NEET
MODEL QUESTION PAPER 1

NATIONAL TESTING AGENCY

Excellence in Assessment

PHYSICS

1. **Variation of photoelectric current with collector plate potential for different frequencies of incident radiations is shown in the graph. Then :**

   1) $v_1 > v_2 > v_3$

   2) $v_3 > v_2 > v_1$

   3) $v_1 = v_2 > v_3$

   4) $v_2 = v_3 > v_1$

2. **A heat engine has an efficiency η . Temperatures of source and sink are each each decreased by 100K. The efficiency of the engine**

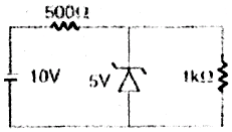
   1) Increases

   2) Decreases

   3) Remains constant

   4) Becomes 1

3. **In the following circuit, the current flowing through 1 $K\Omega$ resister is :**



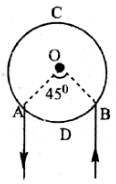
   1) 0 mA

   2) 5 mA

   3) 10 mA

   4) 15 mA

4. **A and B are two points on a uniform ring of resistance 15Ω. The $\angle AOB = 45°$. The equivalent resistance between A and B is C**



   1) 1.64 Ω

   2) 2.84 Ω

   3) 4.57 Ω

   4) 2.64 Ω

5. **In the nuclear decay given below:**

   $^{Z}_{A}X \rightarrow {}^{Z}_{Z+1}Y \rightarrow {}^{A-4}_{Z-1}B \rightarrow {}^{A-4}_{Z-1}B$, the particles emitted in the sequence are:

   1) γ, β, α 2) β, γ, α

   3) α, β, γ 4) β, α, γ

6. **A quantity X is given by $\varepsilon L \frac{\Delta V}{\Delta T}$ where ε_0 is the permittivity of the free space, L is a length, ΔV is a potential difference and Δt is a time interval. The dimensional formula for X is the same as that of**

   1) resistance

   2) charge

   3) voltage

   4) current

7. **Two identical coherent sources are placed on a diameter of a circle of radius R at separation $x (\ll R)$ symmetrically about the centre of the circle. The sources emit identical wavelength λ each. The number of poi8nts on the circle with maximum intensity is : $(x = 5\lambda)$**

   1) 20 2) 22

   3) 24 4) 26

8. **The focal length of lenses of an astronomical telescope are 50 cm and 5 cm. The length of the telescope when the image is formed at the least distance of distinct vision is**

   1) 45 cm

   2) 55 cm

   3) $\frac{275}{6}$ cm

   4) $\frac{325}{6}$ cm

9. **An astronomical telescope has an angular magnification of magnitude 5 for distant objects. The separation between the objective and the eye-piece is 36 cm and the final image is formed at infinity. The focal length f_0**

of the objective and f_e of the eye-piece are respectively:

1) 45 cm and p cm 2) 50 cm and 10 cm

3) 7.2 cm and 5 cm 4) 30 cm and 6 cm

10. In Young's double slit experiment distance between two sources is 0.1 mm. The distance of screen from the source is 20 cm. Wavelength of light used is 5460 A^0. Then, angular position of the first dark fringe is approximately

1) 0.08°

2) 0.16°

3) 0.20°

4) 0.31°

11. A luminous object is placed at distance of 30 cm from a convex lens of focal length 20 cm. On the other side of the lens, at what distance from the lens must a convex mirror of radius of curvature 10cm be placed in order to have upright image of the object coincident with it?

1) 30cm 2) 60cm

3) 50cm 4) 12cm

12. In an experiment four quantities a, b, c and d are measured with percentage error 1%, 2%, 3% and respectively, Quantity P is calculated as follows $P = \frac{a^3b^2}{cd}$ % error in the measurement of P is:

1) 4%

2) 14%

3) 10%

4) 7%

13. In an electrical circuit R, L, C and ac voltage source are all connected in series. When L is removed from the circuit, the Phase difference between the voltage and the current in the circuit is $(\pi/3)$. If instead, C is removed from the circuit the phase difference is again $(\pi/3)$. The power factor of the circuit is :

1) $\frac{1}{2}$ 2) $\frac{1}{\sqrt{2}}$

3) 1 4) $\frac{\sqrt{3}}{2}$

14. A Boy throws n balls per second at regular time intervals. When the first ball reaches the maximum height he throws the second one vertically up. The maximum height reached by each ball is

1) $\frac{g}{2(n-1)^2}$

2) $\frac{g}{2n^2}$

3) $\frac{g}{n^2}$

4) $\frac{g}{n}$

15. The percentage increase in the magnetic field B when the space within a current carrying toroid is filled with aluminium (the susceptibility of aluminium = (2.1×10^{-5}) is :

1) 10^{-3} 2) 2.1×10^{-3}

3) 4×10^{-3} 4) 3×10^{-3}

16. A bird moves in such a way that it has a displacement of 12 m towards east, 5 m towards north and 9 m vertically upwards. Find the magnitude of its displacement

1) $5\sqrt{2}m$

2) $5\sqrt{10}m$

3) $5\sqrt{5}m$

4) $5\ m$

17. **A portion is released from rest in a region of steady and uniform electric and magnetic fields which are parallel to each other. The particle will move in a:**

1) straight line 2) circle

3) helix 4) cycloid

18. **A particle moves along a straight line OX. At a time t (in seconds) the distance x (in metres) of the particle is given by $x = 40 + 12t - t^3$. How long would the particle travel before coming to rest?**

1) 24 m

2) 40 m

3) 56 m

4) 16 m

19. **An electron of mass m is accelerated through a potential difference of V and then it enters a magnetic field of Induction B normal to the field. Then, the radius of the circular path is:**

1) $\sqrt{\frac{2eV}{m}}$ 2) $\sqrt{\frac{2Vm}{eB^2}}$

2) $\sqrt{\frac{2Vm}{eB}}$ 4) $\sqrt{\frac{2eV}{e^2B}}$

20. **A Ball is thrown at an angle θ and another ball is thrown at an angle $(90° - \theta)$ with the horizontal from the same point with same speed $40\ ms^{-1}$. The second ball reaches 50m higher than the first ball. Find their individual heights?**

1) 15m, 65m

2) 25m, 75m

3) 10m, 60m

4) 20m, 70m

21. **Two identical electric conductors A and B have the same length L and carry the same current I. Wire A is bent into a circle of radius and wire B is bent to form a square of side a. If B_1 and B_2 are the values of magnetic induction at the centre of the circle and the centre of the square respectively, then the ratio of B_1/B_2 is:**

1) $(\pi^2/8)$ 2) $(\pi^2/8\sqrt{2})$

3) $(\pi^2/16)$ 4) $(\pi^2/16\sqrt{2})$

22. **Sand is being dropped on a conveyor belt at the rate of M kg/s. The force necessary to keep the belt moving with a constant velocity of v m/s will be**

1) Zero

2) Mv newton

3) 2 Mv newton

4) Mv/2 newton

23. **A 30W. 15V filament b8ulb is operated by using m cells, each of emf 2V and internal resistance 0.5Ω connected in series. The value of m for which the bulb consumes its rated power is :**

1) 5 2) 8

3) 7 4) 15

24. **A balloon with mass m is descending down with an acceleration a (where a<g). How much mass should be removed from it so that it starts moving up with an acceleration a?**

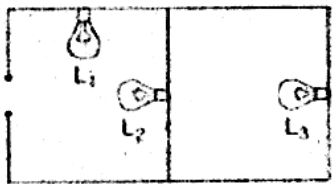
1) $\frac{2ma}{g+a}$

2) $\frac{2ma}{g-a}$

3) $\frac{ma}{g+a}$

4) $\frac{ma}{g-a}$

25. **Figure shows three similar lamps L_1, L_2 and L_3 connected across a power supply. If the lamp L_3 fuses, how will the light emitted by L_1 and L_2 change?**



1) No change

2) Brilliance of L_1, decreases and that of L_2 increases.

3) Brilliance of both L_1 and L_2increases.

4) Brilliance of both L_1 and L_2decreases.

26. Power applied to a particle varies with time as $P = (3t^2 - 2t + 1)$ watt, where t is in second. Find the change in its kinetic energy between t = 2s to t = 4s

1) 32 J

2) 46 J

3) 61 J

4) 120 J

27. In the series combination of n cells, each cell is having emf E and internal resistance r. If three cells are wrongly connected then effective emf and internal resistance of the combination will be:

1) $nE, (nr - 3r)$

2) $(nE - 2E), nr$

3) $(nE - 4E), nr$

4) $(nE - 6E), nr$

28. A stone tied to a string of length L is whirled in a vertical circle, with the other end of the string at the centre. At a certain instant of time, the stone is as its lowest position and has a speed u. The magnitude of the change in its velocity as it reaches a position where the string is horizontal is :

1) $\sqrt{u^2 - 2gL}$

2) $\sqrt{2gl}$

3) $\sqrt{u^2 - gL}$

4) $\sqrt{2(u^2 - gL}$

29. Figure shows a circuit with three ideal batteries in it. The circuit elements have the following values:

$\Delta V_{B_1} = 3.0V, \Delta V_{B_2} = 6.0\ V$

$R_1 = 2.0\Omega, R_2 = 4.0\ \Omega$

The currents i_1, i_2 and i_3 as shown in the circuit have the values:

1) $0.50\ A, -0.25\ A, +0.25\ A$

2) $0.25\ A, -0.50\ A, -0.25\ A$

3) $0.50\ A, 0.50\ A, 1.0\ A$

4) $-0.25\ A, 0.50\ A, 0.25\ A$

30. An engine pumps water through a hose pipe. Water passes through the pipe and leaves it with a velocity of 2 m/s. The mass per unit length of water in the pipe is 100 kg/m. What is the power of the engine?

1) 400 W

2) 200 W

3) 100 W

4) 800 W

31. A capacitor of capacitance $1\mu F$ withstands a maximum voltage of 6KV, while another capacitor of capacitance $2\mu F$, the maximum voltage 4KV. If they are connected in series, the combination can withstand a maximum of

1) 6KV 2) 4KV

3) 10KV 4) 9KV

32. Two particles each of mass m travelling along the same direction with velocities u_1 and u_2 collide perfectly in-elastically. The loss of kinetic energy will be

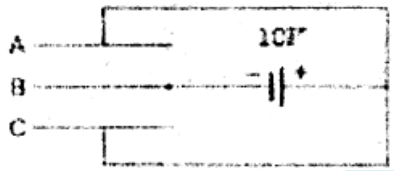
1) $\frac{1}{2}m(u_1-u_2)^2$

2) $\frac{1}{4}m(u_1-u_2)^2$

3) $m(u_1-u_2)^2$

4) $2m(u_1-u_2)^2$

33. Three plates A,B,C each of area 50 cm^2 have separation 3mm between A and B and 3 mm between B and C. The energy stored when the plates are fully charged is:



1) $7.4\times10^{-6}\,J$

2) $14.75\times10^{-8}J$

3) $7.4\times10^{-9}J$

4) $14.75\times10^{-10}J$

34. Two bodies of mass 1 kg and 3 kg have position vectors $\hat{\imath}+2\hat{\jmath}+\hat{k}$ and $-3\hat{\imath}-2\hat{\jmath}+\hat{k}$, respectively. The centre of mass of this system has position vector

1) $-2\hat{\imath}+2\hat{k}$

2) $-2\hat{\imath}-\hat{\jmath}+\hat{k}$

3) $-2\hat{\imath}-\hat{\jmath}-2\hat{k}$

4) $-\hat{\imath}+\hat{\jmath}+\hat{k}$

35. Four charges 2C, - 3C, - 4C and 5C respectively are placed at the four corners of a square. Which of the following statements is true for the point of intersection of the diagonals?

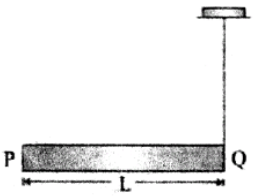
1) Electric field is zero but electric potential is non-zero

2) Electric field is non-zero but electric potential is zero.

3) Both electric field and electric potential are zero.

4) Neither electric field not electric potential is zero.

36. A rod PQ of mass M and length L is hinged at end P. The rod is kept horizontal by a massless string tied to point Q as shown in figure. When string is cut, the initial angular acceleration of the rod is



1) $\frac{3g}{2L}$

2) $\frac{g}{L}$

3) $\frac{2g}{L}$

4) $\frac{2g}{3L}$

37. An open pipe is in resonance in its 2nd harmonic with a tuning fork of frequency f_1. Now it is closed at one end. If the frequency of the tuning fork is increased gradually from f_1, then again a resonance is obtained with a frequency f_2. In this case if the pipe vibrates in nth harmonic, then:

1) $n=3, f_2=\frac{3}{4}f_1$

2) $n=3, f_2=\frac{5}{4}f_1$

3) $n=5, f_2=\frac{5}{4}f_1$

4) $n=5, f_2=\frac{3}{4}f_1$

38. A simple pendulum with a brass bob has a period T. The bob is now immersed in a non-viscous liquid and oscillated. If the density of the liquid is $1/8^{th}$ of brass, the time period of the same pendulum will be

1) $\sqrt{\frac{8}{7}}T$

2) $\frac{8}{7}\,T$

3) $\frac{64}{49}\,T$

4) T

39. A particle of mass m is located in a one dimensional potential field where potential energy is given by $U(x) = A(1 - cos\ px)$, where A and p are constants. The period of small oscillations of the particle is:

1) $2\pi\sqrt{\frac{m}{Ap}}$

2) $2\pi\sqrt{\frac{m}{Ap^2}}$

3) $2\pi\sqrt{\frac{m}{A}}$

4) $\frac{1}{2\pi}\sqrt{\frac{Ap}{m}}$

40. An external pressure P is applied on a cube at $0°C$ so that it is equally compressed from all sides. K is the bulk modulus of the material of the cube and α is its coefficient of linear expansion. Suppose we want to bring the cube to its original size by heating. The temperature should be raised by

1) $\frac{3\alpha}{PK}$

2) $3PK\alpha$

3) $\frac{P}{3\alpha K}$

4) $\frac{P}{\alpha K}$

41. The displacement of a particle varies according to the relation is $x = 4(cos\ \pi t + sin\ \pi t)$ then the amplitude of the particle is

1) 8 2) -4

3) 4 4) $4\sqrt{2}$

42. Water rises to height 'h' in capillary tube. If the length of capillary tube above the surface of water is made less than 'h' then

1) water does not rise at all

2) water rise to the tip of capillary tube and then starts overflowing like a fountain

3) water rises up to the top of capillary tube and stays there without overflowing

4) water rises up to a point a little below the top and stays there

43. Calculate the ratio of the mean free path of the molecules of two gases having molecular diameters $1A^0$ and $2A^0$. The gases may be considered under identical conditions of temperature, pressure and volume.

1) 4 : 1 2) 1 : 4

3) 2 : 1 4) 1 : 2

44. Four molecules of a gas are having speeds 1m/sec, 4m/sec, 8m/sec and 16m/sec respectively. The root mean square velocity of the gas molecules is

1) 7.25 m/s

2) 52.56 m/s

3) 84.25 m/s

4) 9.2 m/s

45. In Carnot engine efficiency is 40% at hot reservoir temperature T. For efficiency to be 50%, what will the temperature of hot reservoir?

1) $\frac{T}{5}$ 2) $\frac{2T}{5}$

3) 6T 4) $\frac{6T}{5}$

CHEMISTRY

46. Excess of SO_2 gas is passed through aqueous solution of NaOH. The resultant solution contains the following ions along with Na^+ ions.

1) SO_3^{2-} ions only

2) HSO_3^- ions only

3) both SO_3^{2-} and HSO_3^- ions

4) SO_4^{2-} ions only

47. Assertion (A): Chlorobenzene is less reactive than benzene towards electrophilic substitution reactions Reason (R) Chlorine has '+M' effect in chlorobenzene

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

2) Bothe A and R are correct. R is not the correct explanation of A.

3) A is true but R is false

4) A is false but R is true

48. In which of the following stronger hydrogen bonds are present

1) H_2O

2) C_2H_5OH

3) H_2SO_4

4) NH_3

49. 34 gm of H_2O_2 is present in 1120 ml of solution. This solution is called

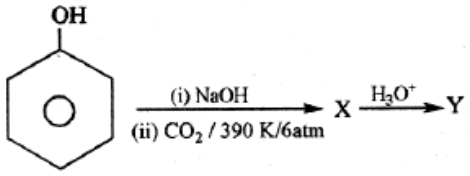
1) 10 vol solution

2) 20 vol solution

3) 34 vol solution

4) 32 vol solution

50.



The fundamental groups present in Y are

1) –CHO, - COOH

2) –OH, -CHO

3) –OH, -COOH

4) –CO- , -COOH

51. $CH_3CL \xrightarrow[dry\ ether]{No} A. C_2H_5Cl \xrightarrow[dry\ ether]{Mg} B \xrightarrow{CH_3OH} C$. The organic compounds A and C are

1) Functional isomers

2) Same compounds

3) Homologues

4) Metamers

52. Which of the following acts as a bleaching agent

1) Javelle water

2) Moist Cl_2

3) Dry O_3

4) All

53. Stability of the species Li_2, Li_2^- and Li_2^+ increases in the order of

1) $Li_2 < Li_2^+ < Li_2^-$

2) $Li_2^- < Li_2^+ < Li_2$

3) $Li_2 < Li_2^- < Li_2^+$

4) $Li_2^- < Li_2 < Li_2^+$

54. Ln_2C_3 (or) LnC liberate

1) H_2 on reaction with dilute acid

2) CO on reaction with boiling water

3) CO_2 on reaction with cold water

4) all

55. $Ethanal + Propanal \xrightarrow[\Delta]{dil\ alkali} A + B + C + D$. The product cannot be

1) 2-butenal

2) 3-Hexenal

3) 2-Pentenal

4) 2-methyl-2-pentenal

56. In Castner – Kellner ce4ll the products formed at cathode and anode are respectivey

1) $NaOH, Cl_2$

2) Cl_2, H_2

3) $Na - Hg, Cl_2$

4) Na, Cl_2

57. 0.4 gm of an organic compound gave 0.188 gm of AgBr by halogen estimation method. The percentage of bromine in the compound is (at. Wt. of Ag = 108, Br=80)

1) 20

2) 40

3) 46

4) 60

58. $Fe^{3+} + SCN^- \leftrightharpoons [Fe(SCN)]^{2+}(aq)$. For this aqueous solution if $FeCl_{3(s)}$ is added then

1) intensity of deep red colour increases

2) intensity of yellow colour increases

3) No change in colour takes place

4) solution becomes colourless

59.

$C_6H_5NH_2 \xrightarrow[273K]{NaNo_2+HCl} X \xrightarrow{H_3PO_2/H_2O} Y \xrightarrow[AlCl_3]{CO+HCl} Z.$

Z is

1) C_6H_5COOH

2) C_6H_5OH

3) C_6H_5CHO

4) C_6H_6

60. The volume of O_2 liberated at S.T.P when excess $SO_{2(g)}$ reacts with one mole of O_3 is

1) zero

2) 22.4L

3) 11.2L

4) 67.2L

61. The compound that is not a Lewis acid is

1) BF_3

2) $AlCl_3$

3) $BeCl_2$

4) CCl_4

62. Statement – I: NH_3 is a strong reducing agent while BiH_3 is a weak reducing agent

Statement – II: NH_3 gives deep blue colour with cupric ion is aqueous solution

1) both statements – I and II are correct

2) statement I is correct and statement – II is incorrect

3) statement –I is incorrect and statement – II is correct

4) both statements – I and II are incorrect

63. $X \xrightarrow[(b)H^+]{(a)KMnO_4}$. Terephthalicacid X is

1) 1,4-dimethyl benzene

2) 1,3-dimethyl benzene

3) 1,2-dimethyl benzene

4) ethyl benzene

64. Under standard conditions, the heats of atomization of $N_{2(g)}H_{2(g)}$ and $NH_{3(g)}$ are 945 KJ/mole, 436 Kj/mole and 1170 KJ/mole. If the standard heat of formation of $N_2H_{4(g)}$ is +106 KJ/mole, then the N-N bond strength is

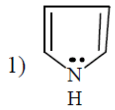
1) 151 KJ/mole

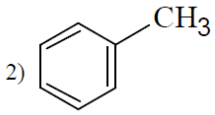
2) 302 KJ/mole

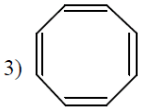
3) 75.5 KJ/mole

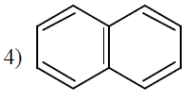
4) 226.5 KJ/mole

65. Which of the following is non-aromatic compound

1) 

2) 

3) 

4) 

66. Which of the following result in a single ketone product following acid catalysed hydration in presence of Hg^{2+} ions

1) 3 – octyne
2) 2 – octyne
3) 1– octyne
4) 4 – octyne

67. $XeF_6 + MF \rightarrow M^+[XeF_7]^-$. Here "M" is

1) Alkali metals
2) Alkaline earth metals
3) Transition metals
4) Inner transition metals

68. The repeating structural unit present in condensation chain polymer of silicones is

1) $\{R_2SiO_2\}$
2) $\{R_2SiO\}$
3) $\{O - SiR_2 - O\}$
4) $\{R_3Si - O\}$

69. 8 moles of AB_2 are introduced into 1 lit vessel. It dissociates as 2 $AB_3(g) \rightleftharpoons A_2(g) + 3B_2(g)$ at equilibrium 2 moles of A_2 is found to be present. The equilibrium constant for the reaction is

1) $2\ moles^2/lit^2$
2) $3\ moles^2/lit^2$
3) $27\ moles^2/lit^2$
4) $36\ moles^2/lit^2$

70. Which of the following electrolytic solution has more limiting molar conductivity at 298K

1) $HCL_{(aq)}$
2) $NaCl_{(aq)}$
3) $NaOH_{(aq)}$
4) $CH_3COONa_{(aq)}$

71. The products obtained by the hydrolysis of lactose are

1) D-glucose and D-galactose
2) D-glucose and D-fructose
3) Saccharic acid and gluconic acid
4) D-glucose only

72. Match the following

Column – I	Column –II
A. Equanil	I. Anibacterial
B. Prontosil	II. Tranquilizer
C. Brompheniramine	III. Antidepressant
D. Veronal	IV. Antihistamine

The correct match is

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

73. The coefficients of I^-, IO_3^- and H^+ om the reaction $I^+ + IO_3^- + H^+ \rightarrow I_2 + H_2O$ in the balanced form respectively are

1) 5, 1, 6
2) 1, 5, 6
3) 6, 1, 5
4) 5, 6, 1

74. $E^0_{Cd^{2+}/Cd} = -0.40V, E^0_{Hg_2SO_4/2Hg} = +0.62V$. For the spontaneous cell reaction E^0_{cell} is

1) +0.71V
2) +1.02V
3) +0.22V
4) -0.22V

75. Which of the following is a cationic complex?

1) Potassium ferrocyanide
2) Cryolite
3) Cuprammonium (II) sulphate
4) Sodium argento thiosulphate

76. Which of the following is not reactive towards Cl_2 at moderate temperatures

1) NaH
2) CsH
3) KH
4) LiH

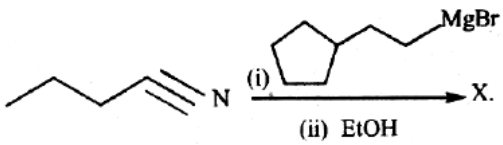
77. The statements regarding diborane are

i) B_2H_6 is stable in the absence of grease and moisture at low temperature

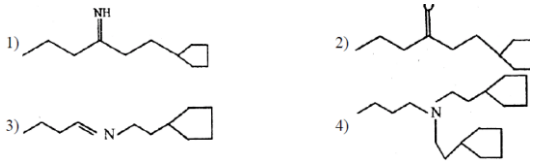
ii) B_2H_6 burns in oxygen to produce a very high temperature

iii) Borazole contains ionic bonds

1) iii only is correct
2) I and ii are correct
3) I and iii are correct
4) ii and iii are correct

78. 

Here 'X' is



79. Drugs that bind to the receptor site inhibit its natural function are called

1) Antagonists
2) Agonists
3) Drug inhibitor
4) Competitive inhibitor

80. The p^{OH} of the solution in which 0.1 M NH_4Cl and 0.1M NH_3 are present in one litre solution is (P^{Kb} of NH_3 is 4.75)

1) 4.75
2) 8.95
3) 9.25
4) 5.05

81. In the density of the solution is 3.12 gm/ml then express the mass of 1.5 ml solution in significant figures.

1) 4.7 gm
2) 4680×10^{-3} gm
3) 46.80 gm
4) 4.680 mg

82. Which of the following has more number of hybrid orbitals around the central atom

1) XeO_3
2) XeF_2
3) XeF_4
4) XeO_4

83. Slag formed in copper metallurgy is

1) $MnSiO_3$
2) $FeSiO_3$
3) $Ca_3(PO_4)_2$

4) $MgSiO_3$

84. In haematite (Fe_2O_3), O^{2-} ions have CCP arrangement while Fe^{3+} ions occupying interstitial positions. If ionic radii of Fe^{3+} and O^{2-} are 0.56A° and 1.4A° then in the crystal

1) Fe^{3+} ions occupy 2/3 of tetrahedral voids
2) Fe^{3+} ions occupy all the edge centres
3) Fe^{3+} ions occupy 2/3 of octahedral voids
4) Fe^{3+} ions occupy all octahedral voids

85. The term that is correct for the attractive forces present in a real gas in the vander Waals equation is

1) nb
2) $-\frac{an^2}{v^2}$
3) $-nb$
4) $\frac{an^2}{v^2}$

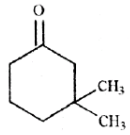
86. Which of the following does exhibit tautomerism

i) HNO_2

ii) $CH_3-CO-CH_2-COOC_2H_5$

iii) H_2SO_3

iv)



1) All
2) Both iii and iv
3) Both ii and iv
4) I, iii and iv

87. Gold numbers of protective colloids A, B, C and D are 0.50, 0.01, 0.10 and 0.005 respectively. The correct order of their protective power is

1) C < B < D < A
2) A < C< B < D
3) A < B < C > D
4) D < A < C > B

88. Among the following the surfactant that will form miscelles in aqueous solution at lowest molar concentration at ambient conditions is

1) $CH_3(CH_2)_{11}OSO_3Na$
2) $CH_3(CH_2)_{11}N(CH_3)_3Br$
3) $CH_3\ (CH_2\ )_{15}\ N(CH_3)_3Br$
4) $CH_3(CH_2)_6COONa$

89. A metal has fcc lattice. The edge length of the unit cell is 404 Pm. The density of the metal is 2.72 gm/cc, the molar mass of the metal is

1) 40 gm/mol
2) 30 gm/mol
3) 27 gm/mol
4) 20 gm/molo

90. $Ag_2S \xrightarrow[roasting]{chloridised} X$ **(compound of silver)** $\xrightarrow{1\%\ NaCN_{(aq)}} Y\ (complex)$ $\xrightarrow{Zn} Z_{(s)}$**. Incorrect statement regarding to the sequence of the reactions is**

1) Formation of Y from X is known as leaching
2) Function of Zn is an oxidizing agent
3) Formation of Z from Y is known as hydrometallurgy
4) NaCN is complexing agent

BOTANY

91. Removal RNA polymerase II will effect the synthesis of

1) tRNA

2) hnRNA

3) rRNA

4) Adaptor RNA

92. (A) – A is an unicellular eukaryotic organism in which cell wall forms two thin overlapping shells

(B) – B is shown by (A). A and B respectively are

1) A – Dino flagellates B-Auxospore formation in sexual life cycle

2) A-Chrysophytes, B-Red sea formation

3) A-Diatoms, B-Asexual reproduction takes place by binary fission

4) A-Chrysophytes B-Red tides formation

93. Which of the following is not correctly matched?

Mode of reproduction	Example
1. Gemmae	Marchantia
2. Conidia	Alternaria
3. Offset	Water Lily
4. Rhizome	Lotus

94. Read the following lists and find out the correct match

List – I	**List II**
A) Robert Hooke	**I) 20th century**
B) Mendel	**II) 18th century**
C) Stephen Hales	**III) 19th century**
D) F.W. Went	**IV) 16th century**
	V) 17th century

1) A-V, B-III, C-I, D-II

2) A-II, B-I, C-III, D-V

3) A-V, B-II,C-III, D-IV

4) A-V, B-III, C-II, D-I

95. At what stage of the cell cycle are histone proteins synthesized in a eukaryotic cells

1) G phase

2) S Phase

3) G_2 Phase

4) early prophase

96. The event as precursor to seed habit is

1) Presence of similar kind of spores

2) Development of monoecious gametophyte

3) Differentiated sporophyte with true root, stem and leaves

4) Development of zygote into young embryo with in the female gametophyte

97. Respiratory Quotient value of a respiratory substrate

1) Directly proportional to Carbon to oxygen ratio

2) Directly proportional to oxygen to carbon ratio

3) Inversely proportional to carbon to hydrogen ratio

4) Inversely proportional to hydrogen to oxygen ratio

98. Unique feature of algae and angiosperms respectively

1) Absence of vascular tissue, presence of double fertilization

2) Absence of embryo, presence of fruits

3) Presence of antheridia, presence of vascular tissue

4) Zygotic meiosis, presence of embryo

99. A monopoly granted to a person who has either invented a new and useful article, made improvement in an

existing article or invented a new process of making an article is called

1) Biomanipulation
2) Bioethies
3) Biopiracy
4) Patent

100. Find out the wrong statemen

1) Apical meristems are found in toot apex and leaf apex
2) Turgidity helps in cell growth
3) Delphinium shows developmental heterophylly
4) Secondary growth is found in toots and stems of dicots and gymnosperms

101. A biochemical reaction found in Krebs cycle but not in EMP pathway is

1) Cleavage
2) Dehydration
3) Substrate level Phosphorylation
4) Decarboxylation

102. Identify the incorrect statement

1) A pair of fleshy fruits which develop from inferior ovaries-Pepo and pome
2) A pair of fleshy fruits which developr from superior ovaries-Hesperidium and Drupe
3) A pair of dry fruits which develop from monocarpellary ovaries-Nut and cypsela
4) A pair of dry indehiscent fruits-Caryopsis and nut

103. Consider the following statements and select the false statement

1) Amino acids are substituted methane compounds
2) Trihydroxy propane is a complex liquid
3) Uracil, Cytosine and thymine are substituted pyrimidines
4) Cell walls of fungi are made up of a homopolymer, chitin

104. The plant having whorled phyllotaxy and polychasial cymose inflorescence

1) Solanum
2) Jasmine
3) Ipomaea
4) Nerium

105. Statement I – Micronutrients are called essential elements because they are required only in trace quantities

Statement II – Trace elements are as important as major nutrients though they are required in minute quantities.

1) Both Statement I and Statement II are true
2) Both Statement I and Statement II are false
3) Only Statement I is false
4) Only Statement II is false

106. Assertion (A): Both true fruit and false fruit are edible in Anacardium occidental is

Reason (R): In Anacardium occidentalis true fruit develops only from the fertilized ovary and false fruit develops from pedicel

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

107. Among china rose, mustard, brinjal, potato, guava, cucumber, onion and tulip, how many plants have superior ovary?

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

108. Internal fertilization occurs in

I) Majority of aquatic algae

II) Anginosperms

III) Pteridophytes

IV) Aquatic flowering plants

1) I, II &III
2) I alone
3) I& IV
4) II, III & IV

109. Match the columns and identify the correct option

Column-I	Column – II
A. Thylakoids	i) Disc-shaped sacs in Golgi apparatus
B. Cristae	ii) Condensed structure of DNA
C. Cisternae	iii) Flat membranous sacs in stroma
D. Chromatin	iv) Infoldings in mitochondria

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

110. Pollen pistil interaction does not include

I) Release of pollen from anther

II) Recognition of compatible or incompatible pollen

III) Germination or inhibition of growth of pollen tube

IV) Entry of pollen tube into ovule

V) Fusion of male and female gametes

1) I & IV
2) III & IV
3) I & V
4) II & III

111. Which of the following statements regarding cyclic flow of electrons during light reactions is false?

1) This process takes place in the stroma lamellae.
2) ATP synthesis takes place
3) NADPH+ H^+ is synthesized
4) Takes place only when light of wavelength beyond 680 nm is available for excitation.

112. Assertion (A) : R.N.A is labile and easily degradable

Reason (R) : DNA is evolved from RNA with chemical modifications that made it more stable

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

113. Study the following diagrams very carefully and recognize following diagrams very carefully and recognize them

I	II	III	IV
1) Polusiphonia	Focus	Salvia	Equisetum
2) Porphyra	Focus	Salvinia	Horsetail
3) Porphyra	Laminaria	Salvinia	Equisetum
4) Polysiphonia	Laminaria	Salvia	Horsetai

114. Floral formula of a flower is represented $\oplus$, $A_{(10)}$, $\underline{G}_1$ as. The correct description of these symbols is

1) Actinomorphic, bisexual, 10 free stamens, unilocular inferior ovary
2) Zygomorphic, unisexual, 10 fused stamens, monocarpellary inferior ovary
3) Zygomorphic, bisexual, 10 sused stamens, monocarpellary superior ovary
4) Actinomorphic, unisexual, 10 free stamens, uniovulate superior ovary

115. Which of the following is the most distinguishing feature of bryophytes?

1) Autotrophic gametophyte parasitized by sporogonium
2) Mostly homosporous, but, a few hererosporus
3) 1st cell in the life of saprophyte is zygote.
4) Shows isomorphic alternation of generation

116. Which of the following statements is correct

1) In the members of Fabaceae first and third whorls of flower have cohesion of floral parts
2) In Solanaceae first, second, third and fourth whorls of flower show cohesion
3) In Liliaceae first (Ex: onion), second and third whorls of flower show cohesion
4) In all the above mentioned families the innermost whorl of flower show cohesion

117. How many of the following fungi are members of Basidiomycetes? Agaricus, Aspergillus, Alternaria, Puffballs, Claviceps, Ustilago, Puccinia, Albugo, Trichoderma, Edible Morel

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

118. Match the following

List –I	List –II
A) Ribosomes	I) Basal body of flagella ‘or’ cilia
B) Centrosomes	II) Maintenance of cell Shape
C) Cytoskeleton	III) Protein synthesis
D) Lysosomes	IV) Intra cellular Transport
	V) Digestion of cellular Contents

1) A-III, B-I, C-IV, D-II
2) A-III, B-I, C-II, D-IV
3) A-III, B-I, C-IV, D-V
4) A-III, B-II, C-IV, D-V

119. Which of the following statements are true w.r.t. bacteria?

i) **Typical bacteria are 1 – 2 mm in size**

ii) **Glycocalyx differs in composition and thickness among different bacteria**

iii) **Fimbriae are elongated tubular structures formed of special protein, help in attachment of bacteria to host cell.**

iv) **Mesosome of bacteria is formed of extensions of plasma membrane in the cell anterior, in the form of viscicles, tubules and lamellae helping in anaerobic respiration**

v) **Polysome of bacteria is formed of one r-RNA attached to many ribosomes**

1) (i) and (ii)

2) (i) and iv)

3) (ii), (iii) and (iv)

4) All except (ii)

120. Ratio between the carbons of alanine and serine aminoacids is

1) 1 : 3

2) 1: 2

3) 3 : 1

4) 1: 1

121. Consider the following statements.

I) Ladybirds and dragonflies are used to get rid of aphids and mosquitoes, respectively.

II) The bacteria Bacillus thuringiensis (Bt) are used as mycoherbictde.

III) Trichoderma sp., free living fungi, are present in root ecosystems where they act against several plant pathogens.

IV) Frankia is a symbiotic bacterium that lives in the root nodules of legumes.

Which of the statements given above are correct?

1) I, II and III

2) I, III and IV

3) II, III and IV

4) I and III only

122. Mitosis occurs in

I) Cells of root apex

II) Cells of stem apex

III) Fundamental megaspore of the plants

IV) Functional microspore of the plants

1) I, II

2) III, IV

3) I, II, III

4) I, II, III, IV

123. DNA replication enzymes are given below. Select their correct sequence in DNA replication.

I) Helicase II) SSB III) Primase

IV) DNA polymerase IV) DNA ligase

1) I → V → IV → III → II

2) I → II → III → IV → V

3) I → III → II → IV → V

4) I → IV → III → II → V

124. Study the following lists with reference to dicot stem and grasses

A) Intrastelar primary lateral meristem involved in secondary growth	I) Intercalary meristem
B) Extra stellar secondary lateral meristem involved in secondary growth	II) Interfascicular cambium
C) The primary meristem Which occurs between mature tissue	III) Cork cambium

D) Intra stellar secondary Intrafesicular Lateral meristem involved in secondary Growth	IV) Intrafascicular cambium (Fascicular vascular cambium)

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

125. For a genes if AA = male plant, aa = female plant. Find out the genotype of endosperm and embryo.

1) AAa, aaA
2) AAa,Aa
3) Aaa, Aa
4) aaA, AAa

126. Which of the following tissues is not a part of bark?

I) Vascular cambium

II) Cork Cambium

III) Secondary phloem

IV) Secondary xylem

1) II and III
2) I and IV
3) I, III and IV
4) I alone

127. Match the following columns

Column –I	Column – II
A. Clone	i) Agamospermy
B. Plant apomixes	ii) Not possible in sugarcane
C. Grafting	iii) Callus
D. Tissue culture	iv) Flower group
E. Inflorescence	v) identical plants

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

128. Assertion (A): The primary succession, is a slow process, taking maybe thousands of years for the climax to be reached

Reason (R): The pioneer species of Xerarch sucession on bare rocks are usually Lichern

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

129. Which of the following is incorrectly matched?

1) Explant → Excised plant part used for callus formation
2) Cytokinin → root initiation in callus
3) Somatic emryo → Embryo produced from a vegetative cell
4) pollen culture → Haploid plants

130. A genetically dwarf variety of pea is treated with Gibberellins and made taller plant. It is now crossed with a normal pure tall plant. All F_1 plants are tall. The F_1 plants are selfed and F_2 generation is raised. Find out the ratio of tall & dwarf plants in F_2/

1) 3 : 1
2) 1 : 1
3) 1 : 3
4) 4 : 0

131. Match the following column

Column –I	Column – II

A. Human urine	i) Cytokinin
B. Gibberella fujikori	ii) Auxin
C. Herring sperm DNA	iii) Ethylene
D. ripening fruit	iv) ABA
E. aging leaves of plants	v) GA

1) a-(ii), B-(iii), C-(iv), D-(v), E-(i)
2) a-(ii), B-(v), C-(i), D-(iii), E-(iv)
3) a-(i), B-(ii), C-(iii), D-(iv), E-(v)
4) a-(v), B-(iv), C-(iii), D(ii), E-(i)

132. A) The association RNA polymerase with initiation factor (σ) is transient during transcription in prokaryotes

B) Inheritance of a character is also affected by promoter and regulatory sequences of a structural gene

C) Presence of introns is probably the ancient feature of the genome

D) The enzyme polynucleaotide phosphorylase is used in polymerizing, RNA with defined sequences in a template dependent manner. The number of options correct are

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

133. Genre regulation governing lactose operon of E. coil that involves the lac I gene product is

1) Negative and repressible because repressor protein prevents transcription
2) Feedback inhibition because excess of β –galactosidase can switch off transcription
3) Positive and inducible because it can be induced by lactose
4) Negative and inducible because repressor protein prevents transcription.

134. Match the following

List – I	**List –II**
A) Pulsation theory	I) +Ve pull
B) Facilated transport	II) Bio-electrical Responses of plant
C) Pressure – flow Hypothesis	III) –Ve pull
D) Cohesion-tension mediated Transpiration pull Model	IV) Diffusion, by hormonal regulated proteins
	V) Munch

1) A-II, B-IV, C-V, D-I
2) A-II, B-IV, C-V, D-III
3) A-II, B-III, C-IV, D-V
4) A-II, B-I, C-IV, D-III

135. A major characteristic of dicot root is the presence of

1) vasculature without cambium
2) Cambium sandwiched between phloem and xylem along the radius
3) Collateral vascular bundles
4) Scattered vascular bundles

ZOOLOGY

136. Which one of the following is the correct difference between rod cells and cone cells of our retina?

		Rod Cells	**Cone Cells**
1)	Over all function	Vision of poor light	Colour vision & detailed vision in bright light
2)	Distribution	More concentrated in centre of retina	Evenly distribution all over retina
3)	Visual pigment	Iodopsin	Rhodopsin

	contained		
4)	Visual acuity	High	Low

137. Which of the following is a method of birth control?

1) GIFT
2) IVF-ET
3) IUD
4) All of those

138. Match the types of cells listed under column I with the secretions given under column II. Choose the answer which gives the correct combination of alphabets of the two colums.

Column – I (Type of cells	Column – II (Secreations)
A) Beta cells	p) Lysozyme
B) Mast cells	q) Muscus
C) Peneth cells	r) Histamine
D) Acinar cells	s) Insulin
	t) Pancreatic enzyme

1) A-s, B-q, C-p, D-t
2) A-s, B-r, C-p, D-t
3) A-q, B-r, C-p, D-t
4) A-s, B-q, C-r, D-t

139. Read the following

a) Muscle contraction
b) Oxygen transportation
c) blood clotting
d) Electrical synaptic transmission

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

140. Which one is incorrect match?

1) Harderian glands-Modified sebaceous gland and secretion lubricates nictitating membrane
2) Paccinian corpuscles – Cutaneous receptor and for smooth touch.
3) Bowmans glands – Present just below the olfactory membrane of Schniderian membrane in order to lubricate and dissolve odoriferous particle.
4) Tapetum lucidum – A part of eye layer "Choroid" that contain guanine pigment and silvery coloured light is reflect at night.

141. Among the unisexual non-chlordates, fertilization is external in

1) Proifera
2) Nematoda
3) Hemichordata
4) Platyhelminthes

142. Lactic acid is generally formed in very fast acting muscle but exceptional muscle is

1) Muscle of Iris and pupil
2) No exception is found
3) Muscles of heart
4) Muscles of jaw

143. Which harmone does not help in erythropoiesis?

1) andogen
2) Thyroxine
3) Adrenaline
4) Cortisol

144. In an ornithine cycle, which of the following are removed from the blood?

1) Urea and uric acid
2) CO_2 and ammonia

3) CO_2 and urea

4) Ammonia and urea

145. Ancestor that is not in evolutionary lineage of mammal

1) Pelycosaur

2) Therapsid

3) Thecodont

4) Synapsids

146. Identify the incorrect statement.

1) True ribs are attached to sternum by costal cartilage

2) True ribs protect the kidneys

3) Vertebrochondral ribs articulate with costal cartilage of seventh rib.

4) Floating ribs are not attached to sternum

147. During undulation movement, if flagellum bends to one side and shows a wave like movement from the base to tip, the organism moves in this direction

1) laterally in the same direction

2) pushed in backward in backward direction

3) laterally in the opposite direction

4) pulled in forward in forward direction

148. Which one of the following is a fat soluble vitamin and its related deficiency disease?

1) Cobalamine – Beri-Beir

2) Retinol-Xerophthalmia

3) Calciferol – Pellagra

4) Ascorbic acid - Scurvy

149. Which one of following cranial nerve does not innervate the muscles of the eye ball?

1) Pathetic nerve

2) Abducens

3) Occulomotor

4) Spinal accessory nerve

150. Which of the following statement is incorrect?

1) Every 100 ml of oxygenated blood can deliver around 5 ml of O_2 to the tissues under the normal physiological conditions

2) Minute quantites of carbonic anhydrase is present in the plasma too.

3) The role of Oxygen in the regulation of respiratory rhythms is quite significant.

4) Chemosensitive area is situated adjacent to the rhythm centre which is highly sensitive to CO_2 and hydrogen ions.

151. Match the following with reference to Ascaris lumbicoides

List –I	List –II
A) Pineal setae	I) Formed after development
B) 2nd stage rhabditiform larve	II) Produced in alveoli of lungs
C) 4th stage rhabditifonn larve	III) Produced in small intestine
D) 1st stage rhabditifonn larve	IV) Serve to transfer sperms
	V) Infective stage to man

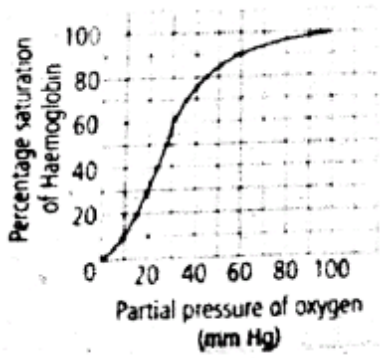
1) A-IV, B-V, C-III, D-I

2) A-IV, B-V, C-II, D-I

3) A-V, B-IV, C-II, D-I

4) A-V, B-IV, C-I, D-III

152. Which of the following is incorrect about the given graph?



1) Increase in partial pressure of CO_2 shift the curve to right.
2) At low temperature the curve shifts to left.
3) Decrease in partial pressure of oxygen shifts the curve to right.
4) At high pH the curve shifts to right.

153. Accumulation of dead filarial worms block the lymph vessels and lymph glands of man resulting in immense swelling. The condition is called.

1) Lymphoedema
2) Lymphangitis
3) Lymphadentis
4) Elephantiasis

154. Match the following

Column –I	Column –II
A) Functional Residual capacity	i) Pepsin
B) Endopeptidases	ii) Elastase
C) Vital capacity	iii) Nucleotidases
D) Pancreatic juice	iv) Chymotrypsin
E) Intestinal Juice	v) Tidal volume
	vi) Residual volume
	vii) Trypsonigen
	ix) Nucleosidases
	x) Expiratory reserve volume

	A	B	C	D	E
1)	v, vii, x	iii, ix	vi	i, ii	viii, ix
2)	vi, x	i, iv	v, viii, x	ii, viii	iii, ix
3)	v	I, iv	vi, vii, x	ii, iii	viii, ix
4)	vi, vii, x	I, iv	v	viii, ix	ii, iii

155. Which one of the following became extinct due to over exploitation by humans?

1) Loris tardigradus
2) Clarias gariepinus
3) Sus salvanius
4) Steller's sea cow

156. Systemic heart refers to

1) atria in lower vertebrates
2) the two ventricles together in humans
3) the heart that contracts under stimulation from nervous system
4) left auricle and left ventricle in higher vertebrates

157. Match the following and select the correct option

A. Johnston's organs	I) Ground vibration
B. Subgenual organs	II) Sound vibrations
C. Tympanal organs	II) Light intensity
E. Ocellar sport	IV) Movement of flagellae

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

158. You are required to draw blood from a patient and to keep in a test tube for analysis of blood corpuscles and plasma. You are also provided with the following four types of test tubes. Which of these will you not use for the purpose?

1) Chilled test tube
2) Test tube containing calcium bicarbonate
3) Test tube containing heparin

4) Test tube containing sodium oxalate

159. Which of the following character is not related to Indian chain viper?

1) Cranial nerves are 10 pairs
2) Jacobson's organs are highly developed
3) Penis is formed by the opposition of the two hemipenes
4) Gaseous exchange takes place through the vascular cloacal wall

160. Which one of the following statements is true for cockroach?

1) The number of ovarioles in each ovary are ten
2) The larval stage is called caterpillar
3) They are ureotelic
4) Anal styles are absent in females

161. Arrange the components of female reproductive system cockroach in correct sequence from anterior to posterior end

A) Vitellarium

B) Oviductus

C) Vagina

D) Germarium

1) D-A-B-C-E
2) A-D-B-C-E
3) D-A-C-B-E
4) A-D-B-E-C

162. 'Forest of nephridia' in earth worm refers to

1) 14^{th} and 15^{th} segment only
2) 1^{st} and 2^{nd} segments
3) 14^{th} to 16^{th} segments
4) 15^{th} and 16^{th} segments only

163. Six cervical vertebrae are seen in these mammal

1) Bradypus and Balaenoptera
2) Panthera and Pteropus
3) Trichechus and Choloepus
4) Choloepus and Bradypus

164. Histiocyte is a connective tissue cell, the function of which is

1) Secretion
2) Epidermal in function
3) Phagocytic
4) Fibre production

165. Both sinus venous and conus arteriosus are absent in

1) Aves, Mammals
2) Reptiles, Aves
3) Reptiles, Aves, Mammals
4) Fishes, Amphibians, Reptiles

166. Which of the following sets of animals belongs to the same class of phylum?

1) Hydra, jellyfish, crayfish
2) spider, scorpion, tick
3) bat, pigeon, whale
4) whale, shark, kagaroo

167. Choose the wrong statement with reference to water pollution

1) When micro organisms consume a lot of CO_2 in water as a result there is a sharp decline in dissolved O_2
2) Natural ageing of a lake by nutrient enrichment of its water is known as eutrophication.
3) Thermal waste water eliminates eurythermal organisms such as fishes but not their juveniles.

4) Increase in the concentration of the pollutant or toxicant at successive trophic levels in an aquatic food chain is called bio-magnification.

168. Match column I with column II and select the correct option.

Column –I	Column –II
A) Mammals	i) Scales
B) Aves	ii) Heterocercal
C) Reptilia	iii) Mammary Glands
D) Osteichthyes	iv) Homocercal
E) Chondrichthyes	v) Pneumatic bones

1) A-I, B-iii, C-v, D-ii, E-iv
2) A-I, B-ii, C-iii, D-iv, E-v
3) A-iii, B-v, C-I, D-iv, E-ii
4) A-iii, B-v, C-I, D-ii, E-iv

169. Identify the Nematodes, which have highly modified amphids but without phasmids

1) Ascaris, Ancylostoma
2) Trichinella, Trichiuris
3) Trichiuris, Enterobius
4) Enterobius, Wuchereira

170. The tube within tube body plan is shown by

1) earthworms and sea cucumber
2) flatworms and roundworms
3) cnidarians and flatworms
4) sponges

171. Identify the correct sequence of various parts of earthworms's alimentary canal from anterior to posterior end

A) Oesophagus
B) Stomach
C) Buccal cavity
D) Pharynx
E) Gizzard
F) Intestinal caecae

1) C→D→E→B→F→A
2) D→A→E→B→F→C
3) C→D→A→E→B→F
4) D→C→A→E→B→F

172. In humans, what is the ratio of number of gametes produced by spermatogenesis

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

173. During the depolarization of nerve impulse, due to the rapid influx of Na^+ ions into the axoplasm the membrane potential shoots rapidly up to

1) +45 mV
2) -70 mV
3) -55 mV
4) -45 mV

174. What is true about Siamese twins

1) Dizygotic twins, joined together.
2) Identical twins which were first borne is siam (Tailand)
3) Monozygotic twins, united in a small area
4) Both 2 and 3

175. Factors favourable for the formation of oxyhaemoglobin in alveoli are

1) high PO_2, low pCO_2, low pH, lower temperature
2) high PO_2, low pCO_2, low pH, high temperature.

3) high PO_2, low pCO_2 high pH, lower temperature

4) high PO_2 low pCO_2, high pH, high temperature

176. Sertoli cells that nourishes spermatozoa are found

1) Between the somniferous tubules
2) In the upper part of the fallopian tube
3) In the germinal epithelium of ovary
4) In the germinal epithelium of the somniferous tubules

177. Oxytocin and vasopressin are synthesized by

1) Endocrine cells of neurohypophysis
2) Neurosecretory cells of epithalamus
3) Endocrine cells of adenohtypophysis
4) Neurosecretory cells of hypothalmus

178. Match the following

Column – I	Column –II
A) Sickle cell anaemia	i) 7^{th} chromosome
B) Phenylketonuria	ii) 4^{th} chromosome
C) Cystic fibrosis	iii) 11^{th} chromosome
D) Huntington's disease	iv) X-chromosome
E) Colour blindness	v)12^{th} chromosome

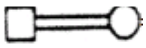
1) A-i, B-iii, C-iv, D-ii, E-v
2) A-iii, B-v, C-i, D-ii, E-iv
3) A-ii, B-iii, C-iv, D-v, E-i
4) A-ii, B-I, C-iii, D-v, E-iv

179. Statement (S): Class Pelecypoda of phylum Mollusca is also called as Lamellibranchiate.

Reason (R): The respiratory organs of the members of pelecypoda are plate like gills. The correct answer is

1) Both (S) and R are true, and ® is not a correct explanation to (S)
2) (S) is correct, but (R) is not correct
3) (S) is not correct, but (R) is correct
4) Both (S) and (R) are true, and (R) is correct explanation to (S)

180. Which one of the following symbols and its representation, used in human pedigree analysis is correct.

1)  = Unaffected male
2)  = Unaffected female
3)  = Male affected
4)  = Mating between relatives

PHYSICS

1 – 10	2	1	2	1	4	4	1	4	4	2
11 – 20	3	2	3	2	2	2	1	3	2	1
21 – 30	2	2	4	1	2	2	4	4	1	4
31 – 40	4	2	4	2	2	1	3	1	2	3
41 – 45	4	3	1	4	4					

CHEMISTRY

46 - 50						2	2	3	1	3
51 - 60	2	4	2	1	2	3	1	1	3	1
61 - 70	4	3	1	1	3	4	1	2	3	1
71 - 80	1	3	1	2	3	4	2	1	1	1
81 - 90	1	3	2	3	4	1	2	3	3	2

BOTANY

91 - 100	2	3	3	4	2	4	2	2	4	1
101 - 110	4	3	2	4	3	2	4	4	4	3
111 - 120	3	2	2	3	1	1	2	3	1	4
121 - 130	4	4	2	2	3	2	1	2	2	1
131 - 135	2	3	4	2	1					

ZOOLOGY

136 - 140						1	3	2	4	2
141 - 150	3	3	3	2	3	2	3	2	4	3
151 - 160	2	4	1	2	4	4	1	2	4	4
161 - 170	1	3	3	3	1	2	3	3	2	1
171 - 180	3	3	1	4	3	4	4	2	4	4

HINTS AND SOLUTIONS

PHYSICS

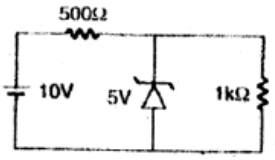
1. The stopping potential is more negative for higher frequency of incident radiation.

2. $\eta = 1 - \frac{T_2}{T_1} = \frac{T_1 - T_2}{T_1}$

$$\eta^1 = \frac{(T_1 - 100) - (T_2 - 100)}{T_1 - 100} = \frac{T_1 - T_2}{T_1\ 100}$$

$\eta^1 > \eta$

3.



In the given circuit, the Zener diode is used as a voltage regulating device. Hence, the voltage across $1K'Omega\ is\ 5V$.

Current flowing through 1KΩ resistor is,

$$I = \frac{5V}{1 \times 10^3 \Omega} = 5 \times 10^{-3} A = 5mA$$

4. $R_1 = \frac{\pi}{4} \times \frac{15}{2\pi} = \frac{15}{8}\Omega$

$$R_2 = \frac{7\pi}{4} \times \frac{15}{2\pi} = \frac{105}{8}\Omega$$

$$R_{eq} = \frac{R_1 R_2}{R_1 + R_2} = \frac{\frac{15}{8} \times \frac{105}{8}}{15} = \frac{105}{64} = 1.64\Omega$$

5. ${}^{A}_{Z}X \xrightarrow{\beta} {}^{A}_{(Z+1)}Y \xrightarrow{\alpha} {}^{A-1}_{Z-1}B \xrightarrow{\gamma} {}^{A-1}_{Z-1}B,$

First X decays by β-emission emitting $\bar{\nu}$, anti-neutrino

simultaneously. Y emits α resulting in the excited level of B which in turn emits a γ-ray

∴ β,α, γ is the answer

6. Dimensions of $\varepsilon_0 L$ = Dimension of capacitance (C)

$$\varepsilon_0 I.\frac{\Delta V}{\Delta t} = \frac{C\Delta V}{\Delta t} = \frac{\Delta Q}{\Delta t} = \frac{charge}{time}$$
$$= current$$

7. Path difference at P is,

$$\Delta x = 2\left(\frac{x}{2}\cos\theta\right) = x\cos\theta$$

For intensity to be maximum,

$\Delta x = n\lambda$

$\therefore$ x cosθ = nλ

$$\cos\theta = \frac{n\lambda}{x}$$

$$\cos\theta \not> 1$$

$$\frac{n\lambda}{x} \not> 1$$

$$\therefore n \not> \frac{x}{\lambda}$$

Putiing x = 5λ

n$\not>$ 5 or n = 1,2,3,4,5

Therefore, in all four quadrants there can be 20 maximas. There are more maximas at θ = 0° and θ = 180°

But n = 5 corresponds to θ=90° and θ=270° which are coming only twice while we have multiplied it four times.

Therefore, total number of maximas are still 20, i.e.,

n = 1 to 4 in four quadrants (total 16) plus four more at $\theta = 0°, 90°, 180°$ and 270°

8. $\frac{1}{f_e} = \frac{1}{v_e} - \frac{1}{u_e}$

$$\frac{1}{f_e} = \frac{1}{-D} - \frac{1}{u_e}$$

$$\frac{-1}{u_e} = \frac{1}{f_e} + \frac{1}{D} \Rightarrow \frac{-1}{u_e} = \frac{D + f_e}{Df_e}$$

$$\Rightarrow -u_e = \frac{Df_e}{D + f_e}$$

$$= f_0 + |u_e| = f_0 + \frac{Df_e}{D + f_e}$$

$$50 + \frac{25 \times 5}{30} = \frac{325}{6}\ cm$$

9. Angular magnification

$$|m| = \frac{f_0}{f_e}\ or\ 5 = \frac{f_0}{f_e}\ or\ f_0 = 5f_e$$

Distance between the objective and the eye-piece is $(f_0 + f_e)$

$\therefore (f_0 + f_e) = 36$

or $5f_e + f_e = 36$

or $f_0 = 6\ cm$

$\therefore f_0 = 5 \times 6\ cm = 30\ cm$

10. $d\ sin\ \theta = (2n-1)\frac{\lambda}{2}$

for first dark fringe

$$d\ sin\theta = \frac{\lambda}{2} \Rightarrow sin\theta = \frac{\lambda}{2d}$$

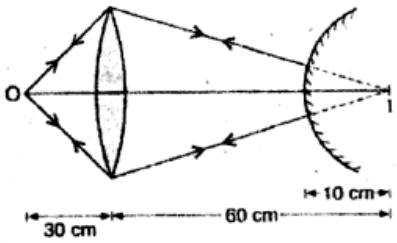
$$\therefore sin\theta = \frac{5460 \times 10^{-10}}{2 \times 10^{-4}}$$
$$= 2730 \times 10^{-6}\ rad$$

$\theta\ is\ so\ small \therefore sin\ \theta = \theta$

$$\therefore \theta = 2730 \times 10^{-6} rad$$

$$= 2730 \times 10^{-6} \times \frac{180}{\pi} \approx 0.16$$

11. $\frac{1}{v} - \frac{1}{u} - \frac{1}{f}$



$$or\ \frac{1}{v} - \frac{1}{-30} = \frac{1}{20}$$

$$\therefore\ v = -60$$

Coincidence is possible when the image is formed at the centre of curvature of the mirror. Only then the rays refracted through the lens will fall normally on the convex mirror and retrace their path to form the image at O. So, the distance between lens and mirror

$$= 60 - 10 = 50\ cm$$

12. $P = \frac{a^3b^2}{cd}$

$\Rightarrow \frac{\Delta P}{P} \times 100 = 3\left(\frac{\Delta a}{a} \times 100\right) + 2\left(\frac{\Delta b}{b} \times 100\right)\left(\frac{\Delta c}{c} \times 100\right)\left(\frac{\Delta d}{d} \times 100\right)$

$= 3 \times 1 + 2 \times 2 + 3 + 4$

$= 3 + 4 + 3 + 4 = 14\%$

13. When L is removed from the circuit, it becomes

$tan\phi = tan\frac{\pi}{3} = \frac{X_c}{R}$

$or\ X_c = R\ tan\frac{\pi}{3} = \sqrt{3}R$

When C is removed from the circuit, it becomes RL circuit.

$\therefore tan\phi = tan\frac{\pi}{3} - \frac{X_L}{R}$

$or\ x_L = R\ tan\frac{\pi}{3} = \sqrt{3}R$

Impedance of the circuit,

$Z = \sqrt{R^2 + (X_L - X_C)^2} = R$

Power factor,

$cos\phi = \frac{R}{Z} = \frac{R}{R} = 1$

14. Distance travelled by the particle is $x = 40 + 12t - t^{-3}$. We know that velocity is rate of change of distance.

$i.e.,\quad v = \frac{dx}{dt}$

15. In the absence of aluminium

$B_0 = \mu_0 H$

In the presence of aluminium

$B = \mu H = \mu_0(1 + x)H$

Percentage increase in B

$= \frac{B - B_0}{B_0} \times 100 = \frac{\mu_0 xH}{\mu_0 H} \times 100$

$x \times 100 = 2.1 \times 10^{-5} \times 100$

$= 2.1 \times 10^{-3}$

16. $\bar{S} = 12\hat{\imath} + 5\hat{\jmath} + 9\hat{k}$

$S = \sqrt{12^2 + 5^2 + 9^2} = 5\sqrt{10}m$

17. The magnetic field (acting parallel to the velocity) would not affect the motion. So the proton will move along the electric field. The trajectory of the particle is a straight line.

18. Distance travelled by the particle is $x = 40 + 12t - t^3$. We know that velocity is rate of change of distance

$i.e.\ v = \frac{dx}{dt}$

$\therefore v = \frac{d}{dt}(40 + 12t - t^3)$

$= 0 + 12 - 3t^2$

But final velocity $v = 0$

$12 = 3t^2 = 0\ \ pr\ t^2 = \frac{12}{3} = 4\ pr\ t$

$= 2s$

Hence distance travelled by the particle before coming to rest is given by

$x = 40 + 12(2) - (2)^3 = 56m$

19. $Bev = \frac{mv^2}{r}\ \ or\ \ r - \frac{mv}{Be}$

$As,\ \ mv = \sqrt{2mK}$

$so,\ \ r = \frac{\sqrt{2mK}}{Be}$

As the electron has been accelerated from rest through a potential difference of V volt, then K = eV

$r = \frac{\sqrt{2mVe}}{B^2e^2} = \sqrt{\frac{2mV}{B^2e}}$

20. $h_1 + h_2 = \frac{u^2}{2g}$

$h_2 = h_1 + 50$

21. $B_1 = \frac{\mu_0}{4\pi} \times \frac{2\pi I}{R} = \frac{\mu_0}{4\pi} \times \frac{2\pi I \times 2\pi}{L}$ ... (i)

$\therefore L = 2\pi R, for\ circular\ loop)$

$B_2 = \frac{\mu_0}{4\pi} \times \frac{1}{\left(\frac{a}{2}\right)}\ [sin\ 45° + sin45°] \times 4$

where $a = \left(\frac{L}{4}\right)$

$\therefore B_2 = \frac{\mu I}{4\pi L} \times 8 \times 4 \times \left[\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}\right]$

$= \frac{\mu_0 I}{4\pi L} \times \frac{64}{\sqrt{2}}$

$\therefore \frac{B_1}{B_2} = \left(\frac{\mu_0}{4\pi}\right)\frac{4\pi^2 I}{L} / \frac{\mu_0}{4\pi L} \times \frac{64I}{\sqrt{2}}$

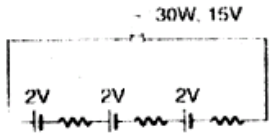
$or \quad \frac{B_1}{B_2} = \frac{\pi^2}{8\sqrt{2}}$

22. $F = V\frac{dm}{dt} = VM$

23. $P = VI = \frac{V^2}{R}$

$I = \frac{P}{V} = \frac{30W}{15V} = 2\ amp$

$R = \frac{V^2}{P} = \frac{(15V)^2}{30W} = 7.5\Omega$



The current I through an external resistance R when m cells each of emf E and internal resistance r are connected in series, is :

$(\therefore VI = W) \qquad I = \frac{mE}{R + mr}$

$Putting\ E = 2V, r = 0.5\Omega$

$R = 7.5\Omega$

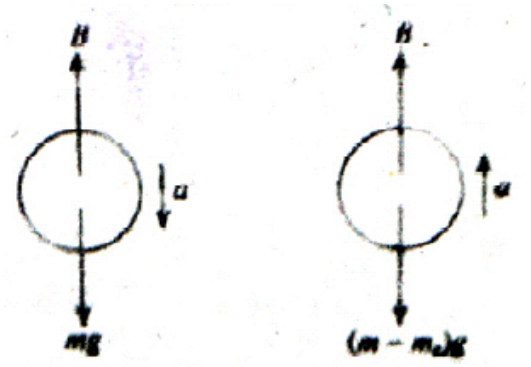
and I=2amp, in eqn.(i), we get:

$2 = \frac{2m}{7.5 + 0.5m}\ or\ \ m = 15$

24. Forces acting on balloon are its weight and buoyant force (B). The buoyant force will be constant as there is no charge in volume of the balloon. When ballon is descending down

$mg - B = ma$

When balloon is moving up



Balloon is moving down balloon is moving up Equation (1) + equation(2)

$\Rightarrow mg - mg + m_{0g} = ma + ma - m_0 a$

$\Rightarrow m_0 = \frac{2ma}{g + a}$

25. Let R be the resistance of each lamp. If E be the applied emf, then the current in the circuit I_1 is given by:

$I_1 = \frac{E}{R + \left(\frac{R}{2}\right)} = \left(\frac{2E}{3R}\right)$

Current flowing through $L_2\ or\ L_3$

$= \frac{1}{2}\left[\frac{2E}{3R}\right] = \frac{E}{3R}$

When L_3 is fused, the whole current flows through L_1 and L_2.

Thus, $L_2 = (E/2R)$

So, current through L_1 decreases and through L_2 increases.

26. $W = \int_{ti}^{if} P\ dt$

27. Since, due to wrong connection of each cell, the total emf is reduced by 2E, then for wrong connection of three cells, the total emf will reduce to $(nE - 6E)$ whereas the total or equivalent resistance of cell combination will be nr.

28. $\frac{1}{2mu^2} = \frac{1}{2}mv^2 + mgL$

$v = \sqrt{u^2 - 2gL}$

$\overrightarrow{\Delta v} = \vec{v} - \vec{u}$

$\left|\overrightarrow{\Delta v}\right| = |\vec{v} - \vec{u}|$

$$\Delta v = \sqrt{v^2 + u^2}$$

$$\Delta v = \sqrt{u^2 - 2gL + u^2}$$

$$\Delta v = \sqrt{2(u^2 - gL)}$$

29. 

Applying kirchhoff's first law at junction E, we get

$$i_3 = i_1 + i_2$$

Applying Kirchhoff's second law for the closed loop ABEFA, we get:

$$-_1R_1 + \Delta V_{B_2} + i_2R_2 - i_1R_1 - \Delta V_{B_1} = 0$$

$$-2i_1R_1 + i_2R_2 + \Delta V_B - \Delta V_B = 0$$

$$-2i_1\,(2) + i_2\,(4) + 6 - 3 = 0$$

$$-4i_1 + 4i_2 + 3 = 0$$

$$-4i_1 + 4i_2 = -3$$

Again, applying Kirchhoff's second for the closed loop BCDEB, we get:

$$-i_3R_1 + \Delta V_{B_2} - i_3R_1 - i_2R_2 - \Delta V_{B_2} = 0$$

$$-2i_3R_1 - i_2R_2 = 0$$

$$-2i_3(2) - i_2(4) = 0$$

$$-4i_3 + 4i_2 = 0 \Rightarrow i_3 + i_2 = 0$$

Solving equns. (i), (ii) and (iii), we get:

$$i_1 = 0.50A, \quad i_2 = -0.25A,$$
$$i_3 = 0.25A$$

30. $p = \left(\frac{m}{t}\right)V^3 = 100(2)^3 = 800W$

31. When the two condensers are connected in series,

$$C = \frac{2 \times 1}{2 + 1} = \frac{2}{3}\mu F \;\; and \; Q = \frac{2E}{3}$$

The potential of condenser C_1 is given by:

$$V_1 = \frac{Q}{C_1} = \frac{2E}{3} < 6KV$$

$$\therefore E < 5 \times \frac{3}{2}9KV$$

$E < 7.5 < 9KV$; With stand voltage = 9KV

32. $\Delta K = \frac{m_1m_2}{2(m_1+m_2)}(U_1 - U_2)^2$

$$\Delta K = \frac{1}{4}m\,(U_1 - U_2)^2$$

33. The given combination is equivalent to two capacitors connected in parallel.

So, the total capacitance $= \frac{2\varepsilon_0 A}{d}$

$$\therefore Energy\ stored = \frac{1}{2}\left(\frac{2\varepsilon_0 A}{d}\right)V^2$$
$$= \frac{\varepsilon_0 AV^2}{d}$$
$$= \frac{8.85 \times 10^{-12} \times 50 \times 10^{-4} \times 100}{3 \times 10^{-3}}$$
$$= 14.75 \times 10^{10}J$$

34. $\vec{r} = \frac{m_1\vec{r_1} + m_2\vec{r_2}}{m_1+m_2}$

$$\vec{r} = \frac{1(\hat{\imath} + 2\hat{\jmath} + \hat{k}) + 3(-3\hat{\imath} - 2\hat{\jmath} + \hat{k})}{1 + 3}$$

$$\vec{r} = -2\vec{\imath} - \vec{\jmath} + \vec{K}$$

35. Let L be the side of the square and the length of the diagonal of the square be $\sqrt{2}L$.

Potential at the point of intersection of diagonals is :

$$V = \frac{1}{4\pi\varepsilon_0} \times \frac{(2 - 3 - 4 + 5)}{\left(\frac{\sqrt{2}L}{2}\right)} = 0$$

and electric field intensity at this point is

$$E = \frac{1}{4\pi\varepsilon_0}\left[\frac{2}{\frac{L^2}{2}}\hat{\imath} - \frac{3}{\frac{L^2}{2}}\hat{\jmath} - \frac{4}{\frac{L^2}{2}}\hat{\imath} + \frac{5}{\frac{L^2}{2}}\hat{\jmath}\right] \neq 0$$

36. $\tau = I \propto$

$$Mg\frac{L}{2} = \frac{ML^2}{3}\alpha$$

$$\alpha = \frac{3g}{2L}$$

37. 

Fundamental harmonic of pen organ pipe is given by:

$$l = \frac{\lambda_1}{2} \quad or \quad \lambda_1 = 2l$$

$$v_1 = \frac{v}{\lambda_1} = \frac{v}{2l}$$

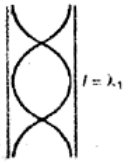
As the tube vibrates in the second harmonic hence,

$$f_1 = 2v_1 = \frac{2v}{2l} = \frac{v}{l} \quad \ldots\ldots (i)$$

If one end is closed, it gives only odd harmonics. Fundamental frequency of closed organ pipe = $\frac{v}{4l}$

The other harmonics are $\frac{3v}{4l}, \frac{5v}{4l}$, etc.

Once, the frequency starts increasing the first higher harmonic that resonated = $\frac{3v}{4l}$



$$If \quad n = 3, f_2 = \frac{3}{4}\frac{v}{l} = \frac{3}{4}f_1$$

However, here is a snag. The frequency is increased from v/l. Here, $\frac{3}{4}f_1$ is not greater than $f_1\left(=\frac{v}{l}\right)$. Hence, $\frac{5}{4}\ f_1$ is the answer because this is greater than f_1. So, answer is (C).

$$n = 5, f_2 = 5 \times \frac{v}{4l} = \frac{5}{4}f_1$$

38. $T^1 = T\sqrt{\frac{\rho_B}{\rho_B - \rho_L}} = T\sqrt{\frac{\rho_B}{\rho_B - \rho_L}} =$

$$T\sqrt{\frac{\rho_B}{\rho_B - \frac{\rho_B}{8}}} = T\sqrt{\frac{8}{7}}$$

39. $U(x) = A[1 - cos\ px]$

$$F = -\frac{dU}{dx} = -Ap\ sin\ px$$

For small oscillation, $sin\ px = px$

$$\therefore F = -Ap^2x$$

$$and\ a = \frac{F}{m} = -\left(\frac{Ap^2}{m}\right)x = -\omega^2 x$$

$$\omega = \sqrt{\frac{Ap^2}{m}} \quad or\ T = \frac{2\pi}{\omega} = 2\pi\sqrt{\frac{m}{Ap^2}}$$

40. $\Delta V = v\gamma\Delta T, K = \frac{-P}{\frac{\Delta V}{V}}$

$$\Rightarrow \frac{\Delta V}{V} - \frac{P}{k}$$

$$3\alpha\Delta T = \frac{p}{k}$$

$$\Delta T = \frac{p}{3k\alpha}$$

41. $x = 4(cos\ \pi t + sin\ \pi t)$

$$= 4\sqrt{2}\left[\frac{1}{\sqrt{2}}cos\ \pi t + \frac{1}{\sqrt{2}}\ sin\ \pi t\right]$$

$$= 4\sqrt{2}\left[sin\frac{\pi}{4}cos\ \pi t + cos\frac{\pi}{4}sin\ \pi t\right]$$

$$= 4\sqrt{2}sin\ \left(\pi t + \frac{\pi}{4}\right)$$

Standard equation of displacement is,

$x = \text{asin}(\omega + \phi)$

Comparing the given equation with standard equation.

$$a = 4\sqrt{2}$$

42. $hr = constant\ t$

43. The mean free path is given by

$$l = \frac{1}{\sqrt{2}\pi d^2 n}$$

where, d = Diameter of the molecule

n = Number of molecules /volume

Here, mean free path $l \propto 1/d^2$

where d = diameter of the molecule

Given that $d_1 = 1\overset{o}{A}, d_2 = 2\overset{o}{A}$

$$\therefore \frac{l_1}{l_2} = \left(\frac{d_2}{d_2}\right)^2 = \left(\frac{2}{1}\right)^2 = \frac{4}{1}$$

44. $V_{rms} = \sqrt{\frac{V_1^2 + V_2^2 + V_3^2 + V_4^2}{4}}$

$$= \sqrt{\frac{1^2 + 4^2 + 8^2 + 16^2}{4}} = 9.2\ m/s$$

45. $\eta = 1 - \frac{T_2}{T_1}$ $\quad \frac{40}{100} = 1 - \frac{T_2}{T_1}$

$T_2 = \frac{3T}{5}$ $\quad \frac{50}{100} = 1 - \frac{T_2}{T'}$ $\quad T' = \frac{6T}{5}$

CHEMISTRY

46. $NaOH + SO_2 \rightarrow$

$$Na_2SO_{3(aq)} \xrightarrow{+SO_2} NaHSO_{3(aq)}$$

47. Due to +M effect c-cl bond aquires partial double bond character

48. In H_2SO_4; the O-H bond has highest polarity; so form stronger H-bond.

49. 1120 ml = 34 gms

$\therefore$ 1000 ml = 30.35 gms

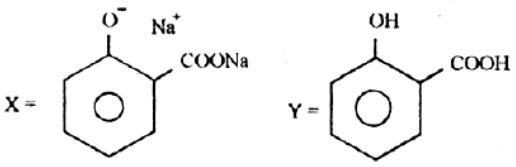
3.035 gms in 100 ml

or

30.35 gms = 100 vol H_2O_2

$\therefore$ 3.3035 = 10 vol H_2O_2

50.



51. $A\&C\ are\ CH_3 - CH_3$

$B.\ CH_3 - CH_2 - MgCl$

52. Javelle water is $NaOCl_{(aq)}\ (or\ KOCl_{(aq)}$ which acts as a bleaching agent to bleach gold ornaments.

53. Bond length decreases with increasing of Bond order.

54. $Ln_2C_3\ (or) LnC$ are non- stoichiometric & Interstitial compounds that liberates H_2 with water.

55. $3 - Hexenal$ is not the

$\alpha\beta - unsaturated\ aldehyde$

56. $NaCl \rightarrow Na^+ + Cl^-$ at cathode

$Na^+ + Hg + e^- \rightarrow Na - Hg$

57. $\%Br = \frac{80\times0.188\times100}{188\times0.4} = 20\%$

58. By the addition of $FeCl_3$, the equilibrium shifts to right side so intensity of red colour increases.

59. $X \rightarrow Benzene\ diazonium\ chloride$

$Y \rightarrow Benzene$

$Z \rightarrow Benzaldehyde$

60. $3SO_2 + O_3 \rightarrow 3SO_3$ where total ozone is utilized

61. Absence of d-orbitals in carbon of CCl_4

62. BiH_3 is thermally unstable and acts as a strong reducing agent

$Cu^{2+} + 4NH_3 \rightarrow (Cu(NH_3)_4)^{2-} \rightarrow$ blue colour

63. X$\rightarrow$ 1, 4 – dimethyl benzene

64. $N_{2(g)} + 2H_{2(g)} \rightarrow N_2H_{4(g)}\Delta H^- + 106\ KJ\ /mol$

$\therefore +945 + 2(436) - 4\left(\frac{1170}{3}\right) - x = +106$

$\Rightarrow x = 151kJ$/mole

65. 3rd one does not follows Huckle rule

66. $CH_2 - CH_2 - CH_2 - C \equiv C - CH_2 - CH_2 - CH_3$ is a symmetrical alkyne which gives the same product on addition of H_2O is / presence of Hg^{2+} for nay triple bonded carbon atom.

67. Alkali metal

68. Conceptual

69. $\underset{\substack{8mols\\4mols\\4mols}}{2AB_3} \rightleftharpoons \underset{2\ mols}{A_2} + \underset{6mols}{3B_2}$

$K_c = \frac{2\times(6)^3}{(4)^2} = 27$

70. Limiting molar conductivity values for H^+, Na^+, OH^-, Cl^- and CH_3COO^- are respectively $(S\ cm^2mol^{-1})$ 349.6, 50.1, 199.1, 76.3 and 40.9

71. D-glucose and D-galactose

72. Conceptual

73. $5\bar{I} + IO_3^- + 6H^+ \rightarrow 3I_2 + 3H_2O$

74. For the spontaneous cell reaction

E^0_{cell} is +Ve

$\therefore Cd^2/Cd$ acts an anode and

$Hg_2SO_4/2Hg$ acts as cathode and

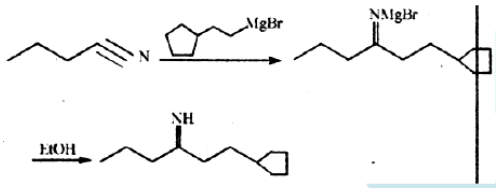
$E^0 = +0.62 — 0.40 = +1.02V$

75. $[Cu(NH_3)_4]^{2+}$ is cationic complex

76. LiH is less reactive

77. Reactivity of diborane decreases in the presence of paraffin (Grease)

78.



79. Antagonist

80. Given mixture is a basic buffer

$\therefore p^{OH} = p^{Kb} + log\frac{[salt]}{[base]}$

$\therefore p^{OH} = 4.75 + 0 = 4.75$

81. $M = d \times V = 3.12 \times = 4.68\ or\ 4.7\ gr$

82. XeO_3, XeO_4 have sp^3 hybridisation with 4 hybrid orbitals XeF_2 is sp^3d have 5 hybrid and XeF_4 sp^3d^2 have six hybrid orbitals.

83. $FeO + SiO_2 = FeSiO_3(Slag)$

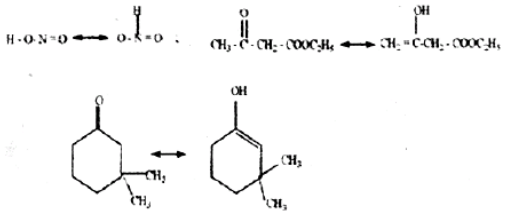
84. Ionic radii of $Fe^{3+} = 0.56\ A^0$ & $O^{-2} = 1.4\ A^0$

radious of octahedral void = 1.4×0.414 ≃ 0.58A°

which is equal to Fe^{3+} ions, so Fe^{3+} ions present in octahedral voids by 2/3 portion to give Fe_2O_3 crystal.

85. $\frac{an^2}{v^2}$

86.



87. Protecting power $\propto \frac{1}{gold\ number}$

88. $CH_3(CH_2)_{15}N(CH_3)_3Br$ has longer carbon chain. So it gives micelles readily.

89. $\rho = \frac{z \times m}{N_A \times a^3}$

$\therefore M = \frac{2.72 \times 6 \times 10^{23} \times (4.04 \times 10^{-8})^3}{4} =$

$27\ gms$

90. $Ag_2S \xrightarrow{NaCl/\Delta} AgCl \xrightarrow{NaCl_{(aq)}} Na[Ag(CN)_2]$

$\xrightarrow{Zn} Na_2[Zn(CN)_4] + Ag.$

Here Zn acts a reducing agent.