

**STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.**  
**(For candidates admitted during the academic year 2015-16)**

**SUBJECT CODE: 15PH/AC/PH43**

**B.Sc. DEGREE EXAMINATION APRIL 2017**  
**BRANCH IV – CHEMISTRY**  
**FOURTH SEMESTER**

**REG. No. \_\_\_\_\_**

**COURSE : ALLIED – CORE**  
**PAPER : PHYSICS– II**  
**TIME : 30 MINS.**

**MAX. MARKS: 30**

**SECTION – A**

**TO BE ANSWERED ON THE QUESTION PAPER ITSELF**  
**ANSWER ALL QUESTIONS: (30x1=30)**

**Choose the correct Answer:**

1. The space around a charge is called as  
a) Electric field    b) Electric potential    c) Magnetic field    d) Electric force
2. Electric potential is directly proportional to  
a)  $\frac{q}{r}$     b)  $\frac{q}{r^2}$     c)  $\frac{q}{r^3}$     d)  $\frac{q^2}{r}$
3. Capacitance of a conductor is given by the relation  
a)  $C = Q/V^2$     b)  $C = Q/V$     c)  $C = QV$     d)  $C = V/Q$
4. Lorentz force is  $F =$   
a)  $q_0 v \times B$     b)  $q_0 E \times B$     c)  $q_0 v \cdot B$     d)  $q_0 v B \sin\theta$
5. The relative permeability of a paramagnetic substance is  
a) unity    b) slightly more than unity    c) zero    d) less than unity
6. Hysteresis gives  
a) loss of energy per unit cycle    b) gain of energy  
c) neither loss nor gain    d) production of magnetic field
7. The direction of force on a current carrying conductor placed in a magnetic field is given by  
a) Fleming's Left Hand Rule    b) Right Hand Palm Rule  
c) Fleming's Right Hand Rule    d) End Rule
8. How can you increase the sensitivity of a moving coil galvanometer?  
a) By increasing the area of the coil    b) By increasing the number of turns of the coil  
c) Both a and c    d) By decreasing the number of turns of the coil
9. If a current carrying conductor is placed in uniform magnetic field parallel to direction of field then force experienced by conductor will be  
a)  $ILB \cos\theta$     b)  $ILB$     c) zero    d)  $ILB \sin\theta$

10. Population inversion means  
a) number of atoms equal in all energy states  
b) number of atoms in higher energy state is smaller than the number of atoms in lower energy states  
c) more atoms in the higher energy state than the lower energy state.  
d) none of the above
11. Intensity of laser beam is  
a) low                      b) zero                      c) infinity                      d) high
12. \_\_\_\_\_ works on the principle of total internal reflection.  
a) Laser                      b) Maser                      c) Hologram                      d) Optical fibre
13. An operational amplifier is a  
a) Non-linear IC                      b) Linear IC                      c) Digital IC                      d) none of the above
14. Boolean equation  $A + 1 =$  is  
a) A                      b) 0                      c) 1                      d) 11
15. If  $1. A = 0$ ,  $A =$   
a) A                      b) 0                      c) 1                      d) 1

**Fill in the blanks:**

16. Unit of Capacitance is \_\_\_\_\_.
17. The unit of retentivity is \_\_\_\_\_.
18. The current sensitivity is determined using the equation \_\_\_\_\_.
19. A hologram contains information of the object about amplitude and \_\_\_\_\_.
20. In Boolean algebra,  $A \cdot (A+B) =$  \_\_\_\_\_.

**State whether true or false:**

21. Electric potential is actually the difference between potential energy at two different locations.
22. The ability of a material to maintain a magnetized state (without the presence of a magnetizing force) is called hysteresis.
23. Figure of merit of a galvanometer is the reciprocal of current sensitivity.
24. Hologram is the results of polarization of object and reference beam.
25. The feedback component in an op-amp integrator is a capacitor.

**Answer briefly:**

26. What is the effect on coulomb's force if the distance between the two charges is reduced to half?

27. What is retentivity?

28. What is meant by the figure of merit of a galvanometer?

29. Expand MASER.

30. Write the Commutative laws of Boolean algebra.



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**MAX. MARKS : 70**

**SECTION – B**

**ANSWER ANY FIVE QUESTIONS:**

**(5×5=25)**

1. Derive an expression for finding electrical potential at a point due to a point charge.
2. a) A capacitor of capacitance 5 microfarad is connected to a 6 V supply. What charge is stored in the capacitor?  
b) A 400 pF capacitor carries a charge of  $2.5 \times 10^{-8}$  C. What is the potential difference across the plates of the capacitor?
3. A 2MeV proton is moving perpendicular to a uniform magnetic field of 2.5 T. What is the magnetic force on the proton? ( $m_p = 1.6 \times 10^{-27}$ )
4. Find the magnetic force on a conductor of length 0.5m long carrying a current of 5A is placed perpendicular to a magnetic field of induction  $2 \times 10^{-3}$  T.
5. Write any five applications of fibre optics.
6. State and prove De Morgan's theorem
7. a) Draw a logic circuit for the Boolean expression  $A + BC + D$ .  
b) Show that  $A + AB = A$

**SECTION – C**

**ANSWER ANY THREE QUESTIONS:**

**(3×15 =45)**

8. State Gauss law. Use Gauss law to determine electric field due to line charge distribution and cylindrical charge distribution.
9. Write the properties of dia, para and ferromagnetic materials.
10. a) What is the principle of Moving Coil Ballistic Galavanometer?  
b) Derive the equation of force on a current carrying conductor placed in a magnetic field.
11. Describe Laser action and also explain the working of Carbon Di-oxide Laser with a neat diagram.
12. With neat circuit diagram describe the construction of an integral and Differential Op-Amp.



