STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2011-12 & thereafter)
SUBJECT CODE : 11PH/AC/PC43

B.Sc. DEGREE EXAMINATION APRIL 2016
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:

1. A charged particle moves through a magnetic field directed perpendicular to its direction of motion. Which of the following quantities of the particle will not change?

   a) Momentum b) speed c) velocity d) acceleration

2. An electron and a proton enter a magnetic field with equal velocities which one of them experience more force?

   a) Electron b) proton c) both d) cannot be predicted

3. The Susceptibility of the diamagnetic substance is:

   a) Very large b) positive and small c) zero d) negative

4. A conductor of length 2m carrying a current of 1A is placed in a magnetic field of 0.5 tesla then the force experienced by the conductor is:

   a) 1N b) 0.5N c) 2N d) 3N

5. On a moving charge of 20C by 2cm, 2J of work is done then the potential difference between the points is:

   a) 0.1v b) 8v c) 2v d) 0.5v

6. If the electric flux entering and leaving an enclosed surface respectively is ϕ_1 and ϕ_2 the electric charge inside the surface will be:

   a) $(\phi_1 + \phi_2)\epsilon_0$ b) $(\phi_1 - \phi_2)\epsilon_0$ c) zero d) ϕ_2 / ϵ_0

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7. Carbon di oxide LASER operates in the region of:

a) IR b) UV c) visible d) microwave

8. Atoms excited to meta stable state remains in the state for:

a) 10^{-6} to 10^{-3}s b) 10^{6} to 10^{-3}s c) 10^{-15} to 10^{-10}s d) 1s

9. For GRIN fibres the refractive index of which of the following is constant:

a) core b) cladding c) both d) none of the above

10. $(1010)_2/(100)_2$ is:

a) $(10.1)_2$ b) $(101)_2$ c) $(010)_2$ d) $(1.01)_2$

11. If A_d and A_c are differential gain and common Mode gain then CMRR is:

a) $A_c.A_d$ b) A_d/A_c c) A_c/A_d d) $(A_c/A_d)^{1/2}$

12. The binary equivalent of $(0.8125)_{10}$ is:

a) $(0.1101)_2$ b) $(0.1010)_2$ c) $(0.1111)_2$ d) $(0.0010)_2$

13. $AB + BA$ equal to:

a) $AB + AB$ b) AB c) A+AB d) $\overline{\overline{AB} + AB}$

14. Let a parallel capacities have a capacitance 4μF. If a dielectric of value 2 is filled between the plates the capacitance of the capacitor becomes:

a) 1μF b) 2μF c) 16μF d) 8μF

15. An ideal op-amp has:

a) Infinite gain b) infinite input impedance
c) large band width d) all the above

II. Fill in the blanks:

16. The electric field inside a spherical shell is _____.

17. If the distance between parallel plate capacitior is reduced by half then the capacitance of the capacitior is _____.
18. In the recording of hologram both amplitude and _____ of the light are recorded.
19. Fibre optics is based on the principle of _____.
20. For an ideal op-amp CMRR is _____.

III. State whether true or false:

21. The current sensitivity of galvanometer is directly proportional to torsional constant.
22. An op-amp is a linear amplifier.
23. The electric field, polarization and displacement vectors are related by $D = \epsilon_0 E + P$.
24. A+BC = (A+B)(A+C).
25. In fibre optics the refractive index of cladding is lower than that of core.

IV. Answer briefly:

26. Give the relation between Electric potential and field strength.

27. Write any two Maxwell's electromagnetic equation.

28. What is population inversion?

29. Give an application of hologram.

30. Draw the circuit of non-inverting amplifier.

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SECTION B

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

1. Explain working of Ammonia MASER.
2. Explain construction of AND, OR, NOT gates using diodes and transistors.
3. A parallel plate capacitor of area 10 sq.m. with relative. Permitivitty 5 is charged to the potential of 100 volts. Calculate the energy stored in it if the distance between the plates is 1mm.
4. The atomic number of gold is 79 and the charge of proton is $1.6x10^{-19}$c. Calculate the electric potential at the surfaces of the nucleus of the gold atom. The radius of the nucleus is $6.6x10^{-13}$m.
5. An α-partide and proton are allowed to pass through a uniform magnetic field perpendicular to their motion with the same kinetic energy. What is the ratio of their radie?
6. Equal point charges of 10^{-7}c each, are placed at the four corners of a square of side 0.1m in this. The magnitude of electric intensity at the point of intersection of the diagonals of the square is how much?
7. The distance between the plates of a parallel plate condenser is 0.02m. A rectangular slab of thickness 0.01m and dielectric constant 5 is placed between them and the distance between the plates is increased in such a way that the condenser is unaltered. What is the new distance?

SECTION – C

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

8. Apply Gauss law to find field due to spherical and cylindrical charge distribution.
9. Explain the working of CO_2 laser.
10. Explain the principle and preparation of holograms.
11. Explain difference, integral and differential amplifier.