



**UNIVERSITY OF NORTH BENGAL**  
B.Sc. Honours 6th Semester Examination, 2021

**DSE4-PHYSICS**

Full Marks: 60

**ASSIGNMENT**

*The figures in the margin indicate full marks.  
All symbols are of usual significance.*

**The question paper DSE4 contains Section-A, Section-B and Section-C. Candidates are required to answer any *one* section from the *three* sections and they should mention it clearly on the Answer Book. Candidates should also ensure that the chosen section in the paper DSE4 is different from the chosen section in the paper DSE3**

**For each question, the candidates will be graded according to the quality of the presentation of the topic (8 marks) and originality of language (2 marks).  
Maximum word limit of each topic is 400**

**Section-A**

**NUCLEAR AND PARTICLE PHYSICS**

**Write short notes on any *six* of the following topics**

10×6 = 60

1. Beta — decay
2. Ionization Chamber
3. Linear accelerator
4. Nuclear reactions: Conservation laws and Q — value
5. Elementary particles: Types and families
6. Nuclear shell model
7. Nuclear binding energy
8. Concept of compound and direct reaction.

**Section-B**

**ASTROPHYSICS AND ASTRONOMY**

**Write short notes on any *six* of the following topics**

10×6 = 60

1. Origin of the solar system: The nebular model

2. Determination of astronomical distance by parallax method
3. Clusters of galaxies
4. Solar atmosphere: Photosphere, chromosphere, corona
5. Stellar spectral classification and Hertzsprung-Russel diagram
6. Rotation curve of galaxy and dark matter
7. Determination of temperature and radius of a star
8. Helioseismology and space telescopes.

### Section-C

#### ADVANCED MATHEMATICAL PHYSICS II

Write short notes on any *six* of the following topics

10×6 = 60

1. Motion of a symmetric top
2. Legendre's dual transformation: establishment of Hamilton's equations of motion
3. Mapping, binary operations, relations and different types of functions
4. Matrix representation of group: reducible and irreducible representation
5. Character table of group with an example
6. Binomial distribution
7. Bayes' Theorem and its application
8. Canonical transformations and transformation equations.

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