-------------Chapter 11--------------

1. Solar brightness, Ls = ?

Hints: S = Solar constant (1.38 × 103) ; R = The radius of earth's orbit around the sun (1AU = 1.496 × 1011m)

1. Ls = 4πR2 × S (ans.)
2. Ls = 2πR2 × S
3. Ls = πR2 × S
4. Ls = 3πR × S

Prove:

1. Density, ρ = ?

Hints: m = mass, v = volume, r = radius

1. ρ = (ans.)
2. ρ =
3. ρ =
4. ρ =

Prove:

1. Average density of sun, ρ = ?

Hints: Solar mass, M = 1.99 × 1030 kg , radius, R = 6.96 × 108 m , v = volume

A. ρ = 1410 kg m-3 (ans.)

B. ρ = 1401 kg m-3

C. ρ = 1430 kg m-3  
D. ρ = 1405 kg m-3

Prove:

Given that, Solar mass M = 1.99 × 1030 kg

radius r = 6.96 × 108 m

We know, Density, ρ =

or, ρ =

= = 1409.080 (aprx.) = 1410 kg m-3

1. Escape velocity, = ?

Hints: G = Gravitational constant (6.67430 × 10-11 Nm kg-1), R = radius, M = mass

A. = (ans.)

B. =

C. =

D. =

Prove:

1. Sun’s escape velocity, = ?

Hints: G = Gravitational constant (6.67430 × 10-11 Nm kg-1), Solar mass, M = 1.99 × 1030 kg , radius, R = 6.96 × 108 m

1. = 6.18 × 105 ms-1 (ans.)
2. = 6.18 × 105 kms-1
3. = 6.81 × 105 ms-1
4. = 6.118 × 105 ms-1

Prove:

Given that, Solar mass, M = 1.99 × 1030 kg

radius r = 6.96 × 108 m

We know, escape velocity, =

or, =

or, =

or, = 6.18 × 105 ms-1 which is sun’s escape velocity.

and, in kilometer = 6.18 × 102 km-1

1. [Schwarzschild radius](https://en.wikipedia.org/wiki/Schwarzschild_radius) or critical radius, Rs = ?

Hints: G = Gravitational constant (6.67430 × 10-11 Nm kg-1), M = Mass of an object, c = speed of light

1. Rs = (ans.)
2. Rs =
3. Rs =
4. Rs =

Prove:

Here, c =

The critical radius Rs is also known as the Schwarzschild radius. Solving Rs we get,

c =

or, c2=

or, c2 =

or, Rs = ,which is [Schwarzschild radius](https://en.wikipedia.org/wiki/Schwarzschild_radius) or critical radius.