Reg. No. | | | | | | | | | | |

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

DEPARTMENT OF PHYSICS
VI SEMESTER B.TECH (OPEN ELECTIVE)
END SEMESTER MAKE-UP EXAMINATIONS, JUNE/JULY 2017

SUBJECT: RADIATION PHYSICS [PHY 3284]

REVISED CREDIT SYSTEM
(24-06-2017)

Duration : 3 Hours | Max. Marks : 50

Note: i) Answer ALL questions.

ii) Missing data may be suitably assumed.

1A. Explain the different methods to obtain heavy charged particles. **3**

1B. Discuss the energy loss characteristics and particle range of heavy charged particles. **5**

1C. What is the average absorbed dose in a 40 cm^3 region of a body organ (of density 0.93 g cm^{-3}) that absorbs 3×10^5 MeV of energy from a radiation field ? **2**

2A. Explain the four different interaction mechanisms of gamma rays. **5**

2B. Discuss the fabrication, working and characteristics of n-channel D-MOSFET. **3**

2C. For what value of the bias voltage ΔV in the diode current equation does $I = 9\ I_o$? Assume T= 300 K **2**

3A. Explain the construction and working of gamma ray spectrometer. **5**

3B. Sketch the transfer characteristic curve for a p-channel JFET with I_{DSS} = 4 mA and V_P = 3 V. **3**

3C. Draw the characteristics curve showing the variation of charge collected with applied voltage in the gas filled detector and explain the different regions in it. **2**

4A. A cylindrical gas filled counter has a metal cylinder 2.5 cm in diameter along whose axis there is a stretched wire of diameter 1.25×10^{-4} cm. If the potential difference between them is 750 V then what is the electric field at the (i) surface of the wire and (ii) surface of the cylinder ? **4**

4B. Discuss coating thickness measurement by nuclear measurement system. **4**

4C. Draw the schematic diagram of compensation technique for density measurement. **2**

5A. Explain level height determination by nuclear measurement system. **5**

5B. What are the advantages of nuclear measurement techniques ? Explain. **3**

5C. What are the physical parameters and the chemical features which can be estimated using nuclear measurement techniques ? **2**

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