DSE-PHY-13-1AS



2013 ARDSE PAUSICS Paper 1A

Suggested Solutions Prepared by Andy Lai 5 5 Art Physics Teacher 47.DS MC 係分 ABC Grade 既地方, 越出越煩, 越出越深, 一定要快又要好小心! 同學 We deliver quality education. We teach with hearts!

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2013 HKDSE Physics Paper IA Suggested Answers

1.	В	2.	В	3.	С	4.	D	5.	Α
6.	D	7.	Α	8.	D	9.	D	10.	D
11.	В	12.	A	13.	D	14.	Α	15.	В
16.	В	17.	Α	18.	D	19.	C	20.	С
21.	Α	22.	C	23.	Α	24.	D	25.	С
26.	С	27.	C	28.	С	29.	D	30.	В
31.	A	32.	C	33.	В	34.	A	35.	В
36.	В			6			2		

MC 係分 ABC Grade 既地方, 越出越煩, 越出越難! 轉數快, 概念清! 缺一不可! 同學一定要快又要好小心!

 Andy's predicted M.C. Grade boundaries:

 5**: 34 / 36
 5*: 31 / 36
 5: 28 / 36

 4: 24 / 36
 3: 20 / 36
 2: 16 / 36





D	
D	黎 Sir 提提你 💮 :
	1. Experimental results of specific latent heat of vaporization of water <
	Standard value of specific latent heat of vaporization of water
	\Rightarrow Less energy is needed for vaporization
	\Rightarrow Some energy is absorbed by the water but not supplied by the heater.
	2 A is incorrect
	If the energy is lost to surroundings more energy is used and the results
	should be higher than the actual value
	should be nighter than the actual value.
	2 P is connect
	5. B is correct.
	Water splashing out means less water is needed to boil, less energy is needed
	for vaporization and so the experimental result is smaller than the standard
	value.
	4. C is incorrect.
	If the steam condenses on the cooler part of the heater and drops back to the
	beaker, more energy is needed to re-boil the water dropped back to the
	beaker and so the experimental result is larger than that standard value.
	5 D is incorrect
	If the heater is not completely immersed in water some energy is lost to
	surroundings and so more energy are used to be the water and so the
	surroundings and so more energy are used to bon the water and so the
	experimental result is larger than that standard value.
	6. Remember, don't just use the equation $l = \frac{E}{m}$ and you will fall into a trap!





4. D 黎 Sir 提提你 🏾 🕙 : **1.** By PV = nRT and before S is opened, in vessel X, $2pV = n_x RT$ while in vessel Y, $p(2V) = n_v RT$. Therefore, the number of moles of gas molecules in vessel X and vessel Y are $n_x = \frac{2pV}{RT}$ and $n_y = \frac{2pV}{RT}$. Therefore, A is correct. **2.** By $E_K = \frac{3RT}{2N_A}$ and before S is opened, the Kelvin temperature of vessel X and vessel Y are the same. Therefore, the average kinetic energy of the gas molecules in both vessels is the same. Therefore, B is correct. 3. When S is opened, since the gas pressure in vessel X is 2p and that in vessel Y is p, the pressure difference (2p - p) makes a net flow of gas molecules from vessel X to vessel Y until equilibrium is reached. Therefore, C is correct. 4. In equilibrium, the pressure in vessel X and vessel Y should be the same. Therefore, By PV = nRT, $P(3V) = (n_x + n_y)RT \implies P = \frac{(n_x + n_y)RT}{3V}$. Since $p = \frac{n_x RT}{2V}$ and $n_x = n_y$, therefore, $P = \frac{2n_x RT}{3V} \implies P = \frac{4}{3} p \neq \frac{2}{3} p$. Therefore, D is incorrect.







黎 Sir 提提你 🖉 :

7.

A

1.	At first, the block is moving to the left with constant speed. Therefore, the
	friction acting on the block = $12 - 2 = 10$ N (To the right)
2.	If the force of 12 N is suddenly removed, since the block is still moving to the
	left, the friction is still acting on the block to the right to oppose the motion
	and its magnitude is still the same as that of before
3.	Therefore, resultant force acting on the block = $2 + 10 = 12$ N (To the right)



9. D 黎 Sir 提提你 学:
1. Taking moment at Y, by principle of moment
Sum of clockwise moment at Y = sum of anti-clockwise moment at Y, 154(0.5) = F_x (0.7)
F_x = 110 N
2. Do you know why I choose to take moment at Y instead of other point?



B 黎 Sir 提提你

> 1. For velocity-time graph, at t = 1 s, the sign of velocity is still negative, which means P travel in the same direction but slower. Therefore, statement 1 is incorrect.

2. At t = 2 s, the displacement of Q from the starting point = $(2 \times 2)/2$ = 2 m At t = 2 s, the displacement of P from the starting point = $(2 \times -2)/2$ = - 2 m Therefore, the separation between P and Q is 2 - (-2) = 4 meters. Therefore, statement 2 is correct.

3. At t = 4 s, the displacement of Q from the starting point = $(2 \times 4)/2 = 4 \text{ m}$ At t = 4 s, the displacement of P from the starting point $= (2 \times -2)/2 + (2 \times 4)/2 = -2 + 4 = 2 \text{ m} \neq 4 \text{ m}$ Therefore, P and Q cannot meet each other at t = 4 s. Therefore, statement 3 is incorrect.



	Γ.	
14.	Α	黎 Sir 提提你 [©] :
		1. Tension in the spring balances the weight.
		Therefore, statement 1 is correct.
		2. Since the card board is in static equilibrium, which means both translation
		equilibrium (Resultant Force = Zero) and rotational equilibrium (Resultant
		Torque = Zero) are achieved. Therefore, the weight and the tension should be
		acting along the same line of force to make the resultant torque become zero.
		Therefore, statement 2 is correct.
		3. The reading of the balance is only become less but not zero since the
		acceleration due to gravity of the moon is not zero, there still be a weight
		acting on the cardboard.
		Therefore, statement 3 is incorrect.

 15.
 B
 黎 Sir 提提你

 1. Let the mass and the radius of the Earth be M and r respectively.

 2. The gravitation acceleration g on the Earth's surface is: $g = \frac{GM}{r^2}$

 3. The gravitational acceleration on the surface of Mars is:

 $g_{Mars} = \frac{G(0.1M)}{(0.5r)^2} = 0.4 \frac{GM}{r^2} = 0.4g$









18.	D	黎 Sir 提提你 🖉 :
		1. For stationary wave, Particle P and Q are both attaining their amplitude in which they are momentarily at rest. However, in this question, there is no
		mention about whether particle P and Q are attaining their amplitude or not.
		Therefore, statement 1 is incorrect.
		2. For stationary wave, Particle Q and R are exactly out of phase / anti-phase.
		Therefore, they will go back to the equilibrium positions at the same time.
		Therefore, statement 2 is correct.
		3. For stationary wave, Particle P and R always in antiphase.
		Therefore, statement is correct.











25. C
黎 Sir 提提你
1. By
$$E = \frac{V}{d} \implies 3 \times 10^6 = \frac{V}{500} \implies V = 1.5 \times 10^9 \text{ V}$$

2. By $V = \frac{U}{Q} \implies 1.5 \times 10^9 = \frac{U}{20} \implies U = 3 \times 10^{10} J$
3. Therefore, order of magnitude of energy released = 10^{10}











30.	В	黎 Sir 提提你 [@] :
		1. Resistor Y and resistor X are in-series; the voltage across resistor Y and
		resistor X are the same. V^2
		2. The resistance of X, Y and Z are the same (Let it be R), By $P = \frac{v}{R}$ so the
		power dissipated by Y and Z are the same.
		3. The equivalent resistance across $Y//Z = R/2$, therefore, the ratio of the
		potential difference (voltage) across X to the potential difference (voltage) across $Y//Z = 2:1$.
		V^2
		4. Therefore, By $P = \frac{v}{R}$, Given the resistance of X, Y and Z are the same, the
		ratio of the power dissipated in X to that Y to that of $Z = 4:1:1$
		5. Therefore, the power dissipated in resistor $Z = 4$ W.









34.	A	黎 Sir 提提你 [©] :
		1. ${}^{238}_{92}U \rightarrow {}^4_2\alpha + {}^{234}_{90}P$
		2. ${}^{234}_{90}U \rightarrow {}^{0}_{-1}\beta + {}^{234}_{91}Q$
		3. ${}^{234}_{91}U \rightarrow {}^{0}_{-1}\beta + {}^{234}_{92}R$
		$4. {}^{234}_{92}U \to {}^{4}_{2}\alpha + {}^{230}_{90}S$
		5. Atomic numbers: 90; Mass numbers: 230

35. B
黎 Sir 提提你 ○:
1. By
$$N = N_{\circ}e^{-\lambda t}$$
, $N = 420e^{-(\frac{\ln 2}{140})(70)} = 296.98 \approx 297 mg$

36.	В	黎 Sir 提提你 [©] :
		1. By $E = mc^2$, $3.8 \times 10^{26} = m(3 \times 10^8)^2$, $m \approx 4.2 \times 10^9 kg$





推出下列新高中物理科暑期班

斑別	逄星期	時間	上課日期		
Physics R01	逄星期三 (Wed)	9a.m. – 10a.m.	8月7,14,21,28		
課程內容: HKDSE Physics Core Section 5: Radioactivity and Nuclear Energy					
Radiation and radioactivity / Atomic model / Nuclear energy					
● 考試答題技巧 + 考生常犯錯誤					

斑別	逄星期	時間	上課日期		
Physics A01	逄星期三 (Wed)	10a.m. – 11a.m.	8月7,14,21,28		
課程內容: HKDSE Physics Elective Section 7: Atomic World					
• Rutherfore	• Rutherford's atomic model / Photoelectric effect				
• Bohr's atomic model of hydrogen / Waves-particles duality					
Probing into Nano scale					
● 考試答題技巧 + 考生常犯錯誤					

班別	逄星期	時間	上課日期		
Physics E01	逄星期三 (Wed)	11a.m. – 12a.m.	8月7,14,21,28		
課程內容: HKDSE Physics Core Section 4a: Electrostatics					
 Electric charges / Electric field / Electric potential 					
● 考試答題技巧 + 考生常犯錯誤					

斑別	逄星期	時間	上課日期		
Physics E02	逄星期三 (Wed)	12a.m. – 1p.m.	8月7,14,21,28		
課程內容:					
HKDSE Phys	ics Core Section 4b:	Circuits and dom	estic electricity		
• Electric C	urrent / Electrical e	nergy / Electromo	tive force (e.m.f)		
• Resistance	e and its complex co	nnection			
• Series and	• Series and parallel circuits / Earthed points as zero potential				
Electrical power / Domestic electricity					
● 考試答題技巧 + 考生常犯錯誤					

班別	逄星期	時間	上課日期		
Physics E03	逄星期三 (Wed)	1p.m. – 2p.m.	8月7,14,21,28		
課程內容:					
HKDSE Physics Core Section 4c: Electromagnetism					
• Magnetic force and magnetic field					
• Magnetic effect of electric current					
• Current-carrying conductor in magnetic field					
• Hall effect and its application					
• Electromagnetic induction / Lenz' Law / Faraday's Law					
• Alternating current (a.c.) / Transformer					
• High voltage transmission of electrical energy					
● 考試答題技巧 + 考生常犯錯誤					

班別	逄星期	時間	上課日期			
Physics M01	逄星期三 (Wed)	2p.m. – 3p.m.	8月7,14,21,28			
課程內容: HKDSE Physics Core Section 2abce: Mechanics Part 1						
Position and Movement / Force and Motion						
Work and Power / Momentum						
● 考試答題技巧 + 考生常犯錯誤						

斑別	逄星期	時間	上課日期			
Physics M02	逄星期三 (Wed)	3p.m. – 4p.m.	8月7,14,21,28			
課程內容:						
HKDSE Physics Core Section 2dfg: Mechanics Part 2						
Projectile motion						
• Uniform circular motion						
• Gravitation						
● 考試答題技巧 + 考生常犯錯誤						



- 全英文筆記,配以充足例題練習.
- 真人現場教授,小組教學.
- 教學語言:廣東話/英語講解.
- 每班名額:最多7人.
- 全期學費: 每班別 HKD 960 四堂, 每堂1小時.

(學生需於第一堂上課前報名和繳交全期學費.)

- 暑期班不設補堂/轉堂, 學生如因任何原因不能上課, 不設退款.
- 歡迎同學自行組班,自定課題,教學時間,進度更具彈性.
- 報名熱線: 6772 3001
- 上課地址:香港九龍旺角煙廠街9號興發商業大廈706室



- 地鐵: 旺角 E2 出口,油麻地 A2 出口
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21K, 74, 74S

小巴:

小巴:



查詢熱線: 6772 3001 電郵地址: <u>enquiry@andylai.hk</u> 網址: <u>www.andylai.hk</u>

黎 sir 簡介 Andy Lai BEng CUHK, MIEEE



◇ 畢業於香港中文大學電子工程學系,黎 sir 教室創辦人之一.

◇ 超過 15 年教授中學文憑 / IB Diploma / GCE / HSC / SAT / AP / GCSE / IGCSE / IB MYP 課程經驗.

◇ 為了與學生一起面對新制度的中學文憑試,黎 sir 親身上陣,以實力於物理科奪取 5**,證明寶刀未老.

◆ 熟悉出題趨勢,教授考試取分技巧;鼓勵同學獨立思考,增強同學理解能力.

♦ 善用生活化例子講解,教法生動,增加學習趣味;深入淺出,明白學生學習上的困難和需要.

◆ 精心編制筆記, 適合中文和英文中學學生就讀; 精心編制練習和試題, 協助同學盡快掌握答題技巧.

◇ 黎 sir 在中學和大學時代已是一名傑出學生, 曾獲取的多項學業上和運動上的獎學金及獎項.

♦ 曾代表香港參加國際性運動比賽,取得優異成績,又讀得又玩得,絕不是死讀書的書呆子.

◆ 任教科目:所有數學科,物理科,化學科,生物科,經濟科,商業科.



黎 sir 教室課程特色:

◆ 小組教學 (1-6人), 導師親身教學; 照顧每位學生需要, 事半功倍.

♦ 精心編制筆記,練習以近 30 年本地和外國公開試題為藍本.

◆ 概念理解,取分技巧並重;協助同學盡快掌握答題技巧.

◆ 歡迎自由組合小組上課,時間及課程內容編排更有彈性.

◆ 詳情請瀏覽以下網址: <u>www.andylai.hk</u>









黎 sir 教室 A Lai Learning Center

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資深中學補習導師 小組補習 事半功倍!!!

黎 sir 簡介 Andy Lai BEng CUHK, MIEEE



- ◆ 畢業於香港中文大學,黎 sir 教室創辦人之一.
- ◇ 超過 15 年教授 中學文憑 / IB Diploma / GCE / HSC / SAT / AP / GCSE / IGCSE / IB MYP 課程經驗.
- ◆ 為了與學生一起面對新制度的中學文憑試,黎 sir 親身上陣,以實力於物理科奪取 5**,證明寶刀未老.
 ◆ 現於黎 sir 教室任教補習班,學生就讀於英文中學,中文中學,國際學校及英國留學生.
- ◆ 熟悉近年出題趨勢,教授考試取分技巧;鼓勵同學獨立思考,增強同學理解能力
- ◆ 善用生活化例子講解,教法生動,增加學習趣味;深入淺出,明白學生學習上的困難和需要.
- ◇ 中英對照筆記,適合中文和英文中學學生就讀; 精心編制練習和試題,協助同學盡快掌握答題技巧.
- ◆ 黎 sir 在中學和大學時代已是一名傑出學生, 曾獲取多項學業上和運動上的獎學金及獎項; 曾代表香港參加國際性運動比賽, 取得優異成績, 「又讀得又玩得」, 絕不是死讀書的書呆子.
- ◆ 黎 sir 在就讀大學時曾於全球最大美資電腦公司任實習生超過一年,大學畢業後旋即於全港大型英 資電腦公司,負責主理該公司所代理的全球大型美資電腦公司儲存系統銷售業務.
- ◇ 於短短半年內將該產品線銷售業績提升超過 50%. 同時更被公司評選為"傑出表現員工 Outstanding Performer",成功將書本上的知識靈活運用於工作上.

地鐵:

小巴:

◆ 黎 sir 為了教學理想, 毅然辭去工作, 全身投入教學事業, 希望將自己的一套學習方法教授學生

黎 sir 教室 課程特色

- ◆ 小組教學 (1-6人),導師親身教學;照顧每位學生需要,事半功倍.
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- ◇ 歡迎自由組合小組上課,時間及課程內容編排更有彈性.
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小巴: 21K, 74, 74S



上課地址: 香港九龍旺角煙廠街9號興發商業大廈706室.
 查詢熱線: 6772 3001
 電郵地址: <u>enquiry@andylai.hk</u>
 網址: www.andylai.hk