STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.

(For candidates admitted during the academic year 2004-05 & thereafter)

SUBJECT CODE : **PH/AC/GP42**

B.Sc. DEGREE EXAMINATION APRIL 2009
BRANCH IV – CHEMISTRY
FOURTH SEMESTER

REG. No._____

COURSE	:	**ALLIED – CORE**
PAPER	:	**GENERAL PHYSICS – 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 hollow metal ball carrying an electric charge produces no electric field at points
        a) outside the sphere   b) inside the sphere   c) on its surface

2.   The capacitance of a parallel plate capacitor increases from $5\mu F$ to $60\mu F$ when a dielectric is filled between the plates. The dielectric constant of the dielectric is
        a) 65   b) 55   c) 12

3.   The torque on a rectangular coil placed in a uniform magnetic field is large when
        a) the no. of turns is large
        b) the area of the coil is small
        c) no. of turns is small

4.   The flux associated with the coil varies at the rate of 1 Wb/minute then the induced emf is
        a) 1V   b) 1/60V   c) 60V

5.   Phosphor-bronze wire is used for suspension in a moving coil galvanometer because it has
        a) high conductivity
        b) high resistivity
        c) small couple / unit twist

6.   The Boolean expression $\overline{A}\ \overline{B}\ \overline{C}$ can be simplified as
        a) AB + $\overline{C}$ b) $\overline{A}\ \overline{B}\ \overline{C}$ c) $\overline{A} + \overline{B} + \overline{C}$

7.   The forbidden energy gap for Ge semiconductor is of the order of
        a) 1.1 eV   b) 0.7 eV   c) 0.3 eV

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8.   The reverse saturation current in a PN junction diode is only due to
       a) majority carriers   b) minority carriers   c) donor ions

9.   The hysteresis loss in a ferromagnetic material is
       a) directly proportional to the area of B-H loop
       b) inversely proportional to the area of B-H loop
       c) no relationship

10.   The magnitude of the force acting on a charge of 2 x 10^{-10} C placed in a uniform electric field of 10 V/m is
       a) $2 \times 1\bar{0}^{-9} N$ b) $2 \times 1\bar{0}^{-11} N$ c) $4 \times 1\bar{0}^{-10} N$

11.   Electric P.E. of two point charges is
       a) $PE \cos\theta$ b) $PE \sin\theta$ c) $QQ'/4\Pi\epsilon_0 r^2$

12.   In an EM wave the phase difference between electric field and magnetic field is
       a) $\Pi/2$ b) $\Pi/4$ c) zero

13.   Improper biasing of a transistor circuit produces
       a) heavily loading of emitter current
       b) distortion in the output signal
       c) faulty location of load line

14.   For population inversion, the number of electrons in the states is given by
       a) $N_1 > N_2$ b) $N_1 < N_2$ c) $N_1 = N_2$

15.   Of the following, the ferromagnetic substance is
       a) Na   b) K   c) Fe

II   FILL IN THE BLANKS:

16.   The process by which the atoms in ground state is taken to excited state is known as _____.

17.   According to the laws of Boolean algebra (A + AB) is equal to _____.

18.   The capacitance of the dielectric filled capacitor is _____.

19.   Moving coil galvanometer is a device used for measuring _____ in a circuit.

20.   The magnitude of susceptibility _____.

III   STATE WHETHER TRUE OR FALSE:

21.   Lines of force start from positive charge and terminates at negative charge.

22.   The capacitance of capacitor is inversely proportional to the area of the plate.

23. A good design of an amplifier circuit must posses high input impedance, low output impedance and high current gain.

24. The efficiency of half wave rectifier is approximately 81.2%.

25. A 3-dimensional image of an object cannot be formed by holography.

IV   ANSWER BRIEFLY:

26. Define : equipotential surface.

27. Define : Lorentz force.

28. How does laser light differ from ordinary light.

29. What is zener breakdown.

30. Define : ripple factor.

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

SECTION – B

ANSWER ANY FIVE QUESTIONS: (5 x 6 = 30)

1.   Obtain an expression for electric potential due to a point charge.

2.   The plate of a parallel plate capacitor have an area of 90 cm^2 each and are
      separated by 2.5mm. The capacitor is charged by connecting it to a 400V supply,
      How much electrostatic energy is stored by the capacitor.

3.   A, B, C are three parallel plate conductors of each of length 10m, carrying current
      as shown in fig. Find the magnitude and direction of the resultant Force on the
      conductor B.
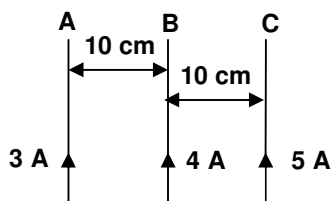
4.   Give the principle of holography. How is a hologram prepared.

5.   Explain the working Ammonia maser.

6.   Explain in detail how a zener diode can be used as a voltage regulator.

7.   a) Convert : (i) 84_{10} into binary number   (ii) $(1010.011)_2$ into decimal number
      b) explain binary addition with example.

SECTION – C

ANSWER ANY TWO QUESTIONS: (2 x 20 = 40)

8.   a) State and prove Gauss' law in electrostatics.

      b) Apply Gauss'law to determine the field due to (i) spherical charge distribution
          (ii) cylindrical charge distribution.

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9. a) Explain the principle of the moving coil galvanometer

    b) With relevant theory, describe how the charge sensitivity of a Ballistic galvanometer may be experimentally determined.

10. a) Describe the valence band, conduction band and forbidden energy gap with the help of energy level diagram.

    b) Explain the working of He-Ne laser.

11. a) State and prove Demorgan's theorem.

    b) Describe with circuit diagram, the construction of basic logic gates using diodes and transistors and explain their truth table.

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