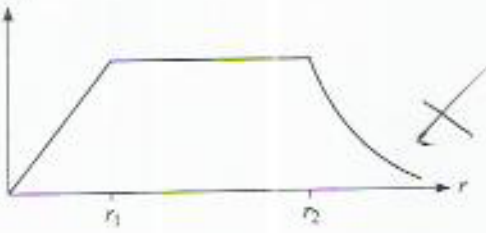
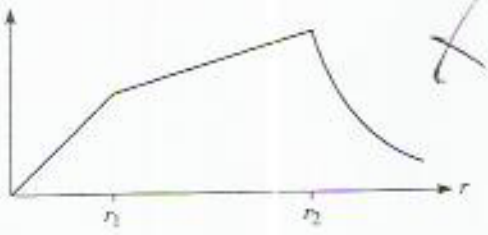
KEY for Q3

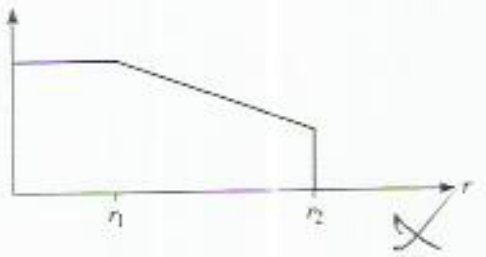
A $M(r)$



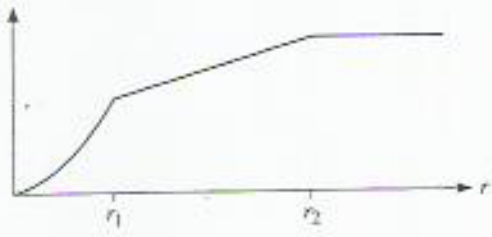
B $M(r)$



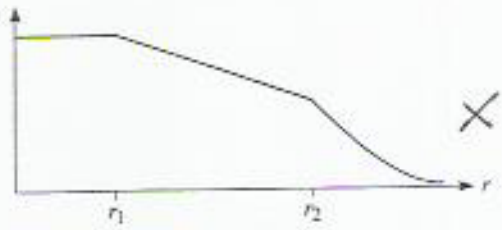
C $M(r)$



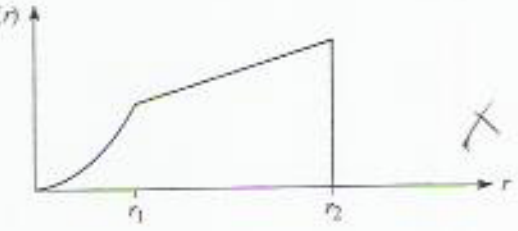
D $M(r)$



E $M(r)$



F $M(r)$



Pencil across *one* cell in row 3.

Q4 The moment of inertia of a mass m orbiting at a radius r is mr^2 about an axis perpendicular to the plane of the orbit and through the centre of the orbit. What is the angular momentum of the Sun due to the rotation of the Milky Way? [*Hint* Angular momentum is defined in Book 1, and you may also wish to know that $\omega = v/r$, with ω in radians per second.] Select the *one* item from the key that is closest to your answer.

KEY for Q4

A 10^{55} kg m^2 s^{-1}
B 10^{35} kg m^2 s^{-1}
C 10^{15} kg m^2 s^{-1}
D 10^{-5} kg m^2 s^{-1}
E 10^{-25} kg m^2 s^{-1}
F 10^{15} kg m s^{-1}
G 10^{-5} kg m s^{-1}
H 10^{-25} kg m s^{-1}

Pencil across *one* cell in row 4.

Q5 Suppose that a galaxy consists (only) of 10^{11} stars like the Sun. The galaxy is a disc, of diameter 30 kpc and thickness 1 kpc. What fraction of the volume of the galaxy is occupied by stars? Select the *one* item from the key that is nearest to your answer.

KEY for Q5

A 1 part in 10^{45}
B 1 part in 10^{34}
C 1 part in 10^{23}
D 1 part in 10^{12}
E 1 part in 10^{6}

Pencil across *one* cell in row 5.

Q6 This question concerns globular clusters of stars in our Galaxy. Which of the following statements is *false*? Select *one* item from the key.

KEY for Q6

A Many globular clusters are found within 21 kpc of the disc, there are few beyond 37 kpc, and there do not seem to be many between 21 kpc and 37 kpc.
B The greatest concentration of globular clusters is found within the volume of the nuclear bulge.
C 30% of the halo's globular clusters are found within, or close to, the volume described as the Galactic disc.
D Globular clusters have been used to locate the centre of the Galaxy.
E $10^7 M_\odot$ is the approximate total mass of halo stars in globular clusters.

Pencil across *one* cell in row 6.