M.Sc. F.Y. (Physics) (NEP Pattern) Semester-II

02MSCPH4-2 - DSE-II Paper-IV - Plasma Physics and Space Science

P. Pages : 2 **GUG/W/24/15419**

Time : Three Hours * 6 2 9 2 * Max. Marks : 80

Either:

1. a) Define Plasma. Explain following terms: **8**

i) Plasma as ionized gas,

ii) Saha's ionization equation,

iii) Concept of Plasma temperature

b) Describe following terms: **8**

i) Debye shielding,

ii) Quasi-neutrality

iii) Plasma parameters and Plasma approximation

OR

e) Explain Occurrence of Plasma. Give details about applications of Plasma in brief with special reference to nuclear fusion and particle acceleration. **8**

f) Explain following terms- **8**

i) Single-particle motion

ii) Dynamics of charged particles in electro-magnetic fields

Either:

2. a) Explain, Wave phenomena in magneto plasma in terms of polarization, phase velocity and group velocity. **8**

b) Write a short note on- **8**

i) Cutoff and resonance for electromagnetic wave propagating parallel and perpendicular to magnetic field.

ii) Appleton-Hartree formula.

OR

e) Explain in detail about Kinetic theory of Plasma with respect to Vlasov equations, Solution of linearized Vlasov equation and Langmuir waves. **8**

f) Describe, Wave-particle interaction and Landau damping in terms of Plasma. **8**

Either:

3. a) Describe Elements of Ionosphere and Magnetosphere. Explain their (i) structure and density profile, (ii) ionosphere-magnetosphere coupling. **8**

b) Explain in detail about Structure of the Sun with solar interior, solar atmosphere, photosphere, chromosphere and corona. **8**

OR

e) Explain in detail about (i) Sunspots and their properties, and (ii) Sun-Earth interactions. **8**

f) Write a detailed note on: basic concept of storm and substorm phenomena. **8**

Either:

4. a) Explain following terms- **8**
i) Chandrasekhar limit for white dwarfs and
ii) Neutron stars and Black holes.

b) Write a short note on : **8**
i) Steller structure (equilibrium, nuclear reactions, energy transport) and
ii) Stellar evolution (with example of our Sun).

OR

e) Explain, Morphology and types of galaxies: Our Milky Way. **8**

f) Write a short note on: **8**
i) Concept of dark matter.
ii) Cosmic microwave background radiation.

5. Attempt **all** of the followings.

a) Write a note on Polarization drift. **4**

b) State and Explain Applications of Plasma Physics. **4**

c) Explain in brief about Coronal Mass Ejections (CMEs). **4**

d) Write a short note on Exoplanets. **4**

****