

List of constants and physical values

Name	Symbol	Value	Units
Planck's Constant	h	6.626×10^{-34}	$\text{m}^2 \text{kg} / \text{s}$
Boltzmann's Constant	k	1.38×10^{-23}	$\text{m}^2 \text{kg s}^{-2} \text{K}^{-1}$
Mass of the electron	m_e	0.511	MeV
Mass of the electron	m_e	9.11×10^{-31}	kg
Charge of the electron	q_e	1.60×10^{-19}	C
Mass of the proton		938	MeV
Mass of the neutron		939	MeV
Assumed speed of sound in soft tissue	c	1540	m/s
Speed of light	c	3×10^8	m/s
Mass of Standard Man		70	kg
Molar gas constant	R	8.31	$\text{J mole}^{-1} \text{K}^{-1}$
Avogadro's Number	N_A	6.02×10^{23}	Atom/mole
Energy mass conversion	amu	931.48	MeV/amu
Electron Volt	eV	1.60×10^{-19}	J/eV
Gyromagnetic ratio - H		26.8×10^7	$\text{radians}^{\text{T}^{-1}} \text{s}^{-1}$
Gyromagnetic ratio - P		10.8×10^7	$\text{radians}^{\text{T}^{-1}} \text{s}^{-1}$
Gyromagnetic ratio - Na		7.08×10^7	$\text{radians}^{\text{T}^{-1}} \text{s}^{-1}$
Ionization constant	W_{air}/e	33.97	eV/ion-pair in air
Roentgen	R	2.58×10^{-4}	C/kg

Half-Lives of common radionuclides

Radionuclide	Half-life	Units
F-18	110	min
P-32	14.3	da
Co-60	5.27	yr
Ga-67	78.3	hr
Sr-89	50.6	da
Y-90	2.67	da
Sr-90	28.8	yr
Mo-99	2.75	da
Tc-99m	6.00	hr
Pd-103	17.0	da
In-111	2.80	da
I-123	13.2	hr
I-124	4.18	da
I-125	60.1	da
I-131	8.02	da
Cs-131	9.69	da
Cs-137	30	yr
Sm-153	1.93	da
Au-198	2.69	da
Ir-192	73.8	da
Tl-201	3.04	da
Rn-222	3.8	da

ICRP tissue weighting factors

Tissue	Tissue weighting factor wT
Bone-marrow (red), Colon, Lung, Stomach, Breast, Remainder tissues*	0.12
Gonads	0.08
Bladder, Oesophagus, Liver, Thyroid	0.04
Bone surface, Brain, Salivary glands, Skin	0.01
* Remainder tissues: Adrenals, Extrathoracic (ET) region, Gall bladder, Heart, Kidneys, Lymphatic nodes, Muscle, Oral mucosa, Pancreas, Prostate (♂), Small intestine, Spleen, Thymus, Uterus/cervix (♀)	

PET Dose Rate Constants

Nuclide	Dose rate constant $\mu\text{Sv m}^2 / \text{MBq h}$	Use
Ga-68	0.134	Effective dose equivalent
Rb-82	0.159	Effective dose equivalent
I-124	0.185	Effective dose equivalent
F-18	0.143	Effective dose equivalent

Radiation Weighting Factors

Radiation Type	Radiation Weighting Factor
Photons, electrons and muons, all energies	1
Proton	5
Fast Neutrons	10
Alpha particles, fission fragments, heavy nuclei	20

Standard Calibration Conditions

Calibrated to deliver 1 cGy/MU at d_{max} in a $10 \times 10 \text{ cm}^2$ field at the 100-cm source-to-surface distance (SSD).

Standard Environmental Conditions:

Conditions of temperature, pressure, and relative humidity for which ion chamber calibration factors apply. In the US and Canada these are:

Temperature, T_0 22 °C,

Pressure, P_0 101.33 kPa,

Relative humidity of the air in the ion chamber between 20% and 80%

IAEA Dose Rate Constants and TVL's

Nuclide	Dose rate constant ($\mu\text{Sv/h MBq}$) @ 1 m	TVL (mm Pb)
Na-24	0.500	59
K-42	0.038	53
K-43	0.147	18
Ca-47	0.150	46
Cr-51	0.005	7
Fe-59	0.170	44
Co-57	0.016	0.7
Co-58	0.150	28
Cu-64	0.032	25
Ga-67	0.022	5.3
Zn-65	0.085	42
Se-75	0.056	5
Tc-99m	0.017	0.9
In-111	0.084	2.5
I-125	0.034	0.06
I-123	0.044	1.2
I-131	0.057	11
Ir-192	0.135	12
Tl-201	0.012	0.6

The ABR has made every effort to insure these values are correct and from common references, but they should not be used for clinical purposes without confirmation.

These are constants and values that may be of use on the ABR examinations in medical physics, but the list may not be all inclusive and questions requiring other constants and values may be included on the examinations.