

BITSAT 2019 Question Paper with Answer Key

Birla Institute of Technology and Science Admission Test

BITSAT : SOLVED PAPER 2019

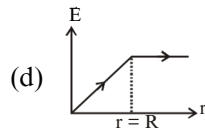
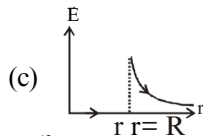
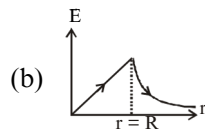
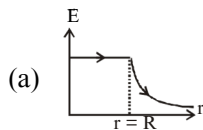
(memory based)

INSTRUCTIONS

- This question paper contains total 120 questions divided into four parts
- Part I: Physics Q No 1 to 20
- Part II: Chemistry Q No 21 to 40
- Part III: English Proficiency Q No 41 to 60
- Part IV: Logical Reasoning Q No 61 to 80
- Part V: Mathematics Q No 81 to 100
- All questions are multiple choice questions with four options only one of them is correct
- Each correct answer awarded 1 marks and -0.25 for each incorrect answer
- Duration of paper 3 hours

PART - I : PHYSICS

1. Which one of the following graphs represents the variation of electric field with distance r from the centre of a charged spherical conductor of radius R ?



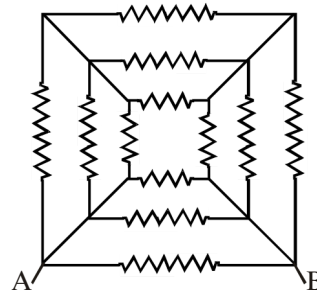
2. If \vec{E} and \vec{B} are the electric and magnetic field vectors of e.m. waves then the direction of propagation of e.m. wave is along the direction of

- (a) $\vec{E} \times \vec{B}$ (b) \vec{B}
(c) \vec{E} (d) None of these

3. The young's modulus of a wire of length L and radius r is Y N/m². If the length and radius are reduced to $L/2$ and $r/2$, then its young's modulus will be

- (a) $Y/2$ (b) Y (c) $2Y$ (d) $4Y$

4. Twelve resistors each of resistance 16Ω are connected in the circuit as shown. The net resistance between A and B is



- (a) 1Ω (b) 2Ω
(c) 3Ω (d) 4Ω

5. The time period of a satellite of earth is 5 hours. If the separation between the earth and the satellite is increased to 4 times the previous value, the new time period will become

- (a) 10 hours (b) 80 hours
(c) 40 hours (d) 20 hours

Two trains are moving towards each other with speeds of 20 m/s and 15 m/s relative to the ground. The first train sounds a whistle of frequency 600 Hz. The frequency of the whistle heard by a passenger in the second train before the train meets, is (the speed of sound in air is 340 m/s)

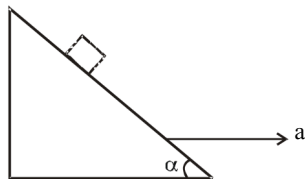
- (a) 600 Hz (b) 585 Hz
(c) 645 Hz (d) 666 Hz

7. You are asked to design a shaving mirror assuming that a person keeps it 10 cm from his face and views the magnified image of the face at the closest comfortable distance of 25 cm. The radius of curvature of the mirror would then be :

(a) 60 cm (b) -24 cm
(c) -60 cm (d) 24 cm

8. A block is kept on a frictionless inclined surface with angle of inclination 'a'. The incline is given an acceleration 'a' to keep the block stationary. Then 'a' is equal to

(a) g sec a
(b) g/tan a
(c) g tan a
(d) g



9. With the increase in temperature, the angle of contact

(a) decreases
(b) increases
(c) remains constant
(d) sometimes increases and sometimes decreases

10. Forward biasing is that in which applied voltage

(a) increases potential barrier
(b) cancels the potential barrier
(c) is equal to 1.5 volt
(d) None of these

11. Number of significant figures in expression

$$\frac{4.327 \text{ g}}{2.51 \text{ cm}^3} \text{ is}$$

(a) 2 (b) 4 (c) 3 (d) 5

12. The ratio of the specific heats $\frac{C_p}{C_v} = \gamma$ in terms of degrees of freedom (n) is given by

(a) $\frac{\gamma}{\gamma-1} + \frac{n}{2}$ (b) $\frac{\gamma}{\gamma-1} + \frac{n}{2}$
(c) $\frac{\gamma}{\gamma-1} + \frac{n}{2}$ (d) $\frac{\gamma}{\gamma-1} + \frac{n}{2}$

13. A stone is thrown with a velocity u making an angle q with the horizontal. The horizontal distance covered by its fall to ground is maximum when the angle q is equal to

(a) 0° (b) 30° (c) 45° (d) 90°

14. A ball of mass 150 g, moving with an acceleration 20 m/s², is hit by a force, which acts on it for 0.1 sec. The impulsive force is

(a) 0.5 N (b) 0.1 N (c) 0.3 N (d) 1.2 N

15. A man drags a block through 10 m on rough surface ($\mu = 0.5$). A force of 3 kN acting at 30°

to the horizontal. The work done by applied force is

(a) zero (b) 7.5 kJ (c) 5 kJ (d) 10 kJ

16. A force of $2\hat{i} + 3\hat{j} + 4\hat{k}$ N acts on a body for 4 second, produces a displacement of

$(3\hat{i} + 4\hat{j} + 5\hat{k})$ m. The power used is

(a) 9.5 W (b) 7.5 W (c) 6.5 W (d) 4.5 W

17. The Earth is assumed to be a sphere of radius R.

A platform is arranged at a height R from the surface of the Earth. The escape velocity of

body from this platform is v_e , where v_e is its escape velocity from the surface of the Earth. The

18. Kepler's second law regarding constancy of areal velocity of a planet is a consequence of the law of conservation of (a) (b) (c) (d)

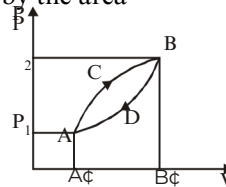
(a) Energy
(b) Angular momentum
(c) Linear momentum
(d) None of these

19. Water is flowing through a horizontal tube having cross-sectional areas of its two ends being A and A' such that the ratio A/A' is 5. If the pressure difference of water between the two ends is 3×10^5 N m⁻², the velocity of water with which it enters the tube will be (neglect gravity effects)

(a) 5 m s⁻¹ (b) 10 m s⁻¹
(c) 25 m s⁻¹ (d) 50 m s⁻¹

20. A thermodynamic system is taken from state A to B along ACB and is brought back to A along BDA as shown in the PV diagram. The net work done during the complete cycle is given by the area

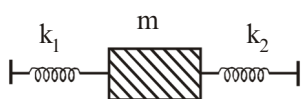
(a) P1ACBP2P1
(b) ACBB'A'A
(c) ACBDA
(d) ADBB'A'A



21. A boat crosses a river from port A to port B, which are just on the opposite side. The speed of water is V and that of boat is V_B relative to the water. Assume that if it has to cross the river directly on the AB line [D = width of the river]

- (a) $\frac{2D}{V_B\sqrt{3}}$ (b) $\frac{\sqrt{3}D}{2V_B}$
(c) $\frac{D}{V_B\sqrt{2}}$ (d) $\frac{D\sqrt{2}}{V_B}$

22. Two springs, of force constants k_1 and k_2 are connected to a mass m as shown. The frequency of oscillation of the mass is f . If both k_1 and k_2 are made four times their original values, the frequency of oscillation becomes



- (a) $2f$ (b) $f/2$ (c) $f/4$ (d) $4f$
23. When a potential difference V is applied across a conductor at a temperature T , the drift velocity of electrons is proportional to

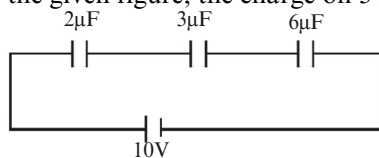
- (a) \sqrt{V} (b) V (c) \sqrt{T} (d) T

24. The amplitude of a damped oscillator becomes $\frac{1}{e}$ in 2 seconds. If its amplitude after 6 seconds is $\frac{1}{n}$ times the original amplitude, the value of n is

- (a) 32 (b) 33 (c) $3\sqrt{3}$ (d) 23

25. The angular speed of the electron in the n th orbit of Bohr hydrogen atom is
- (a) directly proportional to n
(b) inversely proportional to \sqrt{n}
(c) inversely proportional to n^2
(d) inversely proportional to n^3

26. In the given figure, the charge on $3\mu F$ capacitor is



- (a) 10 μC (b) 15 μC
(c) 30 μC (d) 5 μC

27. Two bodies A and B are placed in an evacuated vessel maintained at a temperature of $27^\circ C$. The temperature of A is $327^\circ C$ and that of B is $227^\circ C$. The ratio of heat loss from A and B is about

- (a) 1 : 4
(b) 1 : 2
(c) 2 : 1
(d) 4 : 1
28. If a rigid body is rotating about an axis with a constant velocity, then
- (a) Velocity, Angular velocity of all particles will be same
(b) Velocity, Angular velocity of all particles will be different
(c) Velocity of all particles will be different but angular velocity will be same.
(d) Angular velocity of all particles will be different but velocity will be same.

29. The fundamental frequency of an open organ pipe is 300 Hz. The first overtone of this pipe has same frequency as first overtone of a closed organ pipe. If speed of sound is 330 m/s, then the length of closed organ pipe is

- (a) 41 cm (b) 30 cm (c) 45 cm (d) 35 cm
30. In Young's experiment, the distance between the slits is reduced to half and the distance between the slit and screen is doubled, then the fringe width

- (a) will not change
(b) will become half
(c) will be doubled
(d) will become four times
31. If a rolling body's angular momentum changes by 20 SI units in 3 seconds, by a constant torque. Then find the torque on the body

- (a) $20/3$ SI units (b) $100/3$ SI units
(c) 20 SI units (d) 5 SI units

32. Charge Q is distributed to two different metallic spheres having radii x and $2x$ such that both spheres have equal surface charge density, then charge on large sphere is

- (a) $\frac{4Q}{5}$ (b) $\frac{Q}{5}$ (c) $\frac{3Q}{5}$ (d) $\frac{5Q}{4}$

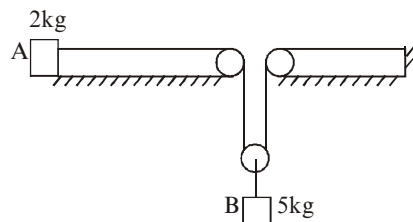
33. In an LR circuit $f = 50$ Hz, $L = 2$ H, $E = 5$ volts, $R = 1$ W then energy stored in inductor is

- (a) 50 J (b) 25 J
(c) 100 J (d) None of these

34. A straight wire of length 0.5 metre and carrying a current of 12 ampere is placed in uniform magnetic field of induction 2 tesla. The magnetic field is perpendicular to the length of the wire. The force on the wire is

- (a) 2.4 N (b) 1.2 N (c) 3.0 N (d) 2.0 N

35. A man drives a car from station B towards station A at speed 60 km/h. A car leaves station A for station B every 10 min. The distance between A and B is 60 km. The car travels at the speed of 60 km/h. A man drives a car from B towards A at speed of 60 km/h. If he starts at the moment when first car leaves the station B, then how many cars would be met on the route? (a) 4 (b) 6 (c) 9 (d) 12
36. In rotatory motion, linear velocities of all the particles of the body are (a) same (b) different (c) zero (d) cannot say
37. If x , v and a denote the displacement, the velocity and the acceleration of a particle executing simple harmonic motion of time period T , then, which of the following does not change with time? (a) $aT + 2pv$ (b) $a^2T^2 + 4p^2v^2$ (c) x (d) $a^2T^2 + 4p^2v^2$
38. A conducting wire frame is placed in a magnetic field which is directed into the paper. The magnetic field is increasing at a constant rate. The directions of induced current in wires AB and CD are (a) B to A and D to C (b) A to B and C to D (c) A to B and D to C (d) B to A and C to D
39. Find the acceleration of block A and B. Assume pulley is massless.

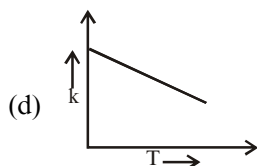
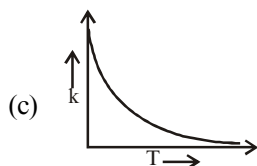
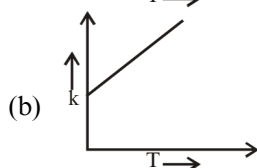
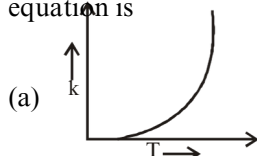


- (a) $\frac{10}{13} \text{ g}, \frac{5}{13} \text{ g}$ (b) $\frac{1}{13} \text{ g}, \frac{5}{13} \text{ g}$
 (c) $\frac{9}{13} \text{ g}, \frac{11}{13} \text{ g}$ (d) $\frac{4}{13} \text{ g}, \frac{13}{5} \text{ g}$

40. The nuclei of which one of the following pairs of nuclei are isotones?
 (a) $^{74}_{34}\text{Se}$, $^{71}_{31}\text{Ga}$
 (b) $^{84}_{38}\text{Sr}$, $^{86}_{38}\text{Sr}$
 (c) $^{92}_{42}\text{Mo}$, $^{92}_{40}\text{Zr}$
 (d) $^{40}_{20}\text{Ca}$, $^{32}_{16}\text{S}$

PART - II : CHEMISTRY

41. Plots showing the variation of the rate constant (k) with temperature (T) are given below. The plot that follows Arrhenius equation is



42. 3.6 g of oxygen is adsorbed on 1.2 g of metal powder. What volume of oxygen adsorbed per gram of the adsorbent at 1 atm and 273 K? (a) 1.7 L (b) 2.0 L (c) 2.1 L (d) 2.2 L
43. In the purification of impure nickel by Mond's process, metal is purified by : (a) Electrolytic reduction (b) Vapour phase thermal decomposition (c) Thermite reduction (d) Carbon reduction

44. When chlorine water is added to an aqueous solution of sodium iodide in the presence of chloroform, a violet colouration is obtained. On adding more of chlorine water and vigorous shaking, the violet colour disappears. This shows the conversion of into
 (a) I_2, HI (b) I_2, HOI
 (c) HI, HIO (d) I_2, HOI

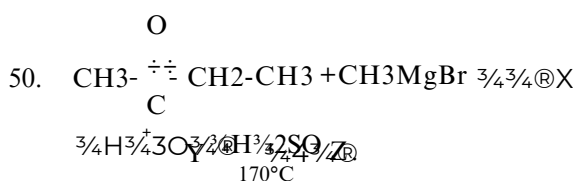
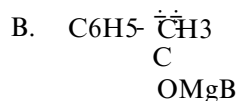
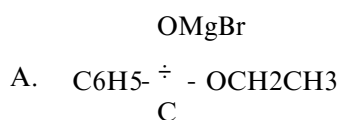
45. In the clathrates of xenon with water, the nature of bonding between xenon and water is
 (a) ionic (b) covalent
 (c) hydrogen bonding (d) dipole-dipole

46. The electronic configurations of Eu (Atomic No. 63), Gd (Atomic No. 64) and Tb (Atomic No. 65) are
 (a) $[\text{Xe}]4f76s2$, $[\text{Xe}]4f8 6s2$ and $[\text{Xe}]4f 85d16s2$
 (b) $[\text{Xe}]4f75d16s2$, $[\text{Xe}]4f7 5d1 6s2$ and $[\text{Xe}]4f 9s2$
 (c) $[\text{Xe}]4f65d16s2$, $[\text{Xe}]4f75d16s2$ and $[\text{Xe}]4f 85d16s2$
 (d) $[\text{Xe}]4f 76s2$, $[\text{Xe}]4f 75d16s2$ and $[\text{Xe}]4f 9s2$

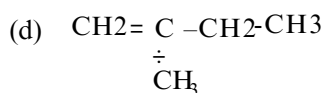
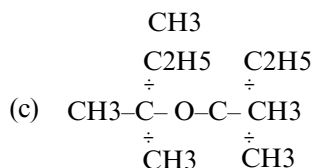
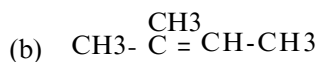
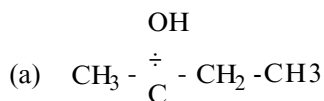
47. Which of the following carbonyls will have the strongest C – O bond ?
 (a) $[\text{Mn}(\text{CO})_6]^+$ (b) $[\text{Cr}(\text{CO})_6]$
 (c) $[\text{V}(\text{CO})_6]^-$ (d) $[\text{Fe}(\text{CO})_5]$

48. How many chiral compounds are possible on monochlorination of 2-methyl butane ?
 (a) 8 (b) 2 (c) 4 (d) 6

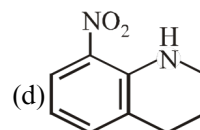
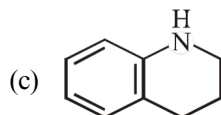
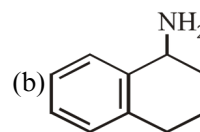
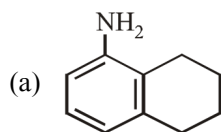
49. Which of the following are intermediates in the reaction of excess of CH_3MgBr with $\text{CH}_3\text{COOCH}_3$ to make 2-phenyl - 2-propanol ?
 (a) $\text{C}_6\text{H}_5\text{MgBr}$ (b) $\text{C}_6\text{H}_5\text{MgOCH}_3$
 (c) $\text{C}_6\text{H}_5\text{MgCH}_3$ (d) $\text{C}_6\text{H}_5\text{MgCH}_2\text{CH}_3$



What is Z?



51. Which of the following is the strongest base ?



52. Which of the following does not reduce Benedict's solution?

(a) Glucose (b) Fructose
 (c) Sucrose (d) Aldehyde

53. General formula of solid in zinc blende structure is:

(a) AB_2 (b) AB_3 (c) AB (d) A_2B

54. Glycine in alkaline solution exists as _____ and migrates to _____.

(a) Cation, cathode
 (b) Neutral, anode
 (c) Zwitter ion, cathode
 (d) anion, anode

55. Product on reaction of ethanamide with phosphorus pentoxide is:
 (a) ethanamine
 (b) acetonitrile
 (c) ethanol
 (d) ethane isonitrile

56. K_a of HX is 10^{-5} , then find concentration of HO^- when equal volumes of 0.25M HX and 0.05 M NaOH are mixed.

- (a) $4 \times 10^{-5} M$ (b) $6 \times 10^{-5} M$
 (c) $8 \times 10^{-3} M$ (d) $2 \times 10^{-5} M$

57. Net cell reaction of $Pt | H (640 \text{ mm}) | H_2Cl | H (510 \text{ mm}) | Pt$.

- (a) 0.89 V (b) 0.93 V
 (c) $2.91 \times 10^{-3} V$ (d) $2.5 \times 10^{-2} V$

58. Which of the following has zero net dipole moment? (a) XeF_4 (b) BrF_3 (c) ClF_3 (d) SF_4

59. Which of the following element has the highest ionisation enthalpy?

- (a) Boron (b) Aluminium
 (c) Germanium (d) Thallium

60. Out of the elements with atomic number 7, 8, 9, 13 which has the smallest size and highest ionization enthalpy?

- (a) 7 (b) 8 (c) 9 (d) 13

61. Which one is classified as a condensation polymer?

- (a) Dacron (b) Neoprene
 (c) Teflon (d) Acrylonitrile

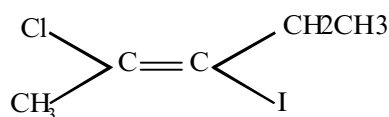
62. Which of the following compounds is not an antacid?

- (a) Phenelzine (b) Ranitidine
 (c) Aluminium hydroxide (d) Cimetidine

63. Mole fraction of the solute in a 1.00 molal aqueous solution is

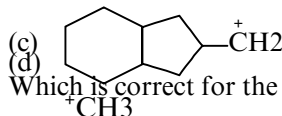
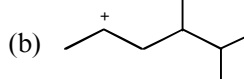
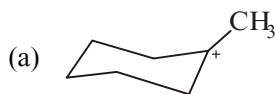
- (a) 0.1770 (b) 0.0177 (c) 0.0344 (d) 1.7700

64. The IUPAC name of the following compound is

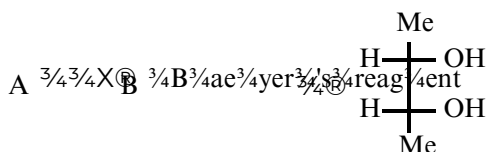


- (a) trans-2-chloro-3-iodo-2-pentene
 (b) cis-3-iodo-4-chloro-3-pentene
 (c) trans-3-iodo-4-chloro-3-pentene
 (d) cis-2-chloro-3-iodo-2-pentene

65. Most stable carbocation among the following is:



- (d) Which is correct for the following changes?



- (a) X is Lindlar Catalyst, B is cis-2-butene

- (b) A is 2-butyne, X is Na-liq. NH_3

- (c) B is trans-2-butene, X is Na-liq. NH_3

- (d) A is 2-butene, X is SeO_2

66. The stability of +1 oxidation state among Al, Ga, In and Tl increases in the sequence:

- (a) $Ga < In < Al < Tl$

- (b) $Al < Ga < In < Tl$

- (c) $Tl < In < Ga < Al$

- (d) $In < Tl < Ga < Al$

67. Which of the following alkaline earth metal hydroxides is amphoteric in character?

- (a) $Be(OH)_2$ (b) $Ca(OH)_2$

- (c) $Sr(OH)_2$ (d) $Ba(OH)_2$

68. Which reaction shows oxidising nature of H_2O_2 ?

- (a) $H_2O_2 + 2KI \rightarrow 2KOH + I_2$

- (b) $Cl_2 + H_2O_2 \rightarrow 2HCl + O_2$

- (c) $2O_2 + Ag_2O \rightarrow 2Ag + H_2O + O_2$

- (d) $NaClO + H_2O_2 \rightarrow NaCl + H_2O + O_2$

69. $aK_2Cr_2O_7 + bKCl + cH_2SO_4 \rightarrow CrO_2 +$



- The above equation balances when

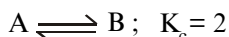
- (a) $a = 2, b = 4, c = 6$ and $x = 2, y = 6,$

- (b) $z = 3, a = 4, b = 2, c = 6$ and $x = 6, y$

- (c) $= 2, z = 3, a = 6, b = 4, c = 2$ and $x =$

- (d) $6, y = 3, z = 2, a = 1, b = 4, c = 6$ and $x = 2, y = 6, z = 3$

71. For the reactions



K_c for the reaction $A \rightleftharpoons D$ is

(a) $\frac{2 \times 4 \times 6}{4 \times 6}$ (b) $\frac{2 \times 4}{4 \times 6}$
 (c) $\frac{2 \times 4 \times 6}{2}$ (d) $\frac{2 \times 4}{2}$

72. Which of the following will always lead to a non-spontaneous change?

- (a) ΔH and ΔS both +ve
 (b) ΔH is -ve ΔS both +ve
 (c) ΔH and ΔS both -ve
 (d) ΔH is +ve ΔS both -ve

73. The densities of two gases are in the ratio of 1:

(a) 16:1 (b) 4:1 (c) 1:4 (d) 1:16

74. In the reaction $2PCl_5 \rightleftharpoons PCl_3 + PCl_5$, the change in hybridisation is from

- (a) sp^3d to sp^3 and sp^3d^2
 (b) sp^3d to sp^2 and sp^3
 (c) sp^3d to sp^3d^2 and sp^3d^3
 (d) sp^3d^2 to sp^3 and sp^3d

75. The group having isoelectronic species is:

- (a) O^{2-} , F^- , Na^+ , Mg^{2+}
 (b) O^- , F^- , Na , Mg^+
 (c) O^{2-} , F^- , Na , Mg^{2+}
 (d) O^- , F^- , Na^+ , Mg^{2+}

76. 100 mL O_2 and H_2 kept at same temperature and pressure. What is true about their number of molecules

- (a) $N_{O_2} > N_{H_2}$
 (b) $N_{O_2} < N_{H_2}$
 (c) $N_{O_2} = N_{H_2}$
 (d) $N_{O_2} + N_{H_2} = 1 \text{ mole}$

77. If m_A gram of a metal A displaces m_B gram of another metal B from its salt solution and if the equivalent mass are E_A and E_B respectively then equivalent mass of A can be expressed as:

(a) $E_A = \frac{m_A}{m_B} \cdot E_B$
 (b) $E_A = \frac{m_A \cdot m_B}{E_B}$

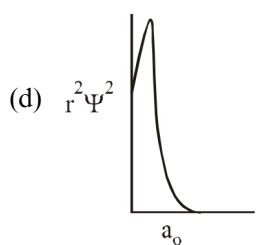
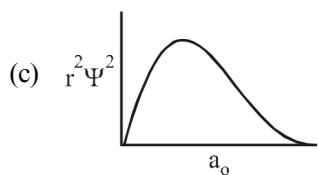
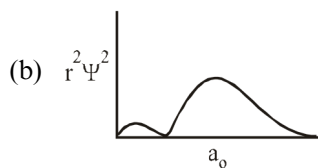
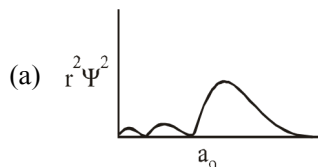
(c) $E_A = \frac{m_B}{m_A} \cdot E_B$

(d) $E_A = \sqrt{\frac{m_A}{m_B}} \cdot E_B$

78. Which one of the following set of quantum numbers is not possible for 4p electron?

- (a) $n = 4, l = 1, m = -1, m_s = \frac{1}{2}$
 (b) $n = 4, l = 1, m = 0, m_s = \frac{1}{2}$
 (c) $n = 4, l = 1, m = 2, m_s = \frac{1}{2}$
 (d) $n = 4, l = 1, m = -1, m_s = \frac{1}{2}$

79. Which of the following radial distribution graphs correspond to $l = 2$ for the H atom?



80. Which of the following is paramagnetic?

- (a) B^2 (b) C_2 (c) N_2 (d) F_2

PART - III (A): ENGLISH

DIRECTIONS (Qs. 81-83) : In the following questions below, out of the four alternatives, choose the one which best expresses the meaning of the given word.

81. Garrulous
(a) Talkative (b) Sedative
(c) Cocative (d) Positive
82. Tinsel
(a) Tinkle (b) Decoration
(c) Tin (d) Colourful
83. Labyrinth
(a) Meandering (b) Rotating
(c) Pacing (d) Wriggling

DIRECTIONS (Qs. 84-86) : In the following questions, choose the word opposite in meaning to the given word.

84. Knack :
(a) Talent (b) Dullness
(c) Dexterity (d) Balance
85. Pernicious :
(a) Prolonged (b) Ruinous
(c) Ruthless (d) Beneficial
86. Opulence :
(a) Luxury (b)
Transparency (c) Weath
(d) Poverty

DIRECTIONS (Qs. 87-90) : Read the passage carefully and choose the best answer to each question out of the four alternatives and mark it by blackening the appropriate circle.

Like watering a plant, we grow our friendships [and all our relationships] by running them. Friendships need the same attention as other relationships. If they are to continue. These relationships can be delightfully non-judgemental, supportive, understanding and fun as your answer.

Sometimes a friendship can bring out the positive side that you never show in any other relationship. This may be because the pressure of playing a 'role' (daughter, partner or child) is removed. With a friend you are to be yourself and free to change. Of course, you are free to do this in all other relationships as well, but in friendships you get to have lots of rehearsals and discussion about changes

as you experience them. It is an unconditional experience where you receive as much as you give. You can explain yourself to a friend openly without the fear of hurting a family member. How do friendships grow ? The answer is simple. By revealing yourself; being attentive; remembering what is most showing empathy; seeing the world through the eyes of your friend, you will understand the value of friendship. All this means learning to accept a person from a completely different family to your own or perhaps someone from a completely different cultural background.

This is the way we learn tolerance. In turn we gain tolerance and acceptance for our own differences.

87. In good friendships, we
(a) give and receive.
(b) neither give nor receive.
(c) only give.
(d) only receive.
88. Empathy means
(a) someone else's misfortunes
(b) the ability to share and understand another's feelings.
(c) skill and efficiency
(d) ability to do something
89. Through strong friendships, we gain
(a) only acceptance.
(b) only attention.
(c) acceptance and tolerance.
(d) only tolerance.
90. Friendships and relationships grow when they are
(a) compared (b) divided
(c) favoured (d) nurtured

DIRECTIONS (Qs. 91-92) : In the following questions, sentences are given with blanks to be filled with an appropriate word(s). Four alternatives are suggested for each question. Choose the correct alternative out of the four as your answer.

91. There are not solitary, free-living creatures ; every form of life is _____ other forms.
(a) dependent on (b) parallel to
(c) overshadowed by (d) covered over by
92. I'll take _____ now as I have another's appointment some where else.
(a) departure (b) your leave
(c) permission (d) leave from work

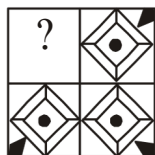
DIRECTIONS (Qs. 93-95) : In the following questions, some parts of the sentences have errors and some are correct. Find out which part of a sentence has an error. The number of that part is the answer. If a sentence is free from error, then your answer is (d). i.e., No error.

93. When one hears of the incident (a)/about the plane crash (b)/ he feels very sorry. (c)/ No error (d)
94. I went there (a)/ with a view to survey (b)/ the entire procedure. (c)/ No error (d)
95. It had laid (a)/ in the closet (b)/ for a week before we found it. (c)/ No error (d)

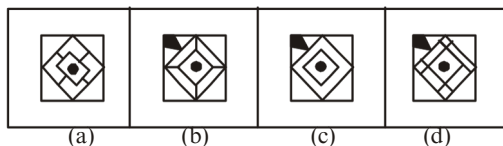
PART - III (B) : LOGICAL REASONING

DIRECTIONS (Qs. 96 & 97) : In the following questions, which answer figure will complete the question figure?

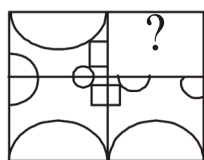
96. Question Figures :



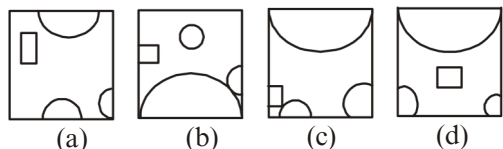
Answer figures :



97. Question Figure:

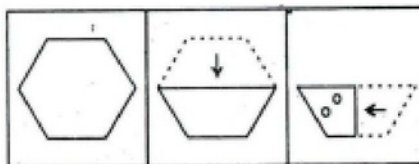


Answer Figure:

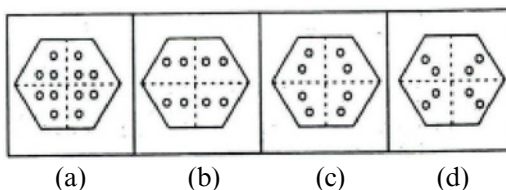


98. A piece of paper is folded and cut/punched as shown below in the question figures. From the given answer figures, indicate how it will A appear when opened.

Question figures:



Answer figures:

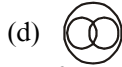
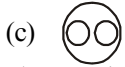


99. Select the related word from the given alternatives:
Medicine : Patient :: Education : ?
(a) Teache (b) School
(c) r (d) Tuition
100. Choose the correct alternative from the given ones that will complete the series.
A3E, F5J, K7O, _____
(a) Q11T (b) Q9V
(c) P9T (d) P11T
101. Which one of the following numbers lacks the common property in the series? 81, 36, 25, 9, 5, 16 (a) (c)
5 (b) 9
36 (d) 25
102. In a certain code language, "TIRED" is written as "56" and "BRAIN" is written as "44". How is 'LAZY' written in that code language?
(a) 64 (b) 61
(c) 58 (d) 43
103. Select the missing number from the given response.

	7	8
	7	8
	77	88
	3773	3632

- (a) 66 (b) 87 (c) 78 (d) 76

104. Which one of the following diagrams best depicts the relationship among Human Society - Youth Club, Political Party and Youths?



105. Among her children, Ganga's favourites are Ram and Rekha. Rekha is the mother of Sharat, who is loved most by his uncle Mithun. The head of the family is Ram Lal, who is succeeded by his sons Gopal and Mohan. Gopal and Ganga have been married for 35 years and have 3 children. What is the relation between Mithun and Mohan?

- (a) Uncle
(c) Brother

- (b) Son
(d) No relation

PART - IV : MATHEMATICS

106. If $x \cos a + y \sin a = P$ is a tangent to the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, \text{ then}$$

- (a) $a \cos a + b \sin a = P^2$
(b) $a \sin a + b \cos a = P^2$
(c) $a^2 \cos^2 a + b^2 \sin^2 a = P^2$
(d) $a^2 \sin^2 a + b^2 \cos^2 a = P^2$

107. If a_1, a_2, a_3, \dots are in A.P. where $a_i > 0$ for all i , then

$$\frac{1}{\sqrt{a_1} + \sqrt{a_2}} + \frac{1}{\sqrt{a_2} + \sqrt{a_3}} + \dots + \frac{1}{\sqrt{a_{n-1}} + \sqrt{a_n}} =$$

- (a) $\frac{n+1}{\sqrt{a_1} + \sqrt{a_n}}$ (b) $\frac{n}{\sqrt{a_1} + \sqrt{a_n}}$
(c) $\frac{n-1}{\sqrt{a_1} + \sqrt{a_n}}$ (d) none of these

108. In order to solve the differential equation

$$x \cos x \frac{dy}{dx} + y(x \sin x + \cos x) = 1$$

the integrating factor is:

- (a) $x \cos x$ (b) $x \sec x$
(c) $x \sin x$ (d) $x \operatorname{cosec} x$

109. Equation of two straight lines are

$$\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4} \text{ and } \frac{x-4}{5} = \frac{y-1}{2} = z.$$

Then

- (a) The lines are non-coplanar
(b) The lines are parallel and distinct
(c) The lines intersect in unique point
(d) The lines are coincident

110. The equation of the curve passing through the

point $(\frac{1}{e}, \frac{1}{e})$ and satisfying the differential

$$\text{equation } y - x \frac{dy}{dx} = a e^{\frac{y}{x}} + \frac{d}{y}$$

- (a) $(x+a)(1+ay) = -4a^2 y \frac{d}{x}$
(b) $(x+a)(1-ay) = 4a^2 y$
(c) $(x+a)(1-ay) = -4a^2 y$
(d) None of these

111. The locus of the mid-point of a chord of the circle

$x^2 + y^2 = 4$, which subtends a right angle at the origin is

- (a) $x + y = 2$ (b) $x^2 + y^2 = 1$
(c) $x^2 + y^2 = 2$ (d) $x + y = 1$

112. With the usual notation $\int_1^2 ([x^2] - [x]) dx$ is equal to

- (a) $4 + \sqrt{2} - \sqrt{3}$ (b) $4 - \sqrt{2} + \sqrt{3}$
(c) $4 - \sqrt{2} - \sqrt{3}$ (d) none of these

113. $\frac{1 + \sin A - \cos A}{1 + \sin A + \cos A} =$

- (a) $\sin \frac{A}{2}$ (b) $\cos \frac{A}{2}$
(c) $\tan \frac{A}{2}$ (d) $\cot \frac{A}{2}$

114. If $x\sqrt{1+y} + y\sqrt{1+x} = 0$, then $\frac{d}{dy} =$

- (a) $\frac{x+1}{x}$ (b) $\frac{1}{1+x}$
(c) $\frac{-1}{(1+x)^2}$ (d) $\frac{x}{1+x}$

115. If $f(x) = 3x^4 + 4x^3 - 12x^2 + 12$, then $f'(x)$ is
 (a) increasing in $(-\infty, -2)$ and in $(0, 1)$
 (b) increasing in $(-2, 0)$ and in $(1, \infty)$
 (c) decreasing in $(-\infty, -2)$ and in $(0, 1)$
 (d) decreasing in $(-2, 0)$ and in $(1, \infty)$

116. Consider $\frac{x}{2} + \frac{y}{4} \geq 1$ and $\frac{x}{3} + \frac{y}{2} \leq 1$, $x, y \geq 0$.

Then number of possible solutions are :

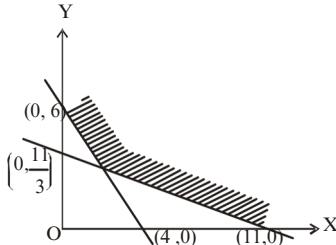
- (a) Zero (b) Unique
 (c) Infinite (d) None of these
117. The distance of a point $(2, 5, -3)$ from the plane $r \cdot (6\hat{i} - 3\hat{j} + 2\hat{k}) = 4$ is

- (a) $\frac{13}{13}$ (b) $\frac{13}{7}$
 (c) $\frac{5}{7}$ (d) $\frac{37}{7}$

118. The value of definite integral $\int_0^{\frac{\pi}{2}} \log(\tan x) dx$ is

- (a) 0 (b) $\frac{p}{4}$
 (c) $\frac{p}{2}$ (d) p

119. For the following feasible region, the linear constraints are



- (a) $x \geq 0, y \geq 0, 3x + 2y \leq 12, x + 3y \leq 1$
 (b) $x \geq 0, y \geq 0, 3x + 2y \leq 12, x + 3y \leq 1$
 (c) $x \geq 0, y \geq 0, 3x + 2y \leq 12, x + 3y \leq 1$
 (d) None of these
120. The general solution of differential equation $(x+1)ydy = (y+1)ex dx$ is
- (a) $(y+1) = k(ex+1)$
 (b) $y+1 = ex+1+k$
 (c) $y = \log \{k(y+1)(ex+1)\}$
 (d) $y = \log \left\{ \frac{ex+1}{y+1} \right\} + k$

121. What is the slope of the normal at the point $(at^2, 2at)$ of the parabola $y^2 = 4ax$?

- (a) $\frac{1}{t}$ (b) t
 (c) $-t$ (d) $-\frac{1}{t}$

122. $\int_0^{p/2} x \sin^2 x \cos^2 x dx$ is equal to

- (a) $\frac{p}{32}$ (b) $\frac{p^2}{16}$
 (c) $\frac{p}{32}$ (d) None of these

123. If $\begin{vmatrix} 6i & -3i & 1 \\ 4 & 3i & -1 \\ 20 & 3 & i \end{vmatrix} = x + iy$, where $i = \sqrt{-1}$, then what is x equal to?

- (a) 3 (b) 2
 (c) 1 (d) 0

124. The limit $\lim_{x \rightarrow 0} \frac{\log_e \left(\frac{1+x}{1-x} \right)}{x^2} + \frac{x-1}{x}$

- (a) is equal to $\frac{1}{2}$ (b) is equal to $-\frac{1}{2}$
 (c) is equal to $\frac{1}{2}$ (d) does not exist

125. If $2 \cos 2x + 3 \sin x - 3 = 0$, $0 \leq x \leq 180^\circ$, then $x =$

- (a) $30^\circ, 90^\circ, 150^\circ$ (b) $60^\circ, 120^\circ, 180^\circ$
 (c) $0^\circ, 30^\circ, 150^\circ$ (d) $45^\circ, 90^\circ, 135^\circ$

126. If the number of available constraints is 3 and the number of parameters to be optimized is 4, then

- (a) The objective function can be optimized
 (b) The constraint are short in number
 (c) The solution is problem oriented
 (d) None of these

127. If $y = \tan^{-1} \frac{\sqrt{x} - x}{1+x^{3/2}}$, then $y'(1)$ is equal to

- (a) 0 (b) $\frac{1}{2}$ (c) -1 (d) $-\frac{1}{4}$

128. The maximum area of rectangle inscribed in a circle of diameter R is

- (a) R^2 (b) $\frac{R^2}{2}$
 (c) $\frac{R^2}{4}$ (d) $\frac{R^2}{8}$

129. If A and B are two events, such that

$$P(A \cap B) = \frac{3}{4}, P(A \cap B^c) = \frac{1}{4}, P(A^c) = \frac{2}{3}$$

where A^c stands for the complementary event of A, then $P(B)$ is given by:

- (a) $\frac{1}{3}$ (b) $\frac{2}{3}$
(c) $\frac{1}{9}$ (d) $\frac{2}{9}$

130. If $f(x) = \begin{cases} \frac{e^{1/x} - e^{-1/x}}{e^x + e^{-1/x}}, & x \neq 0 \\ k, & x = 0 \end{cases}$ then

- (a) f is continuous at x, when $k = 0$
(b) f is not continuous at $x = 0$ for any real k.
(c) None of these

131. $\cos^{-1} \frac{2 \tan^{-1} \sqrt{1-x^2}}{\sqrt{1+x^2}}$
(a) $\frac{1}{8}(x^2 - 1) + k$ (b) $\frac{1}{2}x^2 + k$
(c) $\frac{1}{2}x + k$ (d) None of these

132. The equation of chord of the circle $x^2 + y^2 = 8x$ bisected at the point (4, 3) is

- (a) $x = 3$ (b) $y = 3$
(c) $x = -3$ (d) $y = -3$

133. x and y are positive number. Let g and a be G. M. and AM of these numbers. Also let G be G. M. of $x + 1$ and $y + 1$. If G and g are roots of equation $x^2 - 5x + 6 = 0$, then

- (a) $x = 2, y = \frac{3}{4}$ (b) $x = \frac{3}{4}, y = 12$
(c) $x = \frac{5}{2}, y = \frac{8}{5}$ (d) $x = y = 2$

134. The co-efficient of x^n in the expansion of

$$\frac{e^{7x} + e^x}{e^{3x}}$$

is

- (a) $\frac{4n-1+(-2)^n}{n!}$ (b) $\frac{4n-1+2n}{n!}$
(c) $\frac{4n+(-2)^n}{n!}$ (d) $\frac{4^{n-1}+(-2)^{n-1}}{n!}$

135. A pair of tangents are drawn from the origin to the circle $x^2 + y^2 + 20(x + y) + 20 = 0$, then the equation of the pair of tangent are

- (a) $x^2 + y^2 - 5xy = 0$
(b) $x^2 + y^2 + 2x + y = 0$
(c) $x^2 + y^2 + xy + 7 = 0$
(d) $2x^2 + 2y^2 + 5xy = 0$

136. If the sum of a certain number of terms of the A.P. 25, 22, 19, is 116. then the last term is

- (a) 0 (b) 2
(c) 4 (d) 6

137. If 1, a and P are in A. P. and 1, g and P are in G. P., then

- (a) $\frac{1}{g} + \frac{2a}{1-2a} = 0$ (b) $\frac{1}{g} + \frac{2a}{1-2a} = 0$
(c) $\frac{1}{g} + \frac{2a}{1-2a} = 0$ (d) $\frac{1}{g} + \frac{2a}{1-2a} = 0$

138. If $y = \sin x + e^x$ then $\frac{d^2 y}{dx^2}$ is equal to

- (a) $\frac{\sin x - e^x}{(\cos x + e^x)^2}$ (b) $\frac{\sin x - e^x}{(\cos x + e^x)^3}$
(c) $\frac{\sin x + e^x}{(\cos x - e^x)^2}$ (d) $(-\sin x + e^x) - 1$

139. The foci of the hyperbola $4x^2 - 9y^2 - 1 = 0$ are

- (a) $(\pm\sqrt{3}, 0)$ (b) $(\pm\sqrt{3}, 0)$
(c) $(\pm\sqrt{3}, 0)$ (d) None of these

140. From the top of a cliff 50 m high, the angles of depression of the top and bottom of a tower are observed to be 30° and 45° . The height of tower is

(a) 50 m (b) $50\sqrt{3}$ m

(c) $50(\sqrt{3}-1)$ m (d) $50\left(1-\frac{\sqrt{3}}{3}\right)$ m

141. The coefficient of x^2 term in the binomial

expansion of $(x^{1/2} + x^{-1/4})^{10}$ is :

(a) $\frac{70}{243}$

(b) $\frac{60}{423}$

(c) $\frac{50}{13}$

(d) none of these

142. The value of l , for which the circle $x^2 + y^2 + 2lx + 6y + 1 = 0$ intersects the circle $x^2 + y^2 + 4x + 2y = 0$ orthogonally, is

(a) $11/8$

(b) -1

(c) $-5/4$

(d) $5/2$

143. The value of $\frac{a^2}{a^2+b^2+c^2} + \frac{b^2}{b^2+c^2+a^2} + \frac{c^2}{c^2+a^2+b^2}$ is

(a) $\frac{2a^2+b^2+c^2}{a^2+b^2+c^2}$

(b) $\frac{a^2+b^2+c^2}{a^2+b^2+c^2}$

(c) 1

(d) None of these

144. If $f(x) = (a-x)^{n!n/}$, where $a > 0$ and $n \in \mathbb{N}$, then $f'(x)$ is equal to :

(a) a

(b) x

(c) x^n

(d) an

145. Sum of n terms of the series $8 + 88 + 888 + \dots$ equals

(a) $\frac{8}{81} [10n+1-9n-10]$

8

(b) $\frac{8}{81} [10n-9n-10]$

(c) $\frac{8}{81} [10n+1-9n+10]$

(d) None of these

146. The modulus of the complex number z such that $|z + 3 - i| = 1$ and $\arg(z) = p$ is equal to

(a) 3

(b) 2

(c) 9

(d) 4

147. Bag P contains 6 red and 4 blue balls and bag Q contains 5 red and 6 blue balls. A ball is transferred from bag P to bag Q and then a ball is drawn from bag Q. What is the probability that the ball drawn is blue?

(a) $\frac{7}{15}$

(b) $\frac{8}{15}$

(c) $\frac{4}{19}$

(d) $\frac{8}{19}$

148. The number of 4-digit numbers that can be formed with the digits 1, 2, 3, 4 and 5 in which at least 2 digits are identical, is

(a) 50

(b) $45 - 5!$

(c) 5

(d) None of these

149. Consider the system of linear equations;

$x_1 + 2x_2 + x_3 = 3$

$2x_1 + 3x_2 + 2x_3 = 1$

$x_3 = 1$

The system has

(a) exactly 3 solutions

(b) a unique solution

(c) no solution

(d) infinite solutions

150. What is the value of y so that the line through $(3, y)$ and $(2, 7)$ is parallel to the line through $(-1, 4)$ and $(0, 6)$?

(a) 6

(b) 7

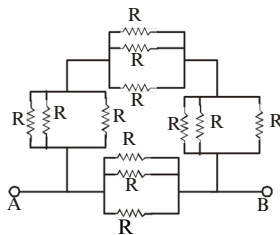
(c) 5

(d) 9

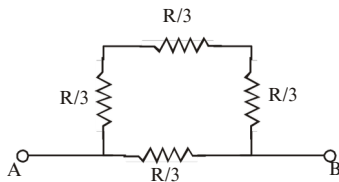
SOLUTIONS

PART - I : PHYSICS

1. (c) The charged sphere is a conductor. Therefore the field inside is zero and outside it is proportional to $1/r^2$. The direction of propagation of electromagnetic wave is perpendicular to the magnetic field B as well as the variation of electric field E as well.
2. (c) Young's modulus of wire does not vary with dimension of wire. It is a constant quantity.
3. (b) Redraw the given circuit,



β



$$R_{\text{net between AB}} = \frac{\frac{3R}{3} \cdot \frac{3R}{3}}{\frac{3R}{3} + \frac{3R}{3}} = \frac{R^2}{4R}$$

where, $R = 16V$
 $R_{\text{net}} = 4V$

5. (c) According to Kepler's law of planetary motion, $T \propto R^3$

$$T_2 = T_1 \left(\frac{R_2}{R_1} \right)^{3/2}$$

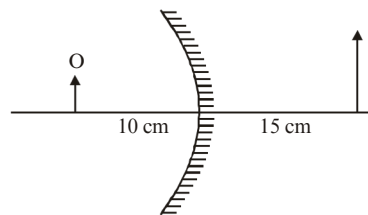
$$= 5 \left(\frac{4R}{R} \right)^{3/2} = 40 \text{ hours}$$

6. (d) $f = \frac{v}{\lambda}$
 Here, $f = 600 \text{ Hz}$, $v = 15 \text{ m/s}$
 $\lambda = 20 \text{ m/s}$, $v = 340 \text{ m/s}$

$$f = 600 \left(\frac{340 + 15}{340 - 20} \right)$$

$$f = 600 \left(\frac{355}{320} \right) = 666 \text{ Hz}$$

7. (c) Concave mirror is used as a shaving mirror.



From question : $v = 15 \text{ cm}$, $u = -10 \text{ cm}$

Radius of curvature, $R = 2f = ?$

Using mirror formula, $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$

$$\frac{1}{15} + \frac{1}{(-10)} = \frac{1}{f} \Rightarrow f = -30 \text{ cm}$$

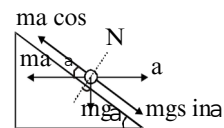
Therefore radius of curvature,

$$R = 2f = -60 \text{ cm}$$

8. (c) From free body diagram,
 For block to remain stationary,

a

$$mg \sin a = ma \cos a$$



$$\Rightarrow a = g \tan a$$

9. (a) On increasing the temperature, angle of contact decreases.
10.) Forward bias opposes the potential barrier and if the applied voltage is more than knee voltage it cancels the potential barrier.

)

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

16. (a)
$$\begin{aligned} & W_{\text{SS}} \otimes F \circ s = \times_{ni} + \mathbb{D} \ j + E \ j + \hat{G} k \ Y \\ & \hat{E} k \ Y \circ \times_{Di} + \text{SSSSS} \otimes s_n \text{말} \\ & \S \text{D} s \text{D} s \text{말} \S \hat{E} s \hat{E} s \text{말} \\ & \S \hat{G} s \hat{G} s \text{말} = \hat{J} \hat{O} \hat{G} \circ, \hat{O} \end{aligned}$$

$$17. \quad (d) \quad v_{\epsilon}^{\odot} \sqrt{\frac{n \mathbf{G} \mathbf{M}}{\mathbf{R}}} \\ \boxtimes \, i \S \S v_{\epsilon} \S \S \S \sqrt{\frac{n \mathbf{G} \mathbf{M}}{\mathbf{R} + \mathbf{h} \mathbf{Y}}} \sqrt{\frac{n \mathbf{G} \mathbf{M}}{\mathbf{x} \mathbf{R} + \mathbf{R} \mathbf{Y}}} \S \S \sqrt{\frac{v_{\epsilon}}{n}} \\ \backslash \, \S \S f = \frac{\dot{C}}{\sqrt{n}}$$

18. (b) $\frac{S}{n} = \bar{X} = \frac{1}{n} \sum_{i=1}^n X_i$

19.) § ÷ ÷ ☐ ◆ ? ? § ☒ § Ĩ ☒ 盐 ◆ 瞞 § ☒ ☒ 龜

$$(a) \quad P_C^+ \frac{\dot{C}}{n} r v \bar{C} = P_h \frac{\dot{C}}{n} \quad n \quad \text{ö ö ö} \times \text{?} \dot{Y}$$

) § ÷ ÷ ☒ ? ? § ☒ § ☒ § ÷ ☒ ? ? ☒ î

$$P_C P_n = D' C \hat{A}_1 \frac{A_C}{A_n} = \hat{G}$$

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AC vC \$C\$An vn

$$\frac{A_c}{A} = \frac{v}{v_c} = \frac{G \beta \gamma_n c}{G \beta \gamma_n c_v}$$

⚡§乙盐⚡?§×?Y

$$PG \text{ Pn} = \frac{C}{n} r \left(\frac{n}{v_n} - \frac{n}{v_C} \right)$$

[illegible]

1. $\mathbb{P} \times \mathbb{G} \times \mathbb{A} \times \mathbb{S} \times \mathbb{C} \times \mathbb{S} \times \mathbb{N} \times \mathbb{E} \times \mathbb{S} \times \mathbb{P} \times \mathbb{C} \times \mathbb{N} \times \mathbb{G}$

$$\|\mathbf{v}\|_C = \hat{G} \quad \text{龜ú瞞}$$

20. (c) $\text{CH}_3\text{COO}^- + \text{H}_2\text{O} \rightleftharpoons \text{CH}_3\text{COOH} + \text{OH}^-$

21. (a)

Diagram (a) shows a rectangular lattice. A vertical dashed line and a diagonal solid line are drawn. A vertical double-headed arrow on the left is labeled U . A horizontal double-headed arrow at the bottom is labeled T . A vertical double-headed arrow on the right is labeled $T + \Delta T$. A diagonal double-headed arrow is labeled T . An angle α is indicated between the vertical and diagonal lines. A small diamond symbol is at the bottom center.

Ca^{2+} 盐 的 水 解

$$= \frac{\ddot{U}}{q} \frac{\ddot{U}}{\ddot{U}} = \frac{n \ddot{U}}{\ddot{U}} \ddot{U}$$

$$f \propto \frac{\dot{C}}{np} \sqrt{\frac{k}{m}}$$

𩚑𩚒𩚓𩚔𩚕𩚖𩚗𩚘𩚙𩚚𩚛𩚜𩚝𩚞𩚟𩚠𩚡𩚢𩚣𩚤𩚥𩚦𩚧𩚨𩚩𩚪𩚫𩚬𩚭𩚮𩚯𩚰𩚱𩚲𩚳𩚴𩚵𩚶𩚷𩚸𩚹𩚺𩚻𩚼𩚽𩚾𩚿𩛀𩛁𩛂𩛃𩛄𩛅𩛆𩛇𩛈𩛉𩛊𩛋𩛌𩛍𩛎𩛏𩛐𩛑𩛒𩛓𩛔𩛕𩛖𩛗𩛘𩛙𩛚𩛛𩛜𩛝𩛞𩛟𩛠𩛡𩛢𩛣𩛤𩛥𩛦𩛧𩛨𩛩𩛪𩛫𩛬𩛭𩛮𩛯𩛰𩛱𩛲𩛳𩛴𩛵𩛶𩛷𩛸𩛹𩛺𩛻𩛼𩛽𩛾𩛿𩜀𩜁𩜂𩜃𩜄𩜅𩜆𩜇𩜈𩜉𩜊𩜋𩜌𩜍𩜎𩜏𩜐𩜑𩜒𩜓𩜔𩜕𩜖𩜗𩜘𩜙𩜚𩜛𩜜𩜝𩜞𩜟𩜠𩜡𩜢𩜣𩜤𩜥𩜦𩜧𩜨𩜩𩜪𩜫𩜬𩜭𩜮𩜯𩜰𩜱𩜲𩜳𩜴𩜵𩜶𩜷𩜸𩜹𩜺𩜻𩜼𩜽𩜾𩜿𩝀𩝁𩝂𩝃𩝄𩝅𩝆𩝇𩝈𩝉𩝊𩝋𩝌𩝍𩝎𩝏𩝐𩝑𩝒𩝓𩝔𩝕𩝖𩝗𩝘𩝙𩝚𩝛𩝜𩝝𩝞𩝟𩝠𩝡𩝢𩝣𩝤𩝥𩝦𩝧𩝨𩝩𩝪𩝫𩝬𩝭𩝮𩝯𩝰𩝱𩝲𩝳𩝴𩝵𩝶𩝷𩝸𩝹𩝺𩝻𩝼𩝽𩝾𩝿𩞀𩞁𩞂𩞃𩞄𩞅𩞆𩞇𩞈𩞉𩞊𩞋𩞌𩞍𩞎𩞏𩞐𩞑𩞒𩞓𩞔𩞕𩞖𩞗𩞘𩞙𩞚𩞛𩞜𩞝𩞞𩞟𩞠𩞡𩞢𩞣𩞤𩞥𩞦𩞧𩞨𩞩𩞪𩞫𩞬𩞭𩞮𩞯𩞰𩞱𩞲𩞳𩞴𩞵𩞶𩞷𩞸𩞹𩞺𩞻𩞼𩞽𩞾𩞿𩟀𩟁𩟂𩟃𩟄𩟅𩟆𩟇𩟈𩟉𩟊𩟋𩟌𩟍𩟎𩟏𩟐𩟑𩟒𩟓𩟔𩟕𩟖𩟗𩟘𩟙𩟚𩟛𩟜𩟝𩟞𩟟𩟠𩟡𩟢𩟣𩟤𩟥𩟦𩟧𩟨𩟩𩟪𩟫𩟬𩟭𩟮𩟯𩟰𩟱𩟲𩟳𩟴𩟵𩟶𩟷𩟸𩟹𩟺𩟻𩟼𩟽𩟾𩟿𩠀𩠁𩠂𩠃𩠄𩠅𩠆𩠇𩠈𩠉𩠊𩠋𩠌𩠍𩠎𩠏𩠐𩠑𩠒𩠓𩠔𩠕𩠖𩠗𩠘𩠙𩠚𩠛𩠜𩠝𩠞𩠟𩠠𩠡𩠢𩠣𩠤𩠥𩠦𩠧𩠨𩠩𩠪𩠫𩠬𩠭𩠮𩠯𩠰𩠱𩠲𩠳𩠴𩠵𩠶𩠷𩠸𩠹𩠺𩠻𩠼𩠽𩠾𩠿𩡀𩡁𩡂𩡃𩡄𩡅𩡆𩡇𩡈𩡉𩡊𩡋𩡌𩡍𩡎𩡏𩡐𩡑𩡒𩡓𩡔𩡕𩡖𩡗𩡘𩡙𩡚𩡛𩡜𩡝𩡞𩡟𩡠𩡡𩡢𩡣𩡤𩡥𩡦𩡧𩡨𩡩𩡪𩡫𩡬𩡭𩡮𩡯𩡰𩡱𩡲𩡳𩡴𩡵𩡶𩡷𩡸𩡹𩡺𩡻𩡼𩡽𩡾𩡿𩢀𩢁𩢂𩢃𩢄𩢅𩢆𩢇𩢈𩢉𩢊𩢋𩢌𩢍𩢎𩢏𩢐𩢑𩢒𩢓𩢔𩢕𩢖𩢗𩢘𩢙𩢚𩢛𩢜𩢝𩢞𩢟𩢠𩢡𩢢𩢣𩢤𩢥𩢦𩢧𩢨𩢩𩢪𩢫𩢬𩢭𩢮𩢯𩢰𩢱𩢲𩢳𩢴𩢵𩢶𩢷𩢸𩢹𩢺𩢻𩢼𩢽𩢾𩢿𩣀𩣁𩣂𩣃𩣄𩣅𩣆𩣇𩣈𩣉𩣊𩣋𩣌𩣍𩣎𩣏𩣐𩣑𩣒𩣓𩣔𩣕𩣖𩣗𩣘𩣙𩣚𩣛𩣜𩣝𩣞𩣟𩣠𩣡𩣢𩣣𩣤𩣥𩣦𩣧𩣨𩣩𩣪𩣫𩣬𩣭𩣮𩣯𩣰𩣱𩣲𩣳𩣴𩣵𩣶𩣷𩣸𩣹𩣺𩣻𩣼𩣽𩣾𩣿𩤀𩤁𩤂𩤃𩤄𩤅𩤆𩤇𩤈𩤉𩤊𩤋𩤌𩤍𩤎𩤏𩤐𩤑𩤒𩤓𩤔𩤕𩤖𩤗𩤘𩤙𩤚𩤛𩤜𩤝𩤞𩤟𩤠𩤡𩤢𩤣𩤤𩤥𩤦𩤧𩤨𩤩𩤪𩤫𩤬𩤭𩤮𩤯𩤰𩤱𩤲𩤳𩤴𩤵𩤶𩤷𩤸𩤹𩤺𩤻𩤼𩤽𩤾𩤿𩥀𩥁𩥂𩥃𩥄𩥅𩥆𩥇𩥈𩥉𩥊𩥋𩥌𩥍𩥎𩥏𩥐𩥑𩥒𩥓𩥔𩥕𩥖𩥗𩥘𩥙𩥚𩥛𩥜𩥝𩥞𩥟𩥠𩥡𩥢𩥣𩥤𩥥𩥦𩥧𩥨𩥩𩥪𩥫𩥬𩥭𩥮𩥯𩥰𩥱𩥲𩥳𩥴𩥵𩥶𩥷𩥸𩥹𩥺𩥻𩥼𩥽𩥾𩥿𩦀𩦁𩦂𩦃𩦄𩦅𩦆𩦇𩦈𩦉𩦊𩦋𩦌𩦍𩦎𩦏𩦐𩦑𩦒𩦓𩦔𩦕𩦖𩦗𩦘𩦙𩦚𩦛𩦜𩦝𩦞𩦟𩦠𩦡𩦢𩦣𩦤𩦥𩦦𩦧𩦨𩦩𩦪𩦫𩦬𩦭𩦮𩦯𩦰𩦱𩦲𩦳𩦴𩦵𩦶𩦷𩦸𩦹𩦺𩦻𩦼𩦽𩦾𩦿𩧀𩧁𩧂𩧃𩧄𩧅𩧆𩧇𩧈𩧉𩧊𩧋𩧌𩧍𩧎𩧏𩧐𩧑𩧒𩧓𩧔𩧕𩧖𩧗𩧘𩧙𩧚𩧛𩧜𩧝𩧞𩧟𩧠𩧡𩧢𩧣𩧤𩧥𩧦𩧧𩧨𩧩𩧪𩧫𩧬𩧭𩧮𩧯𩧰𩧱𩧲𩧳𩧴𩧵𩧶𩧷𩧸𩧹𩧺𩧻𩧼𩧽𩧾𩧿𩨀𩨁𩨂𩨃𩨄𩨅𩨆𩨇𩨈𩨉𩨊𩨋𩨌𩨍𩨎𩨏𩨐𩨑𩨒𩨓𩨔𩨕𩨖𩨗𩨘𩨙𩨚𩨛𩨜𩨝𩨞𩨟𩨠𩨡𩨢𩨣𩨤𩨥𩨦𩨧𩨨𩨩𩨪𩨫𩨬𩨭𩨮𩨯𩨰𩨱𩨲𩨳𩨴𩨵𩨶𩨷𩨸𩨹𩨺𩨻𩨼𩨽𩨾𩨿𩩀𩩁𩩂𩩃𩩄𩩅𩩆𩩇𩩈𩩉𩩊𩩋𩩌𩩍𩩎𩩏𩩐𩩑𩩒𩩓𩩔𩩕𩩖𩩗𩩘𩩙𩩚𩩛𩩜𩩝𩩞𩩟𩩠𩩡𩩢𩩣𩩤𩩥𩩦𩩧𩩨𩩩𩩪𩩫𩩬𩩭𩩮𩩯𩩰𩩱𩩲𩩳𩩴𩩵𩩶𩩷𩩸𩩹𩩺𩩻𩩼𩩽𩩾𩩿𩪀𩪁𩪂𩪃𩪄𩪅𩪆𩪇𩪈𩪉𩪊𩪋𩪌𩪍𩪎

$$f_{\tilde{N}_p} = \frac{c_p}{m} \sqrt{\frac{E_k c^2 E_{kn}}{m}}$$

$$\frac{\dot{C}}{n\rho\sqrt{\frac{E \times k_c + k_n}{m}}} = \frac{\dot{C}}{n_c n_p \sqrt{\frac{k_c + k_n}{m}}} = n f$$

23. (b) $\ddot{U} = \frac{s \dot{Y}}{r} = \frac{\dot{Y}}{r}$

瞞□SSSS v μ V

[illegible]

$$\frac{\tilde{U} \otimes \tilde{S} \otimes C \otimes \tilde{S} \otimes n \otimes \tilde{S} \otimes \tilde{S} \otimes C \otimes S}{D}$$

$$\backslash \, s \frac{S \bar{A}}{D} \, s \odot s \boxtimes_A n \, \acute{u} \, \text{龜} \, \text{P} \, s \odot s \boxtimes \, \acute{u} \, \text{龜} \, s \text{嘴} \, s \times \spadesuit \acute{Y}$$

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$$\boxtimes \text{龍} \S \times \blacklozenge \acute{Y} \S \boxtimes \quad \S \times \blacklozenge \blacklozenge \acute{Y}$$

$$\begin{array}{ccccccc} \dot{C} & & \dot{C} & \ddot{D} & & & \\ \S - \S \textcircled{C} \S & \S - \dot{\S} & \text{D} & \S & \S \S \textcircled{C} \S & \text{D} & \text{D} \end{array}$$

25. (d) $\$ \diamond \text{盐} \boxtimes \$ \text{曷} \boxtimes \boxtimes \$ \boxtimes \boxtimes \boxtimes$
 $\div \boxtimes \$ \diamond \$ \boxtimes \boxtimes \diamond \boxtimes \text{ĩ} \boxtimes \$ \diamond \boxtimes \text{龜} \$ \diamond$
 $\text{曷} \diamond \text{C} \text{曷} \boxtimes \text{勑} \$ \boxtimes \boxtimes \diamond \boxtimes \boxtimes \$ \boxtimes \text{nD}$
 $\text{wn}\mu_{\text{nD}}$

26. (a) $\bar{U} = \frac{\dot{C}}{n} + \frac{\dot{C}}{D} + \frac{\dot{C}}{G}$ $\bar{U} = \dot{C}m$

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\S Z=\bar{U}=\times\acute{C}'\acute{C}\bar{A}\textcircled{\tiny{G}}\acute{Y}'\acute{C}\bar{A}=\acute{C}\bar{A}_m\bar{U} \\
 \\$\text{勸}\boxtimes\text{𐤒}\boxtimes\boxtimes+\boxtimes\text{𐤓}\text{𐤓}\\$D\mathfrak{z}\\$+\boxtimes\boxtimes+\text{𐤒}\boxtimes\\$隼\text{𐤒}\\$ \boxtimes \\
 CA3U\ddot{o}

27. (a) $\hat{Y}^C = \frac{s \times \dot{\bar{E}}\dot{\bar{Y}}_A}{s \times \dot{\bar{E}} - \dot{\bar{E}}\dot{\bar{Y}}_A} S = \frac{xG\bar{A}\bar{A}'\dot{\bar{E}} - xD}{xG\bar{A}\bar{A}'\dot{\bar{E}} - xD}$

28.)
29. (c) $\vec{C} = \frac{1}{n} \sum_{i=1}^n \vec{C}_i$

[illegible]

$$) ^a \setminus \S \S l = \frac{\quad}{n} = \frac{\mathbb{D} \mathbb{D} \bar{A}}{n' \mathbb{D} \bar{A} \bar{A}} = \frac{\acute{C} \acute{C}}{n \bar{A}}$$

[illegible]

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$$\frac{n}{n_1} = \frac{D_1 H_1}{D_2 H_2} \quad \frac{D_1}{D_2} = \frac{C_1}{C_2}$$

$$\frac{D_1}{D_2} = \frac{C_1}{C_2} \quad \frac{D_1}{D_2} = \frac{C_1}{C_2}$$

[illegible]

[illegible]

[illegible]

32. (a) $\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} m v^2 \right) = \frac{1}{2} m v \frac{dv}{dt} = \frac{1}{2} m v a$
 $\frac{1}{2} m v a = \frac{1}{2} m \frac{v}{r} \frac{dv}{dr} = \frac{1}{4} m \frac{d}{dr} (v^2)$
 $\frac{1}{4} m \frac{d}{dr} (v^2) = -\frac{1}{4} m \frac{d}{dr} \left(\frac{v^2}{r} \right) = -\frac{1}{4} m \frac{d}{dr} \left(\frac{v^2}{r} \right)$
 $\frac{1}{4} m \frac{d}{dr} (v^2) = -\frac{1}{4} m \frac{d}{dr} \left(\frac{v^2}{r} \right) = -\frac{1}{4} m \frac{d}{dr} \left(\frac{v^2}{r} \right)$

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$$s = \frac{Z}{\dot{E} p_{nx}} \quad \S s = \frac{Z \tilde{N}}{\dot{E} p_{nx} \Psi}$$

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PART - II : CHEMISTRY

43. (b)

[illegible]

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42. (c) 空曠曠\$§§烈§§曠§§§§?§§龜§§§§曠§§§

$$= \frac{\mathbb{D}}{\ddot{\mathbb{O}}} = \mathbb{D}$$

[illegible][illegible]

§©§

§C§—

$$= \frac{D}{Dn} \frac{\bar{A} \ddot{A} \ln \dot{C}}{\dot{C}} \S \S n \ddot{C}$$

48. (c)
$$\begin{array}{ccccccc} & \text{Cl} & & & \bar{U} & & \\ & | & & & | & & \\ \text{CH}_2 & - \text{CH}^* & - \text{CH}_2 & - \text{CH}_3 & \bar{U} & - & \bar{U} \\ & | & & & | & & \\ & \text{CH}_3 & & & \bar{U} & & \\ & (\text{R} + \text{S}) & & & \times \text{和} & & \end{array}$$

[illegible]

49. (b) $\bar{U}G \S \hat{G} \S \bar{U} \S \S \text{젤} \bar{U}_n \hat{G} \S \text{è} \S \bar{U} \text{ ㄷ容} \text{ ㄹ} \frac{3}{4} \text{ ㄹ}$

$$\begin{array}{ccccccc} \text{절공} \diamond \check{\text{T}} & & \text{절} & & \text{절공} \diamond \check{\text{T}} & & \text{절} \\ \text{ÜG} \$\text{G} \$\text{Ü} \$\text{절} \text{Ü} \text{n} \text{G} \text{®} & \text{ÜG} \$\text{G} \$\text{Ü} \$\text{§§§§} \text{G} \text{Ü} \text{n} \text{절공} \text{Ü} \text{B} \text{공} \diamond \check{\text{T}} & \text{ÜG} \$\text{G} \$\text{Ü} \$\text{Ü} \text{B} \text{®} & \text{ÜG} \$\text{G} \$\text{Ü} \$\text{Ü} \text{D} \\ \text{Ü} \text{D} & \text{Ü} \text{D} & \text{Ü} \text{D} & \text{Ü} \text{D} \\ \times \text{SY} & \times \check{\text{T}} \text{Y} & \times \check{\text{Ü}} \text{Y} & \end{array}$$

50. (b) $\bar{U} \mathfrak{D} \S \S \S \S \bar{U} \S \S \bar{U}_h \S \S \S \S \S \bar{U}_D \S \S \S \S \S \bar{U} \S \mathfrak{D} \text{空} \text{?} \text{!}^{3/4} \text{®}$

[illegible]

- [illegible]

-
- A graph showing the radial probability density $r^2 \psi^2$ as a function of the radial distance a_0 . The curve starts at the origin, rises to a single maximum, and then decays towards zero as a_0 increases. The horizontal axis is labeled a_0 with an arrow pointing to the right.

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$$\| \nabla \times \vec{C} + \vec{C} \cdot \nabla \vec{U} \|_{\vec{U}} \leq \bar{U} \|\vec{U}\|_{\vec{U}}^n$$

$$\text{和} \otimes \times + \otimes \dot{Y} \times \dot{C} - \otimes \text{泐} \dot{Y} \text{主} \otimes^n \text{泐}$$

[illegible]

𪛗𪛘𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿𪜀𪜁𪜂𪜃𪜄𪜅𪜆𪜇𪜈𪜉𪜊𪜋𪜌𪜍𪜎𪜏𪜐𪜑𪜒𪜓𪜔𪜕𪜖𪜗𪜘𪜙𪜚𪜛𪜜𪜝𪜞𪜟𪜠𪜡𪜢𪜣𪜤𪜥𪜦𪜧𪜨𪜩𪜪𪜫𪜬𪜭𪜮𪜯𪜰𪜱𪜲𪜳𪜴𪜵𪜶𪜷𪜸𪜹𪜺𪜻𪜼𪜽𪜾𪜿𪝀𪝁𪝂𪝃𪝄𪝅𪝆𪝇𪝈𪝉𪝊𪝋𪝌𪝍𪝎𪝏𪝐𪝑𪝒𪝓𪝔𪝕𪝖𪝗𪝘𪝙𪝚𪝛𪝜𪝝𪝞𪝟𪝠𪝡𪝢𪝣𪝤𪝥𪝦𪝧𪝨𪝩𪝪𪝫𪝬𪝭𪝮𪝯𪝰𪝱𪝲𪝳𪝴𪝵𪝶𪝷𪝸𪝹𪝺𪝻𪝼𪝽𪝾𪝿𪞀𪞁𪞂𪞃𪞄𪞅𪞆𪞇𪞈𪞉𪞊𪞋𪞌𪞍𪞎𪞏𪞐𪞑𪞒𪞓𪞔𪞕𪞖𪞗𪞘𪞙𪞚𪞛𪞜𪞝𪞞𪞟𪞠𪞡𪞢𪞣𪞤𪞥𪞦𪞧𪞨𪞩𪞪𪞫𪞬𪞭𪞮𪞯𪞰𪞱𪞲𪞳𪞴𪞵𪞶𪞷𪞸𪞹𪞺𪞻𪞼𪞽𪞾𪞿𪟀𪟁𪟂𪟃𪟄𪟅𪟆𪟇𪟈𪟉𪟊𪟋𪟌𪟍𪟎𪟏𪟐𪟑𪟒𪟓𪟔𪟕𪟖𪟗𪟘𪟙𪟚𪟛𪟜𪟝𪟞𪟟𪟠𪟡𪟢𪟣𪟤𪟥𪟦𪟧𪟨𪟩𪟪𪟫𪟬𪟭𪟮𪟯𪟰𪟱𪟲𪟳𪟴𪟵𪟶𪟷𪟸𪟹𪟺𪟻𪟼𪟽𪟾𪟿𪠀𪠁𪠂𪠃𪠄𪠅𪠆𪠇𪠈𪠉𪠊𪠋𪠌𪠍𪠎𪠏𪠐𪠑𪠒𪠓𪠔𪠕𪠖𪠗𪠘𪠙𪠚𪠛𪠜𪠝𪠞𪠟𪠠𪠡𪠢𪠣𪠤𪠥𪠦𪠧𪠨𪠩𪠪𪠫𪠬𪠭𪠮𪠯𪠰𪠱𪠲𪠳𪠴𪠵𪠶𪠷𪠸𪠹𪠺𪠻𪠼𪠽𪠾𪠿𪡀𪡁𪡂𪡃𪡄𪡅𪡆𪡇𪡈𪡉𪡊𪡋𪡌𪡍𪡎𪡏𪡐𪡑𪡒𪡓𪡔𪡕𪡖𪡗𪡘𪡙𪡚𪡛𪡜𪡝𪡞𪡟𪡠𪡡𪡢𪡣𪡤𪡥𪡦𪡧𪡨𪡩𪡪𪡫𪡬𪡭𪡮𪡯𪡰𪡱𪡲𪡳𪡴𪡵𪡶𪡷𪡸𪡹𪡺𪡻𪡼𪡽𪡾𪡿𪢀𪢁𪢂𪢃𪢄𪢅𪢆𪢇𪢈𪢉𪢊𪢋𪢌𪢍𪢎𪢏𪢐𪢑𪢒𪢓𪢔𪢕𪢖𪢗𪢘𪢙𪢚𪢛𪢜𪢝𪢞𪢟𪢠𪢡𪢢𪢣𪢤𪢥𪢦𪢧𪢨𪢩𪢪𪢫𪢬𪢭𪢮𪢯𪢰𪢱𪢲𪢳𪢴𪢵𪢶𪢷𪢸𪢹𪢺𪢻𪢼𪢽𪢾𪢿𪣀𪣁𪣂𪣃𪣄𪣅𪣆𪣇𪣈𪣉𪣊𪣋𪣌𪣍𪣎𪣏𪣐𪣑𪣒𪣓𪣔𪣕𪣖𪣗𪣘𪣙𪣚𪣛𪣜𪣝𪣞𪣟𪣠𪣡𪣢𪣣𪣤𪣥𪣦𪣧𪣨𪣩𪣪𪣫𪣬𪣭𪣮𪣯𪣰𪣱𪣲𪣳𪣴𪣵𪣶𪣷𪣸𪣹𪣺𪣻𪣼𪣽𪣾𪣿𪤀𪤁𪤂𪤃𪤄𪤅𪤆𪤇𪤈𪤉𪤊𪤋𪤌𪤍𪤎𪤏𪤐𪤑𪤒𪤓𪤔𪤕𪤖𪤗𪤘𪤙𪤚𪤛𪤜𪤝𪤞𪤟𪤠𪤡𪤢𪤣𪤤𪤥𪤦𪤧𪤨𪤩𪤪𪤫𪤬𪤭𪤮𪤯𪤰𪤱𪤲𪤳𪤴𪤵𪤶𪤷𪤸𪤹𪤺𪤻𪤼𪤽𪤾𪤿𪥀𪥁𪥂𪥃𪥄𪥅𪥆𪥇𪥈𪥉𪥊𪥋𪥌𪥍𪥎𪥏𪥐𪥑𪥒𪥓𪥔𪥕𪥖𪥗𪥘𪥙𪥚𪥛𪥜𪥝𪥞𪥟𪥠𪥡𪥢𪥣𪥤𪥥𪥦𪥧𪥨𪥩𪥪𪥫𪥬𪥭𪥮𪥯𪥰𪥱𪥲𪥳𪥴𪥵𪥶𪥷𪥸𪥹𪥺𪥻𪥼𪥽𪥾𪥿𪦀𪦁𪦂𪦃𪦄𪦅𪦆𪦇𪦈𪦉𪦊𪦋𪦌𪦍𪦎𪦏𪦐𪦑𪦒𪦓𪦔𪦕𪦖𪦗𪦘𪦙𪦚𪦛𪦜𪦝𪦞𪦟𪦠𪦡𪦢𪦣𪦤𪦥𪦦𪦧𪦨𪦩𪦪𪦫𪦬𪦭𪦮𪦯𪦰𪦱𪦲𪦳𪦴𪦵𪦶𪦷𪦸𪦹𪦺𪦻𪦼𪦽𪦾𪦿𪧀𪧁𪧂𪧃𪧄𪧅𪧆𪧇𪧈𪧉𪧊𪧋𪧌𪧍𪧎𪧏𪧐𪧑𪧒𪧓𪧔𪧕𪧖𪧗𪧘𪧙𪧚𪧛𪧜𪧝𪧞𪧟𪧠𪧡𪧢𪧣𪧤𪧥𪧦𪧧𪧨𪧩𪧪𪧫𪧬𪧭𪧮𪧯𪧰𪧱𪧲𪧳𪧴𪧵𪧶𪧷𪧸𪧹𪧺𪧻𪧼𪧽𪧾𪧿𪨀𪨁𪨂𪨃𪨄𪨅𪨆𪨇𪨈𪨉𪨊𪨋𪨌𪨍𪨎𪨏𪨐𪨑𪨒𪨓𪨔𪨕𪨖𪨗𪨘𪨙𪨚𪨛𪨜𪨝𪨞𪨟𪨠𪨡𪨢𪨣𪨤𪨥𪨦𪨧𪨨𪨩𪨪𪨫𪨬𪨭𪨮𪨯𪨰𪨱𪨲𪨳𪨴𪨵𪨶𪨷𪨸𪨹𪨺𪨻𪨼𪨽𪨾𪨿𪩀𪩁𪩂𪩃𪩄𪩅𪩆𪩇𪩈𪩉𪩊𪩋𪩌𪩍𪩎𪩏𪩐𪩑𪩒𪩓𪩔𪩕𪩖𪩗𪩘𪩙𪩚𪩛𪩜𪩝𪩞𪩟𪩠𪩡𪩢𪩣𪩤𪩥𪩦𪩧𪩨𪩩𪩪𪩫𪩬𪩭𪩮𪩯𪩰𪩱𪩲𪩳𪩴𪩵𪩶𪩷𪩸𪩹𪩺𪩻𪩼𪩽𪩾𪩿𪪀𪪁𪪂𪪃𪪄𪪅𪪆𪪇𪪈𪪉𪪊𪪋𪪌𪪍𪪎𪪏𪪐𪪑𪪒𪪓𪪔𪪕𪪖𪪗𪪘𪪙𪪚𪪛𪪜𪪝𪪞𪪟𪪠𪪡𪪢𪪣𪪤𪪥𪪦𪪧𪪨𪪩𪪪𪪫𪪬𪪭𪪮𪪯𪪰𪪱𪪲𪪳𪪴𪪵𪪶𪪷𪪸𪪹𪪺𪪻𪪼𪪽𪪾𪪿𪫀𪫁𪫂𪫃𪫄𪫅𪫆𪫇𪫈𪫉𪫊𪫋𪫌𪫍𪫎𪫏𪫐𪫑𪫒𪫓𪫔𪫕

$$\vec{U} \cdot \vec{\nabla} \phi \approx \frac{1}{2} \frac{d\phi}{dt}$$

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$$\setminus \S \mathfrak{D} A = \mathfrak{D} B \mathfrak{C} \frac{p}{\overline{E}}$$

$$\frac{\text{DOMA}}{\text{OA}}$$

瞞 π $\frac{OM}{n}$

$$D \frac{\dot{C}}{\sqrt{n}} = \frac{\text{절편}}{n}$$

▷ 젤공_v©_vn

$$\frac{1}{\sqrt{n}} \sum_{t=1}^n \left(\frac{\partial \log f_t(\theta)}{\partial \theta} - E \left[\frac{\partial \log f_t(\theta)}{\partial \theta} \right] \right) = o_p(1)$$

$$\sum_{n=0}^{\infty} \frac{(-1)^n}{(n+1)!} = e^{-1}$$

$$I = \frac{n}{n} \text{OC}_{\text{集}} - \frac{n}{n} \text{OC}_{\text{集}}$$

112. (c) $I = \frac{n}{n} \frac{\partial}{\partial \mathbf{C}} \frac{n}{n} \frac{\partial}{\partial \mathbf{C}} - \frac{n}{n} \frac{\partial}{\partial \mathbf{C}} \frac{n}{n} \frac{\partial}{\partial \mathbf{C}}$

$$= \overset{\circ}{\partial} \overset{\sqrt{\cdot}}{\mathcal{C}} + \overset{\circ}{\partial} \overset{\sqrt{\mathbb{D}}}{\sqrt{n}} n + \overset{\circ}{\partial} \overset{n}{\sqrt{\mathbb{D}}} \mathbb{D} - \overset{\circ}{\partial} \overset{n}{\check{\mathcal{C}}}$$

$$= \dot{E} - \sqrt{n} - \sqrt{D}$$

113. (c) $\frac{\text{C}\ddot{\text{e}}\text{H}\text{H} \text{ } \text{H} \text{ } \text{H} \text{ } \text{H}}{\text{H} \text{ } \text{C}\ddot{\text{e}}\text{H} \text{ } \text{H} \text{ } \text{H} \text{ } \text{H}}$

[illegible]

[illegible]

114. (c) $\frac{1}{\sqrt{C_+}} + \frac{1}{\sqrt{C_+}} = \bar{A}$

D $\sqrt{C+10} = -10\sqrt{C+}$

和乙盐

$$n \times C_{\text{ess}}^{\text{Y}} \otimes Y \otimes C_{\text{ess}}^{\text{Y}} n \times C_{\text{ess}}^{\text{Y}}$$

[illegible]

$$P_{\mathcal{S}} \Pi_{\mathcal{S}} \otimes \mathcal{S} \otimes \Pi_{\mathcal{S}} \times \dot{C} \otimes \dot{Y} \otimes P_{\mathcal{S}} \Pi_{\mathcal{S}} \otimes \mathcal{S} \otimes \Pi_{\mathcal{S}} = - \frac{1}{C_+}$$

$$\frac{\partial}{\partial t} = \frac{-(\dot{C} + \frac{1}{2} \ddot{C})}{(\dot{C} + \frac{1}{2} \ddot{C})^2} = \frac{-\ddot{C}}{(\dot{C} + \frac{1}{2} \ddot{C})^2}$$

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$$\delta \tilde{N} \delta \times \quad \dot{Y} \delta \textcircled{C} \delta \acute{C} \textsubscript{n} \quad \textcircled{D} \grave{e} \delta \textcircled{C} \textsubscript{n} \textsubscript{n} \quad \delta \textsubscript{n} \textcircled{E}$$

$$\boxtimes \S \S \times Y \S \boxtimes \S \blacklozenge ? \div \boxtimes \boxtimes \text{瞞} \blacklozenge ? \blacklozenge ?$$

$$\tilde{N} \times Y > \bar{A} \otimes \mathbb{P} \otimes \mathbb{C}^n \otimes \mathbb{D} \otimes \mathbb{C}^n \otimes \mathbb{N} \otimes \mathbb{N} \otimes \mathbb{E} \otimes \mathbb{O} \otimes \bar{A}$$

[illegible]

$$\mathbb{P} \quad \S\S\dot{C}n \ \S\times \ \S \ \S\dot{C}Y\S\times \ \S\grave{e}\S n Y\S\S\bar{O}\S\S\bar{A}$$

[illegible]

[illegible]

A horizontal number line with arrows at both ends pointing to $-\infty$ and $+\infty$. Three points are marked on the line: n , A , and C . Above point n is an arrow pointing left towards $-\infty$. Above point C is an arrow pointing right towards $+\infty$.

$$\text{𪛗} \cdot \text{𪛗} \boxtimes \text{𪛗} \times \text{nî} \bar{\text{A}} \hat{\text{Y}} \text{E} \times \text{𪛗} \text{Y} \text{ö}$$

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116. (c) $\bar{U} \otimes \text{?} \otimes S + \frac{\partial}{\partial t} C_1 D + n \epsilon C_1$

[illegible]

117. (b) $\mathbb{N} \models \varphi \Rightarrow \mathbb{N} \models \varphi + \hat{G} - \mathbb{D} \vdash \varphi = \mathbb{G} - \mathbb{D} + \mathbb{N} \vdash$

[illegible]

$r_{+C} = \frac{\dot{C}_A}{U} r_{\dot{i} \hat{i}} \frac{\dot{i} \ddot{x} \acute{C} \acute{u} \acute{u}}{\hat{i} \hat{i} \text{D} \acute{y}} \frac{\dot{C}_A r}{\ddot{o} \acute{u} \acute{x} \text{暗}}$

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$$\Box \vdash \Box \S \vdash \Box \S \Box \S \quad \Diamond \quad \Box \S \Diamond \S \hat{G} \S \quad \Diamond \quad \Box \Box$$

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[illegible]

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$$\dot{C}_n \bar{A} \dot{\otimes} \dot{G} \bar{A} \dot{G}$$

$$\left| \begin{array}{c} \dot{C} \\ n \\ \dot{C} \end{array} \right| \quad \left| \begin{array}{c} \dot{D} \\ n \\ \dot{C} \end{array} \right|$$

$$D = \begin{vmatrix} n & \mathbb{D} & \dot{C} \end{vmatrix} = \bar{A} \S D \dot{C} = \begin{vmatrix} \mathbb{D} & \mathbb{D} & \dot{C} \end{vmatrix}^{-1} \bar{A}$$

$$\text{鹽} \boxtimes \begin{array}{|c|} \hline \mathbb{D} \hat{G}_n \\ \hline \end{array} \qquad \begin{array}{|c|} \hline \mathbb{C} \hat{G}_n \\ \hline \end{array}$$

			
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$$\boxtimes \S \times \mathbb{D} \hat{\imath} \S \text{泐} \acute{Y} \hat{\imath} \S \check{T} \times n \hat{\imath} \S \tilde{I} \acute{Y} \hat{\imath} \S \bar{U} \times \acute{C} \hat{\imath} \S \acute{E} \acute{Y} \S \boxtimes \S$$

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