Reg. No.



DEPARTMENT OF PHYSICS VI SEMESTER B.TECH (OPEN ELECTIVE) END SEMESTER EXAMINATIONS, MAY 2017

SUBJECT: RADIATION PHYSICS [PHY 3284]

REVISED CREDIT SYSTEM (03/05/2017)

Duration : 3 Hours

Max. Marks: 50

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Note: i) Answer ALL questions.

ii) Missing data may be suitably assumed.

- **1A.** Explain the various methods to obtain electromagnetic radiation.
- 1B. Explain the following terms related to interaction of fast electrons with 5 absorbing medium: (i) Specific energy loss (ii) Electron range and transmission curve (iii) Positron Interaction.
- 1C. A beam of gamma rays produces 4 electro static unit (1 esu = 3.34 x 10⁻¹⁰ C)
 2 of charge per second in 0.08 g of air. What is the exposure value in (a) SI unit and (b) roentgen/sec ?
- 2A. Explain gamma ray attenuation and the interaction of neutrons with 5 absorbing medium.
- 2B. Discuss the fabrication, working and characteristics of n-channel JFET. 3
- 2C. The current in a diode under forward bias of 100 mV is 200 mA at a 2 temperature of 300 K. What is the current in the diode if it is under reverse bias of 100 mV ?
- **3A.** Explain the construction and working of proportional counter. **5**
- **3B.** Sketch the transfer characteristic curve for an n-channel depletion-type **3** MOSFET with I_{DSS} = 10 mA and V_P = 4 V.
- **3C.** What are the different geometries of gas filled detector? Explain. **2**

- **4A.** A gas counter has a capacitance of about 50 pF, and it collects all charges **4** produced in it in a time duration of 10⁻⁶ s. If a 3 MeV alpha and beta particle deposits all its energy in the counter, what is the voltage and current produced at output of the counter ?
- **4B.** Explain the method of quantity measurement by nuclear measurement **4** system.
- **4C.** Draw the schematic diagram of differential type measuring system. **2**
- **5A.** Explain density measurement by nuclear measurement system. **5**
- **5B.** Explain the principal elements of nuclear measuring system using the **3** alternative structural schemes.
- **5C.** Why the isotopic technique of level height determination is considered as the **2** universal one compared to other available methods ?
