BE/INST/SEM-VIII (CBSGS)/Nuclear Instrumentation/MAY-16

Q.P. Code : 722700

(3 Hours) **[Total Marks :80**

N.B. : (1) Q No. **1** is **compulsory**.
(2) Answer any **Three** out of remaining **Five** questions.
(3) Use **legible** handwriting.
(4) Draw neat **diagram** with proper **labeling**.

1. Answer the following:- **20**
   (a) Briefly explain the nature of alpha, beta and gamma radiations.
   (b) Explain half life time .
   (c) Mention the **types** of Scintillator.
   (d) Explain **Isotopes and Isobars** with example.

2. (a) Explain the **properties** of alpha, beta and gamma radiations in **detail**. **10**
   (b) What is **Scintillation detector**? What are the **properties** of good Scintillator? **10**

3. (a) Explain different **working regions** of gas filled detectors. **10**
   (b) Explain **G.M counter** with its V - I characteristics. **10**

4. What is **Gamma camera**? Explain Gamma camera with neat block diagram. How it can be used in medical application? **20**

5. (a) Explain the factors affecting resolution of gamma- energy for nuclear instruments. **10**
   (b) Explain application of nuclear instrumentation for **leak detection and locating**. **10**

6. (a) Explain the principle and architecture of **MCA** (multi channel analyzer). **10**
   (b) Explain solid state detectors (**Ge - Li or Si - Li**) with neat diagram. Also list the advantages of semiconductor detectors. **10**
