0 English for special purposes 1404/02/23

---

1 The volume fraction of neon in the atmosphere of the earth is 18 per million. The molecular mass of neon is 20 amu, while that of the atmospheric air is 29 amu. How many parts per million is the mass fraction of neon in the earth's atmosphere?

---

2 The flow rate (volume per time) of water through a tube is proportional to the radius of the tube to the power 4. The flow rate through a tube of radius r is Q. The total flow rate through a collection of 4 tubes of radius $(r/2)$ is Q'. This is equal to 4 times the flow rate through a tube of radius $(r/2)$. What is (Q'/Q)?

---

3 The intensity (power per surface area) of the sun above the atmosphere of the earth is $(1.4\,\mathrm{k\,W\,m^{-2}})$. The distance between Mars and the sun is 1.5 times the distance between the earth and the sun. What is the intensity of the sun above the atmosphere of Mars? Express your answer with 2 significant digits.

---

4 The density of mercury is $[13.6\,\mathrm{g\,(c\,m)^{-3}}]$. The pressure at some point is $(70\,\mathrm{c\,m})$ of mercury. How many Pascals is the pressure at that point? Take the acceleration of gravity $(10\,\mathrm{m\,s^{-2}})$, and express your answer with 2 significant digits.

---

5 The ratio of the volume of a ball of the radius r to the volume of a cube of the side $(2\,r)$ is a. The ratio of the surface area of a disk of the radius r to the surface area of a square of the side $(2\,r)$ is b. What is (b/a)?

---

6 Good luck

English for special purposes **1404/02/23**

Please write the answers in boxes and return only the answer sheet.

name: Mohammad

family name: Khorrami

student number: 0

1	12
2	0.25
3	$0.62\,\mathrm{k\,W\,m^{-2}}$
4	95×10^3
5	1.5