

SESSIONAL EXAM 2022
SEMESTER 5
PAPER – PHY-HE-5056

MARKS: 30

TIME: 1 HOUR 15 MIN

Q1. Answer any 7 questions:

1X7=7

1. What are the constituents of a nucleus?
2. How is an atomic nucleus represented? Write which symbol signify what.
3. What is the relation between mass number and nuclear radius?
4. What is atomic mass unit?
5. Write the relation between Z (proton number), N (neutron number) and A (mass number).
6. What is Binding energy of a nucleus?
7. Define packing fraction.
8. Define angular momentum of a nucleus.
9. What is a nuclear reaction?
10. Define Q value of a nuclear reaction.

Q2. Answer any 5 questions:

2X5=10

1. What is parity? Define even and odd parity.
2. Define Compound nucleus. Explain how is it formed.
3. Name the various types of nuclear reactions.
4. Define nuclear reaction cross section. What are its units and dimensional formula.
5. What are direct reactions. Explain in short.
6. Show that nuclear density is same for all nuclei.
7. Find a relation between electron volt and amu.
8. What is nuclear magnetic moment.

Q3. Answer any 1 question:

1X3=3

1. What are the conservation laws of a nuclear reaction?
2. Why are the similarities of a liquid drop and a nucleus?
3. Draw the binding energy curve. Explain in brief.
4. Explain the N-Z graph.

Q4. Answer any 1 question:

1X10=10

1. Explain liquid drop model and obtain the Semi Empirical formula.
2. Derive the Rutherford scattering formula.
3. What are the kinematics of a nuclear reaction? Write about exothermic and endoergic reactions. (5+5=10)