \right] = q \left[\frac{KP \cos 45^{\circ}}{\left(1 \times 10^{-2}\right)^{2}} - \frac{KP \cos 135^{\circ}}{\left(2 \times 10^{-2}\right)^{2}} \right]$$

Work done = $\frac{100}{3}J$
 $\left| \vec{v}_{cm} \right| = \frac{1}{3}\sqrt{1^{2} + 4^{2}} = \frac{\sqrt{17}}{3} = 1.37m / s$

9. Ans: B) For a compound microscope $m \propto \frac{1}{f_0 f}$

So in a compound microscope magnification will be large, if the focal length of the

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eye piece is smaller.

10. Ans: C)

8.

$$[ax^{2}] = [F]$$

$$[a][L^{2}] = [MLT^{-2}]$$

$$[a] = [ML^{-1} T^{-2}]$$

$$[bt^{1/2}] = [F]$$

$$[b^{2}t] = [F]^{2}$$

$$[b^{2}t][T] = [MLT^{-2}]^{2}$$

$$[b^{2}] = \frac{M^{2}L^{2}T^{-4}}{T}$$

$$= [M^{2}L^{2}T^{-5}]$$

$$\therefore \frac{[b^{2}]}{[a]} = \frac{[M^{2}L^{2}T^{-5}]}{[ML^{-1}T^{-2}]}$$

$$= [ML^{3} T^{-3}]$$



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The initial area $(A_1) = \pi r_1^2 = (3.14)(20 \text{ cm})^2$ = (3.14) (400cm²) = 1256cm² The final area $(A_2) = \pi r_2^2 = (3.14)(20.5 \text{ cm})^2$ = (3.14) (420.25cm²) = 1319.585 cm² The change in area (ΔA) = 1319.585cm² – 1256cm² = 63.585cm² Formula of the change in area : $\Delta A = \beta A_1 \Delta T$ 63.585 = β (1256) (70°C) 63.585 = β (87,920°C) β = 63.585/ 87,920°C β = 0.00072/°C

12. Ans: A) The centripetal force provided by the magnetic force is given as:

$$\frac{mv^2}{r} = qvB$$
$$\implies r = \frac{mv}{qB} = \frac{p}{qB}$$

Also, momentum can be written as: $KE = \frac{p^2}{2m}$

$$\Rightarrow p = \sqrt{2mKE}$$

 $\beta = 7.2 \times 10^{-4} / C^{\circ}$

Here, are same for all the particle, so, $r \propto \frac{\sqrt{m}}{2}$

Now the ratios are: $r_p: r_d: r_a = \frac{\sqrt{m}}{e}: \frac{\sqrt{2m}}{e}: \frac{\sqrt{4m}}{2e}$ (Let the mass of proton is m)

So,
$$r_{\alpha} = r_p < r_d$$

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13. Ans: C)
$$U = \frac{k \times 40 \times 10}{.02} - \frac{k \times 10 \times 20}{.04} = 9 \times 10^9 \left[2 \times 10^4 - 5000 \right] = 135 \times 10^{12} (J)$$

14. Ans: B) Magnet A is allowing all the field lines passing through it, therefore it is ferromagnetic.

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Magnet B is repelling the field lines therefore it is diamagnet.

Magnet C is attracting the field lines therefore it is paramagnet.



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15. Ans: D)

torque is the cross product of the force $\overrightarrow{\mathbf{F}}$ and the position vector' $\overrightarrow{\mathbf{r}}$ ' $\overrightarrow{\tau} = \overrightarrow{\mathbf{r}} \times \overrightarrow{\mathbf{F}}$ so the angle between τ and \mathbf{F} is 90° and between τ and \mathbf{r} is 90° for example if we take dot product between two vectors as $\theta = 90^\circ$

$$\implies \cos \theta = \cos 90^{\circ} = 0$$
$$\implies \overrightarrow{\mathbf{r}} \cdot \overrightarrow{\tau} = 0$$
$$\overrightarrow{\mathbf{F}} \cdot \overrightarrow{\tau} = 0$$

- 16. Ans: C) Only the central fringe is white all other fringes are coloured.
- 17. Ans: D)

```
We know that - \begin{split} S &= ut + \frac{1}{2}at^2 \\ \text{Given } u &= 0 \text{ , then } - \\ S_1 &= \frac{1}{2}a(10)^2 = \frac{1}{2}a(100) \\ \text{And } S_2 &= \frac{1}{2}a(20)^2 = \frac{1}{2}a(400) \\ \text{Hence, } S_2 &= 4S_1 \end{split}
```

18. Ans: B) Volume of a liquid flowing per second is equal to the product of area and velocity of liquid i.e., Q = Av According to Torricelli's Theorem velocity of efflux i.e. the velocity with which the liquid flows out of a hole is equal to $\sqrt{2gh}$ where h is the depth of the hole below the liquid surface. So we have $Q = A\sqrt{2gh}$. Hence volume of liquid flowing per second depends upon the hight of the liquid above the orifice the acceleration due to gravity the area of the orifice and it is independent of the density of the liquid

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19. Ans: B)

Given
$$\begin{split} &V_1=26 \ \mathrm{Volt} \\ &A_1=2 \ \mathrm{Amp.} \\ &R \ (\ \mathrm{Total} \ \mathrm{resistance}) \\ &= (6+3+x) = (9+x)\Omega \\ &I = \frac{V}{R} = \frac{26}{(9+x)} = 2 \\ &13=9+x \\ &\mathrm{or} \ x = 4\Omega \end{split}$$



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20. Ans: C)

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$$K = \sqrt{\frac{I}{M}} = \sqrt{\frac{ML^2}{3M}} = \frac{L}{\sqrt{3}}$$

21. Ans: C)





case (1) when there is no friction, From Newton's second law, F = ma

 \Rightarrow mg sin θ = ma₁

 $\Rightarrow a_1 = g \sin \theta$ (1)

Now, as body starts from rest so initial velocity(u) = 0 m/s.

Let, body travels 'x' distance in t time, so from equation of motion.

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

 $\Rightarrow x = \frac{1}{2}a_{1}t_{1}^{2}$ (from equation (1))
 $\Rightarrow t^{2} = \sqrt{\frac{2x}{a_{1}}} = \sqrt{\frac{2x}{g\sin\theta}}$ (2)
case (2) : - When there is friction
From Newton's second law, F= ma

$$\Rightarrow$$
mgsin θ - μ mg cos θ = ma₂

 $\Rightarrow a_2 = g \sin\theta - \mu g \cos\theta \quad (3)$

Now, as body starts from rest so initial velocity (u) = 0 m/s. Let, body travels 'x' distance in t time. So from equation of motion.

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

$$\Rightarrow x = \frac{1}{2}a_{2 t_{2}^{2}}$$

$$\Rightarrow t_{2} = \sqrt{\frac{2x}{a_{1}}} = \sqrt{\frac{2x}{g \sin\theta - \mu g \cos\theta}} \quad ------(4)$$
It is given that $t_{2} = 2t_{1}$ ------(5)
So, $\sqrt{\frac{2x}{g \sin\theta - \mu g \cos\theta}} = 2\sqrt{\frac{2x}{g \sin\theta}}$
Now, substituting $\theta = 45^{\circ}$ and solving above equation we get
 $\sqrt{\frac{1}{1-\mu}} = 2$
 $\mu = \frac{3}{4} = 0.75$
22. Ans: B) Induced emf
 $\varepsilon = \frac{d\phi}{dt}$
 $i = \frac{1}{R} \frac{d\phi}{dt}$
 $\frac{\Delta Q}{\Delta t} = \frac{1}{R} \frac{\Delta \phi}{\Delta t}$
So, $Q = \frac{\Delta \phi}{R}$

23. Ans: A) Unit of stefan's constant. The Net power radiated is

$$P = \sigma A T^{4}$$
$$\sigma \Longrightarrow \frac{P}{A T^{4}} = \frac{watt}{m^{2} - K^{4}}$$

24. Ans: C)

Distance from centre x = A - $\frac{A}{3} = \frac{2A}{3}$ So potential energy = $\frac{1}{2}Kx^2 = \frac{1}{2}K\left(\frac{2A}{3}\right)^2$

$$\mathsf{PE} = \frac{4}{9} \left(\frac{1}{2} \mathbf{k} \mathbf{A}^2 \right) = \frac{4 \mathbf{E}}{9}$$



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Given : $\phi = 5t^3 - 100t + 300$ $e = -\frac{d\phi}{dt}$ $e = -[15t^2 - 100]$ e = -[60 - 100]e = 40

26. Ans: A) Apply $\Delta Q = ms\Delta T$

 $\Delta Q = 5 \times 4200 \times (100 - 20)$

$$\Delta Q = 1680 \text{ K.}$$

27. Ans: B) When a person is standing on a weighning machine, and the machine is going downward with acceleration 'a' then, the Normal reaction is given by, N = M(g - a).

So, N < Mg So, the measured weight is less than the true weight.

28. Ans: B) When block in air

$$n_1 = 260 = \frac{1}{2L} \sqrt{\frac{1 \times g}{M}}$$

When block is immersed in a liquid of density 1.2, then weight in liquid = weight in air - loss in weight

Tension
$$= Mg\left(1 - \frac{1.2}{1.8}\right) = Mg = \frac{g}{3}$$

 $n_2 = \frac{1}{2L}\sqrt{\frac{g}{3M}} = \frac{n_1}{\sqrt{3}}$ EDUCATION FOUNDATION MOODBIDET (R)
 $n_2 = \frac{260}{\sqrt{3}} = 150Hz$

29. Ans: A) $X_L = \omega_L = 2nfL$. Therefore the correct answer is A.

30. Ans: A)





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$$\begin{split} m_{3}g - T_{2} &= m_{3}a \qquad \dots \dots (1) \\ m_{2}g + T_{2} - T_{1} &= m_{2}a \qquad \dots (2) \\ T_{1} - m_{1}g &= m_{1}a \qquad \dots (3) \\ (m_{3}+m_{2}-m_{1})g &= (m_{1}+m_{2}+m_{3})a \\ a &= \frac{(m_{3}+m_{2}+m_{1})g}{m_{1}+m_{2}+m_{3}} \\ put this value in eq. (1) \\ m_{3}g - T_{2} &= m_{3}a \\ m_{3}g - m_{3}\frac{(m_{3}+m_{2}-m_{1})g}{(m_{1}+m_{2}+m_{3})} &= T_{2} \\ m_{3}g \left[1 - \frac{(m_{3}+m_{2}-m_{1})}{(m_{1}+m_{2}+m_{3})}\right] &= T_{2} \\ \therefore T_{2} &= \frac{2m_{1}m_{3}g}{m_{1}+m_{2}+m_{3}} \end{split}$$

31. Ans: C) Curve represent incident radiation of same frequency & different intensities.

32. Ans: C)
$$\frac{1}{\lambda} = Rz^3 \left(\frac{1}{1^2} - \frac{1}{2^2} \right)$$

 $\frac{1}{\lambda} \propto z^2$
 $\lambda \propto \frac{1}{z^2}$
 $\lambda_1 : \lambda_2 : \lambda_3 = \frac{1}{9} : \frac{1}{4} : \frac{1}{1}$
 $\frac{4:9:36}{36} = 4:9:36$

33. Ans: B)

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Path difference on the circle of radius around O on the wall will be same hence concentric circle



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As we know

$$I = \frac{V}{R_{eq}}$$
$$P = I^2 R$$

For maximum power dissipation, I should be maximum.

For maximum I, R_{eq} should be minimum.

Hence, for given condition, $R_{min}=2\Omega$ when

 R_p (shown in diagram) became zero (i.e. R_p = 0)

Now,

$$I = \frac{12}{2} = 6A$$

 \therefore Maximum power dissipation in 2Ω is

$$P_{max} = (6)^2 (2)$$

 $P_{max} = 36 \times 2 = 72 W$

35. Ans: B)

Given :

$$\begin{split} n &= 2 \times 10^{21} \\ I &= 10 mm \\ V_d &= 0.25 mm/sec \\ Total charge Q &= ne = 2 \times 10^{21} \times 1.6 \times 10^{-19} = 320 \\ C \\ Drift velocity(V_d) &= 0.25 = \frac{distance}{time} = \frac{10}{T} \\ T &= 40 \; sec \\ now \; current \; I &= \frac{Q}{T} = \frac{320}{40} = 8A \end{split}$$

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36. Ans: A) The Root mean square velocity is given by

$$v_{rms} = \sqrt{\frac{3RT}{M}}$$
Where, M = molecular mass

$$V_{rms_{H}} = \sqrt{\frac{3RT}{2}}$$

$$V_{rms_{O}} = \sqrt{\frac{3R(320)}{32}}$$

$$V_{rms_{O}} = \sqrt{3R(10)}$$
Given : $V_{rms_{H}} = V_{rms_{O}}$

$$\therefore \sqrt{\frac{3RT}{2}} = \sqrt{3R(10)}$$

$$\frac{T}{2} = 10$$

$$T = 20K$$
37. Ans: D) h $\geq 5r/2$
38. Ans: A) $mg(h_{1} - h_{2}) = ms\Delta T$
 $10(2.5 - 0.5) = 25.2 \times \Delta T$
 $\Delta T = \frac{20}{25.2} = 0.79K$

39. Ans: C) Apparent acceleration due to gravity because of force of buoyancy

$$g' = g\left(1 - \frac{\rho_i}{\rho_s}\right)$$

$$\rho_i = \rho_s/10$$

$$\Rightarrow g' = g\left(1 - \frac{1}{10}\right)$$

$$= \frac{9}{10}g$$

$$T \propto \frac{1}{\sqrt{g}}$$

$$\Rightarrow T' = \sqrt{\frac{10}{9}}T$$

40. Ans: A) As no external force is there so its angular momentum will remain conserved. So,

angular momentum $\vec{L} = I\omega$ = constant

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since mass gets stick to the periphery its mass will increase and to get it conserved its ω decreases.

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Net MOI increases. Therefore, the correct answer is A.



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$$F \longrightarrow m$$

$$a = \frac{f}{m}$$

$$V = u + at$$

$$V = 0 + \frac{F}{m}t$$

$$KE = \frac{1}{2}mv^{2} = \frac{1}{2}m \times \frac{F^{2}}{m^{2}}t^{2} = \frac{F^{2}t^{2}}{2m}$$

42. Ans: B)

$$A_{R} = \sqrt{A_{1}^{2} + A_{2}^{2} + 2A_{1}A_{2}.\cos(\Delta\phi)}$$

$$0 = A^{2} + A^{2} + 2A^{2}\cos(\Delta\phi)$$

$$\Rightarrow -2A^{2} = 2A^{2}\cos(\Delta\phi)$$

$$\Rightarrow \cos(\Delta\phi) = -1$$

$$\Rightarrow (\Delta\phi) = \pi$$

$$\Rightarrow \frac{2\pi}{\lambda}.\Delta x = \pi$$

$$\Delta x = \frac{\lambda}{2}$$
ans: C)
$$\frac{\Delta P}{\lambda} \times 100 = \left[2\left(\frac{\Delta\alpha}{\lambda}\right) + \left(\frac{\Delta\beta}{\lambda}\right) + 4\left(\frac{\Delta\gamma}{\lambda}\right)\right]$$

- 43. Ans: C) $\frac{\Delta P}{P} \times 100 = \left[2\left(\frac{\Delta \alpha}{a}\right) + \left(\frac{\Delta \beta}{\beta}\right) + 4\left(\frac{\Delta \gamma}{\gamma}\right) \right] \times 100$ = $(2 \times 0.1 + 0.2 + 4 \times 0.4) \times 100 = 2.0\%$
- 44. Ans: A) PN-junction diode conducts when the value of forward bias is more than the potential barrier.
- 45. Ans: C)

Α	в	Υ					
0	0	0					
0	1	1					
1	0	1					
1	1	0					
$\mathbf{Y} = \left(\overline{\mathbf{A}} \cdot \mathbf{B}\right) \left(\overline{\mathbf{B}} \cdot \mathbf{A}\right)$							

Therefore, the correct answer is (C)

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46. Ans (B)

80 g of O₂ =
$$\frac{80}{32}$$
 mol = 2.5 mol = 2.5 × 2 × 6.02 × 10²³ atoms of O

5g of H₂ = 5/2 mol = 2.5 mol = $2.5 \times 2 \times 6.02 \times 10^{23}$ atoms of H

47. Ans (B) Ionic size decreases with increase of nuclear charge

48. Ans (D)



49. Ans (A)

B.O. =
$$\frac{N_b - N_a}{2} = \frac{10 - 4}{2} = 3$$
.

50. Ans (A) Lewis acid strength decreases down the group

51. Ans (C)



Bond angle of OCl_2 is more than even H_2O . It is due to larger Cl-atom that H-atom/ Structure of ClO_2

Total number of valence electrons in $ClO_2 = 7 + 6 \times 2 = 19$

Therefore it is odd electron species with one 3e - 2c bond

Due to partial π -bond character in one of the two Cl – O bond, the O – Cl – O bond

angle increases to 118°. Therefore, correct order of increasing bond angles is $OF_2 < H_2O < OCl_2 < ClO_2$

52. Ans (A) Boiling points of hydrides of group 15 follow the order. SbH₃ > NH₃ > AsH₃ > PH₃

53. Ans (A) $\Delta H = \Delta E + \Delta n_8 RT = -5 - 1 \times 2.0 \times 298 cal = -601 cal$

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 $\Delta G = \Delta H - T\Delta S = -601 - 298 (-10) = 2379 \text{ cal}$

- 54. Ans (C)
- 55. Ans (B) o-nitrophenol forms intra molecular hydrogen bond and p-form forms inter molecular H-bond, so it has low B.P. than p-nitrophenol
- 56. Ans (A)

57. Ans (A)
$$CH_3-C \equiv CH + NH_4OH + AgNO_3 \rightarrow CH_3 - C \equiv C - Ag + NH_4NO_3 + H_2O$$

- 58. Ans (A)
- 59. Ans (C)



60. Ans (C) Extent of dissociation increases steadily with increasing dilution.

61. Ans (B) 2L of $3M \text{ AgNO}_3 = 6 \text{ moles of AgNO}_3$

 $3L \text{ of } 1 \text{ M BaCl}_2 = 3 \text{ moles of BaCl}_2$

$$2\operatorname{AgNO}_{4 \text{ moles}} + \operatorname{BaCl}_{3 \text{ moles}} \rightarrow 2\operatorname{AgCl} + \operatorname{Ba}(\operatorname{NO}_{3})_{2 \text{ moles}}$$

Thus 6 moles of $NO_3^{-}[Ba(NO_3)_2]$ ions are present in 2 + 3 = 5L

Hence, molarity $=\frac{\text{No.of moles}}{\text{Vol. of solution in litres}} = \frac{6}{5} = 1.2$

62. Ans (C)

$$\begin{aligned} & \underset{\substack{1\\ l-\alpha}}{\text{CuCl}_{2}} \rightarrow \underset{\alpha}{\overset{0}{\alpha}} \underset{\alpha}{\overset{0}{\alpha}} \overset{2}{\overset{0}{2\alpha}} \\ & i = 1 - \alpha + \alpha + 2\alpha = 1 + 2\alpha \\ & \text{Assuming 100\% ionization, } i = 3 \end{aligned}$$

Now
$$\Delta T_{b} = i.K_{b}.m = iK_{b}.\frac{W_{2}}{M_{2}}.\frac{1000}{W_{1}} = \frac{3 \times 0.52 \times 13.44 \times 1000}{134.4 \times 1000} = 3 \times 0.052 = 0.156 \approx 0.16$$

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63. Ans (C)

$$k = \frac{2.303}{t} \log\left(\frac{a}{a-x}\right)$$



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$$k = \frac{2.303}{1} \log\left(\frac{100}{25}\right) = 2 \times 0.693$$
$$t_{1/2} = \frac{0.693}{k} = \frac{0.693}{2 \times 0.693} = \frac{1}{2} hr$$

64. Ans (B) Arrhenius equation is

$$k = Ae^{-E_a/RT}$$

$$\ln k = \ln A - \frac{E_a}{RT}$$

$$\ln k = -\frac{E_a}{R} \cdot \frac{1}{T} + \ln A$$

$$y = m.x + c \quad \text{(Equation of straight line)}$$

$$Slope = -\frac{E_a}{R}$$

$$E_a = -\text{slop} \times R$$

$$= -(-1 \times 10^4 \text{ K}) \times 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$$

$$= 83410 \text{ J} = 83.41 \text{ kJ mol}^{-1}$$
65. Ans (A)

66. Ans (B)

$$\mathbf{E}_{\text{cell}} = \mathbf{E}_{\text{cell}}^{\circ} + \frac{0.0591}{2} \log \frac{\left[\mathbf{C}\mathbf{u}^{2+}\right]}{\left[\mathbf{Z}\mathbf{n}^{2+}\right]}$$

Higher the concentration of Cu^{2+} and lower the concentration of Zn^{2+} more will be

Ecell

 \therefore Correct order: $E_3 > E_2 > E_1$

```
Cu + 2Ag^+ \rightarrow Cu^{2+} + 2Ag
```

 $\Delta G^{\circ} = -nFE^{\circ}_{cell}$

$$= -2 \times 96500 \times 0.46 = -\,88780 \; J$$

= -88.78 kJ = -89 kJ

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68. Ans (C) Lower the value of reduction potential more is the reducing power

69. Ans. C.

70. Ans (B) The unpaired electrons in Fe^{2+} ion (four) are less than in Mn^{2+} ion (five)

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 \therefore Fe²⁺ ion is less paramagnetic than Mn²⁺ ion.

The correct order is : $V^{2+} < Cr^{2+} < Fe^{2+} < Mn^{2+}$

- 71. Ans (A) Due to Lanthanoid contraction order will be $Yb^{+3} < Pm^{+3} < Ce^{+3} < La^{+3}$
- 72. Ans (C) In octahedral crystal field, CFSE is higher
- 73. Ans (D)
- 74. Ans (D) $[Co(NH_3)_5Cl]Cl_2 \rightarrow [Co(NH_3)_5Cl]^{2+} + 2Cl^{-}$

```
2Cl^- + 2AgNO_3 \rightarrow 2AgCl
```

- 75. Ans (D) Nitrosonium (NO)⁺ and Nitronium ion (NO_2^+) are positive ligands
- 76. ANS. D
- 77. Ans (D)

Choice (D) represents an optically active compound because it has an asymmetric carbon (*C) atom.

Hence, the order of reactivity is : $(C_6H_5)_2C(CH_2)Br > (C_6H_5)_2CHBr > (CH_3)_2CHBr > CH_3CH_2Br$

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78. Ans (D) In S_Nl reaction, the rate determining step is the formation of carbocation which in turn depends upon the stability of carbocation. The stability of colocations is

$$(C_6H_5)_2 \overset{+}{C}(CH_3) > (C_6H_5)_2 \overset{+}{C}H > (CH_3)_3 \overset{+}{C} > (CH_3)_2 \overset{+}{C}H > \overset{+}{C}H_3 \overset{+}{C}H_2$$

79. Ans: D

80. Ans: A

KMnO₄ / H⁺ - o-Agent

 $K_2 Cr_2 O_7 \ / \ H^+ \ - o\text{-}Agent$

are converting benzyl alcohol into benzoic acid.

- 81. ANS. C.
- 82. ANS. A.
- 83. ANS. A.
- 84. ANS. B.

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- 85. Ans: B) Compound: I, II, V show Haloform reaction.
- 86. Ans: C) H-bonding between carboxylic acids are intermolecular hydrogen bonding.
- 87. Ans: A
- 88. Ans: D) Both statement I and statement II are true
- 89. Ans: B
- 90. Ans: A) HCl undergoes oxidation by releasing Cl₂ gas so HCl act as be the reducing agent than oxalic acid.

BOTANY

Q. No	91	92	93	94	95	96	97	98	99	100
Key Ans	D	С	С	C	С	В	С	А	Α	В
Q. No	101	102	103	104	105	106	107	108	109	110
Key Ans	D	С	С	C	D	В	D	А	В	Α
Q. No	111	112	113	114	115	116	117	118	119	120
Key Ans	А	В	В	A	В	D	В	А	С	В
Q. No	121	122	123	124	125	126	127	128	129	130
Key Ans	D	D	Α	D	А	В	С	С	С	С
Q. No	131	132	133	134	135					
Key Ans	В	D	A	C	D					



Q. No	136	137	138	139	140	141	142	143	144	145
Key Ans	В	С	С	D	В	Α	Α	С	С	В
Q. No	146	147	148	149	150	151	152	153	154	155
Key Ans	D	D	С	В	С	А	А	D	В	D
Q. No	156	157	158	159	160	161	162	163	164	165
Key Ans	В	С	D	А	А	С	В	С	D	С
Q. No	166	167	168	169	170	171	172	173	174	175
Key Ans	В	А	С	D	В	В	А	А	В	А
Q. No	176	177	178	179	180					
Key Ans	A	В	С	С	D					