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

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

VI SEMESTER B.TECH (OPEN ELECTIVE)

END SEMESTER EXAMINATIONS, MAY 2016

SUBJECT: RADIATION PHYSICS [PHY 322]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitable assumed.

1A.	Explain the different methods available to obtain neutron radiation.	**5**
1B.	Explain the nature of interaction of heavy charged particles and its stopping power.	**3**
1C.	What is the lowest wavelength limit of the X-rays emitted by a tube operating at a potential of 195 kV?	**2**
2A.	Discuss the *energy loss characteristics* and *particle range* of heavy charged particles.	**5**
2B.	Explain the terms: (i) Exposure (ii) Absorbed dose (iii) Equivalent dose	**3**
2C.	What is the highest energy to which doubly ionized helium atoms can be accelerated in a dc accelerator with 3 MV maximum voltage?	**2**
3A.	Explain Compton scattering and gamma ray attenuation.	**5**
3B.	Sketch the transfer characteristic curve for *p-channel* depletion type MOSFET with I_{DSS} = 6 mA and V_P = 6 V.	**3**
3C.	What are the differences between BJT and FET ?	**2**

4A. Discuss the fabrication, working and characteristics of n-channel JFET. **5**

4B. Discuss the process of measuring radiation exposure using TLDs. **3**

4C. Calculate the scintillation efficiency of anthracene if 1 MeV of particle energy loss creates 20,300 photons with average wavelength of 447 nm. **2**

5.62%

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

5B. A pocket air-wall chamber has a volume of 2.5 cm^3 and a capacitance of 7 pF, initially charged at 200 V. After the chamber was used the reader showed a potential difference of 170 V. What exposure in roentgens can be inferred? Density of air at STP is 1.293 kg/m^3. **3**

0.252 R

5C. Discuss the process of creation of discrete avalanches in proportional counter. **2**

6A. Discuss the method to measure density of materials by nuclear measurement technique. **5**

6B. Explain the principal elements of nuclear measuring system using the alternative structural schemes. **3**

6C. Mention the advantages of nuclear measuring systems over conventional methods. **2**

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