

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.  
(For candidates admitted during the academic year 2011-12)

SUBJECT CODE : 11PH/AC/PC43

B.Sc. DEGREE EXAMINATION APRIL 2013  
BRANCH IV – CHEMISTRY  
FOURTH SEMESTER

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

COURSE : ALLIED – CORE

PAPER : PHYSICS FOR CHEMISTRY - II

TIME : 30 MINS.

MAX. MARKS : 30

SECTION – A

TO BE ANSWERED IN THE QUESTION PAPER ITSELF

ANSWER ALL QUESTIONS:

(30 x 1 = 30)

I. CHOOSE THE CORRECT ANSWER:

- The Electric field at any point is directly proportional.  
a) Distance                      (b) charge                      (c) 1/distance                      (d) (distance)<sup>2</sup>
- The relation between electric field and potential is  
a)  $E = d^2V/dx^2$                       (b)  $E = (dV/dx)^{1/2}$                       (c)  $E = dV/dx$                       (d)  $E = -dV/dx$
- Capacitance of a parallel plate capacitor is related to distance between the plates as  
a) 1/d                      (b) 1/d<sup>2</sup>                      (c) d                      (d) d<sup>2</sup>
- When a charge moves with a velocity parallel to the magnetic field, then the force on the charge is  
a)  $F = Bqv$                       (b)  $F = Bq$                       (c)  $F = q^2 Bv$                       (d) zero
- The unit of a area under a hysteresis curve is  
a)  $JKg^{-1}$                       (b)  $J^{-1}$                       (c) J                      (d)  $Am^{-1}$
- The charge sensitiveness of a ballistic galvanometer depends on  
(a) Magnetic field                      (b) area of cross section  
(c) number of turns                      (d) all the above
- An ideal op-amp has  
(a) Finite gain                      (b) low input impedance  
(c) infinite gain                      (d) high output impedance
- The decimal equivalent of  $(86)_{16}$   
(a) 124                      (b) 132                      (c) 134                      (d) 133

9. The output of an inverting amplifier is  
 (a)  $V_o = (R_f \cdot R) V_i$     (b)  $V_o = (R_f \cdot R)/V_i$     (c)  $V_o = (R_f/R) V_i$     (d)  $V_o = -(R_f/R) V_i$
10. According to De Morgan's theorem  $\overline{A + B}$  is  
 (a)  $\overline{AB}$     (b)  $\overline{A}B$     (c)  $\overline{A}\overline{B}$     (d)  $AB$
11. In CO<sub>2</sub> LASER Carbondioxide, nitrogen and helium are mixed in the ratio  
 (a) 1:3:5    (b) 1:4:5    (c) 1:5:4    (d) 4:1:5
12. The propagation of light in fibre optics is based on the principle of  
 (a) Refraction    (b) reflection  
 (c) interference    (d) total internal reflection
13. The binary equivalent of  $(20)_{10}$   
 (a) 1100    (b) 11100    (c) 10101    (d) 11110
14. When the dielectric between the capacitor is removed then capacitance  
 (a) decreases    (b) increases    (c) remains same    (d) none of the above
15. Holography is based on the principle of  
 (a) reflection    (b) diffraction    (c) refraction    (d) interference

II. **Fill in the blanks:**

16. The number of field lines passing through unit area is -----
17. According to Maxwells equations  $\vec{\nabla} \times \vec{E} =$  -----
18. In fibre optics the refractive index of cladding is -----then the core.
19. The number of atoms per unit volume that occupy a given energy level is called ----- of that energy level.
20. An ideal Op amp has -----input impedance

III. **True or false:**

21. Gauss law can be applied for all problems.
22. Electric field is non-conservative.



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**TIME : 2 ½ HOURS** **MAX. MARKS : 70**

**SECTION B**

**ANSWER ANY FIVE QUESTIONS: (5 × 6 = 30)**

1. Obtain the relation for potential at a point due to electric field.
2. Derive the expression for capacitance of a parallel plate capacitor with dielectric.
3. Give some application of hologram.
4. Explain summing and difference circuit using op-amp.
5. Explain the construction of AND and OR gate using diodes.
6. If  $q$  and  $4q$  are placed apart by 1 m. determine the point between them where the electric field is zero.
7. Convert a)  $(36)_{10}$  to  $( )_{16}$     b)  $(22)_{10}$  to  $( )_8$     c)  $(12)_{10}$  to  $( )_2$

**SECTION – C**

**ANSWER ANY TWO QUESTIONS: (2 × 20 = 40)**

8. Determine the field due to a spherical and cylindrical charge, distribution.
9. Explain the working of Ammonia MASER.
10. Explain integral, differential, inverting and non inverting amplifier.
11. Explain the working of CO<sub>2</sub> LASER.

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