

CITY COLLEGE

Internal Examination 2021

Physics(Hons.) CBCS Semester- V

Paper : DSE B-1(Nuclear and Particle Physics)

Time : 1 hour

Full Marks : 20

Answer any ten questions from the following : [10 × 2 = 20]

1. What is packing fraction? Draw the packing fraction curve and explain.
2. The binding energy of the neon isotope ${}_{10}^{20}\text{Ne}$ is 160.647 Mev. Find its atomic mass.
3. What is radiative capture? Give example.
4. What is the geometrical significance of cross-section of nuclear reactions?
5. Write and explain Bethe formula for energy loss due to ionization.
6. What is pair production? Explain.
7. What do you understand by the dead time, recovery time and resolving time of GM counter?
8. Draw the schematic diagram of a fixed frequency cyclotron and state its limitations.
9. Compare between Cyclotron and Betatron.
10. Identify the type of the following interaction from the conservation laws :
$$\Sigma^0 \rightarrow \Lambda^0 + \gamma \quad (\text{life time } \leq 10^{-14} \text{ s})$$
11. What is charge conjugation? Explain.
12. State how photo multiplier tube (PMT) works.