SRI CHAITANYA EDUCATIONAL INSTITUTIONS, INDIA.

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SEC: SR ELITE, SR AIIMS S60 & LTC-IC SUB: PHYSICS JIPMER

JIPMER GRAND TEST - 3

DATE: 29-05-20 Max. Marks: 800

IMPORTANT INSTRUCTIONS :

Jawaharlal Institute of Postgraduate Medical Education and ResearchTotal Number of Questions: 200,Physics: 60 ,Chemistry: 60,Biology: 60,English and Comprehension: 10, Logic and Quantitative Reasoning: 10For each correct Answer +4 mark. For Each Incorrect Answer – 1 marks.Total marks = 4x200 = 800 marks Duration : 21/2 Hours.

- 01. The pair of quantities having neither units nor dimensions is
 - a) Plane angle and specific gravity
 - b) Magnetic permeability and Relative permittivity
 - c) Coefficient of friction and coefficient of restitution
 - d) Linear momentum and Angular momentum
- 02. A particle is projected with a velocity of 10 ms⁻¹ at an angle 37^{0} with horizontal. A bird moves along the path of projected particle with constant speed of 4 ms⁻¹. Find the acceleration of bird when it is at highest point of path of particle (g = 10ms⁻²) a) zero. b) 10 ms⁻² c) 5 ms⁻². d) 2.5 ms⁻²
- 03. A body when projected vertically up with initial velocity v_0 covers a total distance D during its time of flight 'T'. If there were no gravity, the distance covered by it during the same time 'T' (velocity equal to v_0) is equal to
 - a) zero b) D c) 2D d) 4D
- 04. A block of metal weighing 2 kg is resting on a frictionless plane. It is struck by a jet releasing water at a rate of 1 kg/sec and at a speed of 5 m/sec. The initial acceleration of the block will be

a) $2.5 m/\sec^2$ b) $1.25 m/\sec^2$ c) $1m/\sec^2$ d) $0.5 ms^{-2}$

- 05. A lift is moving downwards with an acceleration equal to acceleration due to gravity. A body of mass m kept on the floor of the lift is pulled horizontally. If the coefficient of friction is μ , then the frictional resistance offered by the body is
 - a) mg b) μmg c) $2\mu mg$ d) zero
- 06. A body takes just twice the time as long to slide down a plane inclined at 30° to the horizontal as if the plane were frictionless. The coefficient of friction between the body and the plane is

a)
$$\frac{\sqrt{3}}{4}$$
 b) $\sqrt{3}$ c) $4/3$ d) $3/4$

- 07. A particle moves under the effect of a force F = Cx from x = 0 to $x = x_1$. The work done in the process is
 - a) Cx_1^2 b) $\frac{1}{2}Cx_1^2$ c) Cx_1 d) Zero

08. A particle of mass m moving with horizontal speed 6 m/sec as shown in figure. If **m** << **M** then for one dimensional elastic collision, the speed of lighter particle after collision will be



a) 2m/sec in original direction

b) 2 m/sec opposite to the original direction

c) 4 m/sec opposite to the original direction

d) 4 m/sec in original direction

09. A particle of mass m is moving in a horizontal circle of radius r under a centripetal force equal to $-\mathbf{K/r^2}$, where K is a constant. The total energy of the particle is

a)
$$\frac{K}{2r}$$
 b) $-\frac{K}{2r}$ c) $-\frac{K}{r}$ d) $\frac{K}{r}$

10. A cubical block of side 'a' is moving with velocity V on a horizontal smooth plane. It hits a very small ridge at point A. The angular speed of the block after it hits A is



11. When a mass is rotating in a plane about a fixed point, its angular momentum is directed along a) A line perpendicular to the plane of rotation

- b) The line making an angle of 45° to the plane of rotation
- c) The radius

d) The tangent to the orbit

12. If each resistance is R ohms, what is the resistance across PQ?



a) 20 Ω

c) 0.9Ω

d) 0.5Ω

- 13. A cylinder rolls up an inclined plane reaches some height and then rolls down (without slipping through out these motions). The directions of the frictional force acting on the cylinder are a) up the incline while ascending and down the incline while descending
 - b) up the incline while ascending as well as descending

b) 10Ω

- c) down the incline while ascending and up the incline while descending
- d) down the incline while ascending as well as descending
- 14. The escape velocity from earth is \mathbf{v}_{es} . A body is projected with velocity $2\mathbf{v}_{es}$ with what constant

velocity will it move in the inter planetary space

a) v_{es} b) 3 v_{es} c) $\sqrt{3} v_{es}$ d) $\sqrt{5} v_{es}$

15. A wire loop formed by joining two semicircular wires of radii R_1 and R_2 carrying a current as shown in the diagram. The magnetic induction at the centre O is



16. A particle executes S.H.M. with a period of 6 second and amplitude of 3 cm. Its maximum speed in cm/sec is

a)
$$\pi/2$$
 b) π c) 2 π d) 3 π

Two masses m1 and m2 are suspended together by a massless spring of constant K. When the 17. masses are in equilibrium, m_2 is removed without disturbing the system. The amplitude of oscillations is



18. According to Hook's law of elasticity, if stress is increased, the ratio of stress to strain b) Decreases c) Becomes zero d) Remains constant a) Increases

When two soap bubbles of radius r_1 and r_2 ($r_2 > r_1$) touching each other, the radius of curvature of 19. common surface is

a)
$$r_2 - r_1$$
 b) $\frac{r_2 - r_1}{r_1 r_2}$ c) $\frac{r_1 r_2}{r_2 - r_1}$ d) $r_2 + r_1$

An ice berg of density 900 Kg/m³ is floating in water of density 1000 Kg/m³. The percentage of 20. volume of ice-cube outside the water is a) 20% b) 10% %

- 21. Water is flowing through a horizontal pipe of non-uniform cross-section. At the extreme narrow portion of the pipe, the water will have
 - a) Maximum speed and least pressure b) Maximum pressure and least speed
 - c) Both pressure and speed maximum d) Both pressure and speed least
- 22. A bimetallic strip is formed out of two identical strips, one of copper and other of brass. The coefficients of linear expansion of the two metals are $\alpha_{\rm C}$ and $\alpha_{\rm B}$. On heating, the temperature of

the strip goes up by ΔT and the strip bends to form an arc of radius of curvature R. Then R is

- a) Proportional to ΔT b) independent of ΔT
- c) Proportional to $|\alpha_B \alpha_C|$ d) Inversely proportional to $|\alpha_B - \alpha_C|$
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The adjoining diagram shows the spectral energy density distribution \mathbf{E}_{λ} of a black body at two 23. different temperatures. If the areas under the curves are in the ratio 16:1, the value of temperature T is



- A gas enclosed in a closed pot is kept in a train moving with high speed, the temperature of the gas 25. a) Will increase b) Will decrease
 - c) Will remain the same d) Will change according to the nature of the gas
- Unit mass of a liquid with volume V_1 is completely changed into a gas of volume V_2 at a constant 26. external pressure P and temperature T. If the latent heat of evaporation for the given mass is L, then the increase in the internal energy of the system is _____ $(V_2 > V_1)$

a) Zero b)
$$P(V_2 - V_1)$$
 c) $L - P(V_2 - V_1)$ d) L

- 27. A Carnot's engine used first an ideal monoatomic gas then an ideal diatomic gas. If the source and sink temperature are 411°C and 69°C respectively and the engine extracts 1000 J of heat in each cycle, then area enclosed by the PV diagram in each case for the 4 strokes each gas is undergoing in the concerned Carnot's cycle
 - a) 100 J, 300 J b) 300 J, 700 J c) 500 J, 500 J d) 700 J, 700 J
- A cylindrical tube of uniform cross-sectional area A is fitted with two air tight frictionless pistons. 28. The pistons are connected to each other by a metallic wire. Initially the pressure of the gas is P₀ and temperature is T₀, atmospheric pressure is also P₀. Now the temperature of the gas is increased to $2T_0$, the tension in the wire will be



29. Consider a process shown in the figure. During this process the work done by the system



- a) Continuously increases
- c) First increases, then decreases



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24.

a) 5°C

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30.	The amplitude of a	wave represented by di	splacement equation y =	$= \frac{1}{\sqrt{a}} \sin \omega t \pm \frac{1}{\sqrt{b}} \cos \omega t \text{ will be}$				
	a) $\frac{a+b}{ab}$	b) $\frac{\sqrt{a} + \sqrt{b}}{ab}$	c) $\frac{\sqrt{a} \pm \sqrt{b}}{ab}$	d) $\sqrt{\frac{a+b}{ab}}$				
31.	A siren emitting so	und of frequency 500 H	Iz is going away from a	static listener with a speed of 50				
	m/sec. The frequence	cy of sound to be heard,	directly from the siren, is	$= (V_{sd} \text{ in air} = 330 \text{ ms}^{-1})$				
	a) 550 Hz	b) 580 Hz	c) 620 Hz	d) 660 Hz				
32.	The kinetic energy	of an electron with de-l	Broglie wavelength of 0.3	3 nanometer is				
	a) 0.168 eV	b) 16.8 eV	c) 1.68 eV	d) 2.5 Ev				
33.	The work function	of a photoelectric mater	rial is 3.3 eV. The thresho	old frequency will be equal to				
	a) $8 \times 10^4 Hz$	b) 8×10 ⁵⁶ Hz	c) $8 \times 10^{10} Hz$	d) $8 \times 10^{14} Hz$				
34.	In any Bohr orbit	of the hydrogen atom	, the ratio of kinetic er	nergy to potential energy of the				
	electron is(1	Take potential energy of	f electron at infinite dista	nce from the nucleus to be zero)				
	a) 1 : 2	b) 2 : 1	c) 1 : (-2)	d) 2 : (-1)				
35.	The half-life of Bi ²	²¹⁰ is 5 days. What time	is taken by (7/8) th part of	f the sample to decay				
	a) 3.4 days	b) 10 days	c) 15 days	d) 20 days				
36.	Energy generation	in stars is mainly due to	,					
	a) Chemical reaction	ns	b) Fission of heavy nuclei					
	c) Fusion of light n	uclei	d) Fusion of heavy mol	ecules				
37.	If a full wave rect	ifier circuit is operatin	g from 50 Hz mains, th	e fundamental frequency in the				
	ripple obtained from	n the full wave rectifier						
	a) 50 Hz	b) 100 Hz	c) 77 Hz	d) 50 Hz				
38.	The combination of	the gates shown in the	figure below produces					
			A					



a) NOR gate

d) XOR gate

- 39. A total charge Q is broken in two parts Q_1 and Q_2 and they are placed at a distance R from each other. The maximum force of repulsion between them will occur, when
 - a) $Q_2 = \frac{Q}{R}, Q_1 = Q \frac{Q}{R}$ b) $Q_2 = \frac{Q}{4}, Q_1 = Q - \frac{2Q}{3}$ c) $Q_2 = \frac{Q}{4}, Q_1 = \frac{3Q}{4}$ d) $Q_1 = \frac{Q}{2}, Q_2 = \frac{Q}{2}$

40. The distance between the two charges 25μ C and 36μ C is 11cm. At what point on the line joining the two, the intensity will be zero

- a) At a distance of 5 cm from $25 \mu C$
- b) At a distance of 5 cm from $36 \mu C$

d) At a distance of 11 cm from $36 \mu C$

- c) At a distance of 10 cm from $25 \mu C$
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41. Two small spheres each having the charge +Q are suspended by insulating threads of length L from a hook. This arrangement is taken in space where there is no gravitational effect, then the angle between the two threads and the tension in each will be

a)
$$180^{\circ}, \frac{1}{4\pi\varepsilon_0}\frac{Q^2}{(2L)^2}$$
 b) $90^{\circ}, \frac{1}{4\pi\varepsilon_0}\frac{Q^2}{L^2}$ c) $180^{\circ}, \frac{1}{4\pi\varepsilon_0}\frac{Q^2}{2L^2}$ d) $180^{\circ}, \frac{1}{4\pi\varepsilon_0}\frac{Q^2}{L^2}$

42. On rotating a point charge having a charge q around a charge Q in a circle of radius r. The work done will be

a)
$$q \times 2\pi r$$
 b) $\frac{q \times 2\pi Q}{r}$ c) Zero d) $\frac{Q}{2\varepsilon_0 r}$

43. A hollow conducting sphere is placed in an electric field produced by a point charge placed at P as shown in figure. Let V_A, V_B, V_C be the potentials at points A.B and C respectively. Then





45. Four condensers each of capacity $4\mu F$ are connected as shown in figure. $V_P - V_Q = 15$ volts. The energy stored in the system is



46. A bar magnet of magnetic M is cut along it length into two equal halves A and B. The piece B is bent in the form of a circle and then A is attached as shown. Its new magnetic moment will be



47. In the figure given below, the current passing through 6Ω resistor is

a) 0.40 ampere



48. A potentiometer is used for the comparison of e.m.f. of two cells $\mathbf{E_1}$ and $\mathbf{E_2}$. For cell $\mathbf{E_1}$ the no deflection point is obtained at 20 cm and for $\mathbf{E_2}$ the no deflection point is obtained at 30cm. The ratio of their e.m.f.'s will be a) 2/3 b) 1/2 c) 1 d) 2

d) 0.80 ampere

49. 100 mA current gives a full scale deflection in a galvanometer of 2Ω resistance. The resistance connected with the galvanometer to convert it into a voltmeter to measure 5Vis
a) 98Ω
b) 52Ω
c) 50Ω
d) 48Ω

50. In the given circuit, with steady current, the potential drop across the capacitor must be



- 51. If a long hollow copper pipe carries a direct current, the magnetic field associated with the current will be
 - a) Only inside the pipe b) Only outside the pipe
 - c) Neither inside nor outside the pipe d) Both inside and outside the pipe
- 52. An α particle and a proton travel with same velocity in a magnetic field perpendicular to the direction of their velocities, find the ratio of the radii of their circular path
 - a) 4 : 1 b) 1 : 4 c) 2 : 1 d) 1 : 2
- 53. A circular coil of diameter 7cm has 24 turns of wire carrying current of 0.75A. The magnetic moment of the coil is
 - a) $6.9 \times 10^{-2} amp m^2$ b) $2.3 \times 10^{-2} amp m^2$
 - c) $10^{-2} amp m^2$ d) $10^{-3} amp m^2$
- 54. A dip circle is at right angle to the magnetic meridian. What will be the apparent dip
- a) 0°
 b) 30°
 c) 60°
 d) 90°

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55. The network shown in the figure is a part of a complete circuit. If at a certain instant the current i is 5A and flowing as shown and is decreasing at the rate of 10^3 A/s then V_A - V_B is



0.03	0.03	0.045
0.10	0.05	0.090
0.20	0.10	0.72

a) Rate = $k[A]^{2}[B]^{2}$ Sri Chaitanya

b) Rate = $k[A]^{2}[B]$ c) Rate = k[A][B] d) Rate = $k[A][B]^{2}$

66. If solubility product of $Zr_3(PO_4)_4$ is denoted by K_{SP} and its molar solubility is denoted by S, then which of the following relation between S and K_{SP} is correct?

a)
$$S = \left(\frac{K_{sp}}{6912}\right)^{\frac{1}{7}}$$
 b) $S = \left(\frac{K_{sp}}{929}\right)^{\frac{1}{9}}$ c) $S = \left(\frac{K_{sp}}{144}\right)^{\frac{1}{6}}$ d) $S = \left(\frac{K_{sp}}{216}\right)^{\frac{1}{7}}$

67. The quantum number of four electrons are given below

I.
$$n = 4$$
 $l = 2$ $m_l = -2$ $m_s = -\frac{1}{2}$
II. $n = 3$ $l = 2$ $m_l = 1$ $m_s = +\frac{1}{2}$
III. $n = 4$ $l = 1$ $m_l = 0$ $m_s = +\frac{1}{2}$
IV. $n = 3$ $l = 1$ $m_l = 1$ $m_s = -\frac{1}{2}$

The correct order of their decreasing energies will be:

- a) IV > III > II > Ib) I > II > III > IVc) I > III > II > IVd) IV > II > III > I68.
 - With respect to an ore, Ellingham diagram helps to predict the feasibility of its
 - a) Thermal reduction b) Electrolysis c) Zone refining d) Vapour phase refining

69. The vapour pressures of pure liquids A and B are 400 and 600 mmHg, respectively at 298 K. On mixing the two liquids, the sum of their initial volumes is equal to the volume of the final mixture. The mole fraction of liquid B is 0.5 in the mixture. The vapour pressure of the final solution, the mole fractions of components A and B in vapour phase, respectively are

a) 500 mmHg, 0.4, 0.6 b) 450 mmHg, 0.4, 0.6 c) 500 mmHg, 0.5, 0.5 d) 450 mmHg, 0.5, 0.5

Which one of the following equations does not correctly represent the first law of thermodynamics 70. for the given processes involving an ideal gas? (Assume non- expansion work is zero)

d) Fehling's test

- a) Isothermal process: q = -wb) Cyclic process: q = -w
- d) Adiabatic Process: $\Delta U = -w$ c) Isochoric process: $\Delta U = q$

71. Fructose and glucose can be distinguished by a) Barfoed's test b) Benedict's test c) Seliwanoff's test

For the following reactions, equilibrium constans are given: 72.

$$S(s) + O_{2}(g) \rightleftharpoons SO_{2}(g); K_{1} = 10^{52}$$

$$2S(s) + 3O_{2}(g) \rightleftharpoons 2SO_{3}(g); K_{2} = 10^{129}$$
The equilibrium constant for the reaction,
$$2SO_{2}(g) + O_{2}(g) \rightleftharpoons 2SO_{3}(g)$$
a) 10^{181} b) 10^{77} c) 10^{154} d) 10^{25}
Among the following molecules/ ions, $C_{2}^{2-}, N_{2}^{2-}, O_{2}^{2-}, O_{2}$

Which one is diamagnetic and has the shortest bond length?

73

a)
$$O_2^{2-}$$
 b) C_2^{2-} c) N_2^{2-} d) O_2
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An electron in ground state of H-atom absorbs 12.75eV of energy and excites to higher energy 74. state. Radius of this higher orbit will be: a) $8.48A^0$ b) $4.77A^{0}$ c) $13.25A^{0}$ d) $19.08A^0$ The strength of 11.2 volume solution of H_2O_2 is: [Given that molar mass of H = 1 g mol⁻¹ and 75. $O = 16 \text{ g mol}^{-1}$] a) 1.7% b) 34% c) 13.6% d) 3.4% The INCORRECT match in the following is 76. b) $\Delta G^0 = 0, K = 1$ c) $\Delta G^0 < 0, K > 1$ d) $\Delta G^0 < 0, K < 1$ a) $\Delta G^0 > 0, K < 1$ The primary pollutant that leads to photochemical smog is: 77. a) nitrogen oxides b) sulphur dioxide c) acrolein d) ozone The decreasing order of electrical conductivity of the following aqueous solutions is 78. (A) 0.1 M Formic acid (B) 0.1 M Acetic acid (C) 0.1 M Benzoic acid a) C > A > Bb) C > B > Ac) A > C > Bd) A > B > CThe electrons are more likely to be found 79. a) in the region a and b b) Only in the region a c) only in the region c d) In the region a and c Enthalpy of sublimation of iodine is 24 cal g^{-1} at 200 °C. If specific heat of $I_2(s)$ and $I_2(vap)$ 80. are 0.055 and 0.031 cal $g^{-1}K^{-1}$ respectively, then enthalpy of sublimation of iodine at 250°C in cal g^{-1} is: a) 2.85 b) 11.4 c) 22.8 d) 5.7 The equilibrium constant K_p for the reaction $2SO_2(g) + O_2(g) \leftrightarrow 2SO_3(g)$ at 1000K is 3.5 atm⁻¹. 81. The partial pressure of oxygen gas to give equal mole of SO_2 and SO_3 at equilibrium is a) 0.29atm b) 3.5atm c) 0.53atm d) 1.7 atm The number of electrons involved in the change for one mole of Fe₃O₄: Given: Fe₃O₄ \rightarrow Fe₂O₃; 82. a) 1 b) 8 c) 6 d) 4 The difference in Bohr's radius of H-atom for (n+1) and nth orbits is equal to (n-1)th of Bohr's 83. radius. Then the value of 'n' is: a) 3 b) 2 c) 4 d) 5 Which one of the following pairs of species have the same bond order ? 84. c) CN^{-1} , COb) $O_2 NO^+$ d) N_2 , O_2^{-1} a) CO, NO Volume occupied by molecules of one mole of gas at NTP , having radius 10^{-8} cm is approximately: 85. d) 10.09mL b) (22.4 / N) litre c) 2.4mL a) 22.4litre For hydrogen gas $C_p - C_v = a$, and for oxygen gas $C_p - C_v = b$, so the relation between a and b is: 86. c) a = 4ba) A = 16b b) 16a = bd) a = bSri Chaitanya

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96.	Rate of	decarboxylation for sod	alime v	will be maximu	um in						
97.	a) Ace Which	tic acid b) 3- of the following configu	-butend ration	c) 3-oxob ole low spin	n complex ?	d) Pent-2- ynoic acid					
	a) d ⁶	b) c	1 ⁷	c) d^1	r r	d) d ⁵					
98.	The nu	mber of S-S bonds in sul	phur tr	rioxide trimer	(S_3O_9) is						
0.0	a) 3	b) 2			c) 1		d) zero				
99.	Which	is the correct code for the $\frac{1}{2}$	e giver	name reaction	ns ?						
	(A)	$ph - C \equiv N \xrightarrow{1)3nC_2 + nC_1}{2)H_2O} \rightarrow$	I)	Perkin reaction	on						
	(B)	$ph-CHO \xrightarrow{KCN\Delta} \rightarrow$	II)	Benzoin con	densation						
	(C)	$ph-CHO \xrightarrow{NaOH} \rightarrow$	III)	Stephen reac	tion						
	(D)	$ph-CHO \xrightarrow{(CH_3CO)_2O}_{CH_3COONa} \rightarrow$	IV	Cannizzaro r	eaction						
	a) A-III	I B-II C – IV D – I			b) A- II I	B-III C-IV	D – I				
	c) A- I,	B-II, $C - III$, $D - IV$			d) A- IV	, B-III, C – II,	D – I				
100.	Which	of the following on the	rmal d	lecomposition	gives colo	ourless parama	agnetic gas and brown				
	coloure	ed paramagnetic gas?									
	I) $L_1N($	D_3 II) Γ	haNO ₃	-1. <i>r</i>	III) Pb(N	$O_3)_2$	IV) $Mg(NO_3)_2$				
101	a) Only The ele	ctronic configuration of	, III OI the ele	ily ement which is	iust above	v only the element v	u) 1, 11, 111, 1v with atomic number 43				
101.	in the n	nodern periodic table is		ment which is			with atomic number 13				
	a) $1s^2 2$	$s^2 2p^6 3s^2 3p^6 3d^5 4s^2$			b) $1s^2 2s^2$	$2p^63s^23p^63d$	$^{10}4s^24p^5$				
	c) $1s^2 2$	$s^2 2p^6 3s^2 3p^6 3d^5 4s^1$			d) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6$						
102.	The nu	mber of 1°, 2°, 3° alkyl h	alide a	re possible in	structural i	ructural isomer of $C_5 H_{11} Br$					
	a) 4, 3,	1 b) 1	, 3, 4		c) 4, 2, 2		d) 4, 3, 2				
103.	Consid	er the following reaction	5		•						
		ONa			Br						
	I.	+ CH ₃ I	>			Cr.	1301Na /				
		CH ₃				CH ₃					
	III. CH	$H_3 - C - Cl + CH_3ONa -$	\longrightarrow		IV. CH ₃	-C - ONa +	$CH_3Cl \longrightarrow$				
		CH ₃			5	I CH ₃	5				
	Which	of the above reactions ca	nnot g	ive an ether?							
	a) I, IV	b) I,	III		c) II, IV		d) II, III				
104.	The spe	ecific rotation of sucrose	$\left(\left[\alpha\right]_{D}^{25}\right)$	(5) is +66.5° (w	vater solve	nt). If 2gm of	sucrose is dissolved in				
	10ml o	f water placed in 5cm tub	be then	observed rota	tion is						
	a) +665	5° b) +	6.65°		c) +0.665	0	d) +3.325°				
105.	Effectiv	ve nuclear charge of Heli	um ato	om is							
	a) 2	b) 1	.3		c) 1.7		d) 1.9				
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106. In Victor Meyer's test of alcohols, 1° alcohols give red colour. The compound produced is

107. Which of the following compound is most basic

a)
$$NO_2 \longrightarrow NH_2$$

b) $O - CH_2 - NH_2$
b) $O - CH_2 - NH_2$
c) H
d) $O - NH_2$

108. In Al_2Cl_6 the number of covalent and coordinate bonds are

- 109. Which one of the following is used to block the ends of polymeric silicone chain a) R_3SiCl b) $RSiCl_3$ c) R_2SiCl_2 d) R_4Si
- 110. Gauche form of ethane 1,2-diol is more stable than its staggered form because of
 a) Inter molecular H-bonding
 b) High dipole moment
 c) Intra molecular H-bonding
 d) more 1.p-1.p repulsions
- 111. In pyrophosphoric acid, H₄P₂O₇, number of σ and $d\pi p\pi$ -bonds respectively are a) 8 and 2 b) 6 and 2 c) 12 and 0 d) 12 and 2
- 112. Which of the following increasing order is not correct as mentioned in the property with it ? a) $HClO < HClO_2 < HClO_3 < HClO_4$ (Thermal stability)

b) $HClO_4 < HClO_3 < HClO_2 < HClO$ (Oxidising power)

- c) $F^- < Cl^- < Br^- < I^-$ (Reducing power)
- d) $HIO_4 < ICl < I_2 < HI$ (Oxidation number of iodine)
- 113. Which of the following compounds will form significant amount of meta product during mono nitration reaction



117.



This reaction is known as

- a) Ledere- Manasse reaction
- c) Cannizaro's reaction

b) Aldol condensationd) Benzoin condensation

- 118. Which of the following is correct Statement?
 - a) CaF_2 is used to decrease melting point of alumina in Hall and Heroult process.
 - b) NaF is used as preservative to prevent fermentation and also for preventing dental cavities
 - c) Blue John is CaF₂
 - d) All the above
- 119. In acidic medium which of the following does not change its colour ?

a)
$$MnO_4^-$$
 b) MnO_4^{2-} c) CrO_4^{2-} d) FeO_4^{2-}
120. $Ag^+ + NH_3 \rightleftharpoons \left[Ag(NH_3) \right]^+$; $K_1 = 3.5 \times 10^{-3}$
 $\left[Ag(NH_3) \right]^+ + NH_3 \rightleftharpoons \left[Ag(NH_3)_2 \right]^+$; $K_2 = 1.7 \times 10^{-3}$
The instability constant of $\left[Ag(NH_3)_2 \right]^+$ is
a) 1.7×10^{-3} b) 1.7×10^5 c) 5.92×10^{-6} d) 1.8×10^3
BOTANY
121. Hormone which induces femaleness in cucumber is
a) Gibberellins b) ABA c) Cytokinin d) Ethylene
122. Net ATP production from one glucose in mature rbc in human is
a) 2 b) 6 c) 8 d) 38
123. Photorespiration is absent in C₄ plants because
a) O₂ is not produced in mesophyll cell b) RuBISCO is not in direct contact with O₂
c) Glucose synthesis occur in mesophyll cell d) more than are options correct
124. Glutamate dehydrogenase help in
a) Transamination b) reductive amination
c) Deamination d) glutamate synthesis
125. Capability of water column in a xylem to resist a pulling is due to
a) Surface tension b) Cohesion c) adhesion d) all the above
126. Mitosis is involved in asexual reproduction in all except
a) Ameoba b) Hydra c) Vegetatively propagating plants d) Bacteria
127. Which of the following are biologically active lipids with 20C and are derivative of arachidonic
acid also?
a) Cerebroside b) Prostaglandins c) ganglioside d) cephalin
128. Which of the following is required for proper chromosome segregation ?
a) Telomere b) Chramatid c) centromere d) chromomere

129.	Evergreen plant among the following is							
	a) Oak b) <i>Pinus</i>	c) maple	d) Birch					
130.	Cause of seed dormancy in Capsella and Lepi	<i>idium</i> is						
	a) Hard seed coat	b) immature embryo						
	c) red light requirement	d) low temperature red	quirement					
131.	Placenta arise from central axis in	, ,	-					
	a) Dianthus, Silene	b) Solanum, China ro	se					
	c) Cucurbita	d) Both a and b						
132.	Double fertilization and triple fusion are chara	acterstics of						
	a) <i>Eucalyptus</i> b) <i>Saragassum</i>	c) Ectocarpus	d) Fern					
133.	Mycorrhizal association occur in all except							
	a) <i>Cycas</i> b) <i>Pinus</i>	c) Cedrus	d) Abies					
134.	Peat is important souce of domestic fuel in sev	veral countres, what is s	source of peat ?					
	a) Partially decomposed Funaria	b) Ferns						
	c) Liverworts	d) Partially decompos	ed Sphagnum					
135.	Locomotory organelle in Trypanosoma is							
	a) cilia b) Pseudopodia	c) flagella	d) absent					
136.	In nature number and kind of organism is n	ot constant. Which of	the following cannot add new					
	organism ?							
	a) Loss of habitat b) mutation	c) evolution	d) sexual reproduction					
137.	With which type of reproduction we can assoc	ciate reduction division	?					
	a) binary fission	b) zoospore formation	l					
	c) conidia formation	d) sexual reproduction	1					
138.	Fertilization is an obligatory event for fruit pre-	oduction in						
	a) Banana b) Pomegranate	c) Orange	d) Grapevine					
139.	Common function that cotyledon and nucellus	s perform in dicots is						
	a) Protection	b) megaspore product	ion					
	c) plantlet formation	d) food storage						
140.	Ocassionally a single gene may express more	than one effect. The ph	enomenon is called					
	a) Pleiotropy	b) multiple allelism						
1 4 1	c) polygenic inheritance	d) more than one optic	ons correct					
141.	Which of the following proteins help in prima	ary packaging of DNA ?						
	a) Non histone proteins	b) histones						
142	c) polyamines	d) calmodulin						
142.	All are dements of tissue culture except	taat taabnalaay in labar	atom					
	a) it require great expense because it needs fai		atory					
	b) It requires acclimatization of plants grown	by tissue culture to exte	ernal environment					
	c) It requires special expertise							
	d) A large number of plants can be grown in s	short time						
143.	The residue left after methane production from	n cattle dung is						
	a) burnt	b) burried in landfills						
	c) Used as manure	d) used in civil constru	uction					
144.	States involved in Ganga action plant are							
	a) Utterakhand, West Bengal	b) UP, Jharkhand						
	c) Bihar	d) All the above						
Sri C	haitanya Pa	ge 15						

100.	a) high PO_2 b) high pCO	c) high pCO_2	d) low acidity
160.	Formation of carbaminohaemoglobin is promo	oted by	a) spermation
	a) Spermateliosis b) Compatibility Peac	tion c) Canacitation	d) Spermiation
159.	undergo the aerosomal reaction successfully a	te temale reproductive	tract that prepare sperms to
1.50	c) Chagas disease, yellow fever	d) Chikungunya, Deng	ue tever
	a) Rabies, polio	b) Filariasis, malaria	
158.	Which of the following pairs are mosquito both	rne viral diseases	
	a) Biotin b) Niacin	c) Thiamine	d) Folacin
157.	Wernicke's syndrome, common in alcoholics,	is due to the deficiency	of
	a) Ecotype b) Ecophene	c) Ecotone	d) Ecoline
156.	The transition zone between two ecosystems i	s called	
	a) Progestin b) Mifepristone	c) Levonorgestrel d)	Centchroman
155.	The contraceptive pill 'Saheli' contains	,, <u>.</u>	
	c) Carrot grass, Black buck	d) Indian aconite. Grea	at Indian Bustard
	a) Mexican poppy, Indian peacock	b) Sal tree, garden liza	rd
154	Which of the following is a pair of critically	a dangered species	<i>a</i> 1141114115
	c) Trichonympha and Termites	d) Escherichia coli and	1 humans
133.	a) Sucker fish and shark	b) Sea anemone and he	ermit crah
152	c) right atrium	u) ascending aorta	
	a) coronary sinus	d) ascending corta	
152.	Coronary arteries that supply blood to the heat	rt muscles, arise from	
150	c) Cystic fibrosis	d) Incontinentiapigmen	ntı
	a) Phenylketonuria	b) Huntington's chorea	1
151.	Which of the following is an autosomal domin	hant disorder	
. –	<u>Z00</u>	<u>LOGY</u>	
	a) Lichen b) phytoplankton	c) moss	d) grass
150.	Pioneer species in xeric succession is		
	a) Phosphorus b) Nitrogen	c) Sulphur	d) all the above
149.	Among the following bio-geo-chemical cycles	s which one does not hav	ve losses due to respiration?
	d) Competent host – prevent expression of des	sired gene	
	c) DNA delivery system – microinjection		
	b) Ligase enzyme – create rDNA by joining D	NA fragments	
140.	a) Gel electronhoresis – separate desired DNA	fragment	n wennonegy
1/18	c) upperais	u) coreopterans	A technology
	a) baculus inuringiensis	d) coleopterans	
147.	Bt cotton is resistant to all except	h) I anidantarara	
1.47	d) formation of non transformant		
	c) formation of blue colonies		
	b) selection of transformants from non transfo	rmants	
	a) selection of recombinants from non recomb	pinants	
146.	Insertional inactivation of marker gene coding	for chromogenic substr	rate help in
	a) rod shaped virus b) spherical virus	c) polyhedral virus	d) icosahedral virus
145.	TMV is a		

161.	. Connecting link between Annelida and Mollusca is										
	a) <i>Chimaera</i>	b) Neopilina	c) Peripatus	d) Proterospongia							
162.	Pulse pressure in hum	ans is									
	a) 40 mm Hg	b) 70 mm Hg	c) 80 mm Hg	d) 120 mm Hg							
163.	In feeding efficiency	of one species might be	e reduced due to t	he interfering and inhibitory presence							
	of the other species, e	ven if resources are abu	Indant then it is ca	alled							
	a) Competitive release	e	b) Resourc	b) Resource partitioning							
	c) Interference compe	etition	d) Competi	itive exclusion							
164.	Match the Columns-I	and II, and choose the o	correct combination	on from the options given.							
	Column-I		Column-II								
	a) <i>Macaca</i>		a) Scaleles	s vertebrate							
	b) Columba		2) Cloacal	chamber							
	c) Vipera		3) Pneumar	tic bones							
	d) Bufo		4) Pinnae a	re present							
	a) a – 4, b – 3, c – 2, c	1 - 1	b) a − 3, b -	-4, c-1, d-2							
	c) $a - 4$, $b - 3$, $c - 1$, c	1 - 2	d) a − 3, b -	d) a − 3, b − 4, c − 2, d − 1							
165.	In males, spermatoger	nesis is regulated by									
	a) Testosterone and F	SH Jactin	b) ICSH an d) FSH and	d) FSH and TSH							
166.	Which of the following	ng statements is NOT co	orrect?								
	a) Oxyntic cells are p	resent in the mucosa of	stomach and secr	ete pepsinogen							
	b) Crypts of Lieberků c) Brunner's glands a	In secrete aminopeptid	ase cosa of duodenum	and secrete alkaline mucus							
	d) Goblet cells are pre	esent in the mucosa of in	ntestine and secre	te mucus							
167.	Implants under the sk	in and injections are al	so used as contra	ceptive device. These devices usually							
	contain										
	a) Progestogens alone	•	b) Estroger	b) Estrogen alone							
	c) Progestogen-estrog	en combination	d) Either 1	d) Either 1 or 3							
168.	Female who cannot	produce ovum, but ca	in provide suitab	ble environment for fertilisation and							
	further development,	could be most likely ass	sisted by								
	a) GIFT	b) ZIFT	c) ICSI	d) IUI							
169.	Volume of air left in t	the lungs after a normal	expiration is call	ed							
	a) ERV	b) RV	c) FRC	d) VC							
170.	DNA polymorphism	that has been used to	develop the DN	A fingerprinting technology is based							
	upon										
	a) Single nucleotide p	olymorphism b)) VNTRs								
	c) Number of protein	coding genes d) U	d) Unique nucleotide bases present in genome								
Sri Chaitanya		Ра	Page 17								

- 171. Recycling is a method for controlling thea) Solid wasteb) Nuclear waste
- 172. Haematocrit value gives
 - a) amount of RBCs in blood
 - c) amount of plasma in blood
- 173. Parkinson disease is due to degeneration of dopaminergic neurons in the
 - a) Substantia nigra, a basal ganglia structure, located in the midbrain
 - b) Caudate nuclei, a component of the basal ganglia.
 - c) Subthalamic nuclei, part of the basal ganglia system
 - d) Globus pallidus, a subcortical structure of the brain
- 174. Each organized skeletal muscle in our body is made up of a number of muscle bundles held together by a common collagenous connective tissue layer called
 - a) Fascia or epimysium b) Endomysium c) Fascia or perimysium d) Fascicle
- 175. A sexually transmitted disease symptomised by the development of chancre on the genitals is caused by the infection of
 - a) *Treponema pallidum*

b) Nisseria gonorrhoeaed) Trichomonas vaginalis

c) Hospital waste

b) number of WBCs in blood

d) haemoglobin percent in blood

d) Toxic waste

- c) Chlamydia trachomatis
- 176. Given below is a pedigree chart showing the inheritance of a certain sex-linked trait in humans. The trait traced in the above pedigree chart is



<u>ENGLISH</u>

Cho	ose the most appropri	iate alternative to fill in	the blank							
181.	The glider	high in the sky.								
100	(a) sore	(b) sour	(c) soar	(d) none of the above						
182.	You may keep your	to yourself.	() : 1							
Cho	(a) council	(b) counsel	(c) mind	(d) none of the above						
102		ym for the given word								
183.	infallible		/ X	/ N						
	(a) untrustworthy	(b) erring	(c) dubious	(d) unreliable						
184.	gather									
	(a) separate	(b) suspend	(c) scatter	scatter (d) spend						
Choo	ose the suitable mean	ing for the given word								
185.	ephemeral									
	(a) unreal	(b) mythical	(c) artificial	(d) short-lived						
186.	stubborn									
	(a) obstinate	(b) easy	(c) willing	(d) pliable						
Cho	ose the suitable one v	vord substitute for the	given words.							
187.	a speech made to one	self								
100	(a) intercourse	(b) speech	(c) dialogue	(d) soliloquy						
188.	an empty comment m	(b) statement	pful	(d) platituda						
Cho	(a) remark	ing for the given idiom	(c) epigrani	(d) platitude						
189	to turn a new leaf		, pin uses.							
107.	(a) to shange complet	taly analy aguras of actio	12							
	(a) to change complet		11 :							
	(b) to shift attention t	o new problems after na	iving studied the old one	e's thoroughly						
	(c) to change the old		28							
	(d) to cover one's fau	ITS								
190.	to take bull by the ho	rns								
	(a) to punish a person	severely for his arroga	nce							
	(b) to grapple courage	eously with a difficulty t	hat lies in our way							
	(c) to handle it with f	ierce attack								
	(d) to bypass the lega	l process and take action	according to one's own	whims						
		LOGICAI	L THINKING							
191.	Look at this series: 14	4, 28, 20, 40, 32, 64, V	What number should cor	ne next?						
	(a) 52	(b) 56	(c) 96	(d) 128						
192.	Which word does NC	T belong with the others	5?							
	(a) guitar	(b) flute	(c) violin	(d) cello						

Sri C	haitanya	Pag	ge 20								
	(a) Blymuth	(b) hupponot	(c) patricrin	(d) crinweel							
	Which word could me	an "maple syrup"?									
	<i>blycrin</i> means maple l	eaf									
	blyonot means oak lea	f									
	dionot means oak tree										
200.	Here are some words t	ranslated from an artific	cial language.								
	I.All mangoes are chea II.Golden-coloured ma (a) Only conclusion I to (c) Either I or II follow	ap. angoes are not cheap. follows vs	(b) Only conclusion II follows(d) Neither I nor II follows								
	Conclusions:	C	C								
199.	Statements: All mange	bes are golden in colour.	No golden-coloured th	ings are cheap.							
	(c) Either I or II is imp	olicit	(d) Neither I nor II is implicit								
198.	 98. Statement: "In order to bring punctuality in our office, we must provide conveyance allowance our employees." - In charge of a company tells Personnel Manager. Assumptions: I.Conveyance allowance will not help in bringing punctuality. II.Discipline and reward should always go hand in hand. 										
	a) Ganesh	b) Raju	c) Kathir	d) Apparu							
	Ganesh. Who is the most senior?										
197.	Kathir is senior of Ga	nesh, Ganesh is senior o	of Apparu. Apparu is ju	nior of Raju. Raju is junior of							
	a) 29	b) 38	c) 10	d) 39							
196.	If $A = 1$, ACE = 9, the	n ART = ?	,	,							
	a) BINARY	b) DAIRY	c) NATION	d) ADDITION							
175.	DICTIONARY	trives select the word wi	nen eur de formed usm	g the letters of the given word.							
195	From the given alterna	tives select the word wh	uich can be formed usin	σ the letters of the given word							
	D) Siee Narayan Dhar D) A D C B	b) A B C D	r ogam								
	A) Arya Samaj	B) Pratnana Samaj	C) veda Samaj								
193.	 inconclusive evidence. Which situation below is the best example of Speculation ? (a) Francine decides that it would be appropriate to wear jeans to her new office on Friday after reading about "Casual Fridays" in her employee handbook. (b) Mary spends thirty minutes sitting in traffic and wishes that she took the train instead of driving. (c) After consulting several guidebooks and her travel agent, Jennifer feels confident that the hotel she has chosen is first-rate. (d) When Emily opens the door in tears, Theo guesses that she's had a death in her family. Arrange the following social reform organisation chromologically on the basis of their foundation 										
193.	People speculate whe	en they consider a situ	uation and assume sor	nething to be true based on							



SRI CHAITANYA EDUCATIONAL INSTITUTIONS, A.P. JIPMER GRAND TEST - 3 KEY SHEET

SR ELITE, SR AIIMS S60 & LTC-IC

DATE: 29-05-20

	PHYSICS																		
1)	C	2)	d	3)	C	4)	a	5)	d	6)	a	7)	b	8)	a	9)	b	10)	b
11)	a	12)	C	13)	b	14)	C	15)	a	16)	b	17)	b	18)	d	19)	C	20)	b
21)	a	22)	d	23)	d	24)	C	25)	C	26)	С	27)	С	28)	b	29)	a	30)	d
31)	d	32)	b	33)	d	34)	C	35)	C	36)	C	37)	b	38)	b	39)	d	40)	a
41)	a	42)	C	43)	d	44)	b	45)	b	46)	d	47)	b	48)	a	49)	d	50)	C
51)	b	52)	C	53)	a	54)	d	55)	d	56)	С	57)	b	58)	b	59)	b	60)	C
CHEMISTRY																			
61)	a	62)	C	63)	a	64)	a	65)	d	66)	a	67)	С	68)	a	69)	a	70)	d
71)	С	72)	d	73)	b	74)	a	75)	d	76)	d	77)	a	78)	С	79)	d	80)	С
81)	a	82)	a	83)	С	84)	С	85)	d	86)	d	87)	b	88)	С	89)	a	90)	a
91)	b	92)	a	93)	b	94)	b	95)	b	96)	С	97)	a	98)	d	99)	a	100)	С
101)	a	102)	a	103)	d	104)	b	105)	b	106)	С	107)	b	108)	С	109)	a	110)	С
111)	d	112)	d	113)	b	114)	d	115)	С	116)	С	117)	a	118)	d	119)	d	120)	b
									BOI	ΓΑΝΥ									
121)	d	122)	a	123)	b	124)	d	125)	d	126)	d	127)	b	128)	С	129)	b	130)	a
131)	d	132)	a	133)	a	134)	d	135)	С	136)	a	137)	d	138)	b	139)	d	140)	a
141)	b	142)	d	143)	С	144)	d	145)	a	146)	a	147)	a	148)	d	149)	d	150)	a
,		,		,		,		,		,		,		,		,		,	
								Z	200	LOGY	ľ	[T		T			
151)	b	152)	d	153)	C	154)	d	155)	d	156)	С	157)	C	158)	d	159)	С	160)	C
161)	b	162)	a	163)	С	164)	a	165)	a	166)	a	167)	d	168)	a	169)	С	170)	b
171)	a	172)	a	173)	a	174)	a	175)	a	176)	a	177)	С	178)	с	179)	a	180)	d

									EN	GLIS	Н								
121)	С	122)	b	123)	b	124)	С	125)	d	126)	a	127)	d	128)	d	129)	С	130)	b
131)	b	132)	b	133)	d	134)	d	135)	b	136)	d	137)	C	138)	b	139)	b	140)	С

SOLUTIONS PHYSICS

01. theory point

02. For particle Mg =
$$\frac{M(u \cos \theta)^2}{R}$$

$$\Rightarrow R = \frac{u^2 \cos^2 \theta}{g}$$

For Bird, $a_n = \frac{v^2}{R} = \frac{v^2}{u^2 \cos^2 \theta} \times g$
$$= \frac{4^2}{10^2 \cos^2 37^0} \times 10 = 2.5 \text{ ms}^{-2}$$

03. During the same time
$$t = \frac{2v_0}{g}$$
, the body
moves in absence of gravity through a
distance D' = v.t, because in absence of
gravity g = 0

$$\Rightarrow \mathbf{D}' = \mathbf{v}_0 \times \left(\frac{2\mathbf{v}_0}{\mathbf{g}}\right) = \frac{2\mathbf{v}_0^2}{\mathbf{g}} \dots (1)$$

In presence of gravity the total distance covered is

$$= D = 2H = 2\frac{v_0^2}{2g} = \frac{v_0^2}{g} \dots (2)$$
$$D' = 2D$$

04. Force on the block
$$F = u \left(\frac{dm}{dt}\right) = 5 \times 1 = 5 N$$

 $\therefore \text{ Acceleration of block } a = \frac{F}{m} = \frac{5}{2} = 2.5 \text{ m/s}^2$

05. normal reaction=0

Hence friction is zero

06.
$$\mu = \tan \theta \left(1 - \frac{1}{n^2} \right) = \tan 30 \left(1 - \frac{1}{2^2} \right) = \frac{\sqrt{3}}{4}$$

07. $W \int F dx = \int Cx dx = C \left[\frac{x^2}{2} \right]^{x_1} = \frac{1}{2} Cx_1^2$

07.
$$W \int_{0}^{1} F dx = \int_{0}^{1} Cx dx = C \left[\frac{1}{2} \right]_{0}^{1} = \frac{1}{2} C.$$

08.
$$v_1 = \left(\frac{m_1 - m_2}{m_1 + m_2}\right)u_1 + \frac{2m_2u_2}{m_1 + m_2}$$

Substituting $m_1 = 0$, $v_1 = -u_1 + 2u_2$

$$\implies v_1 = -6 + 2(4) = 2m/s$$

i.e. the lighter particle will move in original direction with the speed of 2 m/s.

09. Here
$$\frac{mv^2}{r} = \frac{K}{r^2}$$
 \therefore K.E. $= \frac{1}{2}mv^2 = \frac{K}{2r}$
$$U = -\int_{\infty}^{r} F dr = -\int_{\infty}^{r} \left(-\frac{K}{r^2}\right) dr = -\frac{K}{r}$$

Total energy $E = K.E. + P.E. = \frac{K}{2r} - \frac{K}{r} = -\frac{K}{2r}$

fom LCAM; mv(a/2)=I
$$\omega$$

Where I = $\frac{2ma^2}{3}$; hence ω =(3v/4a)

11. theory point

10.

- 12. All resistors are in parallel
- 13. theory point
- 14. Velocity of body in inter planetary space $v' = \sqrt{v^2 - v_{es}^2}$

:.
$$v' = \sqrt{(2v_{es})^2 - v_{es}^2} = \sqrt{3v_{es}^2} \implies v' = \sqrt{3} v_{es}$$

$$15. \quad \frac{\mu_o I}{4} \left[\frac{1}{R_1} + \frac{1}{R_2} \right]$$

16.
$$v_{\text{max}} = a\omega = a\frac{2\pi}{T} = 3 \times \frac{2\pi}{6} = \pi \ cm/s$$

17.
$$\Delta l = \frac{m_2 g}{k}$$

18. $\frac{\text{Stress}}{\text{Strain}} = \text{Modulus of elasticity} = \text{constant}$

19.
$$\frac{4T}{r} = \frac{4T}{r_1} - \frac{4T}{r_2}$$

20.
$$\frac{V_{out}}{V} = \left(\frac{\sigma - \rho}{\sigma}\right) = \frac{1000 - 900}{1000} = \frac{1}{10}$$
$$\therefore V_{out} = 10\% \text{ of } V$$

21. theory point

22.
$$R = \frac{d}{(\alpha_B - \alpha_C)\Delta T} \implies R \propto \frac{1}{\Delta T} \text{ and } R \propto \frac{1}{(\alpha_B - \alpha_C)}$$

23. $\frac{A_T}{A_{2000}} = \frac{16}{1}$ (given)

2 | P a g e

Area under $e_{\lambda} - \lambda$ curve represents the emissive power of body and emissive power $\propto T^4$ (Hence area under $e_{\lambda} - \lambda$ curve) $\propto T^4$ $\Longrightarrow \frac{AT}{A_{2000}} = \left(\frac{T}{2000}\right)^4 \Longrightarrow \frac{16}{1} = \left(\frac{T}{2000}\right)^4,$ $T = 4000 \ K.$ $\theta_{\text{mix}} = \frac{\theta_w - \frac{L_i}{C_w}}{2} = \frac{100 - \frac{80}{1}}{2} = 10^{\circ}C$ 24. Temperature of the gas is concerned only 25. with it's disordered motion. It is no way concerned with it's ordered motion. 26. $\Delta Q = \Delta V + P \Delta V \Longrightarrow mL = \Delta U + P(V_2 - V_1)$ $\Rightarrow \Delta U = L - P (V_2 - V_1) \qquad (\because m = 1)$ $\eta = 1 - \frac{T_2}{T_1} = 1 - \frac{(273 + 69)}{(273 + 411)} = 0.5$ 27. \Rightarrow Work done = $\eta \times Q = 0.5 \times 1000 = 500 J$ 28. Volume of the gas is constant V = constant \therefore $P \propto T$ *i.e.*, pressure will be doubled if temperature is doubled $\therefore P = 2P_0$ Now let F be the tension in the wire. Then equilibrium of any one $P\overline{A}$ piston gives $F = (P - P_0)A = (2P_0 - P_0)A = P_0A$ 29. As the volume is continuously increasing and the work of expansion is always positive, so the work done by the system continuously increases.

30.
$$y = \frac{1}{\sqrt{a}} \sin \omega t \pm \frac{1}{\sqrt{b}} \sin \left(\omega t + \frac{\pi}{2} \right)$$

Here phase difference $=\frac{\pi}{2}$:. The resultant

amplitude =
$$\sqrt{\left(\frac{1}{\sqrt{a}}\right)^2 + \left(\frac{1}{\sqrt{b}}\right)^2} = \sqrt{\frac{1}{a} + \frac{1}{b}} = \sqrt{\frac{a+b}{ab}}$$

31.
$$n' = n \left(\frac{v}{v + v_s} \right) = 760 \times \left(\frac{330}{300 + 50} \right) = 660 Hz$$

32.
$$\lambda = \frac{h}{\sqrt{2mE}} \Rightarrow E = \frac{h^2}{2m\lambda^2}$$
$$= \frac{(6.6 \times 10^{-34})^2}{2 \times 9.1 \times 10^{-31} \times (0.3 \times 10^{-9})^2}$$
$$= 2.65 \times 10^{-18} J = 16.8 \, eV$$

33.
$$v_0 = \frac{W_0}{h} = \frac{3.3 \times 1.6 \times 10^{-19}}{6.6 \times 10^{-34}} = 8 \times 10^{14} Hz$$

34.
$$K.E = \frac{kZe^2}{2r}$$
 and $P.E. = -\frac{kZe^2}{r}$; $\therefore \frac{K.E.}{P.E.} = -\frac{1}{2}$

35.
$$\frac{1}{8}N_0 = N_0 \left(\frac{1}{2}\right)^{t/T} \Longrightarrow \left(\frac{1}{2}\right)^3 = \left(\frac{1}{2}\right)^{t/5} \Longrightarrow t = 15 \ days.$$

- Energy generation in stars is due to fusion reactions
- 37. Frequency of output = 2f

38.
$$Y = \overline{\overline{A}.\overline{B}} = \overline{\overline{A}} + \overline{\overline{B}} = A + B$$

This output equation is equivalent to OR gate

39.
$$Q_1 + Q_2 = Q$$
 (i) and $F = k \frac{Q_1 Q_2}{r^2}$ (ii)
From (i) and (ii) $F = \frac{kQ_1(Q - Q_1)}{r^2}$
For *F* to be maximum $\frac{dF}{dQ_1} = 0 \implies Q_1 = Q_2 = \frac{Q}{2}$
40. $x_1 = \frac{x}{\sqrt{\frac{Q_2}{Q_1} + 1}} = \frac{11}{\sqrt{\frac{36}{25} + 1}} = 5 cm$

41. The position of the balls in the satellite will become as shown below

$$+\mathcal{Q} \bigoplus \begin{array}{c} L & \begin{array}{c} 180^{\circ} & L \\ \bullet & \end{array} & \bullet \\ \end{array} + \mathcal{Q} \longrightarrow \begin{array}{c} 0 \\ \bullet \end{array} + \mathcal{Q} \end{array}$$

Thus angle $\theta = 180^{\circ}$ and Force $= \frac{1}{4\pi\varepsilon_0} \cdot \frac{Q^2}{(2L)^2}$

42. Since charge Q moving on equipotential surface

so work done is zero.

43. Conducting surface behaves as equipotential

surface
44.
$$C = \frac{e_0 A}{d} = 1pF$$
 and $C' = \frac{Ke_0 A}{2d} = 2pF$ $\therefore K = 4$
45. Total capacitance of given system $C_{eq} = \frac{8}{5}\mu F$
 $U = \frac{1}{2}C_{eq}V^2 = \frac{1}{2} \times \frac{8}{5} \times 10^{-6} \times 225 = 180 \times 10^{-6} J$
 $= 180 \times 10^{-6} \times 10^7 \text{ erg} = 1800 \text{ erg}$
46. $M_{\text{semiconductor magnet}} = \frac{2(\mu/2)}{\pi} = \frac{M}{\pi}; M_{Nef} = \frac{M}{2} + \frac{M}{\pi}$
47. P.d. across the circuit $= 1.2 \times \frac{6 \times 4}{6 + 4} = 2.88 \text{ volt}$
Current through 6 ohm resistance
 $= \frac{2.88}{6} = 0.48 A$
48. Ratio will be equal to the ratio of no
deflection lengths *i.e.* $\frac{E_1}{E_2} = \frac{l_1}{l_2} = \frac{2}{3}$
49. $R = \frac{V}{l_8} - G = \frac{5}{100/10^3} - 2 = \frac{5000}{100} - 2 = 48\Omega$
50. Moving anticlockwise from A
 $-iR - V + 2V - 2iR = 0$
or $3iR = V$ or $i = \frac{V}{3R}$
 $V_A - V_B = iR + V - V = iR$
 \Rightarrow Potential drop across $C = \frac{V}{3}$
51. Because for inside the pipe $i = 0 \therefore B = \frac{\mu_0 i}{2\pi r} = 0$
52. $r = \frac{mv}{qB} \Rightarrow \frac{r_a}{r_p} = \frac{m_a}{m_p} \times \frac{q_p}{q_a} = \frac{4}{1} \times \frac{1}{2} = \frac{2}{1}$
53. $M = NiA = 24 \times 0.75 \times 3.14 \times (3.5 \times 10^{-2})^2$
 $= 6.9 \times 10^{-2} A - m^2$
54. theory point
55. By using Kirchoff's voltage law
 $V_A - i R + E + \left|L\frac{di}{dt}\right| = V_B \Rightarrow V_B - V_A = 15 \text{ volt.}$

56. theory point

57. Given
$$u = (f + x_1)$$
 and $v = (f + x_2)$

The focal length $f = \frac{uv}{u+v} = \frac{(f+x_1)(f+x_2)}{(f+x_1)+(f+x_2)}$

On solving, we get $f^2 = x_1 x_2$ or $f = \sqrt{x_1 x_2}$

 $\frac{f_1}{f_2} = \frac{2}{3}$(i)

$$\frac{1}{f_1} - \frac{1}{f_2} = \frac{1}{30} \qquad \dots \dots (ii)$$

Solving equation (i) and (ii)

 $f_2 = -15 \, cm$ (Concave)

 $f_1 = 10 \, cm \, (\text{Convex})$

59. formula

58.

60. theory point

Logical Thinking

- 191. This is an alternating multiplication and subtracting series: First, multiply by 2 and then subtract 8.
- 192. The guitar, violin, and cello are stringed instruments; the flute is a wind instrument.
- 193. This is the only situation in which someone makes an assumption that is not based on conclusive evidence. Choices a and c reflect situations in which assumptions are made based on evidence. In choice b, Mary is not assuming anything to be true. She is simply wishing that she'd made a different decision.
- 199. Clearly, the conclusion must be universal negative and should not contain the middle term. So, it follows that 'No mango is cheap'. Since all mangoes are golden in colour, we may substitute 'mangoes' with 'goldencoloured mangoes'. Thus, II follows
- 200. In this language, the adjective follows the noun. From dionot and blyonot, you can determine that 'onot' means oak. From blyonot and blycrin, you can determine that bly means leaf. Therefore, crin means maple. Because the adjective maple comes after the noun, *patricrin* is the only possible choice.