2022 MYE 4NA Science (Physics) Answer

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

Section A

1 **(a)** μ 1

(b) 60 000 1

(c) t_{avg} for 20 oscillations
= (35.26 + 36.23 + 34.83 + 34.94 + 36.02)/5
= 35.456 s 1
period = 35.456/20
= 1.77 s (3 s.f.) 1

2 **(a)** 1 / 20 = 0.05 s 1
0.05 x 6 = 0.3 s 1

(b) v = (0.6)/(2 x 0.05) = 6.0 m/s 1

(c) accelerates/increasing velocity 1

3 **(a)** 80 F = 20 x 42
F = 10.5 N 1

(b) 42 ÷ 100 = 0.42 N/kg 1

(c) 0.42 x 300 = 126 N 1

(d) Work is needed to compress the air.

4

wire	colour of insulation
earth	Yellow and green
live	Brown
neutral	blue

2 marks for 3 correct. 1 mark for 2 correct.

Section B

5 **(a)** convection 1

(b) Water near the coil is cooled, contracts, become denser and sink, displacing the water below. The water below, 1
being less dense, rises and is cooled by the coil. The 1
process repeats and convection current is formed below the coil. 1

(c) Internal energy decreases as temperature of the water 1
and hence the internal kinetic energy decreases. 1

(e) The graph will be less steep. 1
As rate of heat transfer decreases since plastic is a poor conductor of heat. 1

6 **(a)** **(i)** 5 m 1
(ii) 1 s 1
(iii) 5 m/s 1
(iv) 2 m 1

(b) FFTTTFFF 1 for every 2 correct

7 **(a)** $(1/6+1/3)^{-1}$ 1
= 2 1
R = 7 + 2 + 6
= 15 Ω 1

(b) I=12/15=0.8 A 1

(c) V=0.8 x 7 =5.6V 1

(d) V_W = 0.8 x 6 = 4.8
V_X = 12 – 5.6 – 4.8 = 1.6 V 1
P = $V^2/R = 1.6^2/6$ = 0.427 W 1

(e) E=0.42667 x 60 = 25.6 J 1