



## Avinashilingam Institute for Home Science and Higher Education for Women

(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)

Re-accredited with 'A+' Grade by NAAC. Recognised by UGC Under Section 12B

Coimbatore - 641 043, Tamil Nadu, India

### Bachelor's Degree Examination –November 2019

**Class : II UG**  
**Major : Physics**

**Time: 3 hours**  
**Max. Marks: 100**

#### 18BPHC07 Electricity and Magnetism

##### Part A

**10 x 1 = 10**

**Choose the correct answer**

- According to Gauss law, the total flux due to a charge outside the closed surface is \_\_\_\_\_.  
a. 0                      b. infinity                      c. Q                      d.  $Q/\epsilon_0$
- The unit of electrostatic pressure is \_\_\_\_\_.  
a. pascal                      b. N                      c.  $N/m^2$                       d. m
- \_\_\_\_\_ is a device for storing charge.  
a. inductance                      b. capacitor                      c. resistor                      d. rectifier
- Surface charge density= \_\_\_\_\_.  
a.  $q/A$                       b.  $q/A^2$                       c.  $A/q$                       d.  $A/q^2$
- Thermo e m f can be measured using \_\_\_\_\_.  
a. meter bridge                      b. Kelvin's double bridge                      c. Volt meter                      d. potentiometer
- Thomson effect is nil for \_\_\_\_\_.  
a. lead                      b. zinc                      c. nickel                      d. cadmium
- A pair of equal and oppositely magnetized poles separated by a distance is called \_\_\_\_\_.  
a. couple                      b. dipole                      c. poles                      d. potential
- Potential due to a magnetic shell, at a point outside the spherical shell is \_\_\_\_\_.  
a. infinity                      b. zero                      c.  $\pi$                       d.  $4\pi$
- Unit of magnetic induction is \_\_\_\_\_.  
a.  $weber/m^2$                       b.  $weber/m$                       c. henry                      d. weber
- Area of hysteresis loop is a measure of \_\_\_\_\_.  
a. retentivity                      b. susceptibility                      c. permeability                      d. energy loss per cycle

**Part B**

**5 x 6 = 30**

**Answer ALL questions**

**Each answer should not exceed 400 words or two pages**

11.a. State and prove Gauss theorem.

(or)

11.b. Derive an expression for electric intensity at a point due to a charged hollow cylinder.

12.a. Define capacitance of a capacitor and explain its principle.

(or)

12.b. Deduce expression for energy of charged conductor.

13.a. Explain the principle of a potentiometer.

(or)

13.b. Write a note on thermoelectric diagram. Apply it for the determination of Peltier coefficient

14.a. Deduce the relation between magnetic intensity and potential, due to a dipole.

(or)

14.b. Write notes on magnetic shell.

15.a. Establish the relation  $\mu_r = 1 + \chi$ .

(or)

15.b. Define and explain the terms hysteresis, retentivity and coercivity

**Part C**

**5 x 12 = 60**

**Answer ALL questions**

**Each answer should not exceed 800 words or four pages**

16.a. What are electrical images? Obtain an expression for electric intensity at a point on the plane conducting surface.

(or)

16.b. Derive expression for electric intensity and electric potential due to an earthed conducting sphere.

17.a. Explain the sharing the charge between two charged conductors.

(or)

17.b. Describe the method of measuring potential difference using Kelvin's absolute electrometer.

18.a. State and prove Kirchoff's laws.

(or)

18.b. Discuss about Seebeck effect in detail with a neat diagram and graph.

19.a. Obtain an expression for the magnetic potential at a point on the axial point due to a dipole.

(or)

19.b. Derive an expression for the potential due to a magnetic shell of different shapes.

20.a. State and explain (i). magnetic induction (B) (ii). Intensity of Magnetisation (I)

(iii). Intensity of Magnetising field (H) (iv). Magnetic permeability ( $\mu$ )

(or)

20.b. Explain the method of calculation of energy loss from a hysteresis loop.

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