SUBJECT CODE : PH/AC/PC23

B.Sc. DEGREE EXAMINATION APRIL 2011
BRANCH IV – CHEMISTRY
SECOND 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 effect of dielectric is to
   a) increase the capacitance
   b) decrease the capacitance
   c) increase the distance between the plates

2. The space around a charge is called as
   a) electric potential   b) electric field   c) magnetic field

3. Electric potential is directly proportional to

   a) $\dfrac{q}{r}$ b) $\dfrac{q}{r^2}$ c) $\dfrac{q^2}{r}$

4. Lorentz force is $\vec{F}$ =
   a) $q_0 \vec{v} \times \vec{B}$ b) $q_0 \vec{E} \times \vec{B}$ c) $q_0 \vec{v} . \vec{B}$

5. _____ is a device for storing charges.
   a) resistor   b) coil   c) capacitor

6. The direction of motion of a conductor in a magnetic field is given by
   a) Fleming's rule   b) Lenz's law   c) Maxwell's rule

7. Hysteresis gives
   a) loss of energy per unit cycle b) gain of energy   c) neither loss nor gain

8. The charge of an electron is
   a) negative   b) positive   c) neutral

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9. Population inversion means
    a) number of atoms equal in all energy states.
    b) number of atoms in higher energy state is smaller than the number of atoms in lower energy state.
    c) More atoms in the higher energy state than the lower energy state.

10. Holography is a recording of _____ pattern.
    a) interference   b) diffraction   c) polarization

11. _____ works on the principle of total internal reflection.
    a) laser   b) optical fibre   c) hologram

12. An operational amplifier is a
    a) Non linear IC   b) Linear IC   c) Digital IC

13. Intensity of laser beam is
    a) low   b) zero   c) high

14. In binary addition 1+1 =
    a) 1   b) 11   c) 10

15. If $1.\overline{A} = 0$, then A =
    a) 0   b) 1   c) $\overline{1}$

II   FILL IN THE BLANKS:

16. Unit of Capacitance is _____.

17. $\vec{\nabla}.\vec{B} =$ _____.

18. Electric flux is a _____ quantity.

19. The emission of a photon by an atom without any external agency is called

    _____ emission.

20. In Boolean algebra × sign indicates _____ operation.

III   STATE WHETHER TRUE OR FALSE:

21. Unit of electric field is newton.

22. The retentivity is greater for hard materials than for soft materials.

23. An ideal operational amplifier has infinite gain.

24. The base of the binary system is 2.

25. In a OR gate 1+0 = 0.

VI   ANSWER THE FOLLOWING:

26. State Coulomb's inverse square law.

27. Define magnetic field.

28. Expand LASER.

29. Define CMRR.

30. Give the truth table for AND gate.

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COURSE	:	ALLIED – CORE
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TIME	:	2 HOURS

MAX. MARKS : 70

SECTION – B

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

1. Find the capacitance of a parallel plate capacitor without dielectric.
2. Explain the hysteresis loop of a magnet.
3. Find the magnetic force on a conductor of length 0.5m long carrying a current of 5A is placed perpendicular to a magnetic field of induction 2×10^{-3} T.
4. Classify different types of optical fibre.
5. Calculate the output voltage of an op amp summing amplifier for $V_1 = 1$ V, $V_2 = 2$ V, $V_3 = 3$ V, $R_1 = 500$ KΩ, $R_2 = 1000$ KΩ, $R_3 = 1000$ KΩ and $R_f = 1000$ KΩ.
6. Convert $(25.625)_{10}$ into binary number.
7. Find the Boolean expression for the output of figure and evaluate it when
   i) A=0, B=1, C=1;   ii) A=1, B=1, C=0.

   A
   B   Y
   C

        figure

SECTION – C

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

8. State Gauss law. Use Gauss law to calculate the field due to a spherical charge distribution.
9. Describe the construction and working of a moving coil ballistic galvanometer and deduce an expression for the charge flowing through it.
10. Describe the construction and working of CO_2 laser.
11. a) Explain the construction of OR, AND and NOT gate, using diodes and transistor.
    b) State and prove De Morgan's theorems.   (13+7)

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