# Bsc Physic Sem - II

## Paper 2 (Gravitation, Astrophysics, Magnetism and Magneto statics)

## Question Bank

1. Derive an expression for the gravitational potential due to a solid sphere at a point : (i) Outside (ii) On the surface of sphere.
2. Define Gravitational Potential and Potential energy and obtain the relation between potential and intensity of gravitational field.
3. Calculate the intensity of gravitational field at a distance 0.2 m from the surface of a solid sphere of mass 20 kg and radius 20 cm. Given G = 6.67 × 10–11 Nm2 /kg2 .
4. Deduce an expression for gravitational self energy.Calculate the gravitational energy of a galaxy if the distance between a pair of stars is averagely 1020 m and composed of $1.6 \times 10^{11}$ stars of mass $2 \times 10^{30}$ each.
5. Derive an expression for the Gauss's law.
6. State and explain Newton's law of gravitation. Define gravitation constant (G).
7. What is Star? Deduce an expression for the mass of the sun when a planet is orbiting in a circular path of radius R.
8. Write short note on Asteroids and meteors.
9. A Star has a surface temperature of 1500°K. The Star will radiate its maximum energy in what part of spectrum? [Given : Wein's constant $b = 3 \times 10^{-3}$ mK]
10. What are Galaxies? Give their classification.
11. Write short note on corona of Sun.
12. Explain the significance of stellar spectrum.
13. Earth receives an amount of heat radiation 1.4 × 103 $Wm^{-2}$ from the sun. Assume the earth re-emits all the radiation received from the Sun. Calculate the surface temperature of the earth
14. Explain Langevin's theory of diamagnetism and derive an expression for the magnetic susceptibility of diamagnetic substance.
15. What is Curie-Weiss law ? Derive an expression for Curie temperature.
16. The magnetic susceptibility of a medium is 940 × 10–4. Calculate its absolute and relative permeability.
17. What are Ferrites? Write their applications.
18. Compare ferromagnetism and ferrimagnetism.
19. Explain the effect of temperature on antiferromagnetic material.
20. Lead in superconducting state has critical temperature of 6.2 K, at zero magnetic field and critical field of 0.064 Am–1 at 0 K. Determine the critical field at 4 K.
21. Deduce Ampere's circuital law. Find the expression for magnetic field due to solenoid using Ampere's circuital law.

22. Obtain the expression for magnetic induction at a point due to a long straight conductor carrying current I.
23. 20 ampere current is flowing in a long straight wire. What will be the intensity of magnetic field at a distance 10 cm from the wire $\mu 0 = 4p \times 10^{-7}$ wb/A-m.
24. Explain the terms: — (i) Magnetization current (ii) Magnetic field vector.
25. State Biot-Savert's Law. Obtain an expression for magnetic field intensity near a straight conductor carrying current.
26. Deduce the relation between B r , H r and M r .
27. A circular coil of radius 5 cm has 50 turns and carries a current of 10 mA. Calculate the magnetic induction at the centre of coil. 29. Define gravitational self energy.
28. State Kepler's second law of planetary motion.Calculate the force of gravitation between two bodies of masses 1 kg each and distance of separation from their centre is 1 m (G = 6.67 × 10–11 Nm2 /kg2 ).
29. Write the sequence of planets in our solar system according to distance from Sun.
30. Define gravitational self-energy of a body. Obtain an expression for gravitational self-energy of a galaxy in terms of number of stars in Galaxy.
31. Define gravitational self-energy of a body. Obtain an expression for gravitational self-energy of a galaxy in terms of number of stars in Galaxy.
32. What is Galaxy ? Explain different types of Galaxies in the universe
33. Explain parallax method for measuring the distance of a planet from earth
34. State Kepler's laws of planetary motion.
35. Derive an expression for the gravitational potential and intensity at a point outside due to a solid sphere
36. Discuss Langevin's theory of paramagnetism and obtain an expression for paramagnetic susceptibility
37. what is Superconductivity ? Explain the terms critical temperature and critical magnetic field for superconductor.
38. What is Meissner effect ? Explain.
39. What is a solenoid ? Derive an expression for the magnetic field inside a solenoid of infinite length. Explain the variation of B with length of the solenoid.
40. There are 500 turns in 40 cm long solenoid. If it carries a current of 1.0 A. Calculate the intensity of magnetic field intensity of the solenoid along its axis.
41. State and explain Biot and Savart law
42. What is Gauss law of magnetization? Explain