0 English for special purposes, the final exam   1402/04/12

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1 A light year is the distance traveled by light in vacuum during one year. What is the value of a light year in terms of the appropriate SI unit (the meter)?

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2 The density of mercury is 13.6 times the density of the water. The atmospheric pressure at the sea level is $(76\,\mathrm{cm})$ of mercury. What is the depth (in meters) in a fresh water lake, at which the total pressure is 1.5 times the atmospheric pressure at the sea level? Assume that the surface of the lake is at the sea level.

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3 The magnitude of a star is defined as $[2.5\,\log(I_0/I)]$, where I is the intensity of the star, I_0 is some constant, and the logarithm is in the base 10 *not the natural logarithm*. The magnitudes of two stars are 1 and 11. What is the ratio of their intensities?

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4 The Pythagoras theorem states that in a right-angled triangle the square of the hypotenuse is equal to the sum of the squares of the other sides of the triangle. In a right-angled triangle, the length of the two sides which are not hypotenuse are 7 and 24 units. How many units is the length of the hypotenuse?

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5 Keep only the first two right digits in your student number, and denote it by x. This is a number less than 100. Denote the square of x by y. Denote the first right digit in y by z. This is a number less than 10. What is the number of positive integers which are bigger than z but smaller than 10?

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6 Good luck

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

name: Mohammad

family name: Khorrami

student number: 0

1 | 10^{16}

2 | 5

3 | 10^4

4 | 25

5 | 9 | (for $x = 0$)