

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2008-09)

SUBJECT CODE : **PH/AC/PM23**

B.Sc. DEGREE EXAMINATION APRIL 2009
BRANCH I – MATHEMATICS
SECOND SEMESTER

REG. No. _____

COURSE : **ALLIED – CORE**
PAPER : **PHYSICS FOR MATHEMATICS – 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:

- Glass rod rubbed with silk gains,
a) positive charge b) negative charge c) no charge
- The electric flux through a closed surface is equal to 'n' times the net charge enclosed by the surface where 'n' is given by,
a) ϵ_0 b) $1/\epsilon_0$ c) $1/\Pi$
- The amount of work done in charging the conductor is stored in the form of,
a) mechanical energy b) kinetic energy c) potential energy
- The magnetic induction produced by Earth on its surface is about,
a) 3.8×10^{-10} Tesla b) 0.36×10^{-4} Tesla c) 0.38×10^{-6} Tesla
- The Maxwell's Equation given by $\nabla \times \mathbf{B}$ states,
a) Gauss's Law b) Faraday's Law c) Ampere's Law
- The aberration produced by variation of μ with λ is called,
a) Spherical aberration b) comatic aberration c) chromatic aberration
- In Newton's Rings, with increase in the order of the fringes the width of the fringes,
a) decreases
b) increases
c) no change – remains constant
- The center of the Newton's Rings in reflected light always appears,
a) bright b) dark c) colored

9. The principle of bending of light waves around obstacles is best explained by,
a) interference b) diffraction c) polarization
10. The double refraction is absent when light enters the crystal,
a) along the optic axis
b) perpendicular to optic axis
c) along the plane of polarization
11. In an Operational Amplifier the voltage at the two input terminals is,
a) zero b) equal c) different
12. The output of an integrator circuit using Opamp is taken across,
a) the feed back resistor b) feed back capacitor c) input capacitor
13. The decimal equivalent of an HEX number FF H is given by,
a) 155 b) 115 c) 255
14. The sum of two binary numbers 1100 and 0100 is given by,
a) 01100 b) 10100 c) 10000
15. What is $A + A$, in Boolean Algebra?
a) 1 b) A c) 2A

II FILL IN THE BLANKS:

16. Charge is a _____ quantity.
17. The unit of magnetic field (B) is _____.
18. In a Nicol prism only the _____ ray is transmitted.
19. The magnification is the ratio of the focal length of the objective and that of _____.
20. An ideal Opamp has _____ input impedance.

III STATE WHETHER TRUE OR FALSE:

21. The force on a moving charge in an electromagnetic field is called Lorentz force.
22. The unit of current density is Coulomb per m^2 .
23. Polar molecules experience torque when placed in an electric field.
24. The extraordinary ray obeys laws of refraction and its refractive index is constant.
25. The Binary equivalent of the Decimal number 29 is 101001.

IV ANSWER THE FOLLOWING BRIEFLY:

26. Define Fleming's Left hand rule.

27. Write down the four Maxwell's equations in free space.

28. What is aplanatic lens?

29. What is optical activity?

30. Define CMRR of a differential amplifier?

XXXXXXXXXX

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2008-09)

SUBJECT CODE : **PH/AC/PM23**

B.Sc. DEGREE EXAMINATION APRIL 2009
BRANCH I – MATHEMATICS
SECOND SEMESTER

COURSE : **ALLIED – CORE**
PAPER : **PHYSICS FOR MATHEMATICS – II**
TIME : **2 ½ HOURS** MAX. MARKS : 70

SECTION – B

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

1. Obtain an expression for the Coulomb's law of force between two charges.
2. Derive an expression for the capacity of a parallel plate condenser.
3. Explain how the refractive index of liquid can be determined by forming Newton's rings.
4. Explain the working of Nicol Prism as an Analyser.
5. Draw an amplifier circuit to give a voltage gain of 10 using Opamp used in
a) Inverting mode b) Non-inverting mode of operation.
6. State and prove DeMorgan's theorem. Give the necessary truth tables.
7. Perform the Addition, Subtraction and Multiplication in Binary number system for the following decimal operations.
a) $19 + 6$ b) $64 - 27$ c) 15×13

SECTION – C

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

8. Discuss the Physical significances of the Maxwell's equations.
9. Describe the construction of a ballistic galvanometer with a neat diagram. obtain the relation between current sensitivity and charge sensitivity of the galvanometer.
10. What is Spherical aberration? Explain the various methods of reducing it.
11. Draw the Ray diagram and describe the working of an Astronomical telescope. Show that the angular magnification is greater when the final image is formed at the near point.

XXXXXXXXXX