

※ 考生請注意：本試題不可使用計算機。 請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. 名詞解釋:

- (a)最大暴露危險群 (3%) (b)整體換氣 (3%) (c)非破壞檢測 (3%)
 (d)事業單位(3%) (e)可呼吸性粉塵 (3%)

2. 下水道工程多為局限空間作業，請說明三種可能的危害與相關防範措施? (12%)

3. 請舉出化學物質與防護衣物可能發生哪三種作用而降低或失去其防護效果? (9%)

4. 僱傭與承攬有何不同? (5%) 請各舉一個例子來說明僱傭與承攬? (5%)

5. 一體積為9 L的氣體鋼瓶內含H₂與He的混合氣體共10 g，鋼瓶溫度與壓力分別為27 °C與8.2 atm，請問H₂與He質量分別為多少? (14%) ($R = 0.082 \text{ (Lxatm)/(Kxmol)}$)，H₂與He分子量分別為2與4 g/mol)

6. De-rooij *et al.* 2017 collected PM10 and endotoxin samples from 9 different sites including one background site (BG). From the table below, does PM10 or Endotoxin have a higher between site variations? (8%) Which two sites have the highest correlation for PM10? (4%) Please give your reasons in the answer.

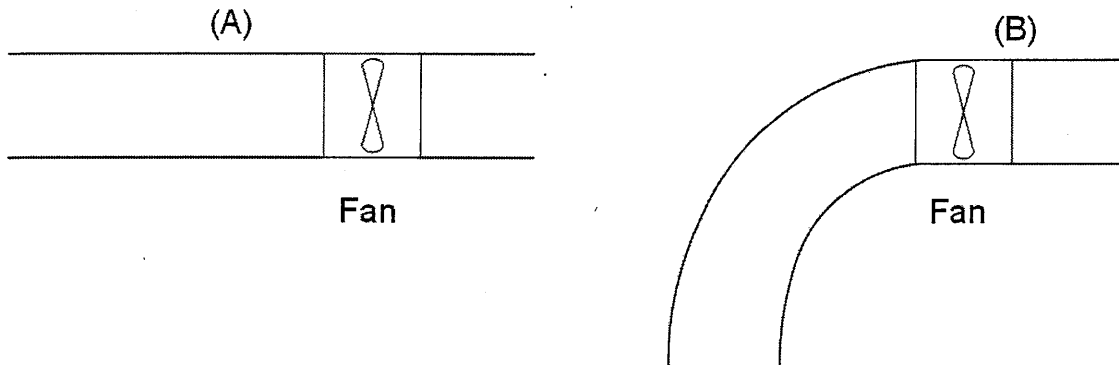
Endotoxin \ PM10	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	BG site
Site 1	1	0.52	0.65	0.72	0.35	0.2	0.72	0.44	0.58
Site 2	0.86	1	0.53	0.68	0.38	-0.04	0.42	0.59	0.41
Site 3	0.91	0.91	1	0.67	0.5	0.12	0.71	0.63	0.26
Site 4	0.91	0.95	0.97	1	0.48	0.31	0.71	0.59	0.66
Site 5	0.94	0.94	0.95	0.97	1	0.46	0.46	0.45	0.00
Site 6	0.93	0.86	0.95	0.95	0.95	1	0.25	0.12	0.36
Site 7	0.89	0.91	0.93	0.96	0.98	0.92	1	0.57	0.52
Site 8	0.86	0.88	0.85	0.90	0.92	0.85	0.96	1	0.48
BG site	0.73	0.87	0.90	0.95	0.83	0.88	0.85	0.87	1

Note. Pearson correlations computed on PM10 concentrations (in $\mu\text{g}/\text{m}^3$); and on endotoxin concentrations (in units/ m^3).

7. List the illumination required from high to low? (8%)

- (a) Performance of visual tasks of high contrast or large scale
 (b) Performance of visual tasks of medium contrast or small size
 (c) Simple orientation for short temporary visits
 (d) Working spaces where visual tasks are only occasionally performed

8. Which of the following setup (A) or (B) will create a higher noise level when using the same duct size, material, fan size, and fan rotating speed? (3%) Why? (7%)



9. Stacey *et al.* 2016 compared four different samplers with a reference sampler under different mineral dust concentrations and wind speed. Which of the following sampler, GK.4.162, GK2.69, FSP 10 or PPI8 most closely matches with the reference sampler? (3%) Please explain your reasons? (7%)

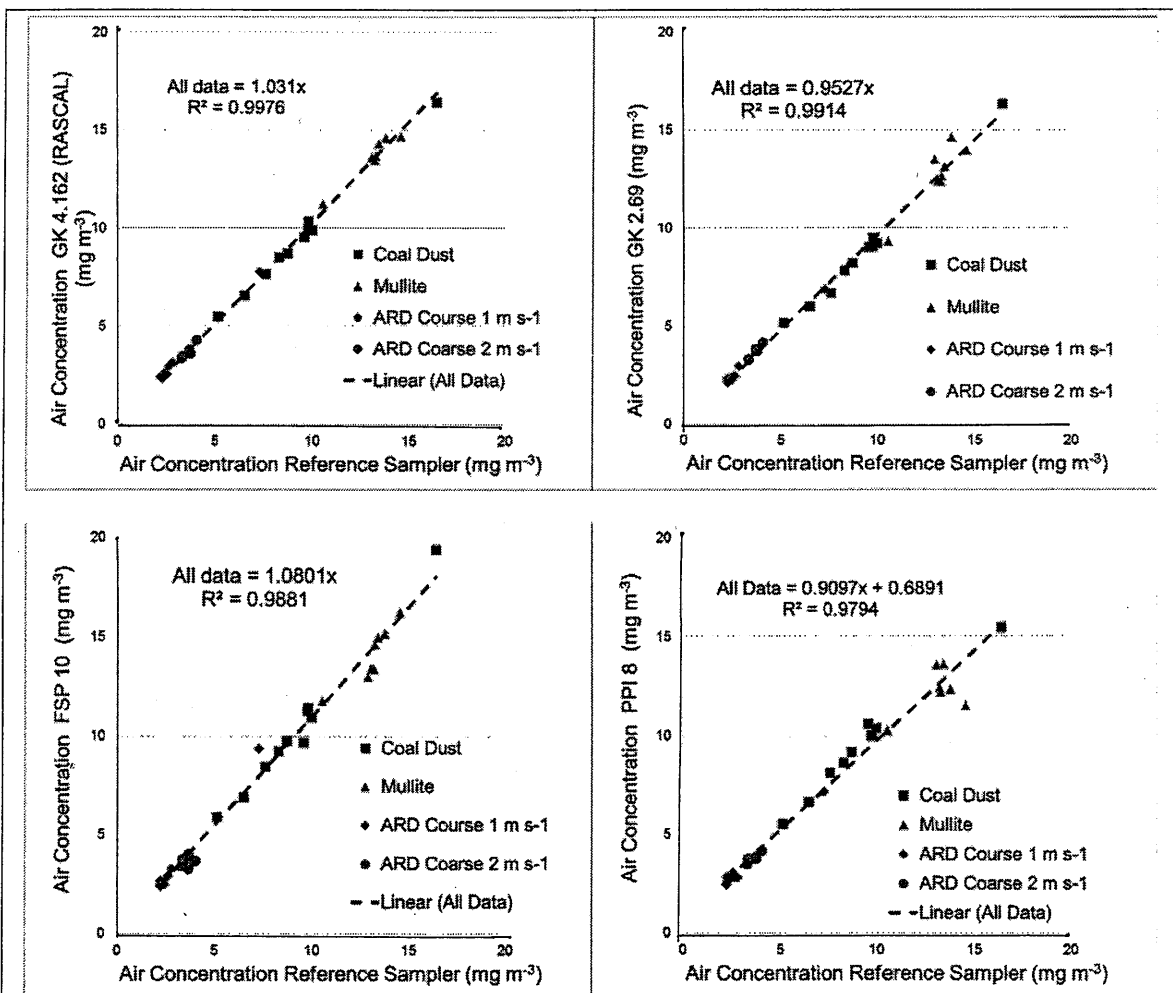


Figure 2 Comparison of respirable dust concentrations between each high flow rate sampler and the SIMPEDS for all mineral dust aerosols and air speeds.