

Question number	Answer	Notes	Marks
3 (a)	MP1. pitch is <u>frequency</u> ;  MP2. any one of: <ul style="list-style-type: none"> <li>• whether sound/note sounds high or low;</li> <li>• high sound has high frequency ORA;</li> </ul>	allow 'it' for pitch  ignore references to amplitude, wavelength  allow vibrates more often / with shorter time period  'high pitch has high frequency' ORA gains 2 marks	2
(b) (i)	ruler / measuring tape; oscilloscope / mobile phone app / data logger / (guitar) tuner;	ignore microphone frequency meter frequency gauge frequency counter	2
(ii)	dependent – frequency / pitch; independent – length (of pipe);		2
(c)	any three of: MP1. repeat AND average the readings; MP2. (measure a) larger range of values; MP3. (measure some) intermediate values;  MP4. improved precision of a named variable / instrument;  MP5. control a named variable (e.g. temperature); MP6. plot a graph of frequency and length; MP7. deal with anomalies;	accept 'measure more values' for 1 mark if NEITHER MP2 nor MP3 awarded e.g. 'use a cm ruler', 'measure frequency in mHz' etc. ignore references to accuracy allow 'blow with controlled apparatus' allow 'plot a graph of the results' allow 'identify anomalies'	3

**Total 9 marks**