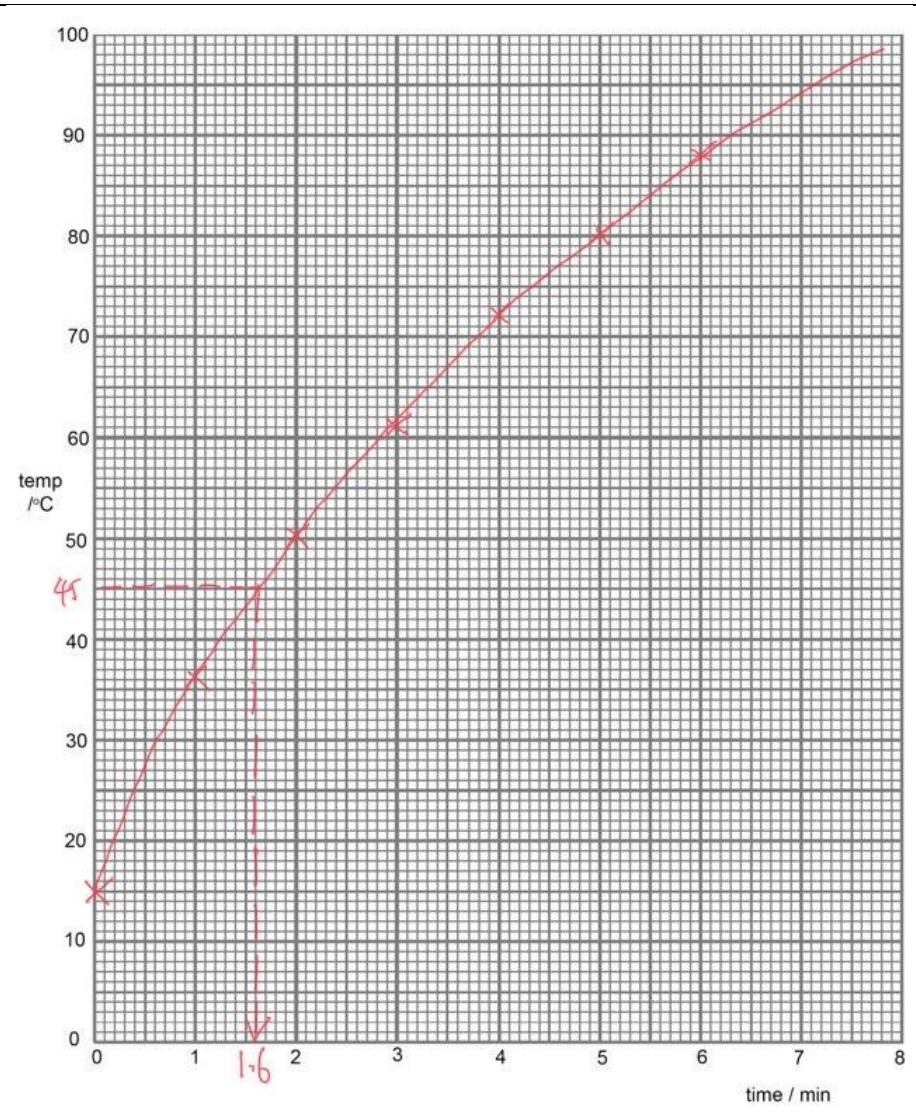
Edgefield Secondary School
Sec 4NA Science Physics 2022
EOY Exam Solutions

MCQ [20 marks]

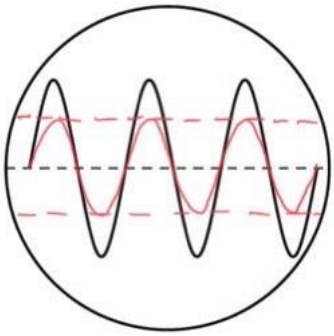
B	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Answer	B	D	D	D	C	D	C	A	C	A
Question	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Answer	B	C	B	B	B	B	C	B	A	A

SECTION A [14 marks]

Q No.	**Solutions**	**Marks**	**Remarks**
1a	Resultant force = 10 N Direction = to the right	1	
b	Water resistance, water drag, water friction (or drag fore or resistive force)	1	
c	As the forward thrust/force is equal to the water resistance, net force on swimmer is 0 N, So he will swim at constant speed	1	
2a	M = (1.5 x 40) + (3 x 10) = 90 Ncm	1	
b	Ma = Mc 90 = W x 30 W = 3.0 N	1	
c	Arrow drawn vertically down from CG at 50 cm mark The line of action of weight passes through the pivot, no perpendicular distance, no moment by the weight.	1	
3a	Q: Constant speed (zero acceleration) R: decreasing deceleration	1	Do not accept zero a for Q
b	Distance = ½(17.5 + 5)5 = 56.25 = 56.3 m or 56 m	1	
c	With the skis, the area in contact with the snow is bigger. Since P = F/A, since F = weight is constant, the pressure decreases, so wont sink into the snow.	1	

4a			
b	1.6 min (accept 1.4 to 1.8 min)	1	
c	Shiny/white and smooth Shiny and smooth surface is a poor emitter of radiation. Rate of emission of radiation will be reduced, hence less heat loss through radiation.	1	

SECTION B [16 marks]

5a	gravitational potential energy	1	
b	GPE = mgh = 40 x 10 x 1.5 = 600 J	2	
c	P = E/t = 600/60 = 10 W	2	
d	Power from main = 100/70 x 10 = 14.28 = 14.3 W or 14 W	1	
e	E = Pt = 0.0143 x 12 = 0.1714 kWh Cost = 0.1714 x 0.28 = \$0.048 (4.9 cents)	1 1	
6a	(i) Microwaves (ii) Gamma rays, x-ray or ultraviolet rays	1 1	
b	V = fλ $3.0 \times 10^8 = 1800 \times 10^6 \times \lambda$ λ = 0.1667 = 0.167 m or 0.17 m	1 1	
c	(i) 20 Hz to 20kHz	1	
	(ii) (1)  (2) B has lower amplitude than A	1 1	Do not accept B is softer as stated in question
d	Electromagnetic waves are transverse wave while sound is longitudinal. OR Electromagnetic waves can travel through vacuum while sound cannot pass through vacuum.	1	

7a	V_{R2} = 12 V	1	
b	R_2 = V/I = 12/0.8 = 15 Ω	1	
c	P_{R2} = IV = 12 x 0.8 = 9.6 W	2	
d	I_{R2} = 2.4 – 0.8 = 1.6 A R_1 = V/I = 12/1.6 = 7.5 Ω	1 1	
e	When R3 is connected parallel to R1, the total effective resistance of the circuit decreases. Hence the main current A1 reading will increase.	1 1	