M 26991

Reg. No. : ...............................

Name : ...............................

IV Semester M.A./M.Sc./M.Com. Degree (Reg./Sup./Imp.)
Examination, March 2015
PHYSICS
PH 403 – Particle Physics, Plasma Physics and Astrophysics

Time : 3 Hours

Max. Marks : 50

SECTION – A

**Two** to be answered out of 4, **10 marks each**.

1. Write an essay on elementary particles.

2. i) Discuss eightfold way. Write a note on Gellmann – Okubo mass formula.

   ii) Explain, with details, one experimental method for detecting resonance.

3. With necessary theory explain the motion of charged particle in uniform E and B field.

4. Write down the basic equilibrium conditions that must be satisfied by a stable stellar structure and derive the condition of radiative equilibrium.

SECTION – B

**Five** to be answered out of eight, **3 marks each** :

5. Write a short note on conservation laws in elementary particles.

6. With suitable example explain about strange particles.

7. Discuss the theory of weak interaction.

8. Give brief history of plasma physics.

9. Give the importance of H-R diagram.

10. With neat sketch explain the importance of Van Allen radiation belts.

11. Briefly explain colour index of stars.

12. Discuss how blackholes are formed and explain its properties.

## SECTION – C

**Three** to be answered out of 5, **5 marks each** :

13. Find the maximum kinetic energy of the electron emitted in the beta decay of the free neutron. The neutron-proton mass difference is 1.30 MeV.

14. Why quarks in a hadrons have different colours ? Would they have to have different colours if their spins were 0 or 1 rather than $\frac{1}{2}$ ?

15. Discuss the motion of charged particles in a magnetic mirror confinement.

16. Compute $\lambda_D$ and $N_D$ for the earth ionosphere with $n = 10^6$ cm$^{-3}$, $kT_e = 0.1$ eV.

17. Discuss the phenomenon of formation of solar system.

—————————