

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 2014
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:

- Electric field due to a point charge
 - is inversely proportional to the distance
 - is inversely proportional to the square of the distance
 - is inversely proportional to the square root of the distance
 - it does not change with the distance
- The dimensions of potential are same as that of
 - work
 - electric field / unit charge
 - work / unit charge
 - force / unit charge
- The effect of dielectric is to
 - increase the capacitance
 - decrease the capacitance
 - reduce the working voltage
 - increase the distance between the plates
- The unit for magnetic field is
 - Weber
 - Weber/m²
 - Weber⁻¹
 - Weber.m²
- When a substance is placed in magnetic field its ability to be magnetized depend upon its
 - permeability
 - susceptibility
 - magnetic intensity
 - none of the above
- The direction of motion of a conductor in a magnetic field is given by
 - Fleming's rule
 - Maxwell's rule
 - Lenz's law
 - Kirchhoff's law
- Holograph carries information of
 - amplitude
 - phase
 - both (a) and (b)
 - none of the above

8. In optical fibre the Refractive Index of core is ----- than the Refractive Index of cladding.
 a) slightly higher b) higher c) lower d) none of the above
9. In the case of LASER, to have population Inversion
 a) $N_2 > N_1$ b) $N_2 < N_1$ c) $N_2 = N_1$ d) both (a) and (c)
10. The binary number 10101 is equivalent to decimal number
 a) 19 b) 12 c) 27 d) 21
11. Operational Amplifier is a
 a) positive feedback amplifier b) direct coupled negative feedback amplifier
 c) push-pull amplifier d) both (a) and (c)
12. The Inverter is
 a) NOT gate b) OR gate c) AND gate d) none of the above
13. Hysteresis loss/unit volume is equal to
 a) area enclosed by $\vec{B} - \vec{H}$ curve b) 4π times area enclosed by $\vec{B} - \vec{H}$ curve
 c) $\frac{1}{4\pi}$ times area enclosed by $\vec{B} - \vec{H}$ curve d) none of the above
14. The only function of NOT gate is
 a) stop a signal b) invert input signal
 c) act as a universal gate d) none of the above
15. An example of a conservation field is
 a) the electrostatic field b) the magnetic field c) any field d) both (a) and (b)

II. Fill in the blanks:

16. For a galvanometer the current which will produce unit reflection on a scale at a specific distance is known as _____.
17. The process of _____ is called Laser action.
18. Gain A_v of the Inverting Op. amp is _____.
19. The Maxwell's Electromagnetic waves are purely _____ in nature.
20. In Boolean algebra, the bar sign(-) indicates _____.

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SECTION B

ANSWER ANY FIVE QUESTIONS:

(5 × 6 = 30)

1. A capacitor is made up of two plates separated by a sheet of insulating material 3mm thick and of relative permittivity 4. The distance between the plates is increased to allow the insertion of a second sheet 5mm thick and relative permittivity ϵ_r . If the capacitance of the capacitors so formed is one half of the original capacitance, find the value of ϵ_r .
2. Explain how a hologram is prepared and viewed.
3. Perform the following multiplication and division in Binary Number System.
a) 13×11 b) Divide 10 by 4
4. Convert $(1076875)_{10}$ to its equivalent binary number.
5. Determine the CMRR of an Op amp for $V_{i1} = 0.5 \text{ mV}$, $V_{i2} = 0.5 \text{ mV}$, $A_c = 12$ and $V_0 = 8V$.
6. State and prove De Morgan's Theorems.
7. Find the potential at the centre of a 1.0 m square having charges $q, -2q, 3q$ and $2q$ at its corners. ($q = 1.0 \times 10^{-8}C$).

SECTION – C

ANSWER ANY TWO QUESTIONS:

(2 × 20 = 40)

8. a) Give the construction of moving coil Ballistic Galvanometer.
b) Derive an expression for the quantity of charge flowing through it and throw obtained.
9. Describe the construction and working of CO_2 LASER.
10. Explain with necessary diagrams and Truth Tables OR, AND gates using diodes.
11. Describe the Magnetometer method of tracing the hysteresis curve for a sample of iron in the form of a long thin rod.

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