

Practice Questions - Topic 1: Planet Earth



By Ben Fletcher

Name:			
Form:			
Mark:	/30	Percentage:	%

Feel free to contact me by my school email if you have any queries or want an explanation of a question. – Ben F :)

Formulae and Data Sheet

Formulae

Equation of Time = Apparent Solar Time (AST) – Mean Solar Time (MST)	
Kepler's 3rd law:	$\frac{T^2}{r^3} = \text{a constant}$
Magnification of telescope:	magnification = $\frac{f_o}{f_e}$
Distance modulus formula:	$M = m + 5 - 5 \log d$
Redshift formula:	$\frac{\lambda - \lambda_0}{\lambda_0} = \frac{v}{c}$
Hubble's law:	$v = H_0 d$

Data

Mass of Earth	$6.0 \times 10^{24} \text{ kg}$
Mean diameter of Earth	13 000 km
Mean diameter of Moon	3500 km
Mean diameter of Sun	$1.4 \times 10^6 \text{ km}$
One Astronomical Unit (AU)	$1.5 \times 10^8 \text{ km}$
Mean Earth to Moon distance	380 000 km
One light year (l.y.)	$9.5 \times 10^{12} \text{ km}$
One parsec (pc)	$3.1 \times 10^{13} \text{ km} = 3.26 \text{ l.y.}$
Sidereal day of Earth	23 h 56 min
Synodic day of Earth	24 h 00 min
Temperature of solar photosphere	5800 K
Hubble Constant	68 km/s/Mpc
Speed of light in vacuum	$3.0 \times 10^8 \text{ m/s}$

Name	Type of body	Mean distance from Sun/AU	Sidereal period/Earth year	Mean temperature /°C	Diameter /1000 km	Mass/Earth mass	Ring system	Moons
Mercury	planet	0.38	0.24	170	4.9	0.055	no	none
Venus	planet	0.72	0.62	470	12.1	0.82	no	none
Earth	planet	1.0	1.0	15	12.8	1.00	no	1: the Moon
Mars	planet	1.5	1.9	-50	6.9	0.11	no	2 small moons: Deimos and Phobos
Ceres	dwarf planet	2.8	4.6	-105	0.95	1.5×10^{-4}	no	none
Jupiter	planet	5.2	11.9	-150	143	318	yes	4 major moons: Ganymede, Callisto, Europa, Io >60 others
Saturn	planet	9.5	29.5	-180	121	95	yes	5 major moons: including Titan, Iapetus >55 others
Uranus	planet	19.1	84.0	-210	51	15	yes	5 major moons: including Titania, Oberon >20 others
Neptune	planet	30.0	165	-220	50	17	yes	1 major moon: Triton >12 others
Pluto	dwarf planet	39.5	248	-230	2.4	2.2×10^{-3}	no	1 major moon: Charon >4 other moons
Haumea	dwarf planet	43.1	283	-241	1.4	6.7×10^{-4}	no	2
Eris	dwarf planet	67.8	557	-230	2.3	2.8×10^{-3}	no	at least 1

1. a)

What is the shape of the Earth?

..... (1 mark)

b)

The equatorial radius of the Earth is 12,756km. Using this and your answer to 1a, make an estimate of the polar diameter of the Earth.

..... km (2 marks)

c)

The equation for the approximate volume of the Earth is:

$$\text{approximate volume of Earth} = \frac{4}{3}\pi \times \text{mean radius of Earth}^3$$

Using data from the **data sheet**, estimate the approximate volume of the Earth. Give your answer in standard form to 3 significant figures.

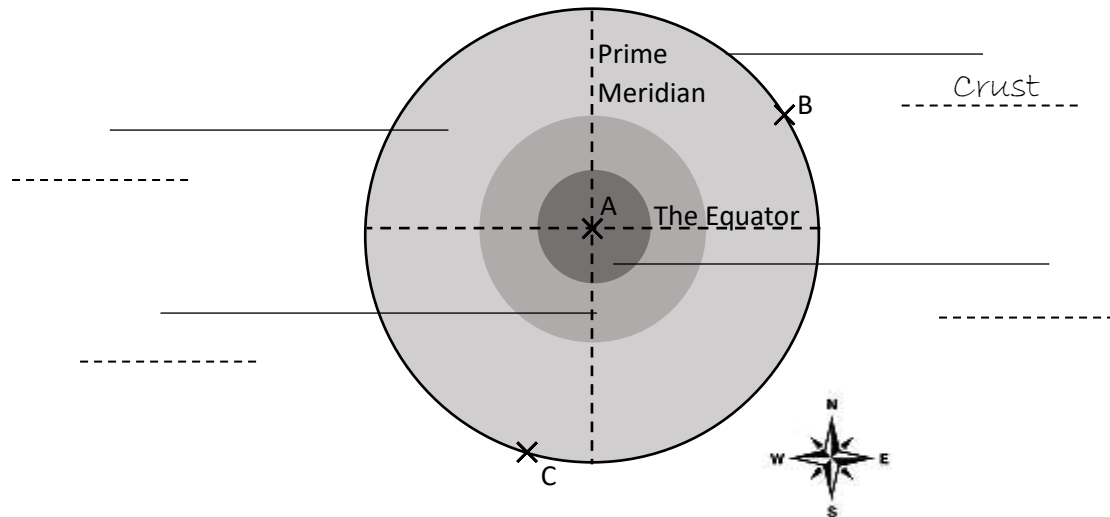
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..... km³ (4 marks)

(7 marks)

2. a)

Label the internal divisions of the Earth on this diagram (The Crust has been labelled for you):



(2 marks)

b)

Estimate the latitude and longitude of the following points on the above diagram:

i) Point A

Latitude:	Longitude:
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ii) Point B

Latitude:	Longitude:
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iii) Point C

Latitude:	Longitude:
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(6 marks)

(8 marks)

3. a)

Provide the latitudes of the following divisions of the Earth's surface:

Tropic of Capricorn:
Tropic of Cancer:
Arctic Circle:
Antarctic Circle:
North Pole:
South Pole:

(6 marks)

b)

What are the definitions of the following:

i) North Pole

.....
..... (1 mark)

ii) Tropic of Capricorn

.....
..... (2 marks)

iii) Arctic Circle:

.....
..... (2 marks)

(11 marks)

4. a)

Why does the sky appear blue?

----- (2 marks)

b)

What is the name of the effect that man-made artificial lights have on seeing conditions?

----- (1 mark)

c)

What is the name of the atmosphere's effect on stars which causes them to flicker?

----- (1 mark)

Thanks for doing my questions ! :D

Mark scheme can be found at <https://physics.bourne-grammar.lincs.sch.uk/astronomy/paper1>

(4 marks)