1.	a barriers attentuation depends on its	PATH LENGTH DIFFERENCE
2.	a normal articulation index is	0.05 - 0.20
3.	a sound which has only ONE FREQUENCY is known as a	PURE TONE
4.	absorption of a surface is calculated by...	surface area (S) x absorption coefficient (∝)
5.	according to SABINE what is a perfect reflector	0
6.	according to SABINE, what is a perfect absorber	1
7.	acoustic boot	an air diverter, diverts air through insulation
8.	an articulation index of 0.00 - 0.05 would be	confidential
9.	an articulation index of 0.50 - 1.00 would be	nil
10.	avoid spaces with...	the depth exceeds twice the height - to prevent sound shadows
11.	community noise can be assessed by TWO METHODS	1.sound level assessment 2.a police officer
12.	cross talk occurs when	two rooms are linked by common ductwork, a redesign of ductwork may be necessary
13.	d' is what and when is it needed	it the the DIRECT DISTANCE from OBSERVER TO ROAD height of receiver²+distance to road² = √d' it is need when using the correction over SOFT GROUND
14.	define flutter echo	RAPID SMALL ECHOES following a short sound beware of PARALLEL WALLS
15.	define PERFORATED PANEL ABSORBERS	a PUNCHED PANEL w an ENCLOSED AIR SPACE between the panel and the wall
16.	design rule of thumb for plant rooms	1.15-20% of total floor area served by plant room 2.min 11m dimension on one wall regardless of plant room size 3.1% of floor area served for cross-section of both supply & return ducts 4.boundary walls, floors, ceilings Rw50
17.	effective barriers require what surface density and cannot have...	10-20kg/m2 any gaps or holes
18.	formula for RESONATOR ABSORBERS	resonator freq = $c/(2 \times \pi) \times \sqrt{s/(l \times V)}$ where c = speed of sound (m/s) s = cross secitonal neck area (m²) l = length of neck (m) V = volume of cavity (m³)
19.	four scales of community noise measurement	Leq - equivalent continuous sound level Ldn - day-night average sound level (weighted Leq, +10db) Lax - single event noise exposure, eg Leq of 1 second Lx - noise level exceeded x% of time
20.	how long can you be exposed to 85dB	8hours
21.	how long can you be exposed to 100dB	15min
22.	how long can you be exposed to 130dB	1 sec
23.	how man y m/sec does sound progapate	~344m/sec
24.	how man ydB increase is needed for a sound to become significantly lounder	8dB
25.	how much attenuation is there AFTER 6m distance for OPEN PLAN offices	6dB per DOUBLING OF DISTANCE $-20\log_{10}(r)$
26.	how much attenuation is there between 2-6m distance for OPEN PLAN offices	3dB $-10\log_{10}(r)$
27.	how much attenuation is there for each DOUBLING of the distance from the source up to 2m for OPEN PLAN offices	6dB $-20\log_{10}(r)$
28.	if a change in resonant frequency is required for a PANEL ABSORBER, what can be done	change mounting system, make tighter, less vibration

#	Question	Answer
29.	**if a sabine number is bigger it is a better...**	ABSORBER
30.	**In DAYTIME - HIGH temperature at ground level so**	sound travels FASTER at ground level, SLOWER HIGH UP
31.	**in NIGHT - LOW temp at ground level so**	sound travels LOWER at ground level, FASTER high up
32.	**name some measures to prevent reverberant echos**	1.use non-parallel walls 2.use absorbant rear wall 3.no aisle walkway along longitudinal axis 4.floor area & volume kept to a minimum
33.	**name two types of sound fields**	direct, reflected
34.	**name types of SOUND ABSORBERS**	1.porous 2.PANEL ABSORBERS (thin membrane) 3.fissured ceiling tile on solid backing 4.RESONATOR ABSORBERS (helmholtz) 5.PERFORATED PANEL ABSORBERS
35.	**noise from AC can come from 2 sources**	1.plant room - motors, compressors, AHUs 2.duct borne - fan noise, airflow noise
36.	**NOISE WITHIN AN ENCLOSURE**	$SPL = SWL + (10\log_{10}[(Q_\emptyset/4\pi r^2)+4/Rc])$ where r = distance from the source (m) $Q_\emptyset$ = directivity of source in direction r S = surface area of room (m²) Rc = room constant = $Rc = Sa/(1-a)$
37.	**one sone = _____ phons**	40 phons
38.	**PERFORATED PANEL ABSORBERS are different than HELMHOLTZ RESONATORS because**	they are not as selectively absorbant
39.	**raytracing angles**	angle of incidence = angle of reflection
40.	**reasonable minimum dimension for sound reflector**	30 x wavelength
41.	**RESONATOR ABSORBERS are most efficient at**	LOW FREQUENCIES
42.	**sabine formula assumes that the sound in enclosure is...**	reasonable reverberant diffuse sound has uniform directivity
43.	**sound absorbers are dependant on...**	1. porosity 2. flow resistance 3. structure factor 4. mounting condition
44.	**sound reflectors are dependant on**	size
45.	**sound waves at GROUND LEVEL travel**	SLOWER
46.	**SPEECH PRIVACY depends on 3 things**	1.SPEECH LEVEL of the SOURCE 2.NOISE REDUCTION achieved between source-receiver locations 3.BACKGROUND noise level at the receiver location
47.	**SPEED of SOUND _____ with temperature**	INCREASES
48.	**supply and return air should not exceed...**	37dB
49.	**the ARTICULATION INDEX is a measure of 0-1. What is 0 and what is 1**	0 - CONFIDENTIAL, can hardly hear conversation 1 - NO PRIVACY, can hear everything
50.	**there are two methods to ascertain ARTICULATION INDEX**	1.with people 2.with computers
51.	**to work out the resonant frequency of a PANEL ABSORBER what formula**	resonant freq = $6000/\sqrt{m.d}$ m=mass of panel (kg/m2) d=distance between panel & wall (m)
52.	**UNIDIRECTIONAL HEMISPHERICAL SOURCE has whatdB attenuation at the end**	-8dB
53.	**UNIDIRECTIONAL SPHERICAL SOURCE has whatdB attenuation at the end**	-11dB
54.	**what is a true scale of loudness**	SONE
55.	**what is dependant on a SOUND REFLECTORS size**	they have a LOW FREQUENCY CUT OFF dependant on their size, below which they act as DIFFUSES
56.	**what is the ARAU-PUCHADES formula for**	NON-UNIFORM distribution of absorption
57.	**what is the EYRING formula for**	reasonably DIFFUSE sound fields DEAD rooms

#	Question	Answer
58.	**what is the FITZROY EYRING formula for**	NON-UNIFORM absorption DEAD rooms
59.	**what is the FITZROY SABINE formula for**	NON-UNIFORM absorption relatively REVERBERANT rooms
60.	**what is the nominal sight height above any obstructions?**	~90mm
61.	**what reverberant sound is heard as an echo for speech?**	anything over 40ms
62.	**when calc traffic noise, what do you need to figure out BASE RATE**	1.base rate 2.speed of traffic & heavy/light 3.correction for gradient 4.correction for surface
63.	**when calc traffic noise, what to you need for OBSTRUCTED**	1.base rate 2.correction for surface (hard) 3.correction for angle 4.correction for barrier
64.	**when calc traffic noise, what to you need for UNOBSTRUCTED**	1.base rate 2.correction for surface (grass) 3.correction for angle
65.	**when did sabine do his research**	1895-98 at harvard
66.	**when do echos occur for speech/music**	40ms for speech 100ms for music
67.	**when is an ideal use for RESONATOR ABSORBERS**	where there is a LONG REVERBERATION in a SINGLE FREQUENCY
68.	**when you put a sound source close to ONE REFLECTING SURFACE, how much dB increase**	+3dB
69.	**when you put a sound source close to THREE reflecting surfaces, (trihedral corner) how much dB increase**	+9dB
70.	**when you put a sound source close to TWO reflecting surfaces, how much dB increase**	+6dB
71.	**where are 4 places that noise can be generated within ducts**	1.obstructions 2.sharp bends 3. sudden enlargements or contractions 4.silencers
72.	**where should silencers be positioned**	as close to the fan as possible
73.	**why shouldn't use concave ceilings**	creates uneven acoustic focus
74.	**with every doubling of exposure (3db) what happens to the allowable daily exposure time**	it halves
75.	**with sound propagation in air, when the DISTANCE DOUBLES**	the AMPLITUDE DROPS BY HALF - 6dB