



FLUKA Beginners' Online Training

**Answers to the questionnaire on
Simple sources and preprocessor instructions**

Question 1

In order to inject at the axes origin a pencil beam of 200 GeV/c protons emitted along the Y axis:

- A. **the use of the BEAM card is not enough**
- B. the use of the BEAMPOS card is not enough
- C. the use of the BEAMAXES card is not enough
- D. the corresponding kinetic energy has to be input
- E. none of the above

As mentioned in the lecture, the default beam is a 200 GeV/c proton beam emitted at the axes origin **along the positive z-direction**. Therefore, one would need an appropriate BEAMPOS or BEAMAXES card in order to define an emission along the Y axis.

Question 2

The BEAM card (on its own) does not allow to get:

- A. beam particles of different energy
- B. a circular beam spot
- C. **multiple primary particle types in the same run**
- D. beam particles with different directions
- E. none of the above

Since energy/momentum and emission angle distributions can be defined with the BEAM card, emitted particles can have different energies and directions. A circular beam-spot can be defined with the BEAM card using the “Annular” option with $R_{in} = 0.0$. However, only a single particle type can requested; to generate particles of different type a source routine is needed.

Question 3

In the case of a spherical surface source (FLOOD):

- A. primary particles are directed radially
- B. **primary particles can escape the sphere**
- C. the source is always centred around the origin of the geometry
- D. the BEAM card is useless
- E. none of the above

In the case of a spherical surface source, particles are emitted in such a way as to produce a constant fluence inside the volume of the sphere; this could not be achieved if they were emitted radially, which would lead to a higher fluence at the centre of the sphere. Once emitted towards the inside of the sphere, there is nothing to prevent primary particles from escaping outside the sphere.

Question 4

The definition directive's (`#define`) value:

- A. has to be provided
- B. can be used in conditional directives
- C. can only be a number
- D. can be used in other cards with the % symbol
- E. **none of the above**

None of the first four statements is true.

A definition directive only requires that a name be given, e.g.: `#define Shielding`

The value cannot be used in conditional directives (e.g. to compare values), only the directive name itself can be used to check whether it has been previously defined/activated, e.g.: `#if Shielding`

The value may be numerical or consist of characters and the correct symbol to call a defined value is \$, e.g.: `$Pbeam`

Question 5

The conditional directives (`#if`, `#elif`, `#else`, `#endif`):

- A. cannot be nested
- B. can be nested only once
- C. **can be nested up to 10 levels**
- D. can be nested without limit