Seat No. ___

King Mongkut's University of Technology Thonburi

Mid-Term Examination of the 2nd/2010 Semester

Selected Topics in Com. Eng... II

Course: CPE 452(3) Acoustics of Musical Instrument and PA Systems

Date : Tuesday 21 st December 2010

Time : 1.00 – 4.00 p.m.

For : CPE 3-4 (A-D)

Instruction : 1. Closed-Book Examination
2. A calculator is allowed.
3. A Sc.-Formulae ruler is allowed.
4. There are 5 problems in 10 pages.
5. Do all problems for 25% keeping.
6. Each problem has 10 marks.

Student's Name : _____ (Capital Letter)

Student's ID : _____

Problem 1	_____	(10 marks)
Problem 2	_____	(10 marks)
Problem 3	_____	(10 marks)
Problem 4	_____	(10 marks)
Problem 5	_____	(10 marks)
Total	_____	(50 marks)
25% of grand total	_____	(100 marks)

Assoc. Prof. Boonruk CHIPIPOP
Designer

(1) Calculate the loudness in phons of noise which has the following analysis:

Octave band Hz	20–75	75–150	150–300	300–600	600–1200	1200–2400	2400–4800	4800–10 000
dB.Level	73	70	69	71	70	65	71	56

(2) Calculate the perceived noise level in PNdB of the noise in Question (1).

(3) The noise level from a factory with ten identical machines measured near some residential property was found to be 54 dB. The maximum permitted is 50 dB at night. How many machines could be used during the night?

(4) Two sounds of 4 W and 10 W power are produced at ground level at a distance of 10 m and 20 m respectively from a listener. If the ground is level, unobstructed and non-absorbing, what will be the S.P.L. of the sound heard by the listener?

(5) A motor car was found to produce the following noise. Calculate the total noise level in dB (linear) and dB (A).

Octave Band Hz	Level dB
20–75	95
75–150	84
150–300	80
300–600	68
600–1200	65
1200–2400	61
2400–4800	60
4800–10 000	60

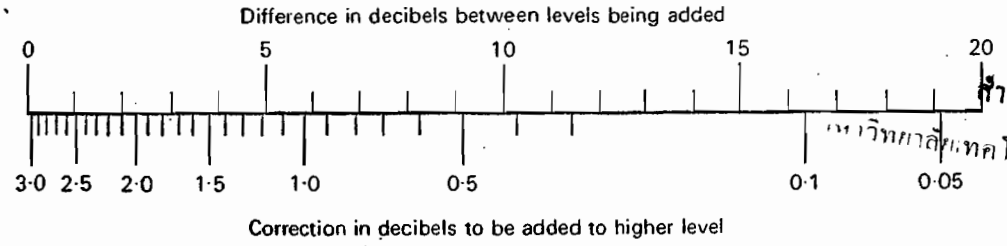


Fig. 1 Scale for combining sound pressure levels

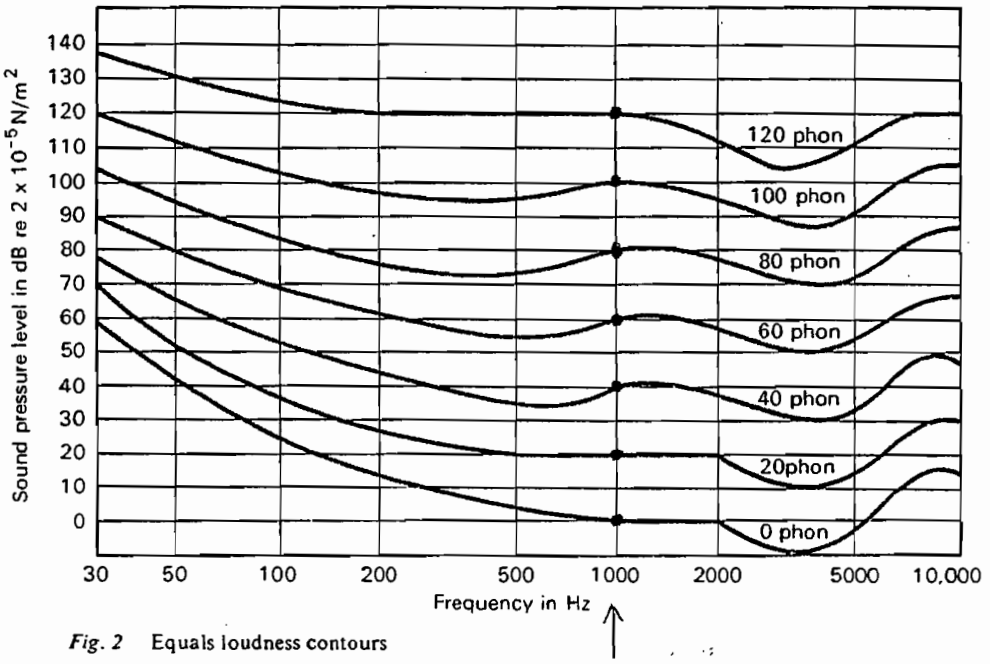
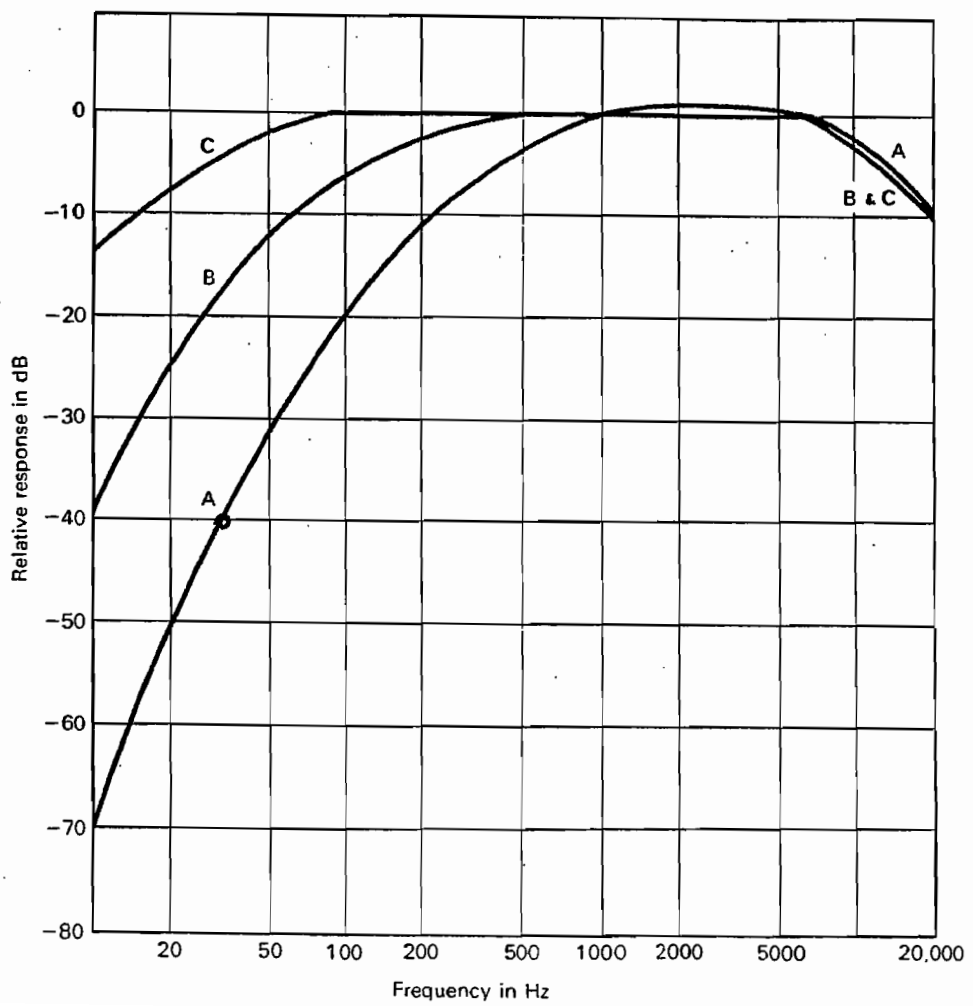


Fig. 2 Equals loudness contours



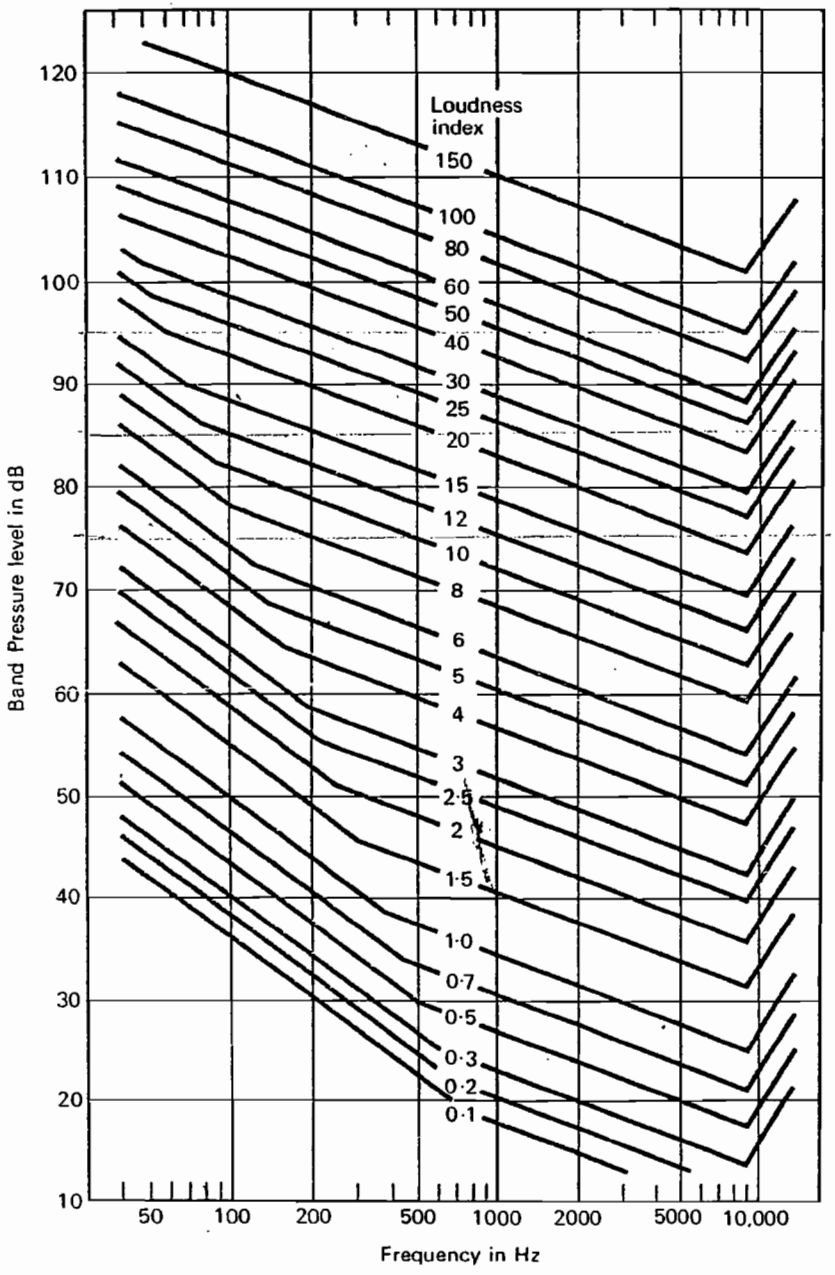


Fig. 4 Loudness index in sones from the S.P.L. of the frequency band dB

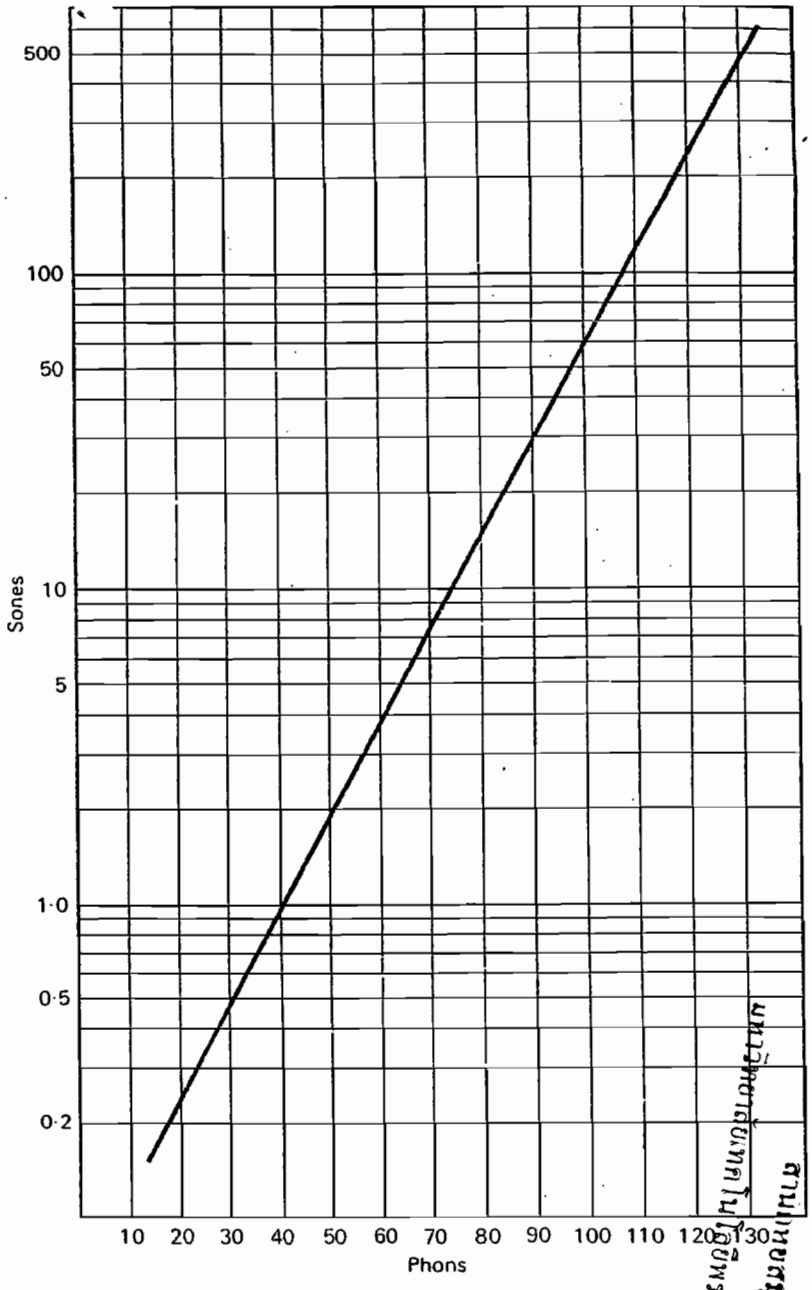


Fig. 5 Relationship between sones and phons

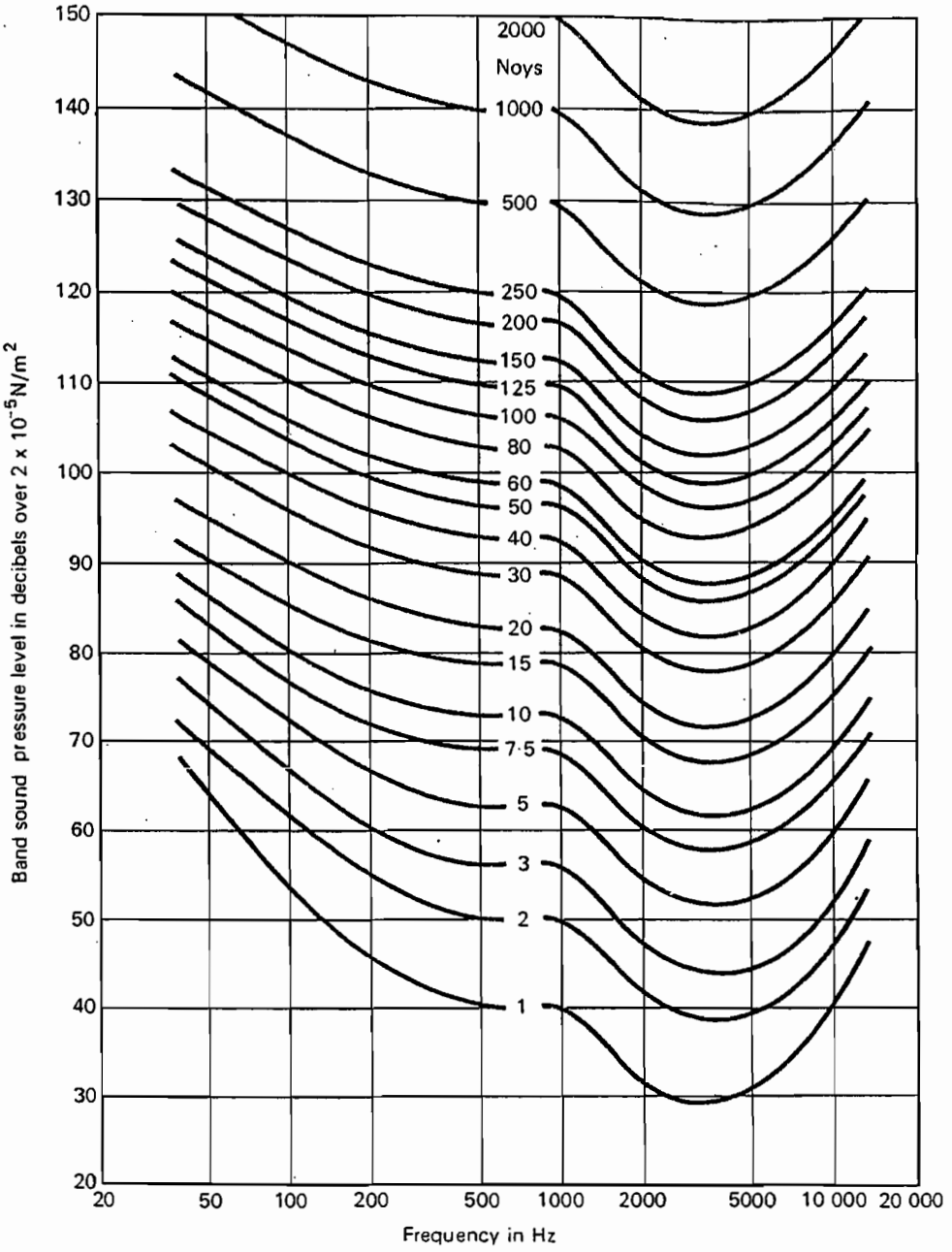


Fig. 6 Contours of perceived noisiness