Orchid Park Secondary School
Sec 4NA Preliminary Examination 2022
Science (Physics)
Answer Scheme

Paper 1

No	Answer	No	Answer
1	D	11	A
2	A	12	C
3	B	13	C
4	A	14	C
5	C	15	B
6	C	16	D
7	D	17	B
8	A	18	B
9	C	19	A
10	B	20	B

Paper 2

Ques	Answer	Marks
1a	Force X – friction/air resistance Force Y- weight	B1
1b	Equal in size	B1
2a	Electronic balance/beam balance	B1
2b	Block X. Area of contact between block X and the table is smaller, hence greater pressure exerted.	B1
2c	Volume = 2 x 2 x 2 = 8 cm^3 Density = m/V= 5/8 = 0.625 cm^3	A1
3a	Transverse: Light, Radiowave Longitudinal: Sound	B1
3b	Wavelength = 3.3 cm Amplitude = 1.0 cm	B2
3c	The vibrations from the prong causes the air particles around it the <u>vibrate</u>, resulting in regions of <u>compressions and rarefaction</u>. The sound is <u>longitudinal</u> in nature as the sound waves travel to the ear of the listener parallel to direction of vibration of the air particles.	B1 B1
4ai	Black as black surfaces are good absorber of radiation	B1
4aii	Increase surface area to increase rate of absorption.	B1
4b	The air near the radiator gain heat, expand, <u>becomes less dense and rises</u>. The <u>cooler, denser air</u> at the top sinks to replace the rising hot air.	B1

	setting up a convection current to help warm up the rest of the room.	B1
5a	Scalar. It has magnitude but not direction.	B1
5b	acceleration $= \frac{v-u}{t}$ $= \frac{6-0}{4}$ $=1.5\ m/s^2$	C1 A1
5ci	Increasing speed/ accelerating	B1
5cii	Constant speed	B1
5d	Distance = area under graph = ½ x 6 x 4 = 12 m	C1 A1
5e	Gravitational potential energy converts to kinetic and thermal energy.	B1
6a	wheel	B1
6bi	Less than 500 N. Effort is further away from the pivot than the load of 500 N	B1
6bii	Place the 500 N load nearer to the pivot. Exert the effort further from the pivot.	B1 B1
6c	Work done = force x distance = 500 x 1.5 = 750 J	C1 A1
6d	W = mg 500 = m x 10 m = 50 kg	 A1
6e	KE = ½ mv^2 = ½ x 50 x 3^2 = 225 J	 A1
7ai	Plotted points Best fit line	M1 A1
7aii	R = V/I = 9.6/0.6 =16 Ω	C1 A1
7b	Long piece of wire – high resistance Short piece of wire- low resistance Thin wire – high resistance Thick wire – low resistance	B1 B1
7c	Neutral wire is connected to the Earth pin Earth wire is connected to the neutral pin Fuse is missing	B2