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 2015
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. The force between two point charges is directly proportional to the product of the charges, and inversely proportional to the square of the distance between them is
    (a) Gauss law   (b) Coulomb's law   (c) Newton's law   (d) Ampere's law

2. Electric flux $d\varphi$ is equal to
    (a) E dS cos ө   (b) S dE cos ө   (c) E cos ө   (d) dS cos ө

3. If C is the capacitance of a capacitor with vacuum and C_1 is the capacitance with dielectric, then the ratio C_1 / C is called
    (a) permittivity   (b) permeability   (c) relative permittivity   (d) relative permeability

4. The ratio of the magnetization M to the magnetic field intensity H is called
    (a) Flux   (b) Magnetic charge   (c) Electric charge   (d) Magnetic susceptibility

5. The moving coil galvanometer is based on the concept of
    (a) Right handed screw rule   (b) Left handed screw rule
    (c) Electric charge   (d) Magnetic charge

6. MASER is related to
    (a) Radio wave   (b) Sound wave   (c) Microwave   (d) Ultrasonic wave

7. In the equation $E_2 – E_1 = h\upsilon$, υ represents
    (a) Planks constant   (b) frequency of absorbed radiation
    (c) frequency of emitted radiation   (d) a constant

8. The process of creating population inversion is called
    (a) Stimulation   (b) emission   (c) absorption   (d) pumping action

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9. The principle used in fiber optic cables is
   (a) refraction   (b) total internal reflection   (c) diffraction   (d) interference

10. In fiber optic cables light energy is transmitted as
    (a) proton   (b) photon   (c) electron   (d) neutron

11. Operational amplifier is a
    (a) Positive feedback amplifier   (b) Direct coupled negative feedback amplifier
    (c) Power amplifier   (d) Non linear amplifier

12. The feedback path of an op amp integrator has
    (a) Transistor   (b) diode   (c) Resistor   (d) capacitor

13. $1110_2 + 1101_2$ is equal to
    (a) 11011_2 (b) 01011_2 (c) 11010_2 (d) 11111_2

14. The Boolean equation $Y = A + B$ is for
    (a) NOT gate   (b) AND gate   (c) OR gate   (d) NAND gate

15. In the following AND law. The incorrect one is
    (a) A. 0 = A   (b) A. 0 = 0   (c) A.1 = A   (d) A..A = A

II.   Fill in the blanks:

16. For a charge outside the closed surface, total flux is_____

17. The ballistic galvanometer is used to measure _____ charge

18. The number of atoms in higher energy state is greater than that in the lower energy
    state is called _____

19. Band width of op amp. Is _____

20. In Boolean algebra, $A + A =$ _____

III.   State whether true or false:

21. The unit for capacitance is ohm

22. Ampere's law of electromagnetic wave states that $\nabla \times B = \mu_o I$

23. LASER beam is a monochromatic.

24. Operational amplifiers are usually powered by dual power supply

25. AND gate is used for addition purpose.

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IV.   Answer briefly:

26. What is a capacitance?

27. Define magnetic flux.

28. What is MASER ?

29. Define CMRR.

30. What is a binary number?

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SECTION B

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

1. Find the numerical aperture and the acceptance angle, if the refractive index of core is 1.55, refractive index of cladding is 1.50 and the refractive index of the surround is 1.

2. A condenser charged to 2 volts is discharged through a ballistic galvanometer when the corrected throw is 9.6 cms and the current sensitivity is 2.2×10^{-8} amp / cm. and period 12 seconds . find the capacity of the condenser

3. Calculate the output voltage of an op amp. Summing $V_1 = 1v$, amplifier for $V_1 = 1v$, $V_2 = 2v$, $V_3 = 3v$, $R_1 = 500$ kΩ, $R_2 = R_3 = R_f = 1$MΩ

4. (a) Add $1110_2 + 1011_2$
   (b) Multiply $1011_2 \times 111_2$
   (c) convert the decimal number 19 into its equivalent binary number.

5. Using Boolean algebra simplify
   $(A+B)(B+C)(C+A) = BC+AB+AC$

6. Give the principle, classification and application of optical fibers.

7. With necessary circuit diagrams explain the function of op amp. as an Integrator and Differentiator.

SECTION – C

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

8. Obtain the equation for
   (a) Electric field due to a spherical charge distribution
   (b) Electric field due to cylindrical charge distribution.

9. Give the theory of moving coil ballistic galvanometer. Also explain how would you determine the figure of merit of it.

10. (a) Give the description and working of ammonia MASER.
    (b) Give the description and working of corbon dioxide LASER.

11. (a) Draw the inverting operational amplifier circuit and obtain the equation for its gain.
    (b) State and prove DeMorgan's theorem.

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