GTV = It is the gross palpable or visible or demonstrable extent and location of malignant growth.

CTV= It is a tissue volume which contains the GTV and/ or subclinical/microscopic malignant disease which has to be eliminated in order to achieve the aim of therapy (cure or palliation).

PTV= It is a volume which contains the CTV along with margins to compensate for geometric variations in the location of the CTV which include the setup error (setup margin) as well as organ motion (internal margin). Geometric variation may be inter-fraction/ intra-fraction and may also be random/systematic.

Dose variation within the PTV is allowed up to +7% and -5% of the prescribed dose.

Dose to the CTV cannot be accurately determined due to geometric uncertainties. The minimum dose to the CTV is equal to or greater than the minimum dose to the PTV. The maximum dose to the CTV is close to the maximum dose to the PTV.
GTV and CTV are clinico-anatomic concepts whereas the PTV is a geometric concept. The dimensions of the GTV may vary depending on the clinical method used to determine it.

Organ at risk= normal tissue/ organ the radiation tolerance of may significantly influence treatment planning and/or prescribed dose.

Treated volume= Volume of tissue receiving a dose which is at least equal to that selected and specified by the radiation oncologist as being appropriate to achieve the purpose of the treatment (whether curative or palliative).
Treated volume is usually larger than the PTV.

Irradiated volume= Volume of tissue receiving a dose which is significant in relation to normal tissue tolerance.
Irradiated volume is usually larger than the treated volume or the PTV.

ICRU reference point:
(1) Dose to the ICRU reference point should be clinically relevant and representative of the dose throughout the PTV
(2) The ICRU reference point should be selected in a region where there is no steep dose gradient
(3) Dose to the ICRU reference point should be accurately measurable
(4) ICRU reference point should be easy to define in a clear and unambiguous way.

The ICRU reference point is usually located at the centre of the PTV and wherever possible is the point of intersection of beam axes.

Dose prescription/ reporting:

(1) ICRU reference point dose (dose to centre of PTV)
(2) Average dose to the PTV
(3) Minimum dose to the PTV

The dose to ICRU reference point is almost independent of the method of computation. It represents the dose at a region of high density of tumor cells. It has good physical accuracy and is easy to determine. It is almost independent of spatial uncertainties and movements. No freedom in selection of dose prescription point is allowed.
Whereas the other methods are subjective as they require PTV definition, which can vary depending on the method of dose computation used and the therapist concerned. The average dose to the PTV is at a region of variable tumor cell density and has variable physical accuracy. The minimum dose to the PTV is a region of low tumor cell density and has good physical accuracy. Computation of both average and minimum dose to the PTV both require computers. Both methods are affected by geometrical variation and movements. Both allow some degree of freedom in choice of dose prescription isodose.