પુના International School
Shree Swaminarayan Gurukul, Zundal

Student Name					
Date	14/07/2020	Grade	XII Sci	Roll No.	
Subject	Physics	Marks	50	Teacher's Sign	

PERIODIC ASSESSMENT 1 20-21

Question no 1 to 05 1 Mark each
Question no 06 to 10 2 Mark each
Question no 11 to 15 3 Mark each
Question no 16 to 20 4 Mark each

1. What is the force between two small charged spheres having charges of 2×10^{-7}C and 3×10^{-7}C placed 30 cm apart in air?
2. Electric field write down Dimensional formula
3. Which orientation of an electric dipole in a uniform electric field would correspond stable equilibrium?
4. Define electric dipole moment. Write its S.I. unit.
5. A charge 'q' is placed at the center of a cube of side l. What is the electric flux passing through each face of the cube?
6. Define electric flux. Write its S. I. unit. A charge q is enclosed by a spherical of radius R. if the radius is to half, how would the electric flux through the surface change?
7. A spherical conducting shell of inner radius r1 and outer radius r2 has a charge
8. 'Q'. A Charge 'q' is placed at the center of the shell.
   (a) What is the surface charge density on the (i) inner surface, (ii) outer surface of the shell?
   (b) Write the expression for the electric field rice at a point x > r2 from the center of the shell.
9. Show that the electric at the surface of a charged conductor is given by $\vec{E} = \sigma/\varepsilon_0 \hat{n}$, where is the charge density is a unit vector normal to the surface in the outward direction.
10. A thin straight infinitely long conducting wire having charge density λ is enclosed by a cylindrical surface of radius r and length l, its axis coinciding with the length of the wire. Find the expression for the electric flux through the surface of the cylinder.
11. A positive point charge (+q) is kept in the vicinity of an uncharged conducting plate. Sketch electric field lines originating from the point on to the surface of the plate. Derive the expression for the electric field at the surface of a charged conductor.
12. Draw 3 equipotential surfaces corresponding to a field that uniformly increases in magnitude but remains constant along Z-direction. How are these surfaces different from that of a constant electric field along Z-direction?
13. What is the area of the plates of a 2F parallel plate capacitor having separation between the plates is 0.5 cm?

14. A positive point charge (+q) is kept in the vicinity of an uncharged conducting plate. Sketch electric field lines originating from the point on to the surface of the plate.
    Derive the expression for the electric field at the surface of a charged conductor.
15. Deduce the expression for the electrostatic energy stored in a capacitor of capacitance 'C' and having charge 'Q'. How will the (i) energy stored and (ii) the electric field inside capacitor be affected when it is completely filled with a dielectric material of dielectric constant 'K'?
16. Derive an expression for the energy stored a parallel plate capacitor. On charging a parallel plate capacitor to a potential V, the spacing between the plates is halved, and dialect medium of $\epsilon_r = 10$ is introduced between the plates, without disconnecting the d.c. source. Explain, using suitable expressions, how the (i) capacitance, (ii) electric field and (iii) energy density of the capacitor change.

    Or

    Out of the two magnetic materials, 'A' has relative permeability slightly greater than unity while 'B' has less than unity. Identify the nature of the materials 'A' and 'B'. Will their susceptibilities be positive or negative?
17. An iron ring of relative permeability μ_r has windings of insulated copper wire of n turns per metre. When the current in the windings is I, find the expression for the magnetic field in the ring.
18. Draw magnetic field lines when a (i) diamagnetic, (ii) paramagnetic substance is placed in an external magnetic field. Which magnetic property distinguishes this behavior of the field lines due to the two substances?
19. Define magnetic susceptibility of a material. Name two elements, one having positive susceptibility and the other having negative susceptibility. What does negative susceptibility signify?
20. A magnetic needle free to rotate in a vertical plane parallel to the magnetic meridian has its north tip down at 60° with the horizontal. The horizontal component of the earth's magnetic field at the place is known to be 0.4 G. Determine the magnitude of the earth's magnetic field at the place.

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