

Name:

On Pre-flights:

- If you work with anyone else, document what you worked on together.
- If you are not using python, then substitute your language of choice when Python is specified.

Do not write in the table to the right.

Problem	Points	Score
1	14	
2	12	
3	9	
4	3	
5	8	
6	9	
Total:	55	

- (a) (6 points) Create the surfaces (without using macrobodies) to build a box that is 5 cm on a side centered on the origin.
- (b) (3 points) Create the same surface using a macrobody.
 - (c) (3 points) Create a cell filled with water (material #1) that resides entirely inside the box specified in either part a) or b). In this cell, we want to transport neutrons and not photons.
- (a) (2 points) Create the a material card for HEU (93.15 wt% ^{235}U , 6.85 wt% ^{238}U) for neutron transport.
 - (b) (4 points) Create surfaces to define a 10 cm tall half-cylinder (i.e. the cross-sectional area looks like a "D") of radius 1 inch parallel to the z-axis with the base centered on the origin. The half-cylinder is defined in the positive x direction

(i.e. all the "—" of the "D" is the y axis).

- (c) (3 points) Create a cell for photon and neutron transport made of HEU contained within the surfaces defined in part b).
4. (3 points) Create the isotropic source of 14.1 MeV neutrons located at the coordinates (0, 3, 10).
5. (a) (1 point) What tally is used to get the surface current in units of particles?
- (b) (1 point) What tally is used to get the surface energy flux in units of MeV/cm²?
- (c) (1 point) What tally is used to get the volume flux in a cell in units of particles/cm²?
- (d) (1 point) What tally is used to get the detector pulse height distribution in a (detector) cell?

- (e) (4 points) What is the card that would be used to specify the energy structure for the volume flux tally F14? The energy bin structure is 0-100 keV, 100 keV - 1 MeV, 1 -14.1 MeV.

6. (a) (2 points) How has the course structure worked for you so far?

- (b) (2 points) How can we improve the PENTRAN content? Early returns - how likely are you to use PENTRAN in the future?

- (c) (2 points) Again, maybe a bit early, but what do you think of bringing in the outside experts to cover SCALE and PENTRAN? Do you think the benefits outweigh the drawbacks?

- (d) (3 points) Do you feel that I adequately addressed the first round of feedback? If not, how can I improve?