



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

**DSE3-PHYSICS**

Full Marks: 60

**ASSIGNMENT**

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

**The question paper DSE3 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 DSE3 is different from the chosen section in the paper DSE4**

**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. Shell model of nucleus
2. Binding Energy
3.  $\alpha$ -decay: theory of  $\alpha$ -emission
4. Compton scattering
5. Synchrotron
6. G. M. Counter
7. Quark model
8. Bethe-Bloch formula.

**Section-B**

**ASTROPHYSICS AND ASTRONOMY**

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

10×6 = 60

1. Basic structure, properties and nature of rotation of Milky Way.

2. Galaxy morphology and Hubble's classification of galaxies.
3. Determination of temperature and radius of a star.
4. Basics of solar magneto-hydrodynamics.
5. Rotation curve of galaxy and dark matter.
6. Origin of the solar system: Planetary rings model, extra-solar planet model.
7. Properties of galactic nucleus and its environment.
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. Euler-Lagrange's equation from variational principle and one of its applications.
2. Poisson brackets and their properties.
3. Isotropy of space and corresponding conservation law.
4. Isomorphism and homomorphism of groups with examples.
5. Cosets of a subgroup and cyclic group.
6. Elementary properties of groups with examples.
7. Bayes' theorem and its application.
8. The Gaussian distribution.

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