Prelim 4NA 2022 Solution Paper 1

1	2	3	4	5
В	D	Α	D	С
6	7	8	9	10
С	Α	D	В	В
11	12	13	14	15
С	D	С	Α	Α
16	17	18	19	20
С	С	Α	В	D

Paper 2 (Section A)

Qns		Marks
1a	Cyclist B	B1
1b	Acceleration = $(0-5)/4$	M1
	$= -1.25 \text{ m/s}^2$	A1
	Max 1m if positive acceleration is given	
2a		B1
2b	Block B and C	M1
	Their line of action of the weight lies within its base area.	
	Therefore, no moment is produced/ no turning effect.	A1
3a	Emf is the amount of work done per unit charge needed to move a	B1
	charge around the circuit.	
3b	Current in $Q = 0.15 A$	M1
	Current in resistor = 0.15 A x 2	
	= 0.3 A	A1
4a	Work done = mgh	M1
	= 500 x 3	
	= 1500 J	A1

4b	Mgh = 800 x 3	M1	
	= 2400 J		
	Kinetic energy = $0.5 \times 80 \times v^2 = 2400$		
	$V^2 = 60$		
	V = 7.75 m/s	A1	
4c	He needs to have some speed when he leaves point A/ he needs	A1	
	to push himself before leaving ramp.		

Paper 2 (Section B)

Qns		Marks
5a	Longitudinal waves are waves that travel in the direction parallel to its vibration.	B1
5bi	Give marks only if frequency is constant and amplitude has decreased.	B1
5bii	Frequency increased/doubled/ pitch increased/doubled	B1
<u>5</u> ci/5cii	Prequency increased/doubled/ pitch increased/doubled	
5ciii	82 – 86 dB	B1
5civ	8 – 16 hours (depends on 5ciii) ecf	B1

5cv	Stand further away/ wear ear plugs			B1
6ai	Variable resistor/ rhe	ostat		B1
6aii	Varies resistance/ ch	anges the current in t	he circuit	B1
6b	Resistance = V/I			
	= 1 / 0.5			
	= 2 Ω			B1
6ci	Upper Limit = 2 V			B1
6cii	It cannot exceed the	emf of the battery		B1
6d	p.d. reading/ V	Current reading/ A		B2
	1.80	0.10		
	1.4	0.30		
	1.00	0.5		
	<u></u>			
	B1 each		1	
6e	Live wire.			B1
7a	Thrust/Lift Weight			B1
7b	Both the magnitude c	of each force is the sa	me.	B1
7c	Chemical Potential E	nergy,		B1
	Gravitational Potentia	al Energy		B1
7di	$KE = 0.5 \times 0.5 \times 30^2$			M1
	= 225 J			A1
7dii	Area under graph = 0.5 x 30 x 6			M1
	= 90 m			A1