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**DEPARTMENT: MEDICAL LABORATORY SCIENCE**

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**MEDICAL PHYSICS ASSIGNMENT**

1. A radioactivetracer, is a chemical compounds  in which one or more atoms have been replaced by a radionuclide so by virtue of its radioactive decay it can be used to explore the mechanism of chemical reactions by tracing the path that the radioisotope follows from reactants to products**.** Radiotracing is thus the radioactive form of isotope labelling. A radioactive tracer can also be used to track the distribution of a substance within a natural system such as a cell or tissue or as a flow tracer to track fluid flow. Radioactive tracers are also used to determine the location of fractures created by hydraulic  fracturing in natural gas production Radioactive tracers form the basis of a variety of imaging systems, such as, PET scsn, SPECT scans and technetium scans. Radiocarbon dating uses the naturally occurring carbon-14 isotope as an isotopic label.
2. In medicine, tracers are applied in a number of tests, such as 99mTc in autoradiography and nuclear medicine, including computer tomography  (SPECT), positron emission tomography  (PET) and scintigraphy. The breath test for helicobacter pylori commonly used a dose of 14C labeled urea to detect h. pylori infection. If the labeled urea was metabolized by h. pylori in the stomach, the patient's breath would contain labeled carbon dioxide. In recent years, the use of substances enriched in the non-radioactive isotope 13Chas become the preferred method, avoiding patient exposure to radioactivity.