P-003-001601 Seat No. _____

# Third Year B. Sc. (Sem. VI) (CBCS) Examination

**March / April – 2020**

## Physics : Paper - P - 601

*(Nuclear Physics & Space Physics) (Old Course)*

**Faculty Code : 003**

**Subject Code : 001601**

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

**Instructions :**

(1) All questions are compulsory.

(2) Figures on right side indicate marks.

(3) Symbols have their usual meaning.

**1** Answer the following questions in short. **20**

(1) The nuclei of the same atomic number but having different atomic mass are called isotopes. True or False.

(2) In equation $R = RoA^{1/3}$ where A is the atomic mass number. True or False.

(3) In cyclotron accelerator two hollow metal boxes 'Dees' are use. True or False.

(4) A particle accelerator is a device for increasing K.E. of charged particle. True or False.

(5) In Plateau region counting rate is independent of potential difference across the tube. True or False.

(6) In Ionization Chamber for neutron detection chamber is filled with _____.

(7) Which physical quantity is not conserved in Nuclear reaction ?

(8) If Q value of reaction is positive then the reaction is _____.

(9) 1 amu $\cong$ _____ MeV.

(10) The material which can slow down the neutron is called _____.

(11) Neutrinos have _____ charge.

(12) Write full form of LHC.

(13) The name of our galaxy is _____.

(14) Parsee is a unit of which quantity ?

(15) In the absence of scattering, our sky would appear _____.

(16) According to Stephen Boltzmann law, energy radiated from an object is proportional to _____ power of its absolute temperature.

(17) The cosmotron is proton synchrotron. True or False.

(18) For Nuclear radiation, distance traversed in straight line in air before coming to rest is called _____.

(19) In Rutherford's artificial transmutation, experiment, nitrogen transmutation into _____.

(20) Uncontrolled chain reaction used in _____.

**2** (a) Write short answers : (any three) **6**

(1) What is natural radio activity ?

(2) Explain working of cyclotron.

(3) Explain interaction of $\alpha$-particles with matter.

(4) Explain classification of Nuclear reaction.

(5) Draw the figure of power reactor.

(6) What is anti matter ?

(b) Write answer to any three : **9**

(1) Explain Nuclear force.

(2) Give limitations of cyclotron and their solution.

(3) Write the application of ionization chamber.

(4) Write formula of threshold energy for endoergic reaction.

(5) Write note on Atom bomb.

(6) Write properties of quarks.

(c) Write answer in detail : (any two) **10**

(1) Explain Bohr's atomic model.

(2) Write principle and working of Proton Synchrotron with figure.

(3) Write a note on scintillation counter.

(4) Write a note on Boiling water reactor.

(5) Explain the conservation laws in elementary particle.

**3** (a) Answer the following questions in short : **6**

(1) Give the name of different types of galaxies.

(2) What is Chandrashekhar limit ?

(3) What is called super sensor ?

(4) Explain briefly the fusion reaction with example.

(5) Draw the figure of Ionization chamber.

(6) What is multiplication factor ?

(b) Write answers to any three : **9**

(1) Discuss the various methods of PLASMA confinement.

(2) Explain black holes in brief.

(3) Explain Neutron stars.

(4) Write principle and working of synchro-cyclotron.

(5) What is nuclear fission ?

(6) Explain the structure of white dwarf.

(c) Write answer in detail : (any one) **10**

(1) Describe the construction and working of G.M. counter.

(2) Explain principle, construction and working of pressurized water reactor.

(3) Explain the HR diagram in detail.

(4) Explain Global Positioning system method.

(5) What is Galaxy ? Explain types of galaxies.

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