English for special purposes, bunch 2 **1393/02/17**

1 Which of the following is correct?

a The sky is fixed relative to us.

b Only the stars (except the sun) are fixed relative to us.

c The sky is rotating relative to us, but all of its objects look fixed relative to themselves.

d The sky is rotating relative to us, and only the stars (except the sun) look fixed relative to each other.

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2 The radius of the orbit of Venus is smaller than the radius of the orbit of the earth. Which of the following would **never** occur?

a Venus being on a line segment between the sun and the earth

b the sun being on a line segment between Venus and the earth

c the earth being on a line segment between the sun and Venus

d the sun, the earth, and Venus making a triangle

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3 The brightest star (apart from the sun) is Sirius. This is star is the brightest, because

a it is nearer than any star to us

b it radiates more power than any star

c its color is white

d none of the above

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4 The power a human needs to survive only, is 100 W. The intensity (power per area) of the sun at the earth's surface is 1.4 KW m^{-2}. The radius of the earth is 6400 km. If all of the sun power radiated on the earth could be used for humans to let them survive only, at most how many people could live on the earth?

a 10^6 **b** 10^9 **c** 10^{12} **d** 10^{15}

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5 The energy content of the highly nutritious foods can reach 40 MJ kg^{-1}. How much of a highly nutritious food (say fat) is then needed, for the survival of a human being for one day?

a 25 g **b** 250 g **c** 2.5 kg **d** 25 kg

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6 The energy released through the explosion of TNT is 4 MJ kg^{-1}. If that energy could be used by a human being to survive (please don't bother yourself with practical difficulties), how much TNT would be needed for the survival of a human being for one day?

a 25 g **b** 250 g **c** 2.5 kg **d** 25 kg

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7 A horsepower is 750 W. The power of a car is 100 horsepower, and the energy of burning fuel is 40 MJ lit^{-1}. At a speed of 100 km h^{-1}, how much fuel per distance is needed (assuming no energy loss)?

a 7 mlit $(100\ km)^{-1}$

b 7 lit $(100\ km)^{-1}$

c 7 m^3 $(100\ km)^{-1}$

d 7000 m^3 $(100\ km)^{-1}$

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8 One definition for a conic is a set of points for all of them the ratio of the distance to a fixed point (the focus) to the distance to a fixed line (the directrix) is constant. This ration is called the eccentricity of the conic. Denoting the eccentricity of a parabola by e, which is correct?

a $e = 0$ **b** $0 < e < 1$ **c** $e = 1$ **d** $1 < e$

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9 Kepler's third law states that for planets'motion, the period-squared is proportional to the semi-major axis-cubed. The perihelion and the aphelion of Jupiter are 4.95 and 5.46 Astronomical units, respectively, where an astronomical unit is the average distance of the earth from the sun. how many years is the period of Jupiter?

a 5 **b** 12 **c** 25 **d** 50

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10 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 5 and 12 units. How many units is the length of the hypotenuse?

a 7 **b** 13 **c** 17 **d** 30

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11 A test particle of mass m is in a gravitational field. The acceleration of that test particle is measured to be a. If that test particle is substituted by another test particle of the mass $(2\,m)$, what would be the acceleration of the second test particle at the same place?

a $0.5\ a$ **b** a **c** $2\ a$ **d** $4\ a$

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12 When a lake freezes, it does so from the surface. That is, there is a surface layer of ice, below which is liquid water. Denoting the density of liquid water by ρ_{w} and that of ice by ρ_{i}, whic is correct?

a $0 = \rho_{\mathrm{i}} < \rho_{\mathrm{w}}$ **b** $0 \neq \rho_{\mathrm{i}} < \rho_{\mathrm{w}}$ **c** $\rho_{\mathrm{i}} = \rho_{\mathrm{w}}$ **d** $\rho_{\mathrm{i}} > \rho_{\mathrm{w}}$

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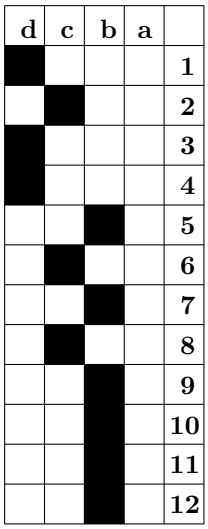
13 Good luck!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