

1 The brightest star (apart from the sun) is Sirius. The moon is brighter than Sirius, because

- a** the moon is nearer to us than Sirius
 - b** the moon radiates more power than Sirius does
 - c** the moon is yellow while Sirius is white
 - d** none of the above
-

2 Which of the following doesn't exist?

- a** a prime number which is odd
 - b** a prime number which is even
 - c** a number which has only one positive divisor
 - d** a prime number which is the square of an integer
-

3 The plot of temperature in Fahrenheit scale versus temperature in Celsius scale is a straight line. 0 degrees Celsius is 32 degrees Fahrenheit, while 100 degrees Celsius is 212 degrees Fahrenheit. x degrees Celsius is x degrees Fahrenheit. What is x ?

- a** -273 **b** -40 **c** -32 **d** 273
-

4 Argon-40 in the atmosphere is mainly the product of a radioactive decay of potassium-40. In this process, which of Z (the atomic number) and N (the number of protons) change?

- a** none **b** only N **c** only Z **d** both
-

5 An astronomical unit is the mean distance between the earth and the sun, roughly equal to 150 000 million km. A light year is the distance traveled by light during one year. One Parsec is the distance from which the angular distance corresponding to one astronomical unit is one arc second. How many astronomical units is a light year?

- a** 1 **b** 500 **c** 6×10^4 **d** 2×10^5
-

6 How many astronomical units is a Parsec?

- a** 1 **b** 500 **c** 6×10^4 **d** 2×10^5

7 The general formula of saturated chain hydrocarbons is $C_n H_{2n+2}$. What is the mass ratio of carbon to hydrogen in heavy saturated chain hydrocarbons?

- a** 1 **b** 2 **c** 6 **d** 12
-

8 The density of mercury is 13.6 times the density of the water. The atmospheric pressure at the sea level is 76 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.

- a** 0.76 **b** 5 **c** 13.6 **d** 76
-

9 Two small balls, one made from wood and the other made from lead, are released from rest, from the same point near the surface of the earth. Their masses are equal. Which one reaches the surface of the earth sooner?

- a** the lead ball
b the wooden ball
c neither
d the one which is larger
-

10 In the previous question, the acceleration of gravity for which of the bodies is larger?

- a** the lead ball
b the wooden ball
c neither
d the one which is larger
-

11 The radius of the orbit of Mars is larger than that of the earth. Which of the following would never occur?

- a** Mars being on a line segment between the sun and the earth
b the sun being on a line segment between Mars and the earth
c the earth being on a line segment between the sun and Mars
d the sun, the earth, and Mars making a triangle
-

12 The density of liquid water is about 1000 times the density of water vapor in the room temperature and pressure. The ratio of the mean distance between to neighboring molecules in the water vapor to the same quantity in liquid water is roughly

a 1

b 10

c 100

d 1000

13 Good luck!

Please mark the correct answers in the answer sheet (the table below) and return it. In case some data is missing, find it.

Name: Mohammad Khorrami

Student number: 0

	a	b	c	d
1	■			
2				■
3		■		
4				■
5			■	
6				■
7			■	
8		■		
9	■			
10			■	
11	■			
12		■		