HKDSE MOCK EXAMINATION 2021

Physics

Marking Scheme

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Paper I Section A
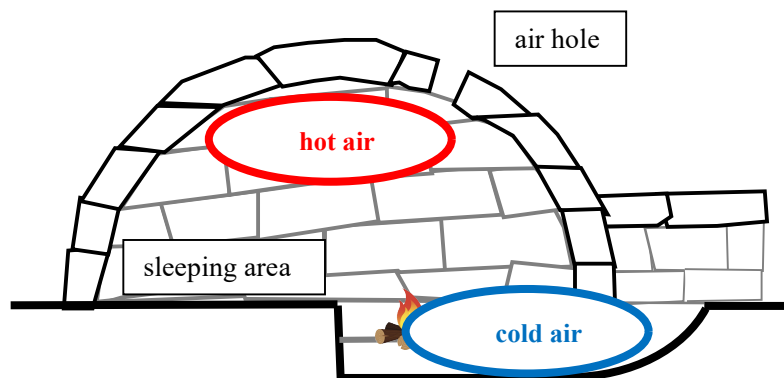
Question No.	Key	Question No.	Key
1.	B	26.	C
2.	B	27.	C
3.	A	28.	C
4.	D	29.	B
5.	B	30.	C
6.	D	31.	C
7.	C	32.	A
8.	D	33.	D
9.	A		
10.	D		
11.	B		
12.	B		
13	A		
14.	A		
15.	B		
16.	C		
17.	C		
18.	B		
19.	B		
20.	D		
21.	D		
22.	A		
23.	C		
24.	A		
25.	C		

Paper I Section B

1. (a)   Hard snow blocks are <u>good insulators</u> since there is <u>trapped air</u> inside them.   1 M + 1 M

   (b) (i)

1 A + 1 A

     (ii)   Hot air is <u>less dense</u> therefore it <u>floats up to the top</u> of the igloo.   1 M + 1 M

         Cold air is <u>denser</u> therefore it <u>sinks down the bottom</u> of the igloo.   1 M + 1 M

   (c)   The air hole on the top of the igloo <u>allows air to enter</u> which <u>avoids suffocation</u>.   1 M + 1 M

2. (a) (i)   16.0 mol   1 M + 1 A

     (ii) $n_x' = 6.42$ mol   (6.35 ~ 6.45 accepted)   1 M + 1 A

         $n_y' = 9.63$ mol   (9.55 ~ 9.65 accepted)   1 M + 1 A

     (iii) $\Delta n = 2.40$ mol   (2.35 ~ 2.45 accepted)   1 M + 1 A

     (iv)   The volume of capillary tube is neglected.   1 M

         Nitrogen is an ideal gas.   1 M

   (b) (i) $M_x : M_Y = 31 : 90$ 1 M + 1 A

     (ii)   The thread moves from X to Y.   2 M + 1 M
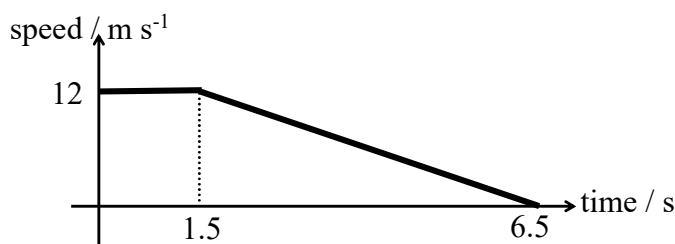
3. (a) (i)   58.86 J   1 M + 1 A

     (ii)   19.62 J

   (b)   Part of the loss of potential energy of P converts to the kinetic energy of P and Q.   1 M
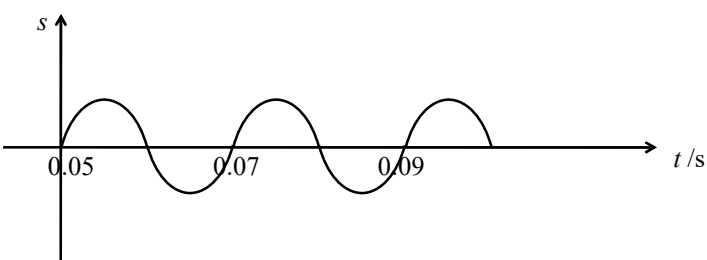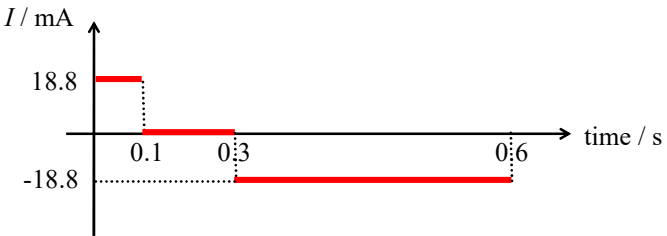
       4.43 m s^{-1} 1 A

4. (a)   1.5 s   1 M + 1 A

   (b)   -2.4 m s^{-2} 1 M + 1 A

   (c)   6.5 s   1 M + 1 A

4 M

5.	(a)		Put some sponge at the edge of the ripple tank.	1 M
	(b)		The wave produced by the dot vibrator <u>transfers to all direction</u> and the wavefront is always <u>perpendicular to the propagation direction</u>.	1 M + 1 M
	(c)	(i)	4 cm	1 A
		(ii)	2 m s^{-1}	1 A
		(iii)	$\Delta x_P = 0$ cm	1 A
			$\Delta x_Q = 3$ cm	1 A
			Constructive interference occurs at P.	1 M
			Destructive interference occurs at Q.	1 M
		(iv)		2 M +1 M

6.	(a)	(i)	clockwise	1 M
			No current	1 M
			anti-clockwise	1 M
	(b)			1 M + 1 M

			from $t = 0$ s to $t = 0.1$ s : 18.8 mA	1 M
			from $t = 0.1$ s to $t = 0.3$ s : 0 mA	1 M
			from $t = 0.3$ s to $t = 0.6$ s : 18.8 mA	1 M

7.	(a)		20 : 1	1 M + 1 A
	(b)	(i)	4.55 A	1 M + 1 A
		(ii)	75.8%	1 M + 1 A
			No, the transformer is not ideal.	1 M
		(iii)	Using <u>laminated soft-iron core</u> can <u>reduce the eddy current</u> induced.	1 M + 1 A
			Using <u>thicker wire</u> can reduce the <u>heating effect of the coil</u>.	1 M + 1 A
	(c)		The <u>output voltage</u> and power of the transformer <u>decrease</u>.	1 M
			Therefore, the lamp becomes <u>dimmer</u>.	1 M

8. (a) (i) 2.35×10^{-10} min^{-1} 1 A

     (ii) 0.417 mol 1 A

     (iii) 73.8 min^{-1} 1 A

     (iv) 10200 yrs 1 M + 1 A

  (b) (i) A nuclear chain reaction is a fission reaction that <u>releases extra neutrons</u>. 1 M

        Thus the fission <u>reaction could maintain or self-propagate</u>. 1 M

     (ii) 7.38×10^{13} J 2 M + 1 A

Paper II

Section A: Astronomy and Space Science

1.	2.	3.	4.	5.	6.	7.	8.
B	A	C	B	C	B	A	C

<u>Marks</u>

1.   (a)   White drafts of higher mass have <u>higher density</u>.   1 M

According to the graph, white drafts of higher mass have <u>shorter radii</u>. Therefore, they have <u>higher densities</u>.   1 M

(b)   19700 K   1 M + 1 A

(c)   11100 K   2 M + 1 A

(d) 2.58×10^8 N   2 M + 1 A

Section B: Atomic world

1.	2.	3.	4.	5.	6.	7.	8.
B	A	A	C	D	B	A	A

<u>Marks</u>

2.　(a)　<u>The electron is able to revolve in certain stable orbits around the nucleus without radiating</u>　1 M + 1M

<u>any energy</u>. The <u>angular momentum</u> of electrons at the stable obits equals the <u>multiples of</u>

$\dfrac{h}{2\pi}$.

　　(b)　　1 : 1　　2 M + 1 A

　　(c)　(i)　1.097 x 10^7 m^{-1}　　3 M + 1 A

　　　　(ii)　656 nm　　1 A

Section C: Energy and Use of energy

1.	2.	3.	4.	5.	6.	7.	8.
B	A	C	B	A	C	D	B

<u>Marks</u>

3.   (a) 1400 m^2 1 M + 1 A

    (b)   39.6 m   1 M + 1 A

    (c)   (i)   235 MeV   1 M + 1 A

        (ii)   a moderator is a medium that <u>reduces the speed of fast neutrons</u>   1 M

        (iii)   the <u>reactor quickly runs hotter and hotter</u>, until some other factor slows the reaction rate such as the water (as a moderator) flashes to steam and the reactor shutdown.   1 M

    (d)   - saving electricity such as turning off unneeded electrical appliance or installing LED lighting tools.   1 M + 1 M

                 - using massive transports or electric vehicles

                 - use less fossil fuel

                 (or any reasonable answers)

Section D: Medical Physics

1.	2.	3.	4.	5.	6.	7.	8.
C	A	D	C	B	B	C	C

<div align="right"><u>Marks</u></div>

4.   (a)   414.8 kg m s^{-1} 1 A

(b)   1.46 x 10^6 kg m s^{-1} or 1.63 x 10^6 kg m s^{-1} 2 M +1 A

(c)   0.08%   (1:1250)   1 M +1 A

(d)   (i)   The resolution increases with the frequency   1 M

(ii)   Acoustic impedance of the body tissue.   1 M

(e)   A-scan record the amplitude while B-scan record the brightness   1 M +1 M