



[SAMPLE PAPER] FOR CLASS

11th GOING TO 12th

TIME : 2 Hours

FULL MARKS : 300

INVENTORS

SCHOLARSHIP CUM OPEN REWARD EXAM

INSTRUCTIONS

[A] General

- 1. This Question paper contains THREE Parts, A, B and C (Physics, Chemistry, and Mathematics).
- 2. This Question Paper contains 11 pages including cover page.
- 3. This question paper contains total 75 questions (Each subject have 20 MCQ type questions and 5 Numerical Value.)
- 4. The Question Paper has blank spaces at the bottom of each page for rough work. No additional sheets will be provided for rough work.
- 5. Blank papers, clip boards, log tables, slide rule, calculators, cellular phones, pagers and electronic gadgets, in any form, are NOT allowed.
- 6. The OMR (Optical Mark Recognition) sheet shall be provided separately.

[B] Answering on the OMR

- 7. In all the parts, each question will have 4 choices out of which only one choice is correct.
- 8. Darken the bubble with Ball Pen (Blue or Black) ONLY.

[C] Filling OMR

- 9. On the OMR sheet, fill all the details properly and completely, otherwise your OMR will not be checked.
- 10. Do not write anything or tamper the barcode in the registration no. box.

[D] Marking Scheme:

Illuminating Mindu.

11. For each question you will be awarded 4 marks if you darken the bubble corresponding to the correct answer ONLY and zero (0) marks if no bubble is darkened. In all other cases, minus one (–1) mark will be awarded.

Registration N	o.:	

SECTION – A : PHYSICS

- 1. Find points at which the tangent to the curve $y = x^3 3x^2 9x + 7$ is parallel to the x-axis
 - (A) (3,–20) and (–1, 12)
 - (C) (3,–10) and (1, 12)

- (B) (3, 20) and (1, 12) (D) None of these
- 2. Let $\vec{A} = \hat{i}A\cos\theta + \hat{j}A\sin\theta$, be any vector. Another vector \vec{B} which is normal to \vec{A} is :-
 - (A) $\mathbf{\hat{B}}\cos\theta + \mathbf{\hat{j}B}\sin\theta$ (B) $\mathbf{\hat{B}}\sin\theta + \mathbf{\hat{j}B}\cos\theta$
 - (C) $\mathbf{\hat{i}}\mathbf{B}\sin\theta \mathbf{\hat{j}}\mathbf{B}\cos\theta$ (D) $\mathbf{\hat{i}}\mathbf{A}\cos\theta \mathbf{\hat{j}}\mathbf{A}\sin\theta$
- 3. If $|\vec{A} \times \vec{B}| = \sqrt{3}\vec{A}.\vec{B}$, then the value of $|\vec{A} + \vec{B}|$ is :-
 - (A) $\left(A^{2} + B^{2} + \frac{AB}{\sqrt{3}}\right)^{1/2}$ (B) A + B (C) $\left(A^{2} + B^{2} + \sqrt{3}AB\right)^{1/2}$ (D) $\left(A^{2} + B^{2} + AB\right)^{1/2}$
- 4. A bird moves from point (1, -2, 3) to (4, 2, 3). If the speed of the bird is 10 m/s, then the velocity vector of the bird is :-
 - (A) $5(\hat{i} 2\hat{j} + 3\hat{k})$ (B) $5(4\hat{i} + 2\hat{j} + 3\hat{k})$ (C) $0.6\hat{i} + 0.8\hat{j}$ (D) $6\hat{i} + 8\hat{j}$
- 5. The coordinates of a moving particle at time t are given by $x = ct^2$ and $y = bt^2$. The speed of the particle is given by :-
 - (A) 2t(c+b) (B) $2t\sqrt{c^2-b^2}$ (C) $t\sqrt{c^2+b^2}$ (D) $2t\sqrt{c^2+b^2}$
- 6. Which of the following velocity-time graph shows a realistic situation for a body in motion:-



 Raindrops are falling vertically with a velocity 10m/s. To a cyclist moving on a straight road the rain drops appear to be coming with a velocity of 20m/s. The velocity of cyclist is :-

(A) 10m/s (B)
$$10\sqrt{3}$$
 m/s (C) 20 m/s (D) $20\sqrt{3}$ m/s





[2]

INVENTORS TALENT SEARCH EXAM (ITSE)_11th going to 12th

- If angular velocity of a disc depends an angle rotated θ as $\omega = \theta^2 + 2\theta$, then its angular 8. acceleration α at θ = 1 rad is : (B) 10 rad/s² (C) 12 rad/s^2 (A) 8 rad/ s^2 (D) None of these If the radii of circular path of two particles are in the ratio of 1 : 2, then in order to have 9. same centripetal acceleration, their speeds should be in the ratio of : (D) $\sqrt{2}$:1 (C) $1:\sqrt{2}$ (A) 1:4 (B) 4:1 A body of mass m_1 exerts a force on another body of mass m_2 . If the magnitude of 10. acceleration of m_2 is a_2 , then the magnitude of the acceleration of m_1 is (considering only two bodies in space) (B) $\frac{m_2 a_2}{m_1}$ (C) $\frac{m_1 a_2}{m_2}$ (A) Zero (D) a_2 A block of mass of 10 kg lies on a rough inclined plane of inclination $\theta = \sin^{-1}$ with the 11. horizontal when a force of 30N is applied on the block parallel to and upward the plane, the total force exerted by the plane on the block is nearly along (coefficient of friction is =) ($q = 10 \text{ m/s}^2$)
- 12. When forces F_1 , F_2 , F_3 are acting on a particle of mass m such that F_2 and F_3 are mutually perpendicular, then the particle remains stationary. If the force F_1 is now removed then the acceleration of the particle is-

(C) OC

(A)
$$F_1/m$$
 (B) F_2F_3/mF_1 (C) $(F_2 - F_3)/m$ (D) F_2/m

13. Three forces start acting simultaneously on a particle moving with velocity \vec{v} . These forces are represented in magnitude and direction by the three sides of a triangle ABC (as shown). The particle will now move with velocity-



(A) Less than \vec{v}

(A) OA

(C) |v| in the direction of largest force BC



(D) OD

(B) OB



(A) g/tan α

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



(D) g tan α

15. Work done in time t on a body of mass m which is accelerated from rest to a speed v in time t₁ as a function of time t is given by :

(A)
$$\frac{1}{2}m\frac{v}{t_1}t^2$$
 (B) $m\frac{v}{t_1}t^2$ (C) $\frac{1}{2}\left(\frac{mv}{t_1}t\right)^2 t^2$ (D) $\frac{1}{2}m\frac{v^2}{t_1^2}t^2$

16. A block attached to a spring, pulled by a constant horizontal force, is kept on a smooth surface as shown in the figure. Initially, the spring is in the natural state. Then the maximum positive work that the applied force F can do is : [Given that spring does not break]

(A)
$$\frac{F^2}{k}$$
 (B) $\frac{2F^2}{k}$ (C) ∞ (D) $\frac{F^2}{2k}$
17. A particle moves in a straight line with retardation proportional to its displacement. Its loss of kinetic energy for any displacement x is proportional to-
(A) x^2 (B) e^x (C) x (D) $\log_e x$
18. A particle of mass 100 g is thrown vertically upwards with a speed of 5 m/s. The work done by the force of gravity during the time the particle goes up is-
(A) $-0.5 J$ (B) $-1.25 J$ (C) $1.25 J$ (D) $0.5 J$
19. A projectile can have the same range R for two angles of projection. If t_1 and t_2 be the times of flights in the two cases, then the product of the two times of flights is proportional to-
(A) R^2 (B) $\frac{1}{R^2}$ (C) $\frac{1}{R}$ (D) R
20. If $\vec{A} \times \vec{B} = \vec{B} \times \vec{A}$, then the angle between \vec{A} and \vec{B} is-
(A) π (B) $\pi/3$ (C) $\pi/2$ (D) $\pi/4$



- 21. Force 3N, 4N and 12N act at a point in mutually perpendicular directions. The magnitude of the resultant force (in N) is :-
- 22. Particle is dropped from the height of 20m on horizontal ground. There is wind blowing due to which horizontal acceleration of the particle becomes 6 ms⁻². Find the horizontal displacement (in meter) of the particle till it reaches ground.
- 23. A block of mass m = 2 kg is resting on a rough inclined plane of inclination 30° as shown in figure. The coefficient of friction between the block and the plane is $\mu = 0.5$. What minimum force F (in N) should be applied perpendicular to the plane on the block, so that block does not slip on the plane (g = 10m/s²)



24. A horizontal force of 10 N is necessary to just hold a block stationary against a wall. The coefficient of friction between the block and the wall is 0.2. The weight of the block (in N) is-



25. A person A of 50 kg rests on a swing of length 1m making an angle 37° with the vertical. Another person B pushes him to swing on other side at 53° with vertical. The work done (in J) by person B is: [g = 10 m/s²]

Space for Rough Work



SECTION – B : CHEMISTRY

26.	If velocity of an electron Li ⁺²	n in I orbit of H atom is V,	what will be the velocity	of electron in 3 rd orbit of		
	(A) V	(B) V/3	(C) 3 V	(D) 9 V		
27.	The difference between series for Li^{2+} ion is :	n the wave number of 1	st line of Balmer series a	and last line of paschen		
	(A) $\frac{R}{36}$	(B) $\frac{5R}{36}$	(C) 4R	$(D)\frac{R}{4}$		
28.	de-Broglie wavelength wavelength of electron	of electron in second	orbit of Li ²⁺ ion will be	equal to de-Broglie of		
	(A) n = 3 of H-atom	(B) n = 4 of C⁵⁺ ion	(C) n = 6 of Be ³⁺ ion	(D) n = 3 of He⁺ ion		
29.	For an electron, with electron will be	n = 3 has only one radi	al node. Th <mark>e orbita</mark> l an	gular momentum of the		
	(A) 0	(B) $\sqrt{6} \frac{h}{2\pi}$	(C) $\sqrt{2} \frac{h}{2\pi}$	(D) $3\left(\frac{h}{2\pi}\right)$		
30.	The MRI (magnetic res radio frequency energy	onance imagin <mark>g) body s</mark> . The wavelengt <mark>h corres</mark> p	canners used in hospital	s operate with 400 MHz uency is		
	(A) 0.75 m	(B) 0.75 c <mark>m</mark>	(C) 1.5 m	(D) 2 cm		
31.	Which of the following o	ber of atoms ?				
	(A) 1.0 g of butane (C₄H	H ₁₀)	(B) 1.0 g of nitrogen (N ₂)			
	(C) 1.0 g of silver (Ag) (D) 1.0 g of water (I			r (H ₂ O)		
32. Vapour density of a gas if its density is 0.178 g/L at NTP is :						
	(A) 0.178	(B) 2	(C) 4	(D) 0.089		
33.	The atomic weights of two elements A and B are 40 and 80 respectively. If x g of A conta atoms, how many atoms are present in 2x g of B?					
	(A) $\frac{y}{2}$	(B) $\frac{y}{4}$	(C) y	(D) 2y		
34.	For the reaction 2P + Q	$H \rightarrow R$, 8 mol of P and 5 m	nol of Q will produce			
	(A) 8 mol of R	(B) 5 m <mark>ol of R</mark>	(C) 4 mol of R	(D) 13 mol of R		
35.	What approximate volu a solution in which the r	me of 0.40 M <mark>Ba(OH)₂ m</mark> molarity of the OH⁻ ions is	ust be added to 50.0 mL 0.50 M?	of 0.30 M NaOH to get		
	(A) 33 mL	(B) 66 mL	(C) 133 mL	(D) 100 MI		



INVENTORS TALENT SEARCH EXAM (ITSE)_11th going to 12th

						[']
If the pressure of a gas contained in a closed vessel is increased by 0.4 % when heated by 1°C its initial temperature must be:						
(A) 250 K	(B) 250°C		(C) 25°C		(D) 25 K	
Equal weights of ethat total pressure exerted	ane & hydrogen are d by hydrogen is:	mixed i	n an empty conta	iner at 2	5º C, the fra	ction of the
(A) 1: 2	(B) 1: 1		(C) 1: 16		(D) 15: 16	
X ml of H_2 gas effuses through a hole in a container in 5 sec. The time taken for the effusion of the same volume of the gas specified below under identical conditions is:						
(A) 10 sec. He	(B) 20 sec. O ₂		(C) 25 sec. CO	2	(D) 55 sec.	CO ₂
The R.M.S. speed of is:	of the molecules of	a gas of	density 4 kg m ∹	³ and pre	essure 1.2 ×	10 ⁵ N m ^{- 2}
(A) 120 m s ⁻¹	(B) 300 m s ^{−1}		(C) 600 m s ⁻¹		(D) 900 m	s ⁻¹
The values of Vander Waal's constant "a" for the gases O_2 , N_2 , NH_3 & CH_4 are 1.36, 1.39, 4.17, 2.253 L ² atm mole ⁻² respectively. The gas which can most easily be liquified is:						
(A) O ₂	(B) N ₂		(C) NH ₃		(D) CH ₄	
Consider the following statements						
1. IE ₁ of nitrogen a <mark>tom is</mark> more than IE ₁ of oxygen atom.						
2. Electron affinity of oxygen is less than sulpur atom						
3. Electronegativity on pauling scale is 2.8 times than electronegativity on mullikan scale,						
The above statements 1, 2, 3 respectively are (T = True, F = False)						
(A) T F F	(B) T T F		(C) F T F		(D) T F F	
Which is not correctly	/ matched?					
(1) Basic strength of oxides C <mark>s₂O<rb<sub>2O< K₂O < N</rb<sub></mark> a ₂ O < Li ₂ O						
(2) Stability of peroxid	des Na ₂ O ₂ < K	20 ₂ < Rb	$0_2O_2 < Cs_2O_2$			
(3) Stability of bicarbonates LiHCO ₃ < NaHCO ₃ < KHCO ₃ < RbHCO ₃ < CsHCO ₃						
(4) Melting point NaF <mark>< NaCl < NaBr < Na</mark> l						
(A) 1 and 4	(B) 1 and 3		(C) 1 and 2		(D) 2 and 3	
The correct order of size of the ions is <mark>:</mark>						
(A) Li ⁺ > Be ²⁺ > Na ⁺ >	> Mg ²⁺		(B) Na⁺ >	Mg ²⁺ > L	.i⁺ > Be²+	
(C) Mg ²⁺ > Be ²⁺ > Na	ı⁺ > Li⁺		(D) Mg ²⁺ >	> Na⁺ > E	3e ²⁺ > Li ⁺	
	If the pressure of a g its initial temperature (A) 250 K Equal weights of ethat total pressure exerted (A) 1: 2 X ml of H ₂ gas effus the same volume of t (A) 10 sec. He The R.M.S. speed of is: (A) 120 m s ⁻¹ The values of Vande 2.253 L ² atm mole ⁻² m (A) O ₂ Consider the followin 1. IE ₁ of nitrogen a 2. Electron affinity 3. Electronegativity The above statement (A) T F F Which is not correctly (1) Basic strength of (2) Stability of peroxid (3) Stability of bicarbo (4) Melting point (A) 1 and 4 The correct order of s (A) Li ⁺ > Be ²⁺ > Na ⁺² (C) Mg ²⁺ > Be ²⁺ > Na ⁺²	If the pressure of a gas contained in a class initial temperature must be: (A) 250 K (B) 250°C Equal weights of ethane & hydrogen are total pressure exerted by hydrogen is: (A) 1: 2 (B) 1: 1 X ml of H ₂ gas effuses through a hole in the same volume of the gas specified be (A) 10 sec. He (B) 20 sec. O ₂ The R.M.S. speed of the molecules of is: (A) 120 m s ⁻¹ (B) 300 m s ⁻¹ The values of Vander Waal's constant "a 2.253 L ² atm mole ⁻² respectively. The gas (A) O ₂ (B) N ₂ Consider the following statements 1. IE ₁ of nitrogen atom is more than IE 2. Electron affinity of oxygen is less that 3. Electronegativity on pauling scale is The above statements 1, 2, 3 respectivel (A) T F F (B) T T F Which is not correctly matched? (1) Basic strength of oxides Cs ₂ O <rb<sub>2 (2) Stability of peroxides Na₂O₂ < K (3) Stability of bicarbonates LiHCO₃ < (4) Melting point NaF < Na⁴ (A) 1 and 4 (B) 1 and 3 The correct order of size of the ions is: (A) Li⁺ > Be²⁺ > Na⁺ > Mg²⁺ (C) Mg²⁺ > Be²⁺ > Na⁺ > Li⁺</rb<sub>	If the pressure of a gas contained in a closed version initial temperature must be: (A) 250 K (B) 250°C Equal weights of ethane & hydrogen are mixed in total pressure exerted by hydrogen is: (A) 1: 2 (B) 1: 1 X ml of H ₂ gas effuses through a hole in a contained be same volume of the gas specified below under the same volume of the gas specified below under (A) 10 sec. He (B) 20 sec. O ₂ The R.M.S. speed of the molecules of a gas of is: (A) 120 m s ⁻¹ (B) 300 m s ⁻¹ The values of Vander Waal's constant "a" for the 2.253 L ² atm mole ⁻² respectively. The gas which (A) O ₂ (B) N ₂ Consider the following statements 1. IE ₁ of nitrogen atom is more than IE ₁ of oxygen is less than sulput 3. Electron affinity of oxygen is less than sulput 3. Electronegativity on pauling scale is 2.8 times The above statements 1, 2, 3 respectively are (T (A) T F (B) T T F Which is not correctly matched? (1) Basic strength of oxides Cs ₂ O <rb<sub>2O< K₂O (2) Stability of peroxides Na₂O₂ < K₂O₂ < Rb (3) Stability of bicarbonates LiHCO₃ < NaHCO₂ (4) Melting point NaF < NaCI < NaE (A) 1 and 4 (B) 1 and 3 The correct order of size of the ions is: (A) Li⁺ > Be²⁺ > Na⁺ > Mg²⁺ (C) Mg²⁺ > Be²⁺ > Na⁺ > Li⁺</rb<sub>	If the pressure of a gas contained in a closed vessel is increased its initial temperature must be: (A) 250 K (B) 250°C (C) 25°C Equal weights of ethane & hydrogen are mixed in an empty contatoral pressure exerted by hydrogen is: (A) 1: 2 (B) 1: 1 (C) 1: 16 X ml of H ₂ gas effuses through a hole in a container in 5 sec. The the same volume of the gas specified below under identical condition (A) 10 sec. He (B) 20 sec. O ₂ (C) 25 sec. CO The R.M.S. speed of the molecules of a gas of density 4 kg m ⁻¹ is: (A) 120 m s ⁻¹ (B) 300 m s ⁻¹ (C) 600 m s ⁻¹ The values of Vander Waal's constant "a" for the gases O ₂ , N ₂ , N 2.253 L ² atm mole ⁻² respectively. The gas which can most easily b (A) O ₂ (B) N ₂ (C) NH ₃ Consider the following statements 1. IE ₁ of nitrogen atom is more than IE ₁ of oxygen atom. 2. Electron affinity of oxygen is less than sulpur atom 3. Electronegativity on pauling scale is 2.8 times than electronegativity on pauling scale is 2.8 times than electronegativity on pauling scale is 2.8 times than electronegativity of peroxides Na ₂ O ₂ < K ₂ O ₂ < Rb ₂ O ₂ < Cs ₂ O ₂ (3) Stability of peroxides Na ₂ O ₂ < K ₂ O ₂ < Rb ₂ O ₂ < Cs ₂ O ₂ (4) Melting point NaF < NaCl < NaBr < Nal (A) 1 and 4 (B) 1 and 3 (C) 1 and 2 The correct order of size of the ions is: (A) Li ⁺ > Be ²⁺ > Na ⁺ > Li ⁺ (D) Mg ²⁺ > (C) Mg ²	If the pressure of a gas contained in a closed vessel is increased by 0.4 its initial temperature must be: (A) 250 K (B) 250°C (C) 25°C Equal weights of ethane & hydrogen are mixed in an empty container at 2 total pressure exerted by hydrogen is: (A) 1: 2 (B) 1: 1 (C) 1: 16 X ml of H ₂ gas effuses through a hole in a container in 5 sec. The time to the same volume of the gas specified below under identical conditions is: (A) 10 sec. He (B) 20 sec. O ₂ (C) 25 sec. CO ₂ The R.M.S. speed of the molecules of a gas of density 4 kg m ⁻³ and press. (A) 120 m s ⁻¹ (B) 300 m s ⁻¹ (C) 600 m s ⁻¹ The values of Vander Waal's constant "a" for the gases O ₂ , N ₂ , NH ₃ & Cl 2.253 L ² atm mole ⁻² respectively. The gas which can most easily be liquified (A) O ₂ (B) N ₂ (C) NH ₃ Consider the following statements 1. IE ₁ of nitrogen atom is more than IE ₁ of oxygen atom. 2. Electron affinity of oxygen is less than sulpur atom 3. Electronegativity on pauling scale is 2.8 times than electronegativity of The above statements 1, 2, 3 respectively are (T = True, F = False) (A) T F (B) T T F (C) F T F Which is not correctly matched? (1) Basic strength of oxides Cs ₂ O <rb<sub>2O<k<sub>2O < Na₂O < Li₂O (2) Stability of peroxides Na₂O₂ < K₂O₂ < Rb₂O₂ < Cs₂O₂ (3) Stability of bicarbonates LiHCO₃ < NaHCO₃ < KHCO₃ < RHCO₃ < C (4) Melting point NaF < NaCl < NaBr < Nal (A) 1 and 4 (B) 1 and 3 (C) 1 and 2 The correct order of size of the ions is: (A) Li* > Be²⁺ > Na* > Li* (D) Mg²⁺ > Na* > E</k<sub></rb<sub>	If the pressure of a gas contained in a closed vessel is increased by 0.4 % when hear its initial temperature must be: (A) 250 K (B) 250 °C (C) 25°C (D) 25 K Equal weights of ethane & hydrogen are mixed in an empty container at 25° C, the fractional pressure exerted by hydrogen is: (A) 1: 2 (B) 1: 1 (C) 1: 16 (D) 15: 16 X ml of H ₂ gas effuses through a hole in a container in 5 sec. The time taken for the the same volume of the gas specified below under identical conditions is: (A) 10 sec. He (B) 20 sec. O ₂ (C) 25 sec. CO ₂ (D) 55 sec. The R.M.S. speed of the molecules of a gas of density 4 kg m ⁻³ and pressure 1.2 × is: (A) 10 sec. He (B) 300 m s ⁻¹ (C) 600 m s ⁻¹ (D) 900 m The values of Vander Waal's constant "a" for the gases O ₂ , N ₂ , NH ₃ & CH ₄ are 1.36, 2.253 L ² atm mole ⁻² respectively. The gas which can most easily be liquified is: (A) O ₂ (B) N ₂ (C) NH ₃ (D) CH ₄ Consider the following statements 1. IE ₁ of nitrogen atom is more than IE ₁ of oxygen atom. 2. Electron affinity of oxygen is less than sulpur atom 3. Electronegativity on pauling scale is 2.8 times than electronegativity on mullikan so The above statements 1, 2, 3 respectively are (T = True, F = False) (A) T F (B) T T (C) F T (D) T F F Which is not correctly matched? (1) Basic strength of oxides Cs ₂ O <rb<sub>2O< K₂O < Na₂O < Li₂O (2) Stability of peroxides Na₂O₂ < K₂O₂ < Rb₂O₂ < Cs₂O₂ (3) Stability of bicarbonates LiHCO₃ < NaHCO₃ < KHCO₃ < RbHCO₃ < CsHCO₃ (4) Metting point NaF < NaCl < NaF < Nal (A) 1 and 4 (B) 1 and 3 (C) 1 and 2 (D) 2 and 3 The correct order of size of the ions is: (A) Li⁺ > Be²⁺ > Na⁺ > Mg²⁺ (C) Mg²⁺ > Na⁺ > Se²⁺ > Li⁺ (D) Mg²⁺ > Na⁺ > Be²⁺ > Li⁺</rb<sub>



INVENTORS TALENT SEARCH EXAM (ITSE)_11th going to 12th

44.	ا the long form of the periodic table, silver (Atomic number 47) belongs to the group					
	(A) 1 st	(B) 10 th	(C) 16 th	(D) 11 th		
45.	What is the position of the element in the periodic table satisfying the electronic configurati $(n - 1) d^1 ns^2$ for n = 4					
	(A) 3rd period and 3rd group		(B) 4th period and 4th	group		

[8]

(C) 3rd period and 2nd group

46.

- No. of visible lines when an electron returns from 5th orbit to ground state in H spectrum-
- **47.** What volume (in litre) of hydrogen gas at 273 K and 1 atm pressure will be consumed in obtaining 21.6 gm of elemental boron (atomic mass = 10.8) from the reduction of boron trichloride by hydrogen-

(D) 4th period and 3rd group

- **48.** A container contains the mixture of water vapour and oxygen gas with total pressure 1.1 atm at certain temperature. If volume is made one third then find the total pressure (assume aqueous tension of water at this temperature is 0.1 atm.)?
- **49.** At what temperature would the most probable speed of CO₂ molecules be twice that at 127°C
- **50.** The electron affinity of a hypothetical element 'A' is 3 eV per atom. How much energy in kcal is released when 10g of 'A' is completely converted to A⁻ ion in a gaseous state?

 $(1 \text{ eV} = 23 \text{ kcal mol}^{-1}, \text{ Molar mass of A} = 30 \text{ g})$

Space for Rough Work



SECTION – C : MATHEMATICS

51. The co-ordinates of a point P on the line 2x - y + 5 = 0 such that |PA - PB| is maximum where A is (4, -2) and B is (2, -4) will be -

52. A ray of light passing through the point A (1, 2) is reflected at a point B on the x-axis line mirror and then passes through (5, 3). Then the equation of AB is -

(A)
$$5x + 4y = 13$$
 (B) $5x - 4y = -3$ (C) $4x + 5y = 14$ (D) $4x - 5y = -6$

- 53. Let the algebraic sum of the perpendicular distances from the points (3, 0), (0, 3) & (2, 2) to a variable straight line be zero, then the line passes through a fixed point whose coordinates are-
 - (A) (3, 2) (B) (2, 3) (C) $\left(\frac{3}{5}, \frac{3}{5}\right)$ (D) $\left(\frac{5}{3}, \frac{5}{3}\right)$
- 54. The line PQ whose equation is x y = 2 cuts the x axis at P and Q is (4, 2). The line PQ is rotated about P through 45° in the anticlockwise direction. The equation of the line PQ in the new position is –

(A)
$$y = -\sqrt{2}$$
 (B) $y = 2$ (C) $x = 2$ (D) $x = -2$

55. The maximum value of the sum of the A.P. 50, 48, 46, 44, is – (A) 325 (B) 648 (C) 650 (D) 652

56. Let a_n be the nth term of a G.P. of positive numbers. Let $\sum_{n=1}^{100} a_{2n} = \alpha \& \sum_{n=1}^{100} a_{2n-1} = \beta$ such

that $\alpha \neq \beta$. Then the common ratio of the G.P. is –

(A)
$$\frac{\alpha}{\beta}$$
 (B) $\frac{\beta}{\alpha}$ (C) $\sqrt{\frac{\alpha}{\beta}}$ (D) $\sqrt{\frac{\beta}{\alpha}}$

57. If ln(a + c), ln(c - a), ln(a - 2b + c) are in A.P., then :

- (A) a, b, c are in A.P. (B) a^2 , b^2 , c^2 are A.P.
- (C) a, b, c are in G.P. (D) a, b, c are in H.P.

58. The sum to n terms of the series $\frac{3}{1^2} + \frac{5}{1^2 + 2^2} + \frac{7}{1^2 + 2^2 + 3^2} + \dots$ is –

(A)
$$\frac{3n}{n+1}$$
 (B) $\frac{6n}{n+1}$ (C) $\frac{9n}{n+1}$ (D) $\frac{12n}{n+1}$
Space for Rough Work







INVENTORS TALENT SEARCH EXAM (ITSE)_11th going to 12th

67.	f A and B be any two sets, then $(A \cap B)'$ is equal to-					
	(A) A'∩B'	(B) A'∪B'	(C)	$A \cap B$	(D) A ∪ B	
68.	Let A and B be two $n\big(A \cap B\big)$ is equal to-	sets such that n	(A) = 70,	n(B) = 60	and $n(A \cup B) = 110.T$	⁻ hen
	(A) 240	(B) 20	(C)	100	(D) 120	
69.	If A = {-2, -1, 0, 1, 2} & f : A \rightarrow Z; f (x) = x ² + 1, then the range of f is					
	(A) {0, 1, 2, 5}		(B)	{1, 2, 5}		
	(C) {- 5, - 2, 1, 2, 3}		(D)	A		
70.	If f : $R \rightarrow R$ satisfies f((x + y) = f(x) + f(y),	for all x, y	$\in R \text{ and } f(\mathcal{T})$	1) = 7, then $\sum_{r=1}^{n} f(r)$ is –	
	(A) $\frac{7n}{2}$		(B)	$\frac{7(n+1)}{2}$		
	(C) 7n (n + 1)		(D)	<u>7n(n + 1)</u> 2		
71.	The value of the expre	ession $\frac{1-4\sin 10^\circ}{2\sin 10^\circ}$	sin 70° is	-///		

72. The expression $\sqrt{\log_{0.5}^2 8}$ has the value equal to _____

73. If
$$f(x) = \cos(\log x)$$
, then $f(x) f(y) - \frac{1}{2} [f(x/y) + f(xy)]$ is equal to -

- 74. The line x + y = p meets the axis of x and y at A and B respectively. A triangle APQ is inscribed in the triangle OAB, O being the origin, with right angle at Q. P and Q lie respectively on OB and AB. If the area of the triangle APQ is $3/8^{th}$ of the area of the triangle OAB, then $\frac{AQ}{BQ}$ is equal to –
- 75. Given sin B = $\frac{1}{5}$ sin(2A + B) then, tan (A + B) = k tan A, where 2k has the value equal to

Space for Rough Work

